EUROPEAN
COMMISSION

Brussels, 18.5.2018
SWD(2018) 198 final

PART 6/6

COMMISSION STAFF WORKING DOCUMENT

Digital Economy and Society Index (DESI) 2018

DESI Report 2018

Telecoms chapter

Austria

Market developments

1. Competitive environment

The Austrian telecom market is showing increasing dynamics in 2017, as two mobile network operators are in the process of acquiring major fixed operators to develop more competitive bundled offers. These acquisitions inject further dynamics following the mobile merger in 2012 and the arrival of new MVNOs as a consequence of the merger remedy, as well as the acquisition of the incumbent A1 Telekom Austria by America Móvil. Mobile services continue to play a prominent role in the Austrian telecommunications market both for voice and broadband services. While the mobile operators are in the process of entering the fixed market, the incumbent A1 Telekom Austria maintains a strong position in all market segments.

In September 2017, the second mobile operator Three (Hutchison Three Austria) took over the fixed network operator Tele2. Tele2 was the largest unbundling operator and one of the largest fixed network operators in Austria. While Tele2 is predominantly active in the fixed segment (but also active as MVNO since 2015) and has a significant share in the fixed business market, Three has not yet provided fixed services on the retail market before the takeover.

Since December 2017, T-Mobile Austria is in the process of acquiring UPC Austria. This acquisition would enable T-Mobile to complement its recently agreed VULA product with its own physical component to match the bundle offers of the incumbent.

a. Fixed market

Coverage	AT-2016	AT-2017	EU-2017
Fixed broadband coverage (total)	99%	99%	97%
Fixed broadband coverage (rural)	94%	94%	92%
Fixed NGA coverage (total)	89%	90%	80%
Fixed NGA coverage (rural)	41%	45%	47%
Ultrafast coverage (total)	no data	66%	58%
4G coverage (average of operators)	89%	97%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

In 2017, 90% of all households were covered by a high-speed broadband next generation access (NGA) network, which is above the EU average of 80%. The rural coverage of high-speed fixed broadband grew from 41% in 2016 to 45% in 2017, but the growth is below the level and growth pace of the EU average (47%). 4G coverage (97%) and ultrafast coverage (66%) is above EU average (91% and 58% respectively).
Concerning NGA roll-out plans, A1 remains the key player in rolling out high-speed networks, but is also the major beneficiary of the Austrian broadband subsidy scheme. A1 continues to deploy mainly FTTC technologies relying on VDSL, G.fast and vectoring, while FTTH are deployed mainly in newly built areas. All major cable networks have upgraded to DOCSIS 3.0 and offer bandwidths up to 300 Mbit/s. FTTC/B/H investments by alternative

operators continued to remain limited in 2017, but further momentum is expected in the coming years when state aid subsidised projects will be realised.

Fixed broadband market shares	AT-2016	AT-2017	EU-2017
Incumbent market share in fixed broadband	58.1%	58.0%	40.3%
Technology market shares			
DSL	65.4%	64.2%	64.2%
Cable	32.0%	32.9%	19.4%
FTTH/B	1.3%	1.8%	12.9%
Other	1.2%	1.2%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

A1's total market share in fixed broadband remained essentially unchanged at 58%, which is still considerably higher than the EU average (40.3%), while cable subscriptions could only gain minimal ground (32.9% compared to 32.0%). In the cable market, the largest cable operator UPC was active in consolidating smaller cable operators in the past years, but is now in the process of being acquired by T-Mobile Austria. In certain regions, telecom operators are also facing increasing competition mainly from regional electricity or utility providers as well as from communities that are active in the broadband market and are beneficiaries of the National Broadband Scheme. These state aid funded fibre networks are often operated by wholesale-only operators. As their coverage and effects on the market were still geographically limited, their domestic market shares do not always reflect the actual positions at local level. There are a few wholesale only operators in Austria with still very low coverage and low and scattered market impact, as they are usually part of or a result of state aid funded local projects scattered around in Austria. Their coverage is likely to increase with the realisation of further state aid projects.

New entrants' DSL subscriptions by type of access (VDSL excluded)	AT-2016	AT-2017	EU-2017
Own network	-	-	0.5%
Full LLU	75.2%	72.0%	72.8%
Shared Access	0.0%	0.0%	4.1%
Bitstream	21.7%	24.6%	14.7%
Resale	3.1%	3.5%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Unbundling operators are less likely to invest in FTTC/B mainly due to low economies of scale. Operators in underserved areas that invest in fibre also rely on public funds (state aid scheme). Since May 2017, a revised virtual unbundling (VULA) offer is available to alternative operators that is also provided with regional handover points (in addition to local handover at the MDF-level).

A1 is obliged to offer VULA with local and regional handover on its copper and NGA-network. The prices (gaps between retail and wholesale prices of flagship products) have been set based on an economic replicability test, and wholesale and retail prices are differentiated by bandwidth.

The take-up of VULA has proved to be low so far (~17 000 lines in mid-2017). Nevertheless, in July 2017, the prices were reduced and A1 concluded a contract with the mobile operator T-Mobile Austria on VULA services. These terms include several other improvements and they are now part of the reference offer.

With regard to the technologies used, mobile broadband is considered as substitute in the residential segment, as bandwidths in the 4G network can be comparable or higher than those in the fixed network and mobile network operators are marketing flat rate mobile tariffs for stationary use at home with wireless modems. Accordingly, mobile broadband regained market shares in 2016 and 2017 after a few years of decline, and mobile broadband is considered an important driver of competition in the residential segment.

Fixed broadband prices	AT-2016	AT-2017	EU-2017
Fixed broadband price index [values between 0-100]	91	90	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile market	AT-2016	AT-2017	EU-2017
Market share of market leader	39%	38%	35%
Market share of second largest operator	29%	34%	28%
Number of MNOs	3	3	-
Number of MVNOs	14	16	-
Market share of MVNO (SIM cards)	5%	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Mobile services constitute the key driver of competition in the Austrian telecommunication market more than ever before. In 2017, the two challenger operators were actively engaged in acquisitions of fixed operators, and one of them concluded a VULA agreement with the incumbent in 2017. There is a clear evidence of mobile substitution in (both voice and broadband markets); and this has also been recognised in market analyses, (notably in residential and non-residential voice minutes, voice access for residential users as well as residential (fixed and mobile) broadband markets). Concerning OTT substitution, in June 2017, RTR conducted a survey concluding that social media platforms are replacing now voice minutes to a larger extent than OTT Voice over Internet services.

As a result of merger remedies (a requirement attached to the approval of the 2012 merger to accept up to 16 MVNOs), there is a flourishing MVNO segment in Austria. In late 2014, UPC entered the market (using the upfront MVNO conditions), and since then the regulated MVNO offer produced competitive wholesale counteroffers from the other two Austrian mobile network operators on a commercial basis. Among these new MVNOs, Ventocom acts as a mobile virtual enabler that provides technical platforms for branded products (mainly Hofer Telekom, but also other brands) using T-Mobile Austria's commercial offer and network.

Mobile broadband prices [EUR/PPP]	AT-2016	AT-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€14	€11	€24
Least expensive offer for tablet and laptop (5 GB basket)	€9	€10	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Austria showed a further increase in 4G coverage in 2017 (to 97% from 89%) that continues to outpace the EU average (of 91%). All three MNOs have deployed a nationwide LTE network and mobile broadband prices are clearly below the EU average (in the case of the handset offer, less than half of the EU average). In 2017, there have been no spectrum trading, spectrum sharing, or licensed shared access agreements in Austria.

Regulatory developments

2. Supporting measures for deployment and investments in high speed networks

a. Spectrum

Austria assigned 69.43% of the harmonised spectrum for wireless broadband, which is in line with the EU average of 69%. There were no spectrum awards in 2017 for WBB and no rights of use for radio spectrum have been amended or renewed. Since the publication of the revised frequency utilisation ordinance in December 2016, which also implemented the 2013 Commission Implementing Decision[1] on harmonisation of the radio spectrum for use by short-range devices, no specific issues with the implementation of Commission technical harmonisation Decisions are being reported. RTR has conducted a consultation on future spectrum awards in March 2016 (together with the Ministry of Transport Innovation and Technology (BMVIT)). In December 2016, it has published a Spectrum Release Plan for the award of the bands 700 MHz, 1.5 GHz, 2 GHz, 2.3 GHz and 3.4-3.8 GHz.

The development of the Austrian 5G strategy was launched already in February 2017, with the objective to commence the roll-out of 5G networks by 2018, leading to coverage of all regional capitals by 2020. This strategy was ultimately not adopted by the federal government due to elections. Nevertheless, 5G remained in the focus of the Chapter on Innovation and Digital of the New Government's Programme 2017-2022, but the concrete measures are not yet outlined. In parallel, the NRA already launched a series of public consultations in 2017 and early 2018[2], with a view to conduct a spectrum award procedure in 2018 for 5G usage in the 3.4-3.8 MHz band.

b. National and EU investments in broadband

The key challenge for broadband roll-out in Austria is the country's mountainous topography, which greatly increases the cost of deployment. 'Breitbandstrategie 2020', Austria's National Broadband Plan (NBP), is generally in line with the Digital Agenda for Europe targets and supersedes them in some aspects. The Austrian government's aim is to achieve 70% ultra-fast broadband coverage (defined as 100 Mbps downstream) by 2018, coupled with 99% ultra-fast broadband coverage for all Austrian households by 2020. In addition, there are regional broadband plans that supplement the NBP. The previous government programme 'Digital Roadmap Austria', published in January 2017, increased Austria's national targets of availability and take-up of high-speed broadband beyond nation-wide coverage of 100Mbps by 2020 to provide high-speed connections for all schools and SMEs and 75% of the citizens till 2020. It also vested the government with the task to develop a comprehensive 5G roll-out strategy and recognises the importance of 5G for the digital economy. The new government programme (2017-2022) sets out new objectives, such as the provision of Gigabit connections nationwide by 2025, and establishing Austria as a 5G pilot country by 2021, and having nation-wide mobile 5G coverage by 2025. Detailed deliverables include the increasing consideration of the Gigabit network roll out, the possibility of subsidisation of connections of

[1] Commission Implementing Decision 2013/752/EU of 11 December 2013, amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices, and repealing Decision 2005/928/EC, OJ L 334, 13.12.2013, p. 17.

[2] In February 2018, RTR launched a consultation on conditions for the award of the 3410-3800 MHz frequency band.

up to 100Mbit, and a commitment to invest future spectrum revenues exclusively in the roll-out of digital infrastructure.

The infrastructure funding programmes in the master plan of the current subsidy scheme's four programmes cover four main areas: Access, Backhaul, Ducts and Connect. The Area programme (Access) aims at the expansion of the geographical coverage of high-performance broadband networks, and the Backhaul programme is focused on connection of existing stand-alone solutions to efficient data highways. The Ducting programme covers the laying of ducting during construction work for non-discriminatory use for broadband networks, while the Connect programme aims at significantly reducing the costs of establishing fibre optic connections for SMEs and schools.. The funds mainly derive from the proceeds of the 2012 spectrum auction often cited as "the broadband billion". The four branches are organised into several calls, for Ducts, the 4th call is currently being organised. By the end of 2017, 145 recipients have received funding commitments for 520 projects totalling 330 million Euros. Almost 680.000 residences in over 1.100 municipalities will be supplied with ultra-fast broadband internet in the near future. This is about 36 percent of all previously underserved residences (< 30 Mbit/s).

Despite the fact that the programmes are advancing well, some stakeholders expressed concerns over the excessively strong position of the incumbent among the successful bidders of the calls, bearing a risk of counterbalancing regulatory efforts to induce competition.

c. Implementation of the Broadband Cost Reduction Directive

The Commission opened infringement proceedings against Austria for failure to notify transposition measures for the Directive[3]. By the end of 2016, Austria adopted the federal laws to transpose the Directive, including the amendment of the relevant telecoms acts, such as the 2003 Telecommunications Act, the CommAustria Act, the Federal Radio and Telecommunications (Broadcasting Devices) Act, and the Postal Market Act. Nevertheless, the complete transposition, including all the regional laws transposing the requirements of Article 8 on in-building infrastructure, was only adopted and notified in October 2017[4]. According to the laws transposing the Directive, RTR acts both as Single Information Point (SIP) and Dispute Settlement Body (DSB).

3. Regulatory function

The Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR) acts as the operational arm for both the Austrian Communications Authority (KommAustria), responsible for the regulation of the broadcasting sector, and for the Telecommunications Control Commission (TKK), which regulates the telecommunications markets. The TKK members and their alternates have been reappointed in November 2017 for a five year term. Both KommAustria, a permanent body and the TKK have a constitutional guarantee of independence. The current head of the NRA is the Managing Director of RTR Telecoms, he commenced his term in February 2014, and holds the chair of BEREC in 2018.

The markets included in the 2014 Commission Recommendation on relevant product and service markets (2014/710/EU) are all subject to at least partial regulation in Austria, along

[3] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[4] The corresponding infringement procedure was closed in January 2018.

with one legacy market from the 2007 recommendation (access to PSTN for residential and non-residential customers) and one from the 2003 recommendation (Broadcasting Transmission).

In 2017, RTR notified Market analysis decisions concerning the wholesale local and central access markets, that have been adopted in July 2017, while the market analysis decisions on fixed call origination (leading to deregulation) and retail access to the PSTN (partly deregulated) have been adopted in May 2017. In October 2017, KommAustria notified a draft decision with regard to wholesale markets for broadcasting transmission services, which were partially deregulated. The broadcasting regulator proposed to continue regulating the market for analogue terrestrial radio broadcasting, given that the market situation is largely unchanged since the regulator last assessed the market in 2013. The Commission services expressed concerns that KommAustria excluded radio transmission services of the main operator (ORS) to its parent company, the national broadcaster (ORF). In the Commission's view, this might lead to a better treatment of ORF by ORS compared to its competitors and thus to discrimination. It was also held that as the majority owner of ORF, the latter could influence ORS's decisions concerning infrastructure developments. Also, as the majority owner of its supplier, ORF can influence the ORS's decisions concerning infrastructure developments. Furthermore, the Commission noted, that ORF could also be subject to different price conditions than competing radio broadcasters. In the light of the above, The Commission opened a Phase II investigation under Articles 7 and 7a of the Framework Directive. The investigation was concluded by a Veto decision. KommAustria ultimately withdrew the draft measure which lead to a Veto Decision by the Commission. Currently, KommAustria is conducting a proceeding with a view to amend the vetoed decision in the light of the Commission's concern.

Since the review of rules governing numbering management in October 2017, personal services can be offered under mobile numbers and mobile numbers can be used for M2M-services. These numbers now have to be 14 digits long (including the country code) in order to increase the amount of available numbering resources.

4. Consumer Matters

According to data provided by the NRA, nearly 2 000 dispute resolution procedures were initiated with the RTR's conciliation body (which does not represent a major departure from the last two years' figures). Contractual issues, such as notice periods and third-party billing, remained prominent.

a. Roaming

Following the introduction of Roam Like at Home[5] (RLAH) in June 2017, Austrian subscribers consumed 1.6 times more calls made and 4.9 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[6]. Concerning sanctions, if the Austrian regulator finds that a breach of the Regulation has occurred, it can initiate a proceeding, and has the power to require the immediate cessation of such a breach in

[5] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[6] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

accordance with Article 16(5) and (6) of the Regulation. In Austria, the Telecommunications Control Commission (TKK) is vested with the powers defined by these provisions. Operators that infringe the Regulation are subject to an administrative penalty of up to €8 000. In such cases, the NRA first warns the operators that it might initiate a proceeding if they fail to comply with the Regulation by a given deadline. According to the NRA, there have been a few cases where operators did not comply with the Roaming Regulation, but most of the cases could be solved before initiating a formal proceeding. In other cases TKK initiated a proceeding in line with the Roaming Regulation. Some of the proceedings could be closed without a formal decision if the operators concerned cease their infringements within the timeframe given by the TKK. The main issues were infringements against Art 6a Roaming Regulation, where roaming providers have charged additional surcharges for retail roaming services in addition to the domestic retail roaming prices.

MVNOs expressed concerns about roaming wholesale charges and their negative effects on their business models paired with a dramatic increase in roaming consumption. TKK granted a sustainability derogation in two cases, and refused it in one case.

b. Net Neutrality

Regarding net neutrality[7], the Austrian Telecommunications Act contains a general provision on penalties applicable *inter alia* to infringements of RTR ordinances and formal decisions based on law. The regulatory authority first issues a formal decision addressing the infringement of net neutrality provisions, and subsequently, if the undertaking does not follow the decision, a penalty of up to 58 000€ shall be applicable. If there is a repeated infringement, the minimum fine should be 10 000€.

In addition, if the regulatory authority establishes that an undertaking has gained economic advantage due to an unlawful act in violation of the respective regulation, the regulatory authority may apply to the Cartel Court to fix an amount to be absorbed. That amount shall depend on the extent of the economic advantage and may be set by the Cartel Court to be up to 10% of the undertaking's turnover of the preceding year.

Finally, a draft amendment of the Telecommunications Act, which enacts net-neutrality specific penalties, is pending at the level of the Parliament. The proposal, however, suffered delays given the elections.

In 2017, RTR launched a wide range of investigations, covering port blockings, the sole availability of private IP addresses, zero-rating offers, video on demand (VoD) as a specialized service, modification/re-routing of traffic and the cutting off of IP connections. In December 2017 TKK took two decisions with regard to net neutrality: TKK prohibited the use of certain traffic management measures in the data stream of end users (so-called "traffic shaping") in A1s product "Free Stream". Moreover TKK decided, that A1 is not allowed any more to prioritize video in their "A1 TV" product (not live IP-TV) in the case of data transmission via Internet access. A1 was granted a period of three years for this technical changeover. Furthermore, A1 was forbidden to disconnect its customers' IP connections every 24 hours (separation in the future only after 31 calendar days) and to demand additional

[7] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

payment for the receipt of a dynamic public IP address by its mobile subscribers. In this respect, already paid fees have to be refunded.

c. 112

The rules governing caller location accuracy and reliability criteria for the European emergency number 112 were not amended in 2017. One Public Safety Answering Point (PSAP), responsible for ambulance and fire brigade in the province of Lower Austria, deployed an AML server (for handset-based caller location) for the whole area of Austria, including also other PSAPs that already implemented the technical interface.

d. Universal Service

In August 2016, the designation of A1 Telekom Austria concerning telephony services (including functional internet connection) and subscriber directory for all operators was removed by decision of the Ministry, thus the scope of the Universal Service Obligation[8] (USO) is reduced to public payphones.

5. Conclusion

Despite regulatory efforts and a relatively high purchasing power, the take-up of fixed high-speed broadband remained low compared to the EU average. Public policy initiatives to stimulate demand may therefore play an important role in further improving connectivity in Austria.

In addition, the new Austrian federal government needs to keep the pace for developing its 5G strategy, as also indicated in the new government programme. The programme sets out ambitious objectives, such as the provision of Gigabit connections nationwide by 2025, establishing Austria as a 5G pilot country by 2021, and mobile nation-wide 5G coverage by 2025. In parallel, the NRA already launched a series of public consultations in 2017 with a view to launch spectrum award procedures for 5G usage in 2018.

[8] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

DESI Report 2018

Telecoms chapter

Belgium

Market developments

1. Competitive environment

The Belgian market is characterised by a relatively high take up of bundled (triple and quadruple play) offers. By the end of 2017, Orange achieved its aim of getting 100 000 customers on their "LOVE" offer (Internet + TV + mobile). Orange is active on the fixed market since May 2016, on the basis of a regulated cable access offer (both cable operators Nethys/Brutélé, operating under the brand "VOO", and Telenet are subject to this remedy).

Telenet finalised its acquisition of fixed cable operator Coditel (SFR Belgium) upon the approval by the Competition Authority in June 2017. This acquisition enables the company to increase its footprint in Brussels and become active in one province in the Walloon region. Orange now also receives access to the Coditel part of the network.

a. Fixed Markets

Coverage	BE-2016	BE-2017	EU-2017
Fixed broadband coverage (total)	99.93%	99.93%	97%
Fixed broadband coverage (rural)	98.48%	98.37%	92%
Fixed NGA coverage (total)	99%	99%	80%
Fixed NGA coverage (rural)	88%	92%	47%
Ultrafast coverage (total)	no data	97%	58%
4G coverage (average of operators)	95%	97%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Belgium has nationwide fixed broadband coverage and almost all households enjoy access to networks delivering next generation access (NGA) of 30 Mbps or more.

Also in rural parts of the country, fixed broadband access is available to 98% of households, with NGA access having climbed to 92% in 2017. Belgium easily outperforms the EU average also for coverage with speeds of 100 Mbps and above. In the mobile market, Belgium has increased its 4G coverage by 2 percentage points, with some operators already deploying LTE-A technology.

Fixed broadband market shares	BE-2016	BE-2017	EU-2017
Incumbent market share in fixed broadband	46.1%	46.5%	40.3%
Technology market shares			
DSL	48.6%	48.0%	64.2%
Cable	51.0%	51.6%	19.4%
FTTH/B	0.3%	0.3%	12.9%
Other	0.1%	0.1%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	BE-2016	BE-2017	EU-2017
Own network	-	-	0.5%

Full LLU	6.9%	9.4%	72.8%
Shared Access	4.7%	5.6%	4.1%
Bitstream	32.2%	54.5%	14.7%
Resale	56.2%	30.5%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Overall, the market shares in the total communications market remain stable compared to the previous year. Cable networks continued to provide the majority of fixed-line broadband access in 2017, with even a slight increase, closely followed by DSL technologies. Fibre-based access however did not see any increase and is still negligible (0.3%), well below the EU average (12.9%).

The new entrants' provision of DSL-grade connectivity services in 2017 remained stable compared to 2016, demonstrating the predominance of bitstream access and reselling. Together, these access solutions accounted for 85% of DSL connections provided by alternative network operators, which is far above EU average. Full unbundling on the other hand is with 9.4% relatively insignificant compared to EU average (72.8%).

Fixed broadband prices	BE-2016	BE-2017	EU-2017
Fixed broadband price index [values between 0-100]	84	82	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile broadband prices [EUR/PPP]	BE-2016	BE-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€26	€23	€24
Least expensive offer for tablet and laptop (5 GB basket)	€18	€19	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Belgium's take-up of mobile broadband remains amongst the lowest in Europe with 73 subscriptions per 100 people. Mobile broadband services in Belgium are slightly cheaper than the EU average when combined with voice calls. However, for mobile broadband connectivity over a laptop or tablet, the corresponding figure for Belgium is €2.00 higher than the EU average.

A further trend towards bundling of telecom services can be observed (fixed-mobile) on both residential and business markets. This can be illustrated by the solid uptake of the Tuttimus/Bizz All-In (Proximus) and WIGO (Telenet) quadruple play products. VOO has recently launched its own product in this category (ONE). More precisely, 89% of the households with fixed broadband are using a bundle (71% of the digital television accesses, 86% of fixed telephony and 19% of mobile telephony are bundled). Operators note that the very favourable bundle discounts put those operators not being in a position to offer bundled services at a disadvantage. MVNOs need to keep their prices very low in order to remain competitive. This makes them struggle to remain on the market, as their low prices may not be profitable on the long run.

Mobile market	BE-2016	BE-2017	EU-2017
Market share of market leader	43%	44%	35%
Market share of second largest operator	26%	27%	28%

Number of MNOs	3	3	-
Number of MVNOs	4	4	-
Market share of MVNO (SIM cards)	13%	8%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Belgium has assigned 67% of the EU harmonised spectrum available for electronic communications services, which is a little below average[9] among the EU countries.

Just over a year after securing a 3.5 GHz wireless licence, Broadband Belgium has in May 2017 handed its concession back to the Belgian Institute for Post and Telecommunications (BIPT).

BIPT organised consultations between May and August 2017 on the 700 MHz, 900 MHz, 1.8 GHz, 1.5 GHz, 2 GHz and 3.6 GHz bands. The auctions for these bands are expected to take place in Q2 of 2019. As regards the 700 MHz band, coordination discussions with neighbouring countries are still ongoing. Astrid[10] will get access to the 700 MHz networks through national roaming agreements for PPDR (Public Protection and Disaster Relief) and Infrabel[11] will get access to the GSM-R extension band of maximum 3 MHz duplex, in addition to the 4 MHz duplex which is already assigned.

The national regulator is already putting experimental spectrum at the disposal of operators to carry out 5G deployment tests. Since the end of 2016, Proximus has started a phase of operational tests for 5G with speeds of 70 Gbps. At the end of 2017, it was announced that Ericsson and Corda Campus would install in early 2018 the first test environment dedicated to 5G in Hasselt. Furthermore, a smart cities project is ongoing in Antwerp, for which the regulator has granted a trial licence as well. However, very strict EMF (Electro Magnetic Frequency) radiations limits in Brussels are reported to make it difficult to roll out 5G there. These limits in Brussels are almost 7 times lower than those permitted by WHO standards and guidelines.

b. National and EU investment in broadband

In order to achieve universal NGA coverage by 2020, a white areas action plan is being prepared by the Minister for the Digital Agenda, in consultation with the municipalities concerned, regional authorities and operators. Among the actions envisaged are measures to reduce the cost of broadband deployment in the context of the implementation of Directive 2014/61/EU, to stimulate investment in areas where there is still no infrastructure and the combination of different access technologies including satellite and an increase in the requirements of mobile coverage. As regards the stimulation of investments, BIPT has proposed a relaxation of the regulation of broadband markets which would allow operators not yet having a 30 Mbps network in the white zones to be able to deploy or modernise their

[9] The EU average is 69%.

[10] Astrid is operator of the national radio communications, paging and dispatching network designed for emergency and security services in Belgium.

[11] Infrabel is the Belgian railway infrastructure manager.

network with the guarantee of not having to open this network to competitors. At the end of 2017, this "light-touch regime" was under public consultation by the regulator.

Furthermore, the Flemish government announced plans to invest in FTTH and has asked the leading telecommunications operators for proposals for developing their infrastructures towards a long term future proof network. A feasibility assessment of proposals was still ongoing at the end of 2017 and it was not decided yet whether the way forward would be co-investment with different communication operators or even with utilities or roll-out by the Flemish government itself.

In December 2016, Proximus announced an investment of 3 billion euro over the coming 10 years ("Fiber for Belgium") to accelerate the roll-out of fibre with the aim to reach at least 85% of all businesses and 50% of all households in Belgium. At the end of 2017, Proximus had already started rolling out fibre in six cities and continued adding a number of new cities to its investment programme.

Through Telenet's €500M five-year "Grote Netwerf" investment programme, which started in 2015 and is expected to be completed mid-2019, Telenet aims to boost the capacity of its network from 600 MHz currently to 1.2 GHz, enabling data download speeds of at least 1 Gbps in the future. As of June 2017, over half of the nodes in Telenet's HFC (hybrid fibre-coaxial) network had been upgraded and Telenet launched during the summer also the update of its network in Brussels. The Coditel (SFR) network will be gradually integrated into the Telenet network and Telenet announced investments also for this part of the network.

c. Implementation of the Broadband Cost Reduction Directive

The deadline to transpose the Broadband Cost Reduction Directive 2014/61/EU[12] into national law expired on 1 January 2016. As Belgium had still not adopted all the laws, regulations and administrative provisions necessary to comply with the Directive, the European Commission decided on 13 July 2017 to refer Belgium to the European Court of Justice for failure to fulfil its obligations under Article 13 of the Directive, i.e. failure to communicate all measures necessary to transpose the Directive into national law. Even though Belgium progressed since the referral to Court and notified the Commission of a number of further measures that would contribute to transposing the Directive at federal and regional levels, full transposition of the Directive has not yet been achieved and the case is still pending in Court (Case C-543/17). Different transposition approaches can however already be seen between the different regions in Belgium, limiting transparency for operators and increasing the burden on them because of the need to adapt to the various regional rules in place.

3. Regulatory function

On 21 March 2017, the Commission registered a notification[13] from the Belgian national regulatory authority, the BIPT, concerning the analysis of the market for wholesale voice call termination on individual mobile networks (corresponding to market 2 of the 2014 Recommendation) in Belgium.

[12] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[13] Case BE/2017/1973.

In the draft measure, the BIPT finds that Proximus, Orange Belgium, Telenet Group (Base), Telenet, Lycamobile, Join Experience, Vectone Mobile and Voxbone have SMP on their respective markets, defined as wholesale call termination on their individual mobile networks. In relation to the remedies, BIPT proposes to impose the following set of obligations on all operators designated with SMP: (i) access and interconnection; (ii) external non-discrimination; (iii) transparency (with the obligation to publish a reference offer imposed only on the three MNOs); (iv) price control on all operators, which in the case of Voxbone takes the form of an obligation to provide wholesale call termination on fair and reasonable terms (rather than specified maximum regulated tariffs).

BIPT considers that in the case of Voxbone[14] the obligation to provide voice termination on fair and reasonable terms implies that the operator's rates should not exceed the maximum regulated fixed termination rates, as according to BIPT, Voxbone's underlying costs do not exceed those of a fixed network operator.

The European Commission made comments to the notification, in particular as regards Voxbone's market definition and price control obligation, as well as the charge control modelling of 4G services. The Commission asked BIPT to take the utmost account of its comments and authorised it to adopt the draft measure.

Following the Commission's comments, BIPT adopted its decision on 26 May 2017, reducing the maximum mobile termination rate (MTR) to 0.99€cent/min.

In 2017, Belgium continued being in delay in carrying out a new market analysis concerning the following five markets for which the European Commission had already launched investigations in 2015: market 1 of the 2014 Recommendation (wholesale call termination on individual public telephone networks at a fixed location); market 3a of the 2014 Recommendation (wholesale local access provided at a fixed location); market 3b of the 2014 Recommendation (wholesale central access provided at a fixed location for mass-market products); market 2 of the 2007 Recommendation (call origination on public telephone networks at a fixed location); and market 18 of the 2003 Recommendation (delivery of broadcasting signals and access to broadcasting networks).

The analyses of markets 3a/2014, 3b/2014 and 18/2003 were under national public consultation in Q3 of 2017 and will, according to information received from the Belgian authorities, be notified to the European Commission in Q2 of 2018. The public consultations for analyses of markets 01/2014 and 2/2007 were launched by the national regulator at the end of December 2017 and are expected to be notified to the European Commission in Q3 of 2018.

In view of the persistent delays in the analyses of the markets mentioned above, the European Commission addressed a letter of formal notice to Belgium on 5 October 2017.

Furthermore, a Court decision from 25 October 2017 regarding market 18/2003 has caused some concern amongst operators. The Brussels appeals court has annulled several decisions by the CRC from 2013 and 2016 that set wholesale rates for accessing cable network services.

In respect of the 2013 Decisions, the Court considered that the regulator did not take into account several of the Commission’s comments on the draft measures notified or did not

[14] An OTT operator that uses mobile numbers.

sufficiently motivate why it did not follow them. The 2016 Decisions were annulled because of their close link to the 2013 Decision and furthermore, the Court considered that a tariff decision cannot be based on a market analysis decision which is more than three years old.

The Court suspended the effects of this annulment until 30 April 2018 to avoid legal uncertainty. It remains to be seen how this will affect the market if the regulator will by that time not yet have finalised the new analyses of markets 3a/2014, 3b/2014 and 18/2003.

The Court also annulled, on 15 March 2017, the decision of the BIPT of 25 August 2016 regarding the wholesale tariffs for fixed termination, for lack of consultation of the Belgian Competition Authority.

4. Consumer matters

With "Easy Switch", a process making it easier to switch bundle operators came into force on 1 July 2017. In the same way as it was already possible to switch mobile operators, with Easy Switch the new operator will be in charge of carrying out the necessary arrangements for the switch reducing the risk of service interruption and double billing. In addition, the Royal Decree[15] enabling this switching also limits the time range of passage of the technician for the installation of the technical devices to half a day maximum and grants a right to compensation in case of not showing up during the set time range.

With regard to transparency of information, the tariff comparison tool put in place by BIPT is being updated and upgraded, so that once finalised, the consumer will be able to use the simulator with his actual exact consumption pattern which the system will obtain automatically. This means he does not need to enter data manually anymore and the tariff simulator can give more pertinent results. In addition, since 2016 a quality barometer of the services provided by fixed and mobile operators is available (including an evaluation of commissioning and repair time, customer services, complaints about bills and network coverage). This tool helps provide the consumer with the information necessary for an objective and transparent comparison of the different offers.

a. Roaming

Following the introduction of Roam Like at Home (RLAH) in June 2017, Belgian subscribers consumed 1.4 times more voice and 4.8 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[16] .

In case of non-compliance with the Roaming Regulation[17], BIPT can make use of Article 21 of the Act of 17 January 2003 regarding the status of the regulator of the postal and telecommunications sectors which provides for sanctions up to 5% of the turnover.

By Decision of 17 October 2017, the BIPT Council imposed an administrative fine of €25 000 upon Lycamobile for non-compliance with Articles 6a and 6e(3) of the Roaming Regulation.

[15] Royal Decree of 6 September 2016 on the migration of fixed line services and bundles in the electronic communications sector.

[16] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[17] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

The reasoning of BIPT was that Lycamobile offered bundles which do not allow roaming and a pre-paid offer, "Pay as you go", which does allow roaming but which is especially unattractive for domestic use due to the high tariffing. BIPT considered this practice as a de facto roaming surcharge for customers who have a bundle and a breach of the Roaming Regulation as customers are confronted with roaming tariffs that are notably higher than the tariffs charged for domestic use.

According to Article 6c of the Roaming Regulation, in specific and exceptional circumstances, with a view to ensuring the sustainability of its domestic charging model, a roaming provider may apply for authorisation to apply a surcharge. The Commission Implementing Regulation[18] lays down detailed rules on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment.

Two operators applied in Belgium to the national regulator for a sustainability derogation. While such derogation was refused for Mundio Mobile, it was granted to VOO and thus allows them to continue applying a small surcharge on roaming consumption. It is the responsibility of the national regulatory authorities to assess applications for sustainability derogations by a mobile operator and to assess, on the basis of the evidence provided by the operator, whether that operator cannot maintain its domestic prices under roam-like-at-home. The operator has to demonstrate to the national regulatory authority the non-sustainability of their domestic charging model to be authorised to temporarily apply a small roaming surcharge. The authorisation is valid for one year and can be renewed on the basis of a new application and assessment by the national regulator.

b. Net neutrality

BIPT monitors net neutrality in Belgium, in cooperation with the regulators of the audiovisual media services. To address violations of net neutrality rules[19], a wide range of penalties up to a maximum amount of 5% of their turnover for legal persons can be imposed. The regulator has been investigating and monitoring closely zero rating practices, but did not yet have to impose any penalties[20].

Key operators are required to publish on their website information about their traffic management policies and their impact on the quality of access services. BIPT also conducted a survey among the main operators in spring 2017 to identify the traffic management measures put in place. The main Belgian operators have put procedures in place to minimize the risk of congestion in their network.

c. 112

[18] Commission Implementing Regulation (EU) 2016/2286 of 15 December 2016 laying down detailed rules on the application of fair use policy and on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment.

[19] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[20] For instance, BIPT published in January 2017 its analysis of Proximus' zero rating offers: http://www.bipt.be/fr/operateurs/telecom/protection-des-consommateurs/lanalyse-de-libpt-du-zero-rating-dapplications-dans-les-offres-de-proximus.

Handset-based caller location (AML) has been deployed, on a voluntary basis by all MNOs, and is available and used for emergency calls since 1 July 2017.

The SMS112 project is fully operational and accessible to all. SMS112 was initially intended only for people with a hearing or speech impairment. SMS112 is now open to all, but when competition for resources arises between "callers", priority is given to registered users of SMS112.

Belgium also launched in June 2017 an app ("112 BE") which allows contacting emergency call centres without the need to remember the emergency numbers and with the possibility to save personal information within the app. The app receives automatic access to the location of the phone and can also be used by hearing or speech impaired persons using the chat function of the app.

Additionally, Belgium also has a public alert system in place ("BE-ALERT") since 2017 where registered users will receive warnings via text messages on mobile phones or via voice-messages on fixed phones at their residence in case of an emergency. The BE-ALERT platform encompasses also "SMS-Alert" which allows authorities to alert the population within a designated geographical area through the use of text messages on mobile phones for impending danger or for mitigating the consequences of emergency situations or disasters.

d. Universal service

In Belgium broadband is included in the scope of universal service with a bitrate for functional Internet access set at 1 Mbps[21].

The Belgian legal framework still needs to be adapted to the judgment of the Court of Justice of the EU of 11 June 2015 in Case C-1/14 which ruled that special tariffs and the financing mechanism provided for in Articles 9 and 13(1)(b) of the Universal Service Directive[22] can only apply to fixed internet, but not to mobile communication services.

At the end of 2017, a proposal for an amendment to the Electronic Communications Act in order to bring the law in line with the Court's judgement was still at Ministerial level.

5. Conclusion

Belgium performs quite well when it comes to achieving connectivity targets, in particular with regard to coverage and uptake of fixed broadband. Further improvements could still be made with regard to mobile connectivity where more competitive prices and demand side efforts could boost uptake. A successful roll-out of 5G depends on a timely completion of the 700 MHz auction. Current EMF limits in the Brussels Capital Region may also have an impact.

It is important that conditions for competition remain favourable. The outcome of the analyses of markets 3a/2014, 3b/2014 and 18/2003 is eagerly awaited by the Belgian market and it is to be hoped that the market situation in Belgium can be addressed with the adequate regulatory

[21] Royal Decree of 2 April 2014 on the specification of the speed level of functional Internet access in the provision of the geographical element of the universal service regarding electronic communications.
[22] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

tools. Once fully transposed in Belgium, the Broadband Cost Reduction Directive could provide further incentives for investment in high-speed networks by alternative operators.

Bulgaria

Market developments

1. Competitive environment

Coverage	BG-2016	BG-2017	EU-2017
Fixed broadband coverage (total)	95%	95%	97%
Fixed broadband coverage (rural)	81%	82%	92%
Fixed NGA coverage (total)	74%	75%	80%
Fixed NGA coverage (rural)	17%	25%	47%
Ultrafast coverage (total)	no data	74.6%	58%
4G coverage (average of operators)	66%	72%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The total coverage of fixed broadband networks in Bulgaria remains unchanged at 95% of households, slightly below the EU average (97%). However, fixed broadband coverage in rural areas remains significantly below the EU average (82% versus 92%). Networks capable of providing at least 30 Mbps (next-generation access (NGA)) are available to three quarters (75%) of Bulgarian homes, slightly below the EU average (80%). Nevertheless, despite some progress, rural areas remain poorly covered by fixed NGA (25%), close to twice below the EU average (47%). On 4G coverage Bulgaria is lagging behind the EU average (91%) at just 72%. Furthermore, Bulgaria has made remarkable progress on ultrafast broadband coverage, reaching 74.6% while the EU average is 58% only. Nevertheless, because other EU countries are progressing faster for most of the other indicators, Bulgaria remains in a group of countries displaying a rather slow development. The fixed broadband price index[23] is 80, while the EU average is 87[24]. However, the price factor could not be the only reason for the slow take-up of fixed broadband in Bulgaria. Other reasons, such as demography, different social interest, consumers' preferences for broadcasting products, the need of increasing digital skills, and an ageing population in some remote areas probably also help to explain this state of play.

Based on recent market analyses[25], the substitutability between fixed and mobile services in Bulgaria is not sufficient to conclude that the two services belong to the same product market. The development of these services in 2017 does not justify the assumption that they are substitutable. Specifically in terms of voice services, in the context of the third round of market analyses of the retail markets for access and calls provided at a fixed location, it has been concluded that there is asymmetric demand side substitutability.

[23] The Broadband Price Index measures the prices of twelve representative broadband baskets as the percentage of household income. The baskets include three speed categories (12-30 Mbps, 30-100 Mbps and at least 100 Mbps) and four types of products (standalone internet, internet + TV, internet + fixed telephony and internet + TV + fixed telephony).

[24] Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

[25] CRC`s Decision № 581/22.11.2016 (market 1 of Recommendation 2007/879/EC and markets from 3 to 6 of Recommendation 2003/311/EC) and CRC`s Decision № 372/13.08.2015 (markets 3a and 3b of Recommendation 2014/710/EU).

Concerning the internet access service, a trend of upward increase of usage is observed, with a rise in the number of subscribers of both fixed and mobile internet access. Currently, there are no clear indications that the fixed internet subscribers tend to switch to mobile access only. A steady growth trend is observed in the total volume of mobile voice service traffic, as well in roaming. At the same time, there is a decrease in the international mobile traffic and in the consumption of all parameters of fixed services. A decrease in the total number of short text messages (SMS) sent is registered, also in roaming. In 2017, the mobile operators in Bulgaria continue to offer some zero-rated services, including tariff plans with a volume of megabytes (MB) to some major OTT services and TV content. The reasons for the decrease in the international mobile voice and SMS traffic along with the increase in the mobile internet traffic could be explained by the impact of the OTT services.

The structure and the range of the most used bundles remained unchanged in 2017 and the main competitors consolidated their positions. The majority offer the bundled service "Television and fixed Internet access", which is preferred by users (over 50% of all bundled services subscribers). In contrast, triple-play bundled services show a drop in subscribers. The most significant growth is observed in the quadruple-play bundles. The TV connection is the most popular service included in a bundle and a bundle is most likely to include also internet access, followed by mobile and fixed telephony. Bundles combining TV and mobile services do not mark considerable success and due to the vast and diverting offers in the market, comparing for Bulgarian consumers is not easy. To date, bundled offers do not fall under ex-ante regulation.

a. Fixed Markets

New entrants' DSL subscriptions by type of access (VDSL excluded)	BG-2016	BG-2017	EU-2017
Own network	-	-	0.5%
Full LLU	-	-	72.8%
Shared Access	-	-	4.1%
Bitstream	-	-	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband market shares	BG-2016	BG-2017	EU-2017
Incumbent market share in fixed broadband	25.1%	26.2%	40.3%
Technology market shares			
DSL	12.1%	10.7%	64.2%
Cable	16.9%	16.7%	19.4%
FTTH/B	47.3%	50.3%	12.9%
Other	23.8%	22.3%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Twenty one undertakings provided access to fixed telephony service to end users. Two new operators started the provision of the service during 2016 (Telekabel AD and Comtex Bulgaria EOOD) and one in 2017 (Novatel EOOD). In April 2017, the merger between Blizoo Media and Broadband EAD with Mobiltel EAD was finalised. As a result, the fixed telephone lines market share of Mobiltel increased, but did not significantly change the order of the operators' shares in the retail fixed telephony market: Bulgarian Telecommunication Company EAD (BTC), Mobiltel EAD (Mobiltel & Blozoo) and Telenor Bulgaria EAD (Telenor). The total market share of the remaining operators is lower than 2%.

In 2017, there was no change in the development trend of the fixed telephony service segment. The declining consumer interest resulted in a decrease of consumption and a decline in the values of all key parameters, including the total volume of revenue (not included in a bundle)[26], the number of the fixed telephony lines and the volume of the outgoing traffic.

On the other hand, the upward trend of fixed Internet access continued in 2017[27] and the number of fixed Internet subscribers[28] (including bundle) maintained its steady growth. The shares of subscribers to high speed[29] and ultra-high speed[30] internet access increased due to the migration to NGA networks and the total volume of retail revenues from fixed Internet access also grew. Infrastructure-based competition reveals a deepened trend of decrease of the number of ADSL subscriptions with no declared demand for the wholesale services offered by BTC. VDSL connections are already provided by BTC in several Bulgarian settlements[31]. The broadband penetration in Bulgaria reached 57.6% based on households[32] and 24.4% based subscriptions per head of population[33]. In 2016, €28 million were invested in NGA, and for 2017 the undertakings planned investing additional €33 million.

In general, the provided average access speeds in rural areas are lower than those provided at national level. However, the trend of increase in the number of subscribers using high and ultra-high-speed access follows that at national level. This growth is due to the increase in the number of fixed broadband subscribers via next generation access networks. The majority of fixed Internet access subscribers are located in towns and cities and only 11.6% of them are located in the rural areas[34] and their absolute number amounted to almost 200 thousand, increasing by 24% for one-year period. A quarter of the fixed Internet access subscribers in the rural areas use FTTN/C and the reported one-year growth rate in subscriptions is 31%. The contrasting change in the same indicator in cities and villages is mainly due to the different economic conditions and the potential for development. Unlike the share of CATV subscribers at national level, which remains relatively stable, the subscribers to CATV in rural areas are increasing. Traditionally, the number of the incumbent's ADSL subscribers declined both at urban and rural levels. In general, wireless networks at a fixed location are mainly used in less populated areas, where the building of wired access is economically inefficient. The number of wireless networks subscribers for one year increased by more than 50% and their share at the end of 2016 was 21% of the total number of fixed broadband subscribers in rural areas. The largest increase by 162% is reported in the number of subscribers with access at a fixed location through mobile network. Satellite access also grew by 8%, but its share in the total number of subscribers in rural areas is only 0.1%. The only decrease observed among wireless access subscribers refers to RLAN.

In the end of 2016, fixed broadband Internet access was provided in 3204 villages, representing 93% of the total rural population. The most significant growth is that of the

[26]Including revenue from fixed telephone service, Carrier Selection service and public payphones. Excluding revenue from installation fees and monthly subscriptions for bundled services with fixed telephony service included.

[27] The data for 2017 regarding the number of broadband access subscribers distributed by speeds and type of Internet access is as of 1.07.2017.

[28] The users of retail Internet access through leased lines and dedicated access are excluded.

[29] Over and including 30 Mbps to 99.99 Mbps.

[30] Over and including 100 Mbps.

[31] https://www.vivacom.bg/bg/files/7119-spisyk-po-t-2-3-ot-prilojenie-2.pdf

[32] According to data taken from the last official census of NSI, conducted in 2011.

[33] According to NSI's data estimations for the number of population in Bulgaria as of 31.12.2016.

[34] The data about rural areas is provided by CRC and covers 2016.

number of settlements covered by fixed access through mobile network (76.2%), followed by FTTN/C (27.6%) and FTTH and CATV (16.9% each). The number of the villages and settlement formations covered by FTTH-B has increased by a total of 12%, which is an indication of the increasing importance of speed and quality of the services provided in small settlements.

b. Mobile market

Mobile market	BG-2016	BG-2017	EU-2017
Market share of market leader	39%	39%	35%
Market share of second largest operator	33%	31%	28%
Number of MNOs	5	5	-
Number of MVNOs	-	-	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Mobile broadband prices [EUR/PPP]	BG-2016	BG-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€60	€48	€24
Least expensive offer for tablet and laptop (5 GB basket)	€22	€18	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Despite the fact that the prices of packages including mobile broadband on handsets in Bulgaria have significantly diminished in 2017, they remain twice more expensive than in the EU-28 on average. Prices for mobile broadband on laptops and tablets have also dropped and are in line with the EU-28.

There are no MVNOs in Bulgaria. As of 1 July 2017, the number of undertakings providing public mobile services in Bulgaria remained unchanged: Mobiltel, Telenor, BTC, Max Telecom and Bulsatcom. The first four provide both mobile telephony service and mobile data services, while Bulsatcom provides only mobile internet. Based on CRC's information, there is no significant change in the market positions of the players on the mobile voice telephony service market. Mobiltel confirms its leading role with the largest number of subscribers (40.2%), followed by Telenor (32.5%) and BTC (27.3%). In the mobile Internet market, the ranking by subscribers' number is led by BTC's 34.67% of the total mobile Internet subscribers, followed by Telenor (34.64%), Mobiltel (30.52%), Max Telecom (0,16%) and Bulsatcom (0.03%). Following the decision of Max Telecom to stop its activities, it requested end of 2017 its licences to be transferred to T.Com[35] and some consumer contracts were terminated without penalties. The remaining subscribers temporarily roamed in the network of Bulsatcom.

The strong competition between the three major mobile undertakings continued, while the segment was characterised by the decline in the number of subscribers of mobile voice telephony services as a result of outflow mainly of the users using prepaid SIM cards service. The observed decline in the amount of revenues from standalone provision of mobile voice telephony services is due to both the increase of the number of subscribers using bundles and the steady upward trend in the volume of free-of-charge calls originated in own networks (on-net). The wholesale revenue (interconnection) increased for a second consecutive year mainly

[35] The final transfer has been realized in the beginning of 2018.

due to the increase in the volume of the terminated traffic contributed by the lowest wholesale termination rates imposed by CRC[36] and to the withdrawal of the price regulation for traffic terminated from non-EU/EEA-calling networks. There are no plans for early 5G trials or deployments.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Since 2016 no advancement has been observed in the spectrum assignment in Bulgaria. Only 26.61% of the spectrum harmonised at EU level for broadband use (including the 700 MHz band) has been assigned. The total assigned spectrum excluding the unpaired 2 GHz band is 290 MHz, compared to the EU average of 751.6 MHz[37]. The entire 3.4-3.8 GHz, 1.5 GHz and 2.6 GHz bands are still awaiting assignment. This situation is partially due to delays in making some crucial spectrum below 1 GHz available for electronic communication services, combined with the lack of commercial interest for some other bands. There are several challenges regarding spectrum management in Bulgaria, where the 800 MHz and 700 MHz bands are still partially occupied by military, or DVB-T broadcasting services. A strong need for redistribution of the 1.8 GHz, the re-farming of 700 MHz, 800 MHz and lower UHF band has been indicated together with a call for general revision and modernisation of the system for spectrum fees. Better quality, legal certainty and enhanced efficient use of spectrum are expected.

The lengthy interferences testing conditions negotiations between operators and the Ministry of Defence for a possible future shared use of the 800 MHz between civil and Military, which started in 2015 after the decision of making available a portion of the band (2 x 10 MHz), are still ongoing. Some operators have stated their interest in the 2.6 GHz band, which was freed already in 2016 and did not find a successful assignment then, due to reluctant operators deterred by the prohibitively high price.

The constant hunger for lower frequency spectrum is further rising due to some undertakings' changes and failures in the market. After stopping its activities, Max Telecom requested for transferring its spectrum licences to a newly created company (T.Com). Furthermore, following the failure of Bulsatcom to timely pay the claimed fees for purchasing spectrum in 1.8 GHz, it lost 2 x 10 MHz in that band. In the process of the relevant public consultation all three undertakings expressed that the assignment of the free radio spectrum in the 1.8 GHz band in blocks of 2 x 2 MHz will lead to an inefficient use of the scarce resource, neither promoting the deployment and development of LTE networks, nor meeting the end users' interests. There is a general agreement of all actors, that there is not enough spectrum for three MNOs in the 1.8 GHz band, in the context of overall lack of resources due to the fact that the 800 MHz and 700 MHz are not available for communication services.

The future Spectrum plans foresee the modification of the frequency allocation plan for civil use. An Inter-Ministerial Working group on the 700 MHz band started its work in 2017, a dedicated Action plan is under preparation and a clear roadmap is expected beginning of

[36] Decision No. 135/14.02.2013 and Decision No. 585/24.11.2016.
[37] Sources: direct communications between MS and EC, ECO reports, EFIS database.

2018. There were no coordination problems with any of the neighbouring countries and agreements for the repurposing were signed with Serbia, Greece, FYROM, Romania, Ukraine and Turkey end of 2017. The preliminary draft foresees that the reallocation of Multiplexes should be carried out without compensation and the number of channels should be reduced to five. The biggest challenge remains the need of the Ministry of Defence claiming 1-1.5 billion BGN for freeing all bands (700 MHz, 800 MHz and lower UHF) from Military use. The bands 31.8-33.4 GHz and 40.5-43.5 GHz are likely to be available for 5G services as soon as there are harmonised technical requirements developed. A position on the still unassigned 2.6 GHz and 3.4-3.8 GHz and the 24.25-27.5 GHz pioneer band is also expected.

b. National and EU investment in broadband

Bulgaria's 2014 broadband strategy, the 'National Broadband Infrastructure for Next Generation Access Plan' (NBP), sets 100% coverage with 30 Mbps by 2020 and 50% take-up rate for 100 Mbps targets, both in line with the Digital Agenda for Europe[38]. Bulgaria is also aiming for 80% take-up rate for 100 Mbps in the business segment by 2020. The "Digital Bulgaria' 2020" updated the NBP by including measures for building broadband infrastructure in rural and scarcely populated areas and foreseeing regulatory actions in relation to the gigabit society targets within horizon 2025. There are no separate regional or municipal broadband plans. Nevertheless, additional measures are needed to increase customers' interest and to timely realise the NBP's objectives. The deployment costs should diminish, in order to decrease the digital divide and the tax deductions put in place are insufficient to encourage the majority of households to take up higher bandwidths. It is essential to combine private financing and financial instruments with European, national and municipal grants in order to achieve the NBP goals, but cooperation between different actors in order to aggregate demand is not going smoothly. Bulgaria does not have a 5G strategy yet, but an Inter-Ministerial working group has been launched in 2017 to revise the NGA plan in order to include it together with E-governance, digital data and cloud services.[39]

Since end of 2016 the State electronic e-Government Agency (SEGA) is the new administrative structure, which inherited of the functions of the former ECMIS. It is in charge of maintenance, operating and development of the electronic communications network of the state administration and its electronic management functions.

Concerning the WiFi4EU initiative, multiple preparatory actions were realised and there is readiness and interest expressed. While still waiting for technical specifications, Mayors were contacted and interested operators were informed.[40]

Due to lengthy internal adjustment discussions the implementation of the wide broadband deployment project co-financed by the European Agricultural Fund for Rural Development (EAFRD) has not started as planned. For the Project "Development of high-speed broadband access in Bulgaria through building a critical, secure, and reliable public ICT infrastructure", co-financed by ESIF funds and lead by SEGA, the contractor's selection procedure for maintaining and operating the network was relaunched after extending the contract term to 15 years. Its prolongation, the project "building super-high-speed connectivity in remote and sparsely populated rural areas" with beneficiary SEGA, and Ministry of Agriculture, Food and

[38] https://www.mtitc.government.bg/en/category/46/next-generation-access-ngn
[39] The new NBP is foreseen for beginning of 2018 with target date 2030.
[40] https://www.mtitc.government.bg/bg/content/vuprosi-i-otgovori-za-eit-i-wifi4eu

Forestry (MAF), co-financed by ESIF funds, foresees € 30 million to connect 44 state administrations of the municipal centres in the "white zone" to the Integrated Electronic Communications Network (IESM) of the state administration. It intends building 1023 km optical cable network and providing connectivity to 72 schools, which would improve the use of electronic services for citizens and businesses, but the application guidelines are still pending and the project has not been launched.

Despite the fact that participants from Bulgaria submitted two promising projects under the Connected Communities Initiative[41] (CCI), a joint partnership between the European Commission and the World Bank providing technical assistance to European broadband project promoters that were expected to be eligible for funding from the European Fund for Strategic Investments (EFSI), none of them has been neither finalised, nor launched.

The project ensuring the connectivity of schools, part of the Strategy for the effective use of ICT in the education and science in Bulgaria, connects 19 regional departments of the Ministry of Education and Science (MES) and foresees 28 connected by the end of 2017. The transferred funds are for terminal equipment to complete the educational backbone network. The application process was completed, the results were published, 91 schools were approved to receive national funding by the end of November and the equipment had to be purchased by mid-December 2017.

In respect of the NOBAL project to build cross-border ultra-high speed connectivity planned to be implemented jointly with Romania and Serbia, uniting their efforts for establishing cross-border broadband infrastructure with a trilateral agreement signed in 2013, at this stage the project has not begun due to lack of appropriate funding model.

c. Implementation of the Broadband Cost Reduction Directive

Following the expiry on 1 January 2016 of the deadline for transposing the Broadband Cost Reduction Directive[42] (BB CRD), the Commission opened infringement proceedings against Bulgaria for failure to notify transposition measures. Five pieces of national legislation transposing the Directive have already been adopted, namely: the Law on spatial planning; the Law on access to public information; the Procedural Administrative Code; the Law on electronic communications; an Ordinance for rules and standards for design, construction and commissioning of cable electronic communications networks and associated infrastructure. However, at the end of 2017, the BB CRD had still not been entirely transposed and notified[43].

The Ministry of Transport, Information Technology and Communications is foreseen as Single Information Point (SIP) for the BB CRD and some preparatory steps to anticipate the adoption of the transposing law for the establishment of the SIP in accordance with Article 4 have been taken in order to rapidly provide access to information about existing physical infrastructure suitable for the deployment of electronic communications networks, as well as

[41] https://ec.europa.eu/digital-single-market/news/connected-communities-initiative

[42] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[43] The European Commission therefore decided in January 2018 to refer the case to the Court of Justice. At the end of February 2018, the Law on electronic communications networks and physical infrastructures, expected to complete the transposition, was adopted. The law was published in the National Gazette on 9 March 2018 and notified to the Commission.

planned and ongoing construction activities. CRC is the designated dispute resolution body under the BB CRD.

3. Regulatory function

During 2017, neither market analyses were due, nor notified to Commission services. Only three markets are still regulated in Bulgaria, namely markets 1, 2, 3a in accordance with Commission Recommendation 2014/710/EU of 9 October 2014. All the other markets were found to be effectively competitive and hence deregulated in the past years. The review of Markets 3a (Wholesale local access provided at a fixed location) will take place in 2018, Market 1 (Wholesale call termination on individual public telephone networks provided at a fixed location) and Market 2 (Wholesale voice call termination on individual mobile networks) in 2019.

In 2017, no change was made to the national numbering plan. The NRA Chairman's mandate expires and as of 15 January 2018 a new one has been appointed. However, the CRC board still has three members with expired mandates and new members are expected to be nominated by the Parliament.

Bulgaria complies with the 2009 Termination Rates Recommendation for both fixed and mobile termination rates, both based on a pure BULRIC price cost methodology. End of 2016 the mobile termination rates decreased and were fixed at €-cents 0.7158 per minute till 2020. Till end of 2018 the fixed termination rates are €-cents 0.0767 per minute and decrease to €-cents 0.0716 per minute for the period 2019-2020.

4. Consumer matters

During 2017 the number of complaints CRC has received has considerably increased and reached 4 252. In most cases consumers complained about pricing and billing, contract termination penalties, unsolicited communications or services, roaming issues and the quality of network coverage. This trend might be explained partly by some roaming related requests for clarifications and the financial problems which one of the providers had, that caused lack of availability of services for several months.

Regarding pricing and billing (except charging of roaming services), contracts termination and penalties, CRC has no legal competence and informs consumers that they have the right to start an Alternative Dispute Resolution (ADR). The NRA also applies some mediation which, usually, resolves the problem between the undertaking and the consumer. About complaints concerning unsolicited communications via SMS/phone, when the sending of such messages is in breach of article 261 of the Law on Electronic Communications, CRC starts an administrative-penal procedure and imposes sanctions. However, the NRA has no power to oblige the person/entity to stop sending spam messages or cease marketing calls. The complaints are forwarded to the Consumers protection commission and/or the Bulgarian DPA (Commission for personal data protection). Regarding the issue related to the early contract's withdrawal the Consumers Protection Commission opened dialogues with the main operators defining a reasonable price of maximum three months penalty. It further disseminates the approach to other operators by informing customers which companies apply fair conditions. Following a binding decision adopted by CRC in 2016, all mobile operators are obliged to develop and publish on their web pages detailed interactive maps of the mobile coverage allowing users to check the level of the signal provided by the operator at a certain place, to ease the consumer to take an informed decision before signing a contract.

a. Roaming

There has not been any major compliance issue as regards Roam Like at Home[44] (RLAH) implementation in Bulgaria, and no operator applied for the sustainability derogation. The retail mobile prices have not increased significantly compared to prior 15 June 2017. In most cases, the price remained identical for more services and a small price increase was accompanied by higher volumes of data. As a result of the EU Roaming regulation, the call minutes by subscribers of Bulgarian undertakings abroad rose. The share of Bulgarian consumers using mobile data while travelling in the EU more than doubled after 15 June 2017, while the share of those never using mobile data while travelling in the EU dropped[45]. Bulgarian subscribers consumed 3.4 times more voice and 8.7 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[46].

RLAH introduction went smoothly, despite some adjustments. In the preliminary assessment process of fair use policy, some inaccuracies and omissions have been spotted and all have rapidly been solved. During the implementation, violations were detected related to the application of alternative tariffs to some users without their explicit confirmation and the lack of transparent conditions concerning the data limits in some contracts. Administrative proceedings have been initiated and instructions were sent to the respective providers to change the information on the data limits in the contracts. Numerous consumer complaints were received and a multitude of inspections were conducted after 15 June 2017. Most frequently complaints are related to the deactivated roaming for certain consumer plans by one mobile operator. Some other complaints concern the consumer's misunderstanding that intra network/family offers count as off-net while roaming. A potential non-compliance with the new roaming rules has been detected for one undertaking, but following actions taken by the NRA, the conditions of the tariff plans have been modified and detailed information on the roaming data allowance has been included.

Besides imposing fines for breaches of the roaming regulation, CRC also can prohibit offers which are non-compliant. On 27 December 2016, Bulgaria published a Law amending the Law on Electronic Communications, (LEC) laying down administrative fines for infringements of certain articles of the roaming regulation. The associated fines are as follows: up to €1 million for infringements of Articles 3, 6e (1), 7, 9 and 12; up to €50 000 for infringements of Articles 4, 5(1), 6e(3) and (4), 11, 14 and 15. Furthermore, on 19 December 2017 Bulgaria amended the LEC, foreseeing that any undertaking providing false, deficient, late, or inaccurate information under the Roaming Regulation shall be liable to a penalty between €2 500 to €25 000. Furthermore, any infringement of Articles 6a and 6b of the Roaming Regulation in connection with Article 3, 4 or 5 of the FUP Implementing Regulation[47] should be fined of €25 000 up to €1 000 000.

b. Net neutrality

[44] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[45] Flash Eurobarometer 454 on the end of roaming charges within the EU, 27 September 2017.

[46] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[47] Commission Implementing Regulation 2016/2286 of 15 December 2016 laying down detailed rules on the application of fair use policy and on the methodology for assessing the sustainability of the abolition of retail roaming surcharges.

Bulgaria has adopted on 27 December 2016 a bill amending the LEC in order to transpose the requirements on penalties in Regulation (EC) No 2015/2120[48]. Bulgarian authorities notified these measures on 13 March 2017. The maximum fines are: up to €100 000 for certain infringements of Article 3(3) (for traffic management practices); up to €2 500 for Article 4 (not providing the information in the contract); up to €20 000 for Article 5(1) and (2) (specific requirements imposed by the NRA and not providing information to the NRA).

CRC monitors and controls the compliance to the open internet provisions and prepares a draft position on the implementation of Articles 3 and 4 of Regulation 2015/2120 in line with the BEREC guidelines, which was published for public consultation. Presently CRC is following BEREC Guidelines and regulations. Furthermore, the NRA is in the process of finalizing the documents for public procurement for the preparation of technical specification for the establishment of a QoS measurement system. The NRA follows BEREC's work on the developing of an opt-in monitoring system and is interested in the use of its software as a basis for the national measurement system.

During 2017, CRC has identified four cases of infringements of Article 4(1) and has notified its findings to the respective providers. CRC surveys the consumers' satisfaction from IAS QoS based on a special-purpose questionnaire published on its web site. Despite the low activity in completing the survey, the analysis reveals that the number of the satisfied end users from the QoS of fixed and mobile IAS is twice as high as the number of unsatisfied ones. The main reasons for the complaints are lower download/upload speeds than agreed for the fixed IAS and the poor or unavailable coverage of the mobile IAS in some areas.

c. 112

In 2017 there were no changes regarding the implementation of more accurate caller location in Bulgaria. In line with a provision of the LEC, the providers of mobile voice services are obliged to determine the caller location with an accuracy of 100m in urban areas and within one km outside of settlements. In the fixed network, the location is determined by the address on which the caller's number is registered. Both mobile and fixed operators use the "push" method for transmitting data for the caller location towards the Public Safety Answering Point (PSAP). Nevertheless, for the reporting period, caller location for mobile calls was temporarily not available due to technical failure. A procurement procedure is in progress and the performance is expected to restart in February 2018.

In 2017, the Commission continued investigating whether Bulgaria has correctly transposed and implemented Article 26(4) of the Universal Service Directive 2002/22/EC guaranteeing equivalent access for end-users with disabilities to emergency services and caller location delivery. Following this, the Law on national emergency call system using the single European number 112 was amended in summer 2016. This amendment guarantees that people with hearing or speech disabilities can access the 112 number. The definition of 'emergency call' was also modified to expressly include other ways, besides voice calls, for people with hearing or speech disabilities to contact 112. After this modification, Ordinance № 6 on Universal service was also amended and published on 29 September 2017. It introduced a new requirement, obliging all operators, at the request of end-users with hearing or speech

[48] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

disabilities, to provide them with an appropriate electronic communications device with the corresponding software.

A review of the Rules for determining the terms and conditions for the provision of end-user location and subscriber data by undertakings providing public telephone services for emergency calls is foreseen during 2018 in order to include handset-based location data. The Minister of interior is responsible to raise awareness on 112. There are information banners at the airports and the awareness in Bulgaria (64%) is significantly higher than for the EU (49%).[49]

d. Universal service

There are no changes in 2017 concerning the scope of universal service[50]. Public payphones, directories and/or directory enquiry services are in the universal service obligation scope. Broadband is not included in the current scope of the universal service. In addition according to the Law on Integration of People with Disabilities the consumers with disabilities may use social allowances for information and telecommunication services.

On the affordability side, it should be underlined that Bulgaria has a social tariffs system in place. In 2017 BTC continued to offer, with no change in prices and conditions, the price packages intended for users: with low income ("Limited plan"); people whose work capacity or capacity for social adaptation has been impaired by over 90% ("Handicap 160" and "Handicap 300" plan); people whose work capacity or capacity for social adaptation has been impaired by over 50% ("Handicap 300" plan); people admitted to social or health institutions ("Social and health institutions" plan). In 2017, the universal service provider has neither submitted to CRC a request for compensation for the provision of the universal service, nor the sector-funded compensation mechanism has been activated.

5. Conclusion

Bulgaria is lagging behind the EU average on 4G coverage. The spectrum release efforts initiated in previous years in the 800 MHz and 700 MHz bands, remained at a standstill, while more difficulties arose in the 1.8 GHz band. Additional prompt efforts on the effective release of spectrum in those bands could have a strongly positive impact on the deployment of high-quality wireless broadband services in Bulgaria. Furthermore, 5G strategy is expected to be rapidly included in the NBP and Bulgaria is supposed to ensure that appropriate spectrum is made available in timely manner to all relevant market players for early 5G trials and deployment. Moreover, deeper focus on deploying broadband in rural areas and on developing digital skills and digital services would decrease the digital divide and benefit the country's overall connectivity, in particular for NGA coverage and take-up. Following the decision to refer Bulgaria to the CJEU, Bulgaria has finally notified complete transposition of the BB CRD in early 2018, which should improve and speed up broadband roll-out. Last but not least, the problems related to the 112 number (non-functional caller location and absence of access for people with disabilities) should swiftly be solved.

[49] E-communications household and telecom single market survey.
[50] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

CROATIA

Market developments

1. Competitive environment

Fixed broadband prices	HR-2016	HR-2017	EU-2017
Fixed broadband price index [values between 0-100]	58	65	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

On 9 June 2017, the National Competition Agency (AZTN) approved a prolongation of the Incumbent HT's management rights over Optima Telekom till 10 July 2021.[51] The incumbent who currently controls Optima Telecom under strict conditions shall commence with the transparent, objective and non-discriminatory sale procedure of its shares held in Optima in January 2020 via a competitive international call for tender. The sales procedure should be prepared by 1 July 2019 and the preference will be given to a potential buyer that is not yet present in the Croatian market.

Also, Optima Telekom acquired ownership over H1, an alternative fixed telecommunication operator, which does not exist as legal entity from 1 August 2017. According to HAKOM (Croatian National Regulatory Authority) at the end of Q2 2017, HT Group owned by Deutsche Telekom holds a fixed broadband market share of more than 71% of the retail broadband market when combining HT, Iskon, Optima, and H1 Telecom (Incumbent HT 47.6%, Iskon 10.4%, Optima Telekom 9.2%, and H1 Telecom 4%).

Consumers complain that all electronic communications services are too expensive, and the data shows that prices for fixed broadband are above the EU average. In the fixed broadband price index Croatia performs very low considering DESI 2018 connectivity Broadband price index is 63 comparing to EU average of 87.

In recent years the number of users of bundled services is growing. After 2-play and 3-play bundles, some operators have started to offer 4-play bundles of services which, in addition to fixed network, internet and television services, also include mobile network services. It is expected that the growth trend in bundles will continue in the following years. TV/Content services play a significant role in bundles as 54% of bundle subscriptions contain TV services.

[51] In June 2014, Croatian incumbent HT took over management of alternative fixed network operator Optima Telekom following the completion of the pre-bankruptcy settlement procedure and the adoption and registration of the decisions by the General Assembly of Optima Telekom. National Competition Agency ruled that the duration of the concentration of HT and Optima Telekom shall be limited to a period of four years, starting from HT's acquisition of control. Upon expiry of the third year of the concentration, HT shall initiate a sales procedure for all its shares in Optima Telekom, wherein it shall also have the right to sell Optima Telekom shares held by Zagrebačka banka. After the expiry of the four-year concentration period, the contract between the bank and HT will end, as will HT's control over Optima Telekom, and HT must transfer its management rights to either Zagrebačka banka or a third party unaffiliated to HT (while authorising the bank to sell HT's Optima Telekom shares).

Therefore, TV/content services seem to be one of the main drivers for subscribing to bundle offers, taking into account savings for the customer compared to standalone services.

In January 2017 AZTN approved the concentration between Vipnet & Metronet. Moreover, some operators instituted proceedings before the AZTN regarding the exclusive TV content rights for some premium TV channels by the incumbent. Furthermore, there are allegations of predatory pricing in case of premium pay TV channels by the incumbent. The Commission is looking into the matter.

a. Fixed Markets

Fixed broadband market shares	HR-2016	HR-2017	EU-2017
Incumbent market share in fixed broadband	49.0%	47.6%	40.3%
Technology market shares			
DSL	80.3%	75.6%	64.2%
Cable	13.3%	13.9%	19.4%
FTTH/B	2.7%	4.1%	12.9%
Other	3.6%	6.3%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed penetration in Croatia of 70% is below the EU average of 75% while fixed connectivity improved over the last year. There are demand stimulation measures in place within the Broadband Development Strategy of the Republic of Croatia for the period 2016 – 2020, and these measures are showing some results. Also, all alternative operators strongly support the National Programme for Backhaul Broadband Infrastructure (NPBBI) programme for deploying of backhaul infrastructure.

New entrants' DSL subscriptions by type of access (VDSL excluded)	HR-2016	HR-2017	EU-2017
Own network	0%	0%	0.5%
Full LLU	52.4%	48.7%	72.8%
Shared Access	0.0%	0.0%	4.1%
Bitstream	47.4%	51.2%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

The data indicate that users in Croatia are still far from substituting their fixed line with a mobile subscription. Households keep their fixed-line connection to access the Internet and consumers perceived mobile and fixed-line access rather as complements.

Coverage	HR-2016	HR-2017	EU-2017
Fixed broadband coverage (total)	97%	99%	97%
Fixed broadband coverage (rural)	89%	97%	92%
Fixed NGA coverage (total)	60%	67%	80%
Fixed NGA coverage (rural)	10%	16%	47%
Ultrafast coverage (total)	no data	34%	58%
4G coverage (average of operators)	67%	73%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The highest demand in 2017 is for fixed broadband internet connections with speeds from 10 to 30 Mbit/s. The number of fixed broadband internet connections with speeds of 30 Mbps and above are increasing. Moreover, it is noticeable that investments in ultrafast broadband infrastructure are much higher in 2017 compared to the last 5 years with more than 70

announcements of new fibre access networks where most were made by the biggest alternative operators and the incumbent.

b. Mobile market

Mobile market	HR-2016	HR-2017	EU-2017
Market share of market leader	47%	46%	35%
Market share of second largest operator	35%	35%	28%
Number of MNOs	3	3	-
Number of MVNOs	-	-	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

In terms of coverage the mobile market is relatively well developed in urban areas but less in rural areas. Therefore the average 4G coverage of 73% of households keeps Croatia in the group of less good performers in the category. However, the given household coverage might be better than reported due to the fact that Croatia as holiday destination has many households that are included in the statistics but are in fact inhabited only a small portion of the year.

On the basis of available data, OTT services (Skype, Viber, Whatsapp, etc.), together with the increasing penetration of smartphone users, are one of the reasons for the decline of SMS traffic volumes in 2016, approximately 9% compared with the same period in 2015.

Mobile broadband prices [EUR/PPP]	HR-2016	HR-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€16	€32	€24
Least expensive offer for tablet and laptop (5 GB basket)	€29	€23	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

MVNO access is not regulated and there are several registered MVNOs, but according to HAKOM none of them is actually providing mobile services.

WiFi technology is widely used in addition to mobile networks for access to internet. It is used predominantly in urban areas, as well as in rural areas too due to weak connectivity. Furthermore, assignments of dedicated numbering ranges for M2M (Mobile to mobile) services have started. In this context, fees for M2M numbers are lower than standard mobile numbers.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Croatia all three mobile operators provide LTE services in the 1.8 GHz band (2358 base stations installed) and two of them in the 800 MHz band (2258 base stations installed). 1.8 GHz spectrum is mostly use for base stations installed in urban areas and 800 MHz spectrum for rural areas. In this context, most operators complain about the high costs for spectrum which allegedly reduces their investment capacity.

Croatia has one license issued for digital television in 700 MHz band that is valid until 26 October 2021.The 700 MHz band shall be available according to the national Strategy of transition of digital terrestrial television to DVB-T2 system and the assignment of the 700

MHz frequency band is currently being developed. The assignment is expected during or after 2020. Currently, the 700 MHz band is used by digital terrestrial television. The deployment of mobile networks in the 700 MHz spectrum largely depends on the implementation of mobile technologies in non-EU neighbouring countries (Bosnia and Herzegovina, Serbia, and Montenegro). The coordination process with neighbouring countries should be finished soon.

As a finalisation of the activities of the SEDDIF (South European Digital Dividend Implementation Forum), in December 2017 Croatia has signed the Framework Multilateral Agreement between the administrations of Albania, Croatia, Greece, Italy, Montenegro, San Marino and Slovenia on the re-planning principles for the frequency plan concerning future digital terrestrial television networks in the frequency band 470-694 MHz (so-called sub-700 MHz band). In this context, Albania and San Marino have not yet signed the agreement at the time of writing this report.

b. National and EU investment in broadband

Croatia is a weak performer in terms of fast and ultrafast broadband coverage based on DESI 2018 connectivity score (67% and 34% respectively). There is still a lack of commercial interest for the construction of fixed electronic communications infrastructure in rural areas, while the complexity of the procedures and documentation required for the development of the projects, suitable for co-financing from ESI funds, significantly slow down the implementation of the National broadband plan. In this segment, operators especially emphasize the unsolved property-rights relationships and the lack of a digital database of existing (already built) electronic communications infrastructure and other utility infrastructure suitable for broadband deployment.

Similarly, regarding take-up of fast or ultrafast broadband Croatia performs low in DESI 2018 connectivity score (14% and 1.4%). The main reasons for the low take-up of broadband in Croatia are the lack of new services that need high capacity and speed, which is visible on HAKOM's interactive GIS portal.[52]

Generally, the number of end-users who use an FTTH connection is increasing, which is mainly the result of new investments in fibre networks and the fact that the incumbent started to utilize already built fibre networks.

The incumbent has continued with the upgrading of its copper networks by building street cabinets (around 200 new cabinets from the beginning of 2017). Besides building new street cabinets, the incumbent also started to use vectoring technology. Additionally, the incumbent started to deploy a FTTB/FTTDP network which by now has been only deployed by Iskon Internet which is 100% owned by the incumbent. Both operators have plans to use G.fast technology on FTTB networks in the near future.

[52] http://mapiranje.hakom.hr/en-US/

The National Framework Programme for the Development of Broadband Infrastructure in Areas Lacking from the Sufficient Commercial Interest for Investment (hereinafter: ONP) represents the national (umbrella) broadband state aid scheme. In accordance with that HAKOM established a separate internal organisational unit to perform the tasks set out within the ONP programme. The investments in Access scheme rollout was approved by the European Commission and is ongoing.

The National Program for Backhaul Broadband Infrastructure covers State aid measures for the backhaul part of NGN networks in white and grey areas. Similar to the ONP, the NPBBI programme also represents an operative programme until 2020, aligned with the ESI funds financial perspective, aimed at reaching DAE targets within the same period. In this context, the NPBBI plan has experienced significant slowdown and in particular alternative operators are urging for faster implementation in order to challenge the monopoly of the incumbent in this area.[53]

Moreover, both programmes support only broadband infrastructure with a speed of at least 30 Mbps to 100 Mbps with upgrade opportunities, excluding the possibility of upgrading existing copper infrastructure.

Over the past year, there has been a noticeable increased interest of citizens who demand through their municipality representatives the introduction of new NGA infrastructure and participation in the National Framework Programme. In addition, political awareness of the importance of these projects and NGA infrastructure in general is increasing.

c. Implementation of the Broadband Cost Reduction Directive

The national measures to transpose the Broadband Cost Reduction Directive[54] were adopted but the single information point is not operational yet. The establishment of such a system is placed under the jurisdiction of the State Geodetic Administration.

The practical application of the Directive 2014/61/EU is manifested in the obligation of contractors to announce ongoing and planned civil works on the website of the State Geodetic Administration and related electronic service is available on the Internet.[55] The provisions of the Directive are transposed and enforced by the Act on Measures to Reduce the Cost of Deploying High-speed Electronic Communications Networks, which came into force at the end of 2016, and by the Act on Amendments to the Electronic communications Act, which came into force in July 2017. The State Geodetic Administration has started with preparations for the establishment of an information system of the Croatian Cadastre of Infrastructure (HR-KI) and a single information point.[56]

There are no formal obstacles concerning network sharing and it depends solely on the operators' decision. HAKOM has no official information on network sharing between the operators. Furthermore, many operators who are planning deployment of network

[53] In this context, from April 2018 the Croatian government has intensified the NPBBI programme for final adoption

[54] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[55] https://e-obavijesti.dgu.hr/

[56] The technical specifications are in a high degree of readiness as of April 2018 and ready for the upcoming announcement as part of the tender documentation.

infrastructure complain about the excessive costs for the right of way charged by the local municipalities.

3. Regulatory function

The following remedies are applicable to copper and fibre networks: access, non-discrimination, transparency, price control, cost accounting and accounting separation

HAKOM did not change the regulatory approach to bundled offers in 2017. A margin squeeze test remains as a regulatory obligation on retail market and broadband markets 3a and 3b (2014). In this context, HAKOM improved the margin squeeze methodology in relation to promotional offers' treatment in a way that includes now a greater scope of additional products and services offered in bundles. The updated margin squeeze methodology has been applied since 1st of January 2017.

The regulatory decisions notified by HAKOM and assessed by the Commission included:

- Decision on amendments of market analysis for wholesale voice call termination on individual mobile networks HR_2017_2019 – concerned amendments of the access obligation imposed on the market for wholesale voice call termination on individual mobile networks. Particularly, HAKOM proposed to impose the obligation to provide IP interconnection on request on all three SMP operators (Hrvatski Telekom, Vipnet and Tele2) from 1 January 2018, at the latest. The Commission commented on the need to notify a measure falling within the scope of Article 7(3) of Directive 2002/21/EC taking note that in February 2017 HAKOM made technical amendments (February 2017 amendments) to the decision on the conditions for IP interconnection from May 2015, notified to the Commission under case HR/2015/1729. The Commission pointed out that the February 2017 amendments were not notified to the Commission.

- Decision on amendments on the market for wholesale local access provided at a fixed location HR_2017_1995 - concerned a number of amendments of HT's LLU Reference Offer related to: i) the introduction of FTTB/FTTDP[57] to HT's fixed network, ii) the introduction of a fee for the usage of diesel generators in the central office and iii) changes concerning the upgrade of the cooper network. The Commissions commented on the vectoring implementation and appropriateness of the substitute virtual access product. The Commission further asked HAKOM to request HT to publish a roadmap which lays out in detail in which areas, at which street cabinets or local exchanges and within which timeframe HT intends to deploy vectoring and to allow for an expression of interest of alternative operators in a VULA product for each new deployment phase.

- Decision on WBA RO amendments on the market for wholesale central access provided at a fixed location for mass – market products HR_2017_1996 – concerned amendments of HT's WBA Reference offer related to the introduction of the FTTB/FTTDP infrastructure defining the monthly fee for: FTTB WBA service (for access at OLT, Ethernet and IP layer), the virtual channels for IPTV service, VOIP service and customer monitoring equipment on the FTTB infrastructure. All prices are based on the BU-LRIC+ cost model. Regarding the proposed prices for WBA on

[57] Fibre to the building/ fibre to the distribution point.

FTTB, HAKOM explained that they were set through the same model previously used for setting WBA on FTTH but taking into account different types of FTTB solutions.

- Decision on access to the fixed telephone network in Croatia – remedies-HR_2017_2035- concerned HAKOM's proposal to impose an additional monthly fee (additional fee) to be charged for the bundle of WLR and BSA services for access speeds equal or higher than 30 Mbit/s. The price for the standalone WLR and the price for the bundled WLR for speeds below 30 Mbit/s remained unchanged. The Commission in its comment called HAKOM to ensure a consistent regulatory approach across the regulated markets.

The mandate of the 5 member HAKOM council will end on 22 February 2018 and at the end of 2017 the Croatian government has launched a call for new HAKOM council members in order to be appointed by the parliament for the 5 year term.[58]

4. Consumer matters

Consumers complain about provisions which allow agents to sell contracts over the phone. Often misleading promises seem to be given over the phone but users apparently receive a notification by post with all needed information and can use their right to withdraw from contract in 14 days after receiving such notification.

HAKOM has received 1 218 complaints and 703 complaints have been resolved as disputes between end-users and their operators until October 2017. The terms of contracts were a main source of consumer complaints in 2017.

In April 2017 HAKOM launched HAKOMetar Plus, a mobile application for users in order to measure the download and upload data rate as well as the ping and signal strength of their internet connection (mobile and WLAN network). It also provides some network services tests. Also, HAKOM uses these results for cross-checking that the published information (coverage maps and available speeds in mobile networks) are consistent with monitoring results.

a. Roaming

HAKOM did not face any non-compliance with the new roaming rules and did not observe increases of domestic prices, neither before nor after 15 June 2017. The main issue in this context was not related to Roam Like at Home[59] (RLAH) but rather to the nature of the international calls (charging).

Regarding sanctions the Croatian Electronic Communications Act defines the possibility to impose fines from HRK 100 000 to 1 000 000 for the undertaking in case of non-compliance with the rules and terms provided for in the Roaming Regulation, and fines from HRK 20 000 to 100 000 for the responsible person in the undertaking.

[58] On 18 March 2018 the Croatian government has decided to propose Mr. Tonko Obuljen to serve as president of HAKOM council for the next 5 year mandate. The decision still needs to be approved by the parliament.
[59] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

HAKOM has the power to initiate misdemeanour proceedings before the competent court and to propose the fine. The NRA may impose the fine directly, but it would be automatically suspended in case of the appeal. The final imposition of the penalty is therefore the sole authority of the court.

Following the introduction of RLAH in June 2017, Croatian subscribers consumed 3.9 times more voice and 10.6 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[60]

b. Net neutrality

In order to evaluate traffic management practices applied by ISPs, at the end of 2016, HAKOM started a project in cooperation with the Faculty of Electrical Engineering and Computing, University of Zagreb, in order to produce a detailed questionnaire for existing implemented traffic management practices of ISP's in Croatia.[61] The questionnaire has been finalized and it is in line with the recently adopted BEREC net neutrality regulatory assessment methodology. Depending on the project results, HAKOM will decide whether any amendments to secondary legislation are necessary.

The exact range of fines for all net neutrality breaches is HRK 100 000 to 1 000 000 for a legal person and HRK 20 000 to 100 000 for a responsible person within the legal person. All breaches are contained in the same provision i.e. Article 119, Paragraph 1 and Subparagraph 70 of the Electronic Communications Act (OG 73/08, 90/11, 133/12, 80/13, 71/14, 72/17). The law does not provide for daily/weekly penalties. HAKOM has a power to initiate misdemeanour proceedings before the competent court and to propose the fine. The NRA may impose the fine directly, but it would be automatically suspended in case of the appeal. The final imposition of the penalty is therefore a sole authority of the court.

HAKOM initiated an informal investigation of Vipnet's zero rated VIP NOW streaming offer and concluded that this offer was not in line with Regulation (EU) 2015/2120[62] because the service can freely be accessed after the exhaustion of the user's data cap, while all other internet traffic is charged. After received a warning VIP adjusted its offer to comply with HAKOM's interpretation of the Regulation. Moreovre, HAKOM also initiated a review on the tariff option "StreamOn" of HrvatskiTelekom which is a zero-rating offer. The bandwidth for video streams is throttled to a maximum of 2 Mbit/s (max. resolution of 480p) representing unequal treatment of data traffic and as such is currently assessed under Art. 3(3) of Regulation (EU) 2015/2120.

c. 112

The competent national authority dealing with 112, the National Protection and Rescue Directorate, has actively promoted 112 at national level as the European emergency number,

[60] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[61] covering the following issues: QoS mechanism used in the network; number of traffic classes and implemented rules of prioritization; aggregation factors used; peak traffic values on average in busy hour; rules for upgrading operators network elements; security issues.

[62] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

conducted awareness-raising measures addressing travellers from EU countries (tourist information brochures, signs on main traffic routes, activities on social media etc.)

There is no new legislation in place laying down caller location accuracy and reliability criteria for the European emergency number 112. The Ministry of the Sea, Transport and Infrastructure is s in charge of regulating this subject. Handset-based caller location is not yet deployed. The Croatian PSAP plans to provide such service in the following years. The Commission services are looking into the matter.

d. Universal service

There have been no changes concerning the scope, designation or financing of universal service[63] since January 2017. Public payphones, directories and/or directory enquiry services are in the scope of the universal service obligation. Broadband access is included in the current scope. A universal service operator is obliged to provide data communications on each reasonable request at a minimum speed of 1 Mbit/s, with the price approved by HAKOM. There are no changes in the designation of universal service providers.

5. Conclusion

Croatia stays among the low performers in connectivity while it improved its overall score. Regarding fixed broadband coverage of households Croatia performs above the EU average which is the category where the highest improvement over the last year was achieved. However, fast and ultrafast broadband coverage remain very low. Broadband services are available throughout the country but the take up of fast and of ultra-fast broadband is very low. Different aspects can be seen as factors which contribute to the low take-up, including low internet use, and relatively high prices for (fast) broadband.

The incumbent HT Group still controls more than 71% of the fixed market in Croatia. The Croatian Competition Protection Agency has granted an extension of the incumbent's control of Optima Telekom by 2021 and such decision will not improve the competitiveness of the sector.

National investment in broadband is improving but more focused regulation could be beneficial to increase the investments of alternative operators. Moreover, regulation could focus on the alleviation of market imbalances to improve Croatia's position, having the lowest score in the Broadband price index. This may provide at least part of the explanation for low take-up rates across all technologies and speeds.

Croatia could focus more on its low connectivity in order to be able to achieve the Digital Agenda Europe goals and in particular to reach fast broadband coverage of the entire population by broadband speeds of at least 30 Mbps. It would be beneficial to speed up the rollout of the approved EU-funded access scheme and in particular the NPBBI backhaul rollout which seems to be particularly delayed and would be most valuable for alternative operators. In general, Croatia could be more vigilant to ensure competitiveness of the market. This would benefit the consumers and would stimulate investments in the fast internet infrastructure and take-up of related retail products. If no action is taken Croatia is risking falling even more behind in the area of digital society.

[63] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

Cyprus

Market developments

1. Competitive environment

The incumbent operator CYTA dominates both the fixed and mobile market but faces increasing competition that has led to eroding market shares.

CYTA expressed its intention to launch a new retail high-speed broadband service in early 2018, utilising FTTH (GPON, currently in pilot phase) and copper (using vectoring/ bonding). At the same time CYTA has expanded its coverage of 4.5G.

The mobile operator MTN has progressively entered the fixed (telephony & broadband) market and offers also pay TV services.

Both CYTA and MTN have made substantial progress deploying their LTE networks and in fact have already fulfilled or are close to fulfilling all relevant coverage obligations.

The mobile operator Primetel has gradually gained market share and has exercised some competitive pressure, which resulted in reduced retail prices. Its offering covers the entire range of services (fixed, mobile, internet and pay TV).

The cable TV provider Cablenet covers most major cities (Nicosia, Limasol, Larnaca) with its own network (Docsis 3.0). It also offers services to selected customers in other cities, utilising CYTA's wholesale access products. Cablenet has also launched mobile telephony services (MVNO agreement with CYTA).

No major changes to the market structure occurred in 2017, with only a small operator (offering fixed & mobile services as MVNO) ceasing operations.

All major market players focus on bundling to leverage a competitive advantage; in fact they increasingly seek to offer converged (fixed and mobile) services. They all perceive content as an important competitive driver and therefore integrate a pay TV offering in their packages. Most of them have sought to acquire rights, particularly related to football games. However, football related rights come with substantial costs that cannot always be recovered by the corresponding revenues. The Commission for the Protection of Competition (CPC) investigates potential infringements of competition law relating to the retail pricing of pay TV services. Pirate services, particularly covering sports events, have disrupted the operators' plans and are a major issue of concern.

Operators in general did not pursue co-investment strategies, despite their tendencies to expand their footprints either geographically or across markets. However, there are occasional joint projects (e.g. CYTA and Cablenet co-investing to install a network connecting Limassol and Pafos; Primetel and MTN making a Radio Access Network (RAN) sharing agreement on MTN’s network).

Based on the observed trends and plans of the main operators, it is expected that Cyprus will meet the national targets regarding coverage of high-speed broadband networks. On the other hand, the take-up of high-speed broadband services is still lagging behind. Demand side measures are therefore envisaged in the national Broadband plan, to increase digital awareness and encourage broadband adoption.

a. Fixed Markets

Fixed broadband market shares	CY-2016	CY-2017	EU-2017
Incumbent market share in fixed broadband	60.4%	57.6%	40.3%
Technology market shares			
DSL	79.6%	79.6%	64.2%
Cable	20.3%	20.4%	19.4%
FTTH/B	0.03%	-	12.9%
Other	0.1%	0.05%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

The data reflect stability in the technology market shares and coverage, which remain higher than the EU average in all categories. The incumbent's market share in broadband continues reducing at approximately three percentiles, i.e. at the same pace as in past years. The cable TV network has emerged as an important alternative infrastructure, retaining a stable 20% market share in fixed broadband, slightly above the EU average.

New entrants' DSL subscriptions by type of access (VDSL excluded)	CY-2016	CY-2017	EU-2017
Own network	-	-	0.5%
Full LLU	54.4%	47.4%	72.8%
Shared Access	0.04%	0.02%	4.1%
Bitstream	45.5%	52.5%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Current new entrants' trend seems to favour service based competition, moving away from LLU and towards bitstream, increasing the share of the latter by seven percentile points.

Coverage	CY-2016	CY-2017	EU-2017
Fixed broadband coverage (total)	> 99.5%	> 99.5%	97.4%
Fixed broadband coverage (rural)	> 99.5%	> 99.5%	92.4%
Fixed NGA coverage (total)	87.5%	87.5%	80.1%
Fixed NGA coverage (rural)	60.0%	60.0%	46.9%
Ultrafast coverage (total)	no data	85.1%	57.8%
4G coverage (average of operators)	64.2%	77.3%	90.8%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

While mobile 4G coverage lags behind the EU average, fixed broadband coverage (including NGA and ultrafast) are substantially higher. However, take up of high-speed services remains low, with only 11.5% of broadband access lines subscribing to services at speeds between 30 Mbps and 100 Mbps, and only 0.3% to services at speeds above 100 Mbps[64].

[64] Source: Communications Committee, data as of July 2017.

Fixed broadband prices	CY-2016	CY-2017	EU-2017
Fixed broadband price index [values between 0-100]	62	65	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

Fixed broadband prices[65] in Cyprus are in general higher than the EU average for high-speed baskets (above 10 Mbps) but close to and often lower than the EU average for low speed baskets (below 10 Mbps). This is fully reflected in the distribution of broadband subscriptions by speed, as Cyprus is the only EU Member State, where the majority of broadband lines (58%) are at speeds below 10Mbps, and this percentage remains practically stable since last year.

At The current lack of attractive retail offerings for ultra-high speed services (at and above 100 Mbps) can explain the very low uptake[66], despite their relatively high coverage, which exceeds the EU average.

On the other hand, 3-play offers are more attractively positioned. For example, in the 12-30 Mbps basket the least expensive price (PPP) in Cyprus is 6.8% higher than the EU average for 3-play services but 31.8% higher for Internet + telephony and 45.4% higher for Internet only services; in the 30-100 Mbps basket the least expensive price (PPP) in Cyprus is 2.9% higher than the EU average for 3-play services but 24% higher for Internet + telephony and 31.9% higher for Internet only services. This reflects an emphasis from the part of operators to push bundles, particularly including TV services.

b. Mobile market

Mobile market	CY-2016	CY-2017	EU-2017
Market share of market leader	58.5%	54.4%	35.4%
Market share of second largest operator	34.1%	36.0%	28.5%
Number of MNOs	3	3	-
Number of MVNOs	2	1	-
Market share of MVNO (SIM cards)	0.8%	0.9%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

The mobile market in Cyprus is duopolistic, with the two largest operators having a combined market share of above 90% (compared to just under 64% in the EU). Mobile operators invest in 4G coverage, which is currently estimated to 77% of households (compared to 64% a year ago) and is being expanded. Despite such progress, Cyprus is still lagging behind, as all other Member States exhibit coverage well above 90% of households.

Mobile broadband prices [EUR/PPP]	CY-2016	CY-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€35.8	€26.4	€23.6
Least expensive offer for tablet and laptop (5 GB basket)	€43.4	€42.4	€16.7

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

[65] Source: Study for fixed broadband prices in Europe 2017 (Empirica, project SMART 2016/0044) - forthcoming.

[66] In 2017 only 0.2% of households subscribe to broadband services with speeds at and above 100 Mbps.

Mobile prices seem to remain a barrier to a wider uptake of mobile broadband. Increasing competition has led to a rapid reduction in prices for bundles (mobile voice & data), by more than 25% compared to 2016, and a progressive convergence towards the EU average. On the other hand prices for data only packages (for tablet and laptop) remain excessively high, more than 2.5 times the EU average. This reflects a possible lack of interest from the part of operators to promote mobile broadband only products and could be related also to the overall tendency in favour of bundles (see also section 1a on the fixed market).

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Overall, Cyprus has assigned 44.5% of the overall harmonised spectrum for broadband, compared to the average of 69% EU-wide.

LTE roll-out has proceeded ahead of schedule. Mobile operators had already reached the coverage target for end 2018 (50% of Cyprus territory) since mid-2016 and have reached the 2020 target (75% of the territory) since mid-2017.

During 2017 there have not been any major developments concerning spectrum assignments for wireless broadband, including the granting of any licences.

Cyprus plans to initiate, within the first semester of 2018, the procedure for authorising available (free) spectrum for WBB within the following frequency bands: 800 MHz (20 MHz), 1.5 GHz (40 MHz), 2 GHz (30 MHz) and 2.6 GHz (55 MHz). These represent 13.3% of the harmonised spectrum.

For the 700 MHz band, Cyprus is currently seeking secure frequencies below 700 MHz, in order to migrate a national DTV operator, who transmits exclusively within the 700 MHz band. For this purpose, Cyprus has processed new assignments to ITU, through the procedures described in the GE06 Plan, and has concluded the coordination procedure with all neighbouring States[67], except Turkey, which refuses to enter into any coordination discussions with Cyprus. An EU-assistance under Article 10(2) of the Radio Spectrum Policy Programme (RSPP) has been requested on 22 August 2017. The issue has also been communicated to the ITU.

At the time of writing, there were no specific plans concerning the use of the sub-700 MHz band.

5G trials are not yet planned, as it does not appear to be a priority either for the State or for the market players; the latter focus mostly towards expanding and commercially exploiting their 4G and 4.5G networks. On the other hand, there are no technical or administrative barriers, as the first band likely to be used for 5G use would be the 3.4-3.8 GHz band, which is already free.

There are no plans in Cyprus for 2G/3G network phase-out or spectrum refarming, as 2G technology will likely continue to be utilised for M2M applications.

[67] Greece, Israel, Palestine, Lebanon, Syria and Egypt.

b. National and EU investment in broadband

The Cyprus Broadband Plan sets targets in line with the Digital Agenda for Europe, specifically: 100% coverage at 30 Mbps by 2020; 50% take-up rate for 100 Mbps. However, it is not adjusted to the targets of the European Gigabit Society[68] or to the 5G Action Plan[69].

The Plan does not provide for supply side measures, having taken into account the market players' stated intention to expand their broadband networks. However, it is acknowledged that the deployment of fast and ultra-fast broadband networks in remote, rural areas is not commercially viable.

Furthermore, the relevant Action Plan 2015-17 within the framework of the Digital Strategy includes awareness campaigns, training programmes for the general population to enhance their digital skills, building of confidence in the security of online transactions, crucial reduction on broadband price, the digitalisation of the government, the digitisation of companies, and the provision of (limited) free Wi-Fi access in public buildings and all villages.

The implementation of the plan lags behind schedule and for several of the projects the money still has to the committed. Among the challenges faced in its timely execution are the court actions customarily taken during most public procurements and causing delays (e-government projects), until relevant decisions are issued. Against this background, market participants have expressed their concern on the persisting low demand for high-speed services.

c. Implementation of the Broadband Cost Reduction Directive

The Broadband Cost Reduction Directive[70] had already been transposed since last year through the Regulation of Electronic Communications and Postal Services (Amendment) Law of 2016[71] and several actions for its practical implementation are under way.

OCECPR has developed a Geographic Information System (GIS) portal (operational since March 2017) that serves the transparency of existing physical infrastructure. The portal provides information on infrastructure elements of electronic communications networks such as duct routes and number of ducts, location and type of manholes, and location of poles and cabinets. It also provides information on location and route of utilities infrastructures (those available in electronic form). Future plans include making it interoperable with an electronic fully automated permit granting procedure, and adding duct availability and broadband ready buildings. OCECPR has requested information on existing physical infrastructure of any network operator (location and route, type and current use, contact point) from all competent agencies (Sewage Boards, Water Supply Boards, Electricity Authority, Water Development Department and Public Works Department). So far however, no information is available, except from contact details.

---

[68] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Connectivity for a Competitive Digital Single Market — Towards a European Gigabit Society (COM (2016) 587 final)

[69] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — 5G for Europe: An action plan (COM (2016) 588 final)

[70] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1)

[71] "Ο περί Ρυθμίσεως Ηλεκτρονικών Επικοινωνιών και Ταχυδρομικών Υπηρεσιών (Τροποποιητικός) Νόμος του 2016", 104(I)/2016 (14/10/2016).

In order to promote broadband ready buildings, there is consideration for the introduction of a 'broadband ready' label for buildings equipped with the appropriate, high-speed ready in-building infrastructure.

By the end of 2017 no use has yet been made of the exception to the access to passive infrastructure (Article 3(f) nor of any other exemptions foreseen in the Directive. Also, there have not been any requests for dispute resolution.

Infrastructure sharing involving other network operators is already used and in fact precedes the transposition of the Directive. One mobile operator has been using the Electricity Authority's (EA) poles.

On the other hand, mobile operators continue to report about the long time needed to obtain a permit and have expressed concerns on how the four month deadline, stipulated in the Directive and the transposing Law can be enforced in practice.

3. Regulatory function

Following the OCECPR Market Analysis Decision on Market 3a (wholesale local access)[72], CYTA has started to develop a reference offer and prices for a VULA wholesale product. In parallel CYTA has stated its intention to launch a retail high-speed broadband service in early 2018, which will be based on FTTH (GPON) or copper with vectoring.

A pilot for the interconnection of CYTA with alternative operators was successfully concluded in mid-November 2017 (phase 1). The final plan, as to where they intend to deploy fiber network, the draft reference offer and the final wholesale prices were anticipated in December 2017[73].

The market players see the introduction of VULA as a positive development but are concerned with the complete lack of information on the prices and terms of the product. Their main concern is the possibility of a very short deadline, which in their view would disallow them to properly prepare and introduce their own retail products.

In Cyprus, eight markets are still subject to SMP regulation

- All markets identified in the Commission Recommendation on relevant markets of 2014, i.e. Market 1 (Wholesale call termination on individual public telephone networks provided at a fixed location), Market 2 (Wholesale voice call termination on individual mobile networks) Market 3a (Wholesale local access provided at a fixed location), Market 3b (Wholesale central access provided at a fixed location for mass-market products), and Market 4 (Wholesale high-quality access provided at a fixed location)

- The following markets of the 2003 Recommendation: Market 14 (Wholesale trunk segments of leased lines), Market 15 (Access and call origination on public mobile

[72] "Η περί των αποτελεσμάτων Εξέτασης Αγοράς και της Επιβολής Ρυθμιστικών Μέτρων στον Οργανισμό με Σημαντική Ισχύ στη σχετική Αγορά χονδρικής παροχής τοπικής πρόσβασης σε σταθερή θέση (Αγορά 3α), Απόφαση του 2017" 91/2017

[73] Until early March 2018, CYTA communicated the relevant information and data to OCECPR. OCECPR expects to complete the evaluation in April 2018.

telephone networks) and Market 18 (Broadcasting transmission services, to deliver broadcast content to end users)

All those markets have been analysed within the last three years. New market analysis notifications are expected in 2018.

The adopted regulated fixed termination rates (FTR) cap for 2017 has been 0.1033 €-cents per minute for local termination. For single and double transit termination the caps have respectively been 0.1363 and 0.2075 €-cents per minute. These rates apply symmetrically to all operators. The adopted regulated mobile termination rates (MTR) cap for 2017 has been 0.99 €-cents per minute for all MNOs/ MVNOs, with one exception. For Primetel, which has acquired spectrum rights in 2014, a glidepath has been imposed, allowing MTR 20% higher than the regulated cap for 2017 but reaching complete symmetry in 2018.

MTRs are currently regulated based on a benchmark approach (average of all EU countries that have applied a BULRIC model). However, for 2018 both MTRs and FTRs are expected to be revised on the basis of the results of a BULRIC model developed for OCECPR.

Following the analysis of markets 3a (wholesale local access) and 3b (wholesale central access), the Regulator has issued two decisions (April 2017) designating CYTA as an SMP in both markets and imposing regulatory remedies, including price control.

Two dispute resolution cases were reported during 2017, both following complaints by Primetel against CYTA. The first concerned alleged denial of provision of collocation at the subloop level (non-compliance with regulatory obligations in Market 3a). It resulted to the imposition of a fine (€5 000) on CYTA. The second concerned an alleged discrimination by CYTA with regard to fault repairs and timeframes in provision of services (non-compliance with obligations arising from reference offers on LLU and bitstream access). OCECPR rejected the request, on the ground of non-substantiation, and informed the applicant in detail about the information and data missing, leading to such rejection.

A new dispute resolution mechanism was established in 2017, following the transposition of the Broadband Cost Reduction Directive. However, there were not any specific cases referred to OCECPR in the framework of such new dispute resolution mechanisms.

4. Consumer matters

In 2017 the Commissioner received 174 complaints most of which were resolved through the mediation of the Commissioner. The majority concerned billing (91), contracts (30), quality of service (18), and security (13). According to the consumer association, among the main issues for consumer complaints are the quality of service, internet speed and financial penalties imposed by some (mobile) operators when switching.

a Roaming

The new roaming rules, which introduce Roam Like at Home (RLAH) and abolish retail roaming charges, are applicable in all EU Member States as of 15 June 2017[74]. In Cyprus, this

[74] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

has led to a substantial increase in roaming consumption. Specifically, Cypriot subscribers consumed 1.9 times more voice services when travelling in the EU in summer 2017 compared to summer 2016. They also consumed 18.5 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2015.[75] In this transition there have not been any derogation requests. No increases were observed in domestic prices before or after 15 June 2017. Also, no complaints were received during the summer period and after the new rules took effect on 15 June 2017, either by Cypriots roaming within in EU or by EU consumers roaming in Cyprus, regarding the quality of service. Finally, there have not been any cases of confirmed or potential non-compliance with the new roaming rules (since 15 June 2017).

b Net neutrality

OCECPR issued secondary legislation[76] on net neutrality, which came into force on 3rd March 2017. The Decree is intended to support the implementation of the Net Neutrality provisions in the Regulation (EU) 2015/2120[77] ("TSM Regulation") and to provide guidance on the monitoring and enforcement of compliance with the provisions of the Regulation. It takes into account the provisions of the Regulation, and the interpretation, recommendations and guidance provided in the BEREC Net Neutrality Guidelines[78].

Among others, the Decree imposes an obligation on ISPs to include speed values (minimum, standard and maximum speed, as percentage of advertised or estimated maximum speed) in their contracts or in their websites. It also interprets the notion of "*significant discrepancy, continuous or regularly recurring*", so as to facilitate the implementation of the Regulation. It also sets out the rules on penalties applicable, in case of infringements of the Net Neutrality rules. Penalties may reach the amount of €170 000 and can be doubled in case of recurrence. Furthermore, OCECPR may suspend the General Authorisation of the provider who violates the Law or the European Regulation.

Further to the issuance of secondary legislation, OCECPR has made available on its web site a free tool for the evaluation of performance of Broadband Connection Services (2B2T)[79] which is aligned with the BEREC Net Neutrality Guidelines. 2B2T is introduced in the provisions of OCECPR's secondary legislation as the only measurement tool approved for the performance evaluation of internet access services.

At the time of writing OCECPR was investigating three cases of potential infringement of net neutrality legislation. Two of them concern the use of zero-rating, specifically Facebook zero (a stripped-down text version of Facebook for which data charges are waived) and Akazoo (a music service offered as add-on to mobile contracts that enables subscribers to listen to unlimited ad-free music without being charged for the data traffic). The third is a case of loss

[75] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018. For the case of data services, the comparison is with Q3/2015, due to unavailability of data for Q3/2016.
[76] "Το Περί της Πρόσβασης στο Ανοικτό Διαδίκτυο Διάταγμα του 2017" 72/2017 (3/3/2017)
[77] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).
[78] BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules BoR (16) 127
[79] http://2b2t.ocecpr.org.cy

of service following a cyber-attack and involves potential infringements of both security legislation (obligation for taking measures to ensure the security of their network) and NN legislation.

c 112

For mobile caller location the accuracy is calculated based on the coverage and characteristics of individual cellular cells (maximum possible distance from the base-station) and it is about 30 meters from the cell ID. The average time for network based caller location identification is 20 sec. Two alternative means for access to emergency services are currently available, by fax and SMS to a long number (99510408). As part of the eCall upgrade, a 112 smartphone application was developed that allows users to send location data to the PSAP, with the use of the mobile phone's built in GPS unit. Official launch of the service is expected in 2018.

d Universal service

There were no new developments or changes to report since last year in the scope of universal service[80] or the designation process. Broadband is not included and its possible inclusion within the US scope is currently not under consideration. The financing of unfair burden is shared between providers. However, the financing mechanism has not yet been activated.

5. Conclusion

Fixed broadband coverage (including NGA and ultrafast) is above EU average in Cyprus. The stated intention of CYTA to introduce services based on FTTH or vectoring and the preparation of a corresponding VULA wholesale product is an important step towards achieving the Gigabit Society objectives. Adherence to the relevant OCECPR Market Analysis Decisions can ensure that such initiative does not threaten competition.

Mobile 4G coverage lags behind the EU average. An accelerated launch of additional spectrum assignment procedures in the first semester of 2018 can help operators (particularly small ones and new entrants) further deploy wireless broadband networks, particularly for high and ultra-high speed networks. Progress is observed towards the effective implementation of the Broadband Cost Reduction Directive. Its impact in the deployment of high-speed broadband infrastructure remains to be seen, particularly relating to the time needed for issuing permits for antenna constructs.

The main challenge remains to foster the take-up of high-speed broadband, influenced by factors, such as pricing, lack of compelling content and low digital literacy. Updating the Broadband Plan as foreseen provides an important opportunity to bring it in line with the objectives of the Gigabit Society and the 5G action plan, to define focused actions, effectively utilising instruments available at European level, and to set out its efficient and closely monitored execution.

[80] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

Czech Republic

Market developments

1. Competitive environment

Fixed broadband prices	CZ-2016	CZ-2017	EU-2017
Fixed broadband price index [values between 0-100]	88	87	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

Fixed broadband is the most common service in bundles (98% of all bundles). The second most common service in bundles is pay TV (67 % of all bundles). The most favourite setup of a bundle is pay TV & fixed broadband (42% of all bundles).

a. Fixed Markets

Fixed broadband market shares	CZ-2016	CZ-2017	EU-2017
Incumbent[81] market share in fixed broadband	26.4%	24.0%	40.3%
Technology market shares			
DSL	31.0%	29.3%	64.2%
Cable	18.1%	17.8%	19.4%
FTTH/B	16.8%	17.5%	12.9%
Other	34.1%	35.4%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	CZ-2016	CZ-2017	EU-2017
Own network	1%	1%	0.5%
Full LLU	25.5%	46.6%	72.8%
Shared Access	0.3%	0.3%	4.1%
Bitstream	73.5%	52.1%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

The Czech telecoms market has a number of notable features. The incumbent[82] voluntarily separated in 2015. Before the separation, its delayed broadband deployment on its DSL network saw the emergence of a large number of local alternative operators (more than 1 000) that use Fixed Wireless Access (FWA) technology, including WiFi technology. These

[81] Under the term 'incumbent', the data in the table refers to O2 Czech Republic that is present only on the fixed retail market. CETIN is the incumbent on the wholesale market as explained in the section on the voluntary separation

[82] In June 2015, O2 Czech Republic a.s. (the former vertically integrated incumbent) voluntarily separated into two companies:

- Česká telekomunikační infrastruktura a.s.(CETIN), which retained the infrastructure of the former vertically integrated incumbent and now acts solely as a wholesale service provider; and
- O2 Czech Republic, which provides retail services on the fixed market and is also a mobile network operator (holder of frequency licences and owner of mobile exchanges) that offers both retail and wholesale services on the mobile market.

operators exert considerable competitive pressure on the wholesale incumbent, with FWA representing one-third of the technology used in the broadband market. The FWA gained market share in 2017 providing for most new subscriptions, boosted also due to the new spectrum allocations in the 3.7 GHz band. However, it is worth noting that the deployment of FTTH/B networks was driven by these local operators, while the incumbent is focusing on the upgrade of its copper network to VDSL. Cable companies — CATV providers — have had a stable number of subscribers and market share in recent years. The main CATV provider enjoys a market share of more than 80% in this segment. Its urban footprint is a major competitive constraint for the retail incumbent as cable provides the wide majority of ultrafast broadband connections (above 100Mbps) in the Czech Republic. There are no wholesale access products available via cable.

In 2017, the new entrant's share of DSL subscription by type of access changed due to the significant migration from CETINS's ADSL bitstream access to its VDSL offer. Hence, although in absolute terms the number of fully unbundled lines decreased marginally, the uptake of ADSL bitstream access halved in this period. Still, 52.1% of the new entrants' DSL broadband subscriptions use ADSL bitstream access – down from 73.5% last year, but still much higher than the EU average of 14.7%. However, new entrants using xDSL account for only a small share of the fixed broadband market – 5,7%. On the other hand, the retail incumbent O2 relies heavily on the ADSL and VDSL bitstream access lines supplied by the wholesale incumbent CETIN.

In 2017, CETIN continued upgrading its DSL network to VDSL. This is part of the CZK 22 billion plan (approx. €800 million) launched in 2015 to develop NGNs over the next seven years, mainly by upgrading its network to VDSL2, VDSL3 and vectoring technology. This year the lease of VDSL lines to new entrants grew to more than double.

CETIN offers three-year and seven-year contracts with long-term volume commitments for wholesale bitstream access seekers. 21 companies used the bitstream reference offer ('mass market offer') that is adjusted in 2017 as well.

Coverage	CZ-2016	CZ-2017	EU-2017
Fixed broadband coverage (total)	99%	98%	97%
Fixed broadband coverage (rural)	97%	95%	92%
Fixed NGA coverage (total)	75%	89%	80%
Fixed NGA coverage (rural)	52%	59%	47%
Ultrafast coverage (total)	no data	60%	58%
4G coverage (average of operators)	94%	99%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

While the target for fixed broadband full coverage is almost met, next generation access (NGA) coverage jumped above the EU average. With regard to the take up of fast broadband (32%) and ultrafast broadband (15.8%) the Czech Republic is performing close to the EU average of 33% and 15.4% respectively. The ultrafast broadband uptake is exclusively catered for by new entrants. The digital divide is best illustrated by NGA coverage, where urban areas are much better served than rural ones. In rural areas, the lack of infrastructure is expected to be tackled with structural intervention co-financed by EU funds. In terms of mobile broadband 4G coverage is almost ubiquitous (99%).

The fixed market can be influenced by fixed wireless access (FWA) providers PODA and Nordic Telecom companies that acquired licences for rights of use for radio frequencies 3.7 GHz band in the 2017 auction.

In 2017 a consolidation process took place in the fixed broadband access market. Kaprain Industrial Holding – owner of the broadband access provider "Nej.cz" – extended its portfolio by purchasing "RIO Media". The merged companies will represent the 5th largest broadband access provider in the Czech Republic. The merger was not notified to the NCA as it did not meet the minimum turnover threshold.

Evidence of fixed mobile substitution was already stated by the Czech Telecommunication Office (ČTÚ) in the analysis of former relevant Market 1/2007 (Access to the public telephone network at a fixed location for residential and non-residential customers) and Market 2/2007 (Call origination on the public telephone network provided at a fixed location[83]. In the second quarter of 2017 the market share of mobile subscribers reached 89.7 % of the total sum of subscribers. In the same period the share of mobile voice traffic reached 93.1 % of the total voice traffic.

b. Mobile market

Mobile market	CZ-2016	CZ-2017	EU-2017
Market share of market leader	42%	42%	35%
Market share of second largest operator	33%	32%	28%
Number of MNOs	4	4	-
Number of MVNOs	1	1	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

There are three GSM/UMTS/LTE network operators and one CDMA network operator in the Czech mobile market. The CDMA network operator decided to switch off CDMA network and replace it with the LTE network. The process is expected to be completed in 2018. Under the LTE licences obtained as part of the 2013 spectrum auction, MNOs are obliged to provide regulated access to their LTE networks at wholesale prices which will enable profitable replicability of their retail services. In 2017 ČTÚ adapted the regulated wholesale price twice and notified them to the MNOs. One full MVNO is present on the Czech market, whereas other 157 MVNOs are branded resellers having commercially agreed wholesale access agreements with MNOs/MVNE.

According to the NRA, the most common technology for mobile backhaul was microwave lines (67,7%), while fibre made up only 21,2% of the available backhaul. As a preliminary assessment of ČTÚ fibre or enhanced radio (e.g. 80 GHz) backhaul capacity needs are expected to grow in line with the mobile data volume increase. Small/femto cells could be connected to the backhaul through regulated fixed access products - LLU or bitstream (VDSL). In 2017 ČTÚ decided to analyse the mobile backhaul market in order to map the needs of mobile operators and the existing capacity serving these needs. The analysis will be forward looking and takes in consideration the 5G deployment.

A network sharing agreement between O2 Czech Republic/CETIN and T-Mobile CZ has been in place since 2011, and its scope has been expanding. It currently covers all mobile

[83] Cases CZ/2016/1845 for (former) Market 1/2007 and CZ/2016/1844 for (former) Market 2/2007

technologies (2G, 3G and 4G) and the entire Czech Republic apart from Prague and Brno (which means it covers the other cities and all rural areas, which together account for about 85% of the population). On 25 October 2016 the European Commission started to investigate the network sharing agreement. The investigation was ongoing in 2017 and examines whether the agreement restricts competition and thereby breaches EU antitrust rules.

Two mobile operators signalled in public statements the gradual switch-off of their 3G network.

Mobile broadband prices [EUR/PPP]	CZ-2016	CZ-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€46	€44	€24
Least expensive offer for tablet and laptop (5 GB basket)	€26	€26	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Overall, mobile broadband prices remained high in the Czech Republic in 2016. Prices for both handset offers (€44/PPP versus €30/PPP) and tablet/laptop offers (€26/PPP versus €18/PPP) were significantly above the EU average.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In the Czech Republic, the percentage of the harmonised spectrum assigned for wireless broadband rose to 80% in 2017 due to the spectrum auction in the 3.6 – 3.8 GHz band.

On 29 August 2017 ČTÚ announced the assignment of radio frequencies in the 3.6 – 3.8 GHz band on the basis of the auction organised earlier that year. The winning applicants were: Nordic Telecom 5G a.s. (80 MHz), O2 Czech Republic a.s. (40 MHz), PODA a.s. (40 MHz) and Vodafone Czech Republic a.s. 40 MHz). The price of each block of 40 MHz was 203 000 000 Kč (approx. EUR 8 200 000). Suntel Net s.r.o. and T-Mobile Czech Republic a.s. applied unsuccessfully in the tender.

LTE is starting to be deployed in the 1800 MHz band as the refarming was completed in 2017. As a consequence, all former GSM licence holders now hold at least 20 MHz of contiguous spectrum.

The national roadmap for the deployment of WBB in the 700 MHz band is still under development. All necessary coordination agreements with neighbouring countries have already been concluded in 2017. National consultation is planned to be launched in 2018 followed in 2019 by auctions for the 700 MHz and 3.5 GHz band. The actual provision of services in the 700 MHz would start at the latest in 2021. PPDR obligations are expected to be accommodated in the 700 MHz band.

The amendment to the Electronic Communication Act of 19 July 2017, foresees the latest date for transition to the Terrestrial Digital Broadcasting DVB-T2 standard as being February 2021. According to national plans the sub-700 MHz band will be used for terrestrial digital TV broadcasting till 2030, in line with the national Digital TV broadcasting development strategy.

The 450 MHz CDMA license of the O2 Czech Republic a.s. was renewed under the technology neutrality principle based on a public consultation procedure. The price of spectrum was set on the basis of an independent expertise.

High spectrum fees were identified as a "financial barrier" in the Action Plan adopted by the Government in March 2017 to implement and facilitate the National NGN plan.

5G trials were announced in November 2017 by one of the operators. Public testing took place in the 3.6 GHz band in Prague.

b. National and EU investment in broadband

In 2016, the Czech Republic adopted the National Development Plan of the Next Generation Networks, which approaches the development of electronic communications networks in two levels. The first level is the identification of legislative or financial barriers with a proposal for action. In March 2017 the Czech Government adopted an Action Plan under National NGN Plan as on the basis of the identification of legislative or financial barriers with a proposal for action to address them. The Action plan lists a set of twenty measures that would focus amongst others on speeding up the permitting process and establishing rights of way. The legislation setting out the construction permitting process was amended accordingly.

In the Operational Programme Enterprise and Innovation for Competitiveness, €521 million (CZK 14 billion) is planned to support the NGA roll-out plan in rural areas. Providers of telecom networks and services are the main beneficiaries of the programme. The programme is expected to allocate grants to deploy NGA and backhaul. A first call for tender was organised in September 2017. However, the implementation of the subsidy scheme has suffered substantial delays and encountered a number of problems that will need to be addressed swiftly in order to prepare the second call in 2018.

c. Implementation of the Broadband Cost Reduction Directive (BB CDR)

In July 2017 the Czech Republic notified the Commission the measures it had taken to transpose the Directive[84] into national law, specifically through Law No 194/2017 on measures to reduce the costs of deploying high-speed electronic communications networks. The Commission is in the process of compliance assessment of the notified legislation.

The national regulator (ČTÚ) is tasked to be the dispute settlement body under the transposition of the Directive. ČTÚ has set up the Single information Point within its structures in Brno. The Ministry of Trade, in cooperation with the NRA, is preparing a guide for investors in electronic communication networks describing the implementation and functioning of the Cost Reduction legislation and the amended Construction law.

3. Regulatory function

Apart from the transposition of the BB CRD the Czech legislator adopted on 19 July 2017 the Law 252/2017 amending the Electronic Communications Act 127/2005. The scope of these amendments provide for consumer protection provisions and the DVB T2 deployment strategy:

[84] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

1) Reduction of the time needed or the effective switch of operators when porting numbers

2) The termination and renewal conditions of the contract

3) Higher sanctions applicable for breaches of consumer protection legislation in electronic communications, including those applicable for breaching the Net Neutrality and Roaming rules

4) Provisions relating to the DVB T2 strategy and deployment.

In 2017 ČTÚ almost completed the 4th round of market reviews[85]. On 26 May 2017 ČTÚ notified[86] the market analyses for wholesale local access and wholesale central access for mass-market products provided at a fixed location (3a and 3b of the 2014 Recommendation). The analysis took into consideration the voluntary separation of the incumbent. On 26 June 2017 the Commission adopted a decision[87] in which it asked ČTÚ to set out in its final measure the reasons for not including CATV and Wi-Fi based solutions in the relevant market. Furthermore, the Commission requested ČTÚ to observe the compliance of O2 and CETIN with their voluntary separation commitments, in particular the distinct management and supervisory structure, as well as separate headquarters, workforce, IT systems. Finally, the Commission asked ČTÚ to monitor the market situation in Markets 3a and 3b, both to ensure (a) that the commercial agreements in Market 3b are sustainable and foster market entry or expansion and (b) that its chosen approach (e.g. pricing flexibility with an "economic space test"), indeed, leads also to an improvement in competitive conditions in Market 3a, indicated, for example, through new market entry or expansion based on inputs obtainable on the wholesale local access market. ČTÚ is planning to notify the remedies in the first half of 2018. On 23 June 2017 ČTÚ notified[88] the market for wholesale high-quality access provided at a fixed location. On 19 July 2017 the Commission decision[89] was adopted to close the notifications without comments.

ČTÚ launched a public consultation on 17 August 2017, inviting for comments on the three criteria test regarding the 'mobile services market' (market 15 in the 2003 Recommendation) covering all network technologies (2G, 3G, 4G). While the mobile wholesale data market is not identified in the Commission Recommendation as susceptible to *ex ante* regulation, ČTÚ may identify such market as susceptible to *ex ante* regulation if an assessment carried out in the national circumstances proves that the so called 'three criteria test'[90] is met. The consultation ended on 17 October 2017[91]. Once the Czech NRA finds that one or more operators enjoy SMP and proposes the imposition of regulatory obligation(s) to redress the retail market failures identified, the Commission will review this measure under Article 7 of the Framework Directive.

[85] markets listed in the 2014 Recommendation
[86] Cases CZ/2017/1985 and CZ/2017/1986
[87] C(2017) 4500 final
[88] Case CZ/2017/1999
[89] C(2017) 5228 final
[90] Point 2 of the recommendation:
(a) the presence of high and non-transitory structural, legal or regulatory barriers to entry;
(b) a market structure which does not tend towards effective competition within the relevant time horizon, having regard to the state of infrastructure-based and other competition behind the barriers to entry;
(c) competition law alone is insufficient to adequately address the identified market failure(s).
[91] https://www.ctu.cz/vyzva-k-uplatneni-pripominek-k-navrhu-testu-tri-kriterii-pro-trh-mobilnich-sluzeb; the deadline for input was prolonged from 17 September to 17 October.

4. Consumer matters

ČTÚ received 1 774 consumer complaints as of 30 September 2017. The most common complaints are related to contractual terms, contracts and their amendments (419 complaints) and to billing (247 complaints).

a. Roaming

Following the introduction of Roam Like at Home[92] (RLAH) in June 2017, Czech subscribers consumed 2.3 times more voice and 6.6 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[93] No price increase was observed by ČTÚ in the case of MNOs.

ČTÚ received three sustainability derogation request from MVNOs but none was granted.

ČTÚ is currently examining a possible breach of Article 6e (3) of Regulation 531/2012. Specifically, there is a suspicion that the tariff provided in Articles 6a, 6b and 6e (1) has not been automatically applied to all existing customers by some operators as from 15 June 2017. ČTÚ is evaluating the impact of these practices on end-users and formal proceedings were not launched in 2017.

The sanction for breaching the RLAH rules were increased by the adoption of Law no. 252/2017 amending the Electronic Communications Act 127/2005, to 15 000 000 CZK or up to the 5 % of company turnover[94].

b. Net neutrality

In March 2017 ČTÚ published a guiding document on "selected issues of access to the open internet and European rules on network neutrality"[95]. The document provides guidance on the application of certain rules of Regulation (EU) 2015/2120[96] in the Czech Republic in particular on issues of zero-rating, internet access services with data caps and services blocking a certain type of content. The document also provides definition of fixed and mobile internet access service speeds and the definition of large, persistent and regularly occurring degradation of service/deviations in service provision. ČTÚ followed the BEREC guidelines in the document.

All Czech MNOs have a zero-rated service included in their offer.

---

[92] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[93] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[94] Subsection 12 and 22 of section 118 of the Act No. 127/2005 Coll. on Electronic Communications and on Amendment to Certain Related Acts.

[95] https://www.ctu.cz/sites/default/files/obsah/stranky/956/soubory/vyjadreniceskehotelekomunikacnihouradukvybranymotazkampristupukotevrenemuinternetuaevropskympravidlu.pdf

[96] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

The penalties applicable to the breach of net neutrality rules were increased with the adoption on 19 July 2017 of the Law 252/2017 amending the Electronic Communications Act 127/2005.[97] These penalties may reach up to CZK 15 000 000 (approximately EUR 600 000) or up to 5% of the net turnover.

In 2017 ČTÚ started administrative proceedings for several breaches of Regulation 2015/2120. These consisted in the breach of transparency obligations provided in Article 4(1) as well as breach of Article 3(1)-(2) consisting in different treatment of data traffic that was beyond the appropriate traffic management measures. Different treatment of data traffic was forbidden by the decision of ČTÚ, while providers were required to make an amendment to the terms of the contract.

c. Emergency communications and 112

Caller location requirements are provided in Decree No. 238/2007 on the transmission of data for the purpose of emergency calls. In June 2017 new requirements for caller location accuracy were imposed on operators. Consequently, as of 1 March 2018 MNOs will have to provide Sector ID based location to the authority handling the call. It is planned to implement the handset based caller location solution. To this end, the National Data Protection authority cleared the solution as being compliant with data protection rules. According to the COCOM report on the implementation of 112[98], access to emergency services for disabled end-users is ensured through text relay service. In 2017 the Czech Public Safety Answering System was upgraded to receive and handle eCall.

d. Universal service

Regarding universal service[99], on 7 June 2017 ČTÚ imposed on O2 Czech Republic a.s. the obligation to offer persons with special social needs accessible discounted[100] tariff plans. Furthermore, on 10 November 2017 ČTÚ imposed on O2 Czech Republic a.s. the obligation to provide public payphones for next three years.

5. Conclusion

The fixed NGA coverage is extending at good pace in the Czech Republic based on the incumbents' VDSL upgrade. However, the rural coverage lags behind and FTTB/FTTH deployment is almost exclusively deployed in urban areas. The implementation of the subsidy scheme financed from ESIF funds has suffered substantial delays and encountered a number of issues with regard to the design of the tender that will need to be addressed swiftly by the

[97] Section 118 (12) (p) of Act No. 127/2005 Coll. provides that an undertaking providing a publicly available electronic communications service commits an offense when […] contrary to a directly applicable European Union rules governing common rules to ensure fair and non-discriminatory handling of traffic in the provision of Internet access services and the provision of related end-user rights (1) does not provide access to the open Internet, or (2) does not ensure that a contract that includes Internet access services contains the required data, (3) does not introduce transparent, simple and effective procedures for dealing with end-user complaints. A fine may be imposed for an offense under Section 118, up to […] CZK 15 000 000 or up to 5 % of the net turnover of the perpetrator of an offense committed for the last completed accounting period, whichever is the higher […]

[98] https://ec.europa.eu/digital-single-market/en/news/implementation-european-emergency-number-112-results-eleventh-data-gathering-round

[99] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

[100] The discount amounts to CZK 200 (approximately EUR 8).

Czech authorities. The effective implementation of the Cost Reduction Directive, in particular, the Single Information Point, would contribute to the deployment of broadband infrastructure to bridge the digital divide.

The National Regulatory Authority did not grant any sustainability derogation to MVNOs while possible breaches of the RLAH rules by MNOs are under investigation.

The national roadmap for the deployment of WBB 700 MHz band is still under development. National consultation is planned to be launched in 2018 followed in 2019 by a multiband auction in the 700 MHz and 3.5 GHz band. The actual provision of services will not start before 2021.

Denmark

Market developments

1. Competitive environment

There were several smaller mergers and acquisitions (M&As) on the Danish market in 2017. Most notably, *TDC* bought the MVNO *Plenti*.

Coverage	DK-2016	DK-2017	EU-2017
Fixed broadband coverage (total)	99%	>99.5%	97%
Fixed broadband coverage (rural)	97%	97%	92%
Fixed NGA coverage (total)	93%	95%	80%
Fixed NGA coverage (rural)	59%	66%	47%
Ultrafast coverage (total)	No data	86%	58%
4G coverage (average of operators)	100%	100%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

a. Fixed Markets

No new operators entered the Danish market in 2017, however, a few consolidations occurred: South Energy/Stofa (SE/Stofa) acquired Boxer TV, thereby gaining some 280 000 TV subscriptions. The takeover was approved on 27 September 2017 by Konkurrencerådet – part of the Danish Competition and Consumer Authority – on conditions. Global Connect acquired Nianet, pending approval by the relevant authorities.

TDC (Yousee) has some 1.33 million TV subscribers (down by 45 000 during the first half of 2017). After the consolidation between Boxer TV and SE/Stofa, SE/Stofa is now estimated to have some 650 000 TV subscriptions.

The incumbent TDC has bilateral access contracts with two regional fibre operators. Some other regional operators have announced to open their networks and to create a common platform, partly under the threat that regulation might kick in (i.e. the NRA DBA defining regional fibre markets). TDC has opened up voluntarily its coax cable network which is being upgraded to DOCSIS 3.1 allowing Gigabit speeds. The commercial pricing is between the regulated copper and prices of a 100 Mbit/s bitstream access product. Alternative operators call for coax regulation as they are not satisfied with the prices and conditions in TDC's commercial contracts. Operators rely on bitstream access, where TV/content services within bundles seem to be the most important driver for innovation. There is no significant interest in unbundled fibre or duct sharing.

Utility companies' roll-out of fibre based broadband has changed the market shares locally, mainly in the southern part of Jutland where the incumbent TDC in certain local areas has market shares below 40%. Dansk Energi has – on behalf of the utility companies that it represents – announced that all of its members are now working on opening their networks for service providers. It will have to be seen if these announcements will be followed up in 2018. According to DBA, so far the utility company SE/Stofa has opened up for Kviknet to offer its services on SE/Stofa's fibre network. At the same time, there are signs in the market that TDC

is starting to make separate agreements with some of the utility companies (e.g. Eniig operating in central and northern parts of Jutland). TDC would hence be able to offer its services to approx. 270 000 households on the utility companies' fibre based network.

Denmark has 100% fixed broadband coverage. In 2017 coverage increased in all categories, except rural fixed broadband coverage, which remained at the same level as in 2016. Overall, coverage is significantly above the EU averages of 76%. Fixed NGA (Next Generation Access) coverage rose in 2017 to 66% of rural households, 19 percentage points above the EU average. The price index for fixed broadband stands at 90, up from 89 in 2016, and slightly above the EU average of 87.[101]

Given the competitive pressure, the incumbent's market share in fixed broadband fell by 2.6% in 2017. Nonetheless, at 52.4% it remained significantly above the EU average of 40.3%.

Fixed broadband market shares	DK-2016	DK-2017	EU-2017
Incumbent market share in fixed broadband	55.0%	52.4%	40.3%
Technology market shares			
DSL	44.5%	40.5%	64.2%
Cable	29.1%	31.0%	19.4%
FTTH/B	24.6%	26.7%	12.9%
Other	1.8%	1.8%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Overall, DSL-based products are becoming less important, as higher-capacity demands become more prevalent. The regulator has completed its broadband market analyses, against the backdrop of the incumbent offering commercial access to its cable network.

New entrants' DSL subscriptions by type of access (VDSL excluded)	DK-2016	DK-2017	EU-2017
Own network	-		
Full LLU	53.4%	52.1%	72.8%
Shared Access	3.3%	2.8%	4.1%
Bitstream	27.3%	28.8%	14.7%
Resale	16.0%	16.3%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

The fixed broadband price index in the digital economy and society Index (DESI)[102], has remained stable at 89 index points in 2017[103].

Fixed broadband prices	DK-2016	DK-2017	EU-2017
Fixed broadband price index [values between 0-100]	89	89	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

[101] Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

[102] See https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2017 [to be updated with 2018 link]

[103] The fixed broadband Price index weights the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30Mbps, 30-100 Mbps and +100Mbps-. This indicator presents values from 0 to 100 (which should not be read as prices) and the higher the values, the better the country performs in terms of price.

For the acquisition of new subscribers mobile service bundles continue to play a significant role. Mobile connectivity is offered together with access to digital content such as ebooks, newspapers, weeklies and online news.

Mobile market	DK-2016	DK-2017	EU-2017
Market share of market leader	38%	38%	35%
Market share of second largest operator	24%	23%	28%
Number of MNOs	5[104]	5	n.a.
Number of MVNOs	2	2	n.a.
Market share of MVNO (SIM cards)	2%	2%	n.a.

Source: Communications Committee. Data as of July 2016 and July 2017.

Mobile broadband prices	DK-2016	DK-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	15	15	24
Least expensive offer for tablet and laptop (5 GB basket)	10	10	17

Source: Commission calculation on the basis of the Mobile Broadband Price Study (Van Dijk).
Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017-July (tablet-laptop) 2017.

Mobile broadband prices as set out in the table above have remained stable in 2017; they are significantly below the EU average.

The DEA has received indications from the operators that they are more likely to phase out 3G before 2G. Indications are that phase out of 3G can take place when the current 3G licenses expire by the end of 2021. The DEA expects 2G to continue in parts of the 900 MHz band for several years at least until 2025, while 2G in the 1800 MHz band is expected to be phased out completely shortly in order to make spectrum available for 4G (LTE).

4G is deployed by all MNO's all over Denmark and covers almost all of Denmark[105].

Hi3G entered into a commercial agreement with Telia in December 2015 on national roaming with regard to mobile voice and mobile data. In 2012, Telenor and Telia entered into a network sharing agreement with regard to the companies' radio access networks (2G, 3G and 4G) and established the company "TT-Netværket" (the 'TT-Network'). The agreement was approved by the Danish National Competition Authority i.a. with the condition attached that Telenor and Telia shall in future auctions participate together through the company "TT-Netværket".

Agreements between MNOs and MVNOs are not regulated according to the DBA's market decisions. Four MNOs (TDC, Telenor, Telia and Hi3G) and two full MVNOs (Lycamobile and Mundio Mobile) are currently subject to the DBA's market regulation on the wholesale market for voice call termination on individual mobile networks.

Some of the operators perform 5G trials. TDC and Huawei have recently performed tests with the new technology, where they have achieved significantly high data rates. The trials take place in central Copenhagen. The DEA has issued a time-limited license to use 40 MHz in the 3.5 GHz frequency band already in September 2016. The DEA has also received inquiries

[104] Besides the four MNOs (TDC, Telenor, Telia and Hi3G) there is "Net1", which differs from the other four MNOs by being based on mobile broadband alone (https://www.net1.dk/om-os/).
[105] 4G coverage can be seen on www.tjekditnet.dk.

from other mobile operators interested in starting 5G trials in the 3.5 GHz band in Denmark. The DEA will issue licenses for such trials when they receive specific requests.

Innovation Fund Denmark has allocated funds to several major projects involving 5G. Approximately DKK 100 million has been granted in support for a number of projects with a total budget of around DKK 200 million. These projects involve universities, industry and operators.

The DEA has no information about commercial deployment of 5G systems. However, in line with international developments they expect commercial deployment will take place from around 2020 in one or more of the frequency bands available for mobile broadband.

Pricing for mobile broadband services in Denmark is significantly below the EU average. When combined with voice calls, the least expensive offer available on the Danish market stands at 62.5% of the average price of the cheapest offers across all Member States. Cheapest offers in Denmark for mobile broadband connectivity using a laptop or tablet are also significantly cheaper than the EU average.

On average, bundles play an important role in the Danish electronic communications market. There were no specific consumer protection issues pertaining to bundles in 2017, although customers generally find consumption monitoring more difficult.

The presence of wifi hot spots is not mapped. However, it can be said that public wifi is generally available for example in government buildings as well as in municipal buildings such a town halls, schools, libraries etc. Also, wifi is common on business premises, hotels, restaurants and shopping areas. Outside public buildings only municipalities have been allowed by law to offer free wifi with a time limitation for tourism purposes. New legislation has been adopted at the end of the year (2017) to allow public entities to offer free WiFi with reference to EU aid schemes such as WiFi4EU.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Denmark, 56.33% of the spectrum available for electronic communications services under EU rules has been assigned.

An auction of the 700 MHz, 900 MHz and 2.3 GHz spectrum is planned for end 2018[106]. There is political support for significant coverage obligations, both in terms of geographic coverage (of "black spots") and speed on cell level (30 Mbit/s downstream / 3 Mbit/s downstream in 700 and 900 MHz and 50/5 Mbit/s in 2.3 GHz).

The 700 MHz band will be available for mobile broadband in Denmark from 4 April 2020. An auction of the 700 MHz band is planned to take place Q3/Q4 2018. The sub-700 MHz band is re-planned and will continue to be used for DTT.

[106] Auction documents are currently under public consultation until 9 April 2018. Final auction documents are expected to be published May-June 2018.

The DEA expects assignments of technology and service neutral licences in the 1.5 GHz and 3.5 GHz bands in 2019 and in the 2.1 GHz band in 2020, most likely on the basis of auctions.

Following WRC-2019, where additional spectrum above 24 GHz is expected to be identified for wireless broadband (WBB), DEA expects that the spectrum will be made available for WBB subject to market demand.

Spectrum in the band 470-694 MHz (so-called "sub-700 MHz" band) will be used for broadcasting for the foreseeable future in line with Decision 2017/899 of 17 May 2017 on the use of the 470-790 MHz frequency band. Coverage requirements from the 2016 auction in the 1.8 GHz band, with mobile voice and mobile broadband connectivity (30 Mbps down / 3 Mbps up) are expected to be met in 245 designated areas by December 2019.

b. EU and national investments in broadband

Denmark continues to implement political initiatives working towards the 2020 goal of 100 Mbps download and 30 Mbps upload for all households and businesses. In 2016 and 2017 a tax deduction was available for the labour cost connected with upgrades or establishment of broadband connections.[107]

Denmark runs a funding program for demand based broadband projects in white areas. 37 out of the 73 projects in the first two rounds went to TDC and accounted for 55% of the funding. In all eleven providers will receive funding in these first two rounds.

The first round of application for state aid under the Broadband Fund was carried out in 2016 and the second round in 2017. Annual rounds in 2018 and 2019 are planned. An evaluation has been presented by the government and the Broadband Fund is expected to be further focussed on improving coverage in poorly served areas outside the densely populated areas. There are plans to extend the Broadband Fund beyond 2019.

The Planning Act has been changed to allow easier access to the establishment of new masts and antenna.

Currently, no deployment projects are financed under the Connecting Europe Facility or the Juncker Plan; similarly, no ESIF funds were earmarked for broadband under the Operational Programmes in 2017. The overall limited relevance of both national and EU funding in broadband deployment reflects overwhelming reliance on private investment, facilitated by regional and local organisations.

c. Implementation of the Broadband Cost Reduction Directive

Denmark notified complete transposition of the Broadband Cost Reduction Directive[108] in June 2016 and has applied its rules since 1 July 2016. The Directive has been transposed into Danish law by a combination of amendments to electronic communications and transport legislation. The DEA has issued guidance on the subject and has not yet received or processed any complaints in this context.

[107] This has now been made permanent. In March 2018, the government published a set of initiatives to improve mobile and broadband coverage as part of the process of making a new political agreement.
[108] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

Denmark has a long standing practise of infrastructure sharing of masts, poles etc., that has been in effect since the late 1990's. The scheme is largely based on industry agreements and reciprocity. The scheme is widely used, with very few cases of dispute resolution.

3. Regulatory function

Art. 7 market regulation is performed by the independent Danish Business Authority DBA under the Ministry of Indstry, Business and Financial Affairs. The other NRA functions (and support for drafting of legislation) are fulfilled by the Danish Energy Agency which is not independent, under the Ministry of Energy, Utilities and Climate. Stakeholders raised informal concerns as to the co-ordination and efficiency of this institutional setup.

In June 2017 the DBA issued 38 market decisions regarding the wholesale market for call termination on individual public telephone networks provided at a fixed location in Denmark (market 1). In August 2017 it issued market decisions regarding the wholesale markets for local access at a fixed location (market 3a) and for central access at a fixed location (to provide mass-market services) (market 3b). One price decision regarding fixed networks and six price decisions regarding mobile networks (all based on an LRIC-model) in Denmark for the year 2018 were taken in December 2017.[109]

Functions in the domain of market analysis and regulation are the preserve of the Danish Business Authority.

Due to competitiveness of the business market, DBA has deregulated the wholesale market for high quality access provided at a fixed location in Denmark per 6 September 2017.

Take-up:

- VULA: Total take-up of 67 800 VULA connections (per 1st July 2017).

- Dual pair bonding: Total take-up of 27 000 connections (per 1st July 2017).

- Vectoring: No specific registration on the take-up of VULA-lines based on vectoring-upgraded copper network.

- Dark fibre: Total take-up of 43 670 connections (per 1st July 2017)

- Fibre drop cable: N/A

- Virtual fibre BSA: Total take-up of 24 994 connections (per 1st July 2017); coax BSA: Not applicable (N/A).

For both fixed and mobile termination rates pure LRIC applies as pricing methodology. The fixed termination rates apply symmetrically to all 38 SMP appointed operators and are set annually for an entire calendar year. Similarly, all mobile termination rates apply symmetrically to the six regulated mobile operators (four MNOs and two MVNOs).

[109] Decisions regarding withdrawal of regulation on the retail market for access to the public telephone network at a fixed location for residential and non-residential customers and on the wholesale market for call origination on the public telephone network provided at a fixed location (markets 1 and 2, cf. Commission Recommendation of December 17th 2007) had been planned for the first half of 2018.

4. Consumer matters

Consumer complaints are handled by the Telecommunications Complaint Board (TCB) and not by the NRA. The number of consumer complaints has gone up from 300-400 per year in 2012/2013 to 500-600 in 2017. 50% of complaints relate to contract terms as telecom contracts are often bundled with other products such as newspaper and magazine subscriptions. Different elements of such bundles can have different contract durations and conditions which creates complexities.

a. Roaming

In 2017 the DEA received approx. 100 complaints regarding roaming (RLAH and price increases).

The DEA has discussed numerous issues with the operators regarding the implementation of Roam Like at Home[110] (RLAH), including exchange rates, objective indicators, domestic only tariff plans, alternative tariffs, transparency, bill-shock and other issues, which have been revisited in light of the RLAH regime. The main issues relate to the calculation of the fair use limit (FUL) as part of the fair use policy and the understanding of Article 6a of the Regulation.

In regard to the FUL calculation the main issue has been what the domestic retail price should be. Several of the operators have requested guidance on what services constitute mobile services and what services can be "subtracted" from the retail price – if a relevant stand-alone price is not available. For example some operators include a music streaming service in all tariff plans, and have asked what to do in this regard. These questions have been addressed in accordance with the BEREC guidelines.

In regard to the understanding of Article 6a the main issue has been the comparison between tariff plans that include RLAH and domestic only tariff plans. Here the main issue has been the degree of separation needed for two different tariff plans to be considered comparable.

The DEA has performed an analysis of the tariff plans of a large number of operators active in Denmark. In eight cases the DEA has initiated a dialogue regarding the tariff plans. Largely the operators have been quick to comply with the directions given by the DEA, and only three actual infringement cases have been initiated. Two of these were promptly settled without a decision and only one decision was issued. The tariff plan in question has been altered by the operator, but the decision has been brought to the Telecommunications Board of Appeal. A decision is expected in the first half of 2018.

Finally, there have been a number of instances where the wording of fair use policies has been insufficient. These wordings have been amended in the course of the dialogue with the DEA. The process of analysis will be repeated early 2018.

Most of the main operators, including three of the four MNOs, increased prices by 10-15% immediately prior to the entry into force of RLAH. Publicly several of the operators justified the general price increases with the cost of operating under the new RLAH-regime. Denmark

[110] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

has however seen very harsh price competition on the mobile markets over the last couple of years, where the profitability of delivering mobile services has fallen across the market to what market players describe as unsustainable levels. The price increases were foreseen by several market analysts, and could be a result of the market bouncing back to more sustainable levels, while using the RLAH-regime as an excuse for the price increases.

Following the introduction of RLAH in June 2017, subscribers in Denmark consumed 1.4 times more voice and 6.3 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[111]

b. Net neutrality

The DEA has all necessary competences to monitor and enforce the open internet provisions. The DEA has a fruitful cooperation with ISPs, consumers and the internet society in the Net Neutrality Forum. The forum works well. Operators are concerned that the BEREC work on Net Neutrality[112] could result in intrusive and unnecessary additional obligations. In the forum the DEA has informed about the provisions in the regulation and the BEREC guidelines and answered questions from the participants. The DEA operates its own monitoring mechanism on speed and other QoS parameters on tjekditnet.dk. The DEA has not and does not plan to certify other mechanisms provided by third parties. In spring 2017 the DEA carried out an analysis of the 42 largest ISP's offerings based on data collected from the operators. A small number of infringements were identified, most of which were resolved through dialogue with the ISPs in question. The DEA issued one decision and injunction banning a restriction on the choice of terminal equipment (tethering). The ISP concerned complied with the decision within the deadline set by the DEA. As there were no consumer complaints in 2016 – 2017 about QoS, consumer satisfaction is assumed to be high.

A filtering mechanism blocking access to child pornography is operated by the ISPs in close cooperation with the National Police and Save the Child Denmark. This filter is deemed to be in compliance with Article 3(3)a) of the Regulation, which makes it possible to block illegal material.

c. Universal service

The designated provider, the former incumbent TDC, has been tasked with providing telephony services, directory enquiry services and directories, and ensuring mandatory access for disabled end-users through a text relay service. The regulatory regime on public payphones was repealed in 2017[113]. No social tariffs exist. Broadband is not included in the current scope of Universal Service Obligations[114] and is not defined in detail. Denmark uses other public policy tools to ensure availability of broadband.

---

[111] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[112] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[113] In February 2018 the last public payphone in Denmark was removed.

[114] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

The financing of unfair burdens linked to universal service is done both through compensation by public funds, and through cost sharing between providers. In 2017, the provision of the maritime distress and safety service in Greenland in 2016 was compensated by an amount of 4.7 million euros. The universal service provider, TDC, has only requested compensation for these services, which from 2017 no longer are part of the scope of universal service.

d. 112

All calls using mobile networks are (at the very least) located by the specific mobile mast used. Previously the Danish National Police has informed the DEA that the accuracy of mast based location ranges between 500-2000 m.

The Danish emergency services provides an app that utilises the GPS data (if available) in the handset. The accuracy of caller location when using the app corresponds to the accuracy of positioning using GPS in general.

Whereas the general public has access to emergency services (112) via ordinary voice telephony or the 112 app (available www.112app.dk) disabled end-users also have the possibility to contact emergency services by text message.

5. Conclusion

Fixed broadband and 4G coverage are among the best in the EU. In order to realise its ambitions of fast broadband everywhere, Denmark will need to improve both take-up of higher speed products and coverage in terms of rural NGA wireline networks. As Denmark overwhelmingly relies on private investment, more clarity on the issue of prospects for regulated access to fibre networks could help investors to assess potential benefits and risks more reliably.

Some of the operators perform 5G trials and achieved significantly high data rates. The Innovation Fund Denmark has allocated funds to several major 5G projects involving universities, industry and operators.

Mobile connectivity is offered together with access to digital content such as ebooks, newspapers, weeklies and online news. This is considered to be particularly relevant for the acquisition of new subscribers. User concerns over the comparability of offers and the quality of contract-related information suggest that further measures could be taken to improve transparency and comparability of electronic communication service offers to end users, mainly in terms of contractual information. This could help to boost demand-side competitive dynamics.

Furthermore, it might be helpful reconsidering the institutional setup of the regulatory function with regard to co-ordination of tasks and overall efficiency. In particular it could be considered whether more clarity on the issue of access to fibre networks could be provided and whether, beyond agreeing on a common methodology with the operators, mobile coverage and QoS data could be cross-checked before it is used for reporting and information of the public.

Estonia

Market developments

1. Competitive environment

In December 2016, the Elisa Group (Estonia's second biggest operator, with a focus on mobile telephony) acquired AS Starman (the market leader in pay-TV). On 16 March 2017, the Estonian Competition Authority approved this transaction with which Elisa acquired 100 percent of the shares of AS Starman. As a result of the merger there is now a further competitor on the market, in addition to Telia, offering bundled mobile services, fixed internet and TV services.

a. Fixed Markets

Coverage	EE-2016	EE-2017	EU-2017
Fixed broadband coverage (total)	91%	89%	97%
Fixed broadband coverage (rural)	73%	73%	92%
Fixed NGA coverage (total)	79%	80%	80%
Fixed NGA coverage (rural)	36%	38%	47%
Ultrafast coverage (total)	no data	71%	58%
4G coverage (average of operators)	94%	96%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Estonia's basic fixed broadband coverage is relatively low, primarily owing to low availability in rural areas. The observed slight decrease in fixed broadband coverage is mainly caused by the closing of wireless local loop services that used CDMA (Code Division Multiple Access) 450 technology. These wireless networks are taken over by mobile network data services. Most of the households that are covered in Estonia by NGA networks also have access to speeds of 100 Mbps or above. Ultrafast coverage in Estonia outperforms the EU average by 13 percentage points. Furthermore, Estonia has very high 4G coverage (96%).

Fixed broadband market shares	EE-2016	EE-2017	EU-2017
Incumbent market share in fixed broadband	58.4%	57.0%	40.3%
Technology market shares			
DSL	38.0%	34.8%	64.2%
Cable	22.2%	22.2%	19.4%
FTTH/B	34.9%	36.5%	12.9%
Other	5.0%	6.5%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	EE-2016	EE-2017	EU-2017
Own network	100%	100%	0.5%
Full LLU	-	-	72.8%
Shared Access	-	-	4.1%
Bitstream	3.9%	-	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

In 2017, Telia's market share continued to be well above the EU average for incumbents' shares, even though a slight decrease can be noted compared to 2016. DSL ceased to be the predominant technology for fixed broadband access which is reflected by a catching up of access via FTTH/B and an increase in fixed wireless access lines. The incumbent controls almost all the DSL lines (98%), thus the market share of new entrants' DSL subscriptions is very low (2%).

Fixed broadband prices	EE-2016	EE-2017	EU-2017
Fixed broadband price index [values between 0-100]	83	85	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile broadband access is quite important in Estonia and 99% of the territory is covered by mobile broadband networks delivering speeds of 30 Mbps or above. 37% of the population can have access to ultrafast broadband with speeds of at least 100 Mbps.

Mobile broadband prices [EUR/PPP]	EE-2016	EE-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€10	€13	€24
Least expensive offer for tablet and laptop (5 GB basket)	€7	€11	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Mobile broadband services in Estonia are significantly cheaper than the EU average when combined with voice calls (almost half the price of EU average) as well as for mobile broadband connectivity over a laptop or tablet.

The use of bundled services continued to gain importance in 2017 and consumers were using bundles as follows: 96% of fixed telephone services, 93% of fixed broadband services, 85% of cable TV services, and 25% of mobile services.

Mobile market	EE-2016	EE-2017	EU-2017
Market share of market leader	43%	45%	35%
Market share of second largest operator	32%	32%	28%
Number of MNOs	3	3	-
Number of MVNOs	1	1	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Estonia has assigned 89% of the EU harmonised spectrum available for electronic communications services, which is above average among the EU countries.

The 700 MHz band has been designated to mobile broadband on 5 October 2014 and digital television switched off their service on 1 July 2017. The public tender for licences in this band

was still pending end of 2017 as it was not clear yet whether part of the 700 MHz band would be used by the State for PPDR (Public Protection and Disaster Relief). The auction is aimed to be carried out during 2018. Furthermore, technical restrictions in some areas of the country are to be expected until certain issues relating to coordination with non-EU countries have been resolved.

As regards the 2.6 GHz band, a public tender was held from March to July 2017 in which all five licences (three 2x10 MHz FDD licences and two 20 MHz TDD licences) were granted.

Finally, with regard to the 3.4-3.8 GHz band, at the end of 2017, the Estonian NRA was preparing to launch a public consultation to collect information about the market expectations in the first half of 2018[115]. After the analysis of the results of this consultation, the public tender conditions will be defined and laid down in a Ministerial decree.

Operators plan to test and deploy 5G in the 700 MHz and 3.6 GHz frequency bands in 2018-2019 and are currently carrying out trials for 5G, but no further plans are known to date.

b. National and EU investment in broadband

The national regulatory authority (NRA), the Estonian Technical Regulatory Authority (ETRA), has developed a website, www.netikaart.ee, which provides detailed information about fixed-line and mobile connectivity capabilities at household level. This website has been made publicly available in October 2017. The Estonian Electronic Communications Act includes an obligation for operators to share the data for the mapping and currently *netikaart* contains data of 95% of the market. This initiative helps to detect the white areas or market failure areas where no broadband is available.

Estonia's connectivity targets are to provide all residents with internet access above 30 Mbps and to achieve at least 60% household subscription rates for speeds above 100 Mbps by 2020. One key measure to achieve this is the "Estonian Wideband Infrastructure Network" (EstWin) project, launched by the Estonian Ministry of Economic Affairs and Communications in 2009. The objective of the project is to roll out 6 600 km of optical cables (backhaul) in rural areas and settlements with less than 10 000 inhabitants, where optical networks did not exist and are not planned by operators. The target is that by 2020, 98% of households, enterprises and institutions should be no further away than 1.5 km from the EstWin network and all existing network nodes should be connected with core networks. These networks are rolled out by non-profit organisations required to provide wholesale access on equal terms to all operators and public authorities. Approximately 85% of the project costs are financed by the European Regional Development Fund (ERDF) while the remaining 15% of network construction cost is co-financed by backhaul network operators.

The planned mid-term evaluation of Estonia's Digital Agenda Strategy did not take place in 2017 due to the priority given to the Estonian presidency of the Council of the EU. The Estonian Ministry will instead focus on developing their new 2021-2027 strategy.

By the end of 2017, 5 300 km of backhaul network had been rolled-out and approximately 1 700 network nodes had been connected, 500 of them located in buildings belonging to local

[115] The Estonian NRA has launched this public consultation on 4 April 2018, asking communication operators for comments on the release of frequencies in the 3.4 to 3.8GHz band for broadband services, open until 30 April 2018.

governments (schools, libraries etc.). Most of the remaining km will be built during 2018. The Estonian government plans to carry out a public tender during 2018 to find a provider for the last mile access part in NGA white areas and is currently working out the conditions for this tender.

The tender will involve all regions of Estonia which have no access network at present and where the private sector is not planning to invest on its own. As businesses had already demonstrated interest in investing in the construction of a high-speed network, the government decided that they will announce a general public procurement open to companies which would cover all of Estonia with broadband, including sparsely-populated areas. The total size of the project is 20 million euros, of which 10 million euros will be invested in 2018.

c. Implementation of the Broadband Cost Reduction Directive

Directive 2014/61/EU[116] is transposed into national law in Estonia by an amendment to the Estonian Building Code and the Act implementing the Building Code and the Planning Act. These two Acts came into force on 1 January 2017. Some of the provisions however became applicable only as of May 2017. It is therefore still too early to see the impact of the measures. However, some interest was indicated by Estonian operators to make use of the rights established by the Broadband Cost Reduction Directive in the future, for instance as regards the sharing of physical infrastructure.

The Ministry of Economic Affairs and Communications is the body performing the functions of the single information point which is called "register of construction works" in Estonia. This register contains information on civil works, however not on existing infrastructure nor on permits. The Estonian Technical Regulatory Authority (ETRA) is assigned the tasks of the dispute settlement body, but so far, no disputes under the Broadband Cost Reduction Directive have been referred to it yet.

3. Regulatory function

Two regulatory decisions were notified to the European Commission in 2017.

The first one[117] concerns an update of remedies in market 2 of the 2014 Recommendation (wholesale voice call termination on individual mobile networks). ETRA had previously defined the relevant market designating Telia Eesti AS, Elisa Eesti AS and Tele2 Eesti AS as having significant market power in the wholesale voice call termination markets in their respective individual mobile networks, irrespective of the technology used (i.e. 2G, 3G and 4G). The companies mentioned are the only ones that have control of call termination services in a mobile telephone network in Estonia. The following obligations are imposed on the SMP operators: access, non-discrimination, transparency (including the publication of a reference offer for interconnection), and price control.

By the notified draft measure, ETRA proposed to update the benchmark with the most recent available results of pure BU-LRIC calculations of other NRAs (published in December 2016, BEREC BoR (16)218). Consequently ETRA proposed to set the MTRs for the period 1 July

[116] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks.
[117] Notification of 6 March 2017, Case EE/2017/1969.

2017 – 30 June 2018 at the level of €0.089/min (decline of 3.3% compared to the previous rate). The Commission did not make comments to this notification.

The second notification[118] concerns new market analyses for markets 3a and 3b of the 2014 Recommendation (the markets for wholesale local access provided at a fixed location, and for wholesale central access for mass-market products provided at fixed location).

The relevant product market for market 3a is defined by ETRA as comprising both fibre-optic and copper-pair access services. Supporting services (including collocation, shared use of cable ducting and buildings) are also considered to be part of the relevant market, provided that they are necessary for the use of the relevant wholesale services. For market 3b, the relevant product market is defined by ETRA as comprising bitstream services provided over copper, fibre and cable, together with access support services. Both relevant geographic markets are national in scope.

ETRA proposed to designate Telia as holding SMP in both markets 3a and 3b in view of its retail and wholesale market shares, extensive infrastructure difficult to duplicate, and strong vertical integration, together with high barriers to entry and lack of countervailing buyer power and to impose on Telia the following obligations: (i) access; (ii) non-discrimination; (iii) transparency; (iv) cost accounting separation; and (v) cost-oriented prices.

ETRA proposed to continue applying cost-oriented prices for both copper and fibre based on the top-down fully distributed historical costs (TD HC FDC) methodology.

ETRA considered that it is very likely that Telia's copper pair access fees would rise considerably, if computed with a current cost accounting method, which in turn would lead to an even more rapid decline of the copper pair access services volumes. ETRA added that as competition is so intense in the Estonian fixed and mobile retail broadband markets, it is unlikely that the operators' network structure (including Telia's) contains significant inefficiencies that a bottom-up model could correct.

As to the proposed cost-orientation for fibre products, ETRA put forward that the Estonian broadband retail market is quite competitive and that the safeguards contained in the Recommendation on Non-discrimination and Costing would unreasonably restrict the SMP operator in developing new retail services without delay.

Upon examination of the notification, the Commission put forward comments on the TD HC FDC cost methodology and on the geographic scope of the market.

Regarding the copper access price, the Commission asked ETRA at the occasion of the next market review to re-assess the need to impose cost-orientation on the local access market, and to develop a new price setting method in line with the Recommendation on Non-Discrimination and Costing, if appropriate.

On the price for fibre, the Commission asked ETRA to consider a more flexible means to price regulate fibre by implementing Equivalence of Input accompanied by other competitive safeguards, most notably a technical and economic replicability tests as proposed in the Recommendation on Non-discrimination and Costing. Pricing flexibility for fibre based broadband access products both at retail and wholesale level may in fact allow Telia to set the

[118] Notification of 26 April 2017, Case EE/2017/1980 and Case EE/2017/1981.

appropriate price points and potentially improve Estonia's relatively low ultrafast broadband household penetration.

With regard to the geographic differentiation of the markets, as competition appears to develop more dynamically in specific geographic areas of Estonia, the Commission invited ETRA at the occasion of the next market review to collect data at a more granular level with a view to assess whether the definition of geographic sub-markets or the geographic differentiation of remedies would be more appropriate.

The European Commission asked ETRA to take the utmost account of its comments and authorised it to adopt the resulting draft measure.

The final adopted remedies remained almost unchanged compared to the ones under the previous market analysis with slightly enhanced transparency obligations on the SMP operator.

At the end of 2017, ETRA was carrying out an analysis of market 1 of the 2014 Recommendation (wholesale call termination on individual public telephone networks provided at a fixed location) and was planning to launch the domestic consultation beginning of 2018. This market analysis is expected to be notified to the European Commission in Q2 of 2018.

The next upcoming analysis concerns market 2 of the 2014 Recommendation (wholesale voice call termination on individual mobile networks) which will be carried out at the end of 2018.

4. Consumer matters

The Consumer Protection Board of Estonia received 455 written requests for explanations (in addition to 1 038 counselling sessions via phone or face-to-face) and the Consumer Disputes Committee received 96 complaints in 2017. This Committee is an independent and impartial unit that operates at the Consumer Protection Board and resolves disputes independently pursuant to the Consumer Protection Act and other legislation.

The Committee is competent to resolve domestic and cross-border consumer disputes initiated by the consumer and arising from contracts between consumers and traders, where one party is a trader whose place of establishment is in the Republic of Estonia. Resolving a dispute by the Consumer Disputes Committee is free of charge for the consumer and the undertaking and in most cases, the outcome will be reached within 90 days from the date the complaint proceeding was started.

The main sources of consumer complaints in the Consumer Disputes Committee in 2017 were, amongst others, related to pricing and billing, contractual penalties, quality of the services, roaming and mobile content services.

Since 2017, the Consumer Protection Board has a new department working on conformity issues of infotechnology devices. Furthermore, a new guidance document has been published by the Consumer Protection Board at the beginning of 2017 to raise consumers' awareness on what to pay attention to when concluding a communications service contract along with a shorter checklist about important contract terms.

a. Roaming

Following the introduction of Roam Like at Home[119] (RLAH) in June 2017, Estonian subscribers consumed 1.4 times more voice and 2.9 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[120].

According to Article 6c of the Roaming Regulation, in specific and exceptional circumstances, with a view to ensuring the sustainability of its domestic charging model, a roaming provider may apply for authorisation to apply a surcharge. The Commission Implementing Regulation[121] lays down detailed rules on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment.

In Estonia, Tele2, Elisa and Telia applied to the national regulator (ETRA) for a sustainability derogation which was granted for one year and allows them to continue apply a small surcharge on roaming consumption in order to avoid an increase in their domestic prices.

In spite of the derogations, mobile telephony packages which allow RLAH without being subject to a surcharge are available in Estonia. According to the last BEREC International Roaming Benchmark Report[122], 85% of Estonian consumers benefit from RLAH, 2% are subject to the roaming surcharge due to the derogation, and 12% are on alternative tariffs[123]. In addition, in line with the Commission Implementing Regulation, when applied, the roaming surcharges are only to recover the costs and below the wholesale roaming price caps in place since 15 June 2017, which means a reduction by more than 85% of the roaming surcharge for data compared to prior that date.

In case of a breach of the Roaming Regulation, ETRA can impose fines on operators of up to €3 200 according to the Electronic Communications Act, the Administrative Procedure Act and the Law Enforcement Act.

b. Net neutrality

Already for the second year in a row, Estonia ranked first worldwide (together with Iceland) in Internet freedom, according to the 2017 edition of a report from Freedom House titled "Freedom on the Net." The "Freedom on the Net" survey is divided into three categories scored between 0-100: obstacles to access, limits on content, and violations of user rights. The lower the score, the higher the internet freedom, making 0 the best and 100 the worst possible score. Estonia was scored six points in 2016 and 2017.

[119] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[120] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.
[121] Commission Implementing Regulation (EU) 2016/2286 of 15 December 2016 laying down detailed rules on the application of fair use policy and on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment.
[122] BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018
[123] 1% are subject to a roaming surcharge for not providing the residence/stable links.

According to the Freedom House report, Estonians have access to a wide range of content online, and very few resources are blocked or filtered by the government.

There appear not to have been particular concerns with regard to net neutrality in Estonia in 2017. The national regulator had investigated two zero-rated offers according to the BEREC guidelines[124] which it found to be in compliance with the Regulation.

As regards penalties imposed under Article 6 of Regulation 2015/2120[125], ETRA is responsible for monitoring compliance with the requirements laid down in Articles 3, 4, 5 and 7 of the Regulation. The Electronic Communications Act, the Administrative Procedure Act and the Law Enforcement Act lay down rules and penalties of up to €9 600.

c. 112

112 is the sole emergency number in Estonia, with contact points of all emergency services located in the premises of the Estonian Emergency Response Centre (EERC). Advanced Mobile Location (AML) has been available for Android phones since the summer of 2016. In over 80% of cases, calls made from Android phones are located with an accuracy of 50 metres or under. Hearing or speech-impaired users can use text messages to contact 112.

d. Universal Service

There are no universal service obligations[126] imposed in Estonia at the moment. Directories have been removed from the scope of universal service obligation in 2007, public payphones in 2010 and fixed telephone services in 2011. Broadband has never been included in the scope of universal service.

5. Conclusion

Estonia is known to be a frontrunner for mobile coverage and uptake. In 2017, it continued to expand its 4G mobile deployment and thereby remains amongst EU's top performers in this regard.

On the other hand, Estonia keeps lagging behind in fixed rural broadband coverage, and consequently the last mile project which is being launched in 2018 aims at increasing rural coverage. The Broadband Cost Reduction Directive, which has been implemented relatively recently in Estonia, could potentially deliver some results in the future, if use is made of its tools to share infrastructure and co-deploy.

[124] BoR (16) 127.
[125] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union
[126] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

DESI Report 2018

Telecoms chapter

FINLAND

Market developments

1. Competitive environment

The Finnish mobile telecommunications market is characterized by fierce competition between three main market players: DNA, Telia Company (formely Telia Sonera) and Elisa. The fixed telecommunications market is divided between several operators, where competition is lively in some parts of the major cities. All three operators mentioned above are active on both fixed and mobile markets. In addition, the telecoms operators within the Finnet Group and other smaller telecommunication operators provide fixed broadband services locally in their operating areas.

Over the reporting period, fixed to mobile substitution has continued: there are currently only 422 000 fixed telephone lines left, while there are 9.48 million mobile subscriptions.

In terms of overall market trends, operators are offering bundles in 4G and mobile devices and also broadband and TV/Content services.

a. Fixed Markets

Coverage	FI-2016	FI-2017	EU-2017
Fixed broadband coverage (total)	97%	97%	97%
Fixed broadband coverage (rural)	84%	84%	92%
Fixed NGA coverage (total)	75%	75%	80%
Fixed NGA coverage (rural)	8%	8%	47%
Ultrafast coverage (total)	no data	59.1%	58%
4G coverage (average of operators)	97%	98%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The access to a fast broadband connection has increased in the recent years. Roughly 51% of Finnish households have access to a fast broadband connection of 100 Mbps and 66% to connection of 30 Mbps or more. 57% of the households have fixed broadband connection and 41% of the subscriptions are 30 Mbps or more.

The largest operators Elisa, Telia Company and DNA have invested mainly in the FTTB/VDSL deployment and are upgrading cable TV networks in the largest cities. At the moment, Elisa is also implementing FTTC/VDSL in the capital and Tampere regions. Elisa and Telia Company have also expressed interest in deploying vectoring, but no vectoring has yet taken place. The largest operators have been unwilling to invest in FTTH networks. In general, the FTTH roll out has been slow and FTTH availability is unequal in different parts of the country.

Fixed broadband market shares	FI-2016	FI-2017	EU-2017
Incumbent market share in fixed broadband	-	-	40.3%
Technology market shares			

DSL	46.5%	49.0%	64.2%
Cable	23.8%	24.4%	19.4%
FTTH/B	29.2%	26.1%	12.9%
Other	0.4%	0.5%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

After Elisa bought the TV, IT and hosting businesses of the regional operator Anvia in the end of 2016, there has not been any significant change on the fixed market in Finland. The impact of this acquisition on the market has not resulted in any further change that the slight increase of the latter's market shares. As of 30 June 2017, the market shares for fixed network broadband subscriptions by operator were as follows: DNA: 26%, Elisa: 35%, Telia Company: 29%, Finnet Group: 8%[127].

New entrants' DSL subscriptions by type of access (VDSL excluded)	FI-2016	FI-2017	EU-2017
Own network	-	-	0.5%
Full LLU	-	-	72.8%
Shared Access	-	-	4.1%
Bitstream	-	-	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

66% of households have availability of at least 30 Mbit/s fixed broadband and 17% of households have at least 100 Mbit/s fixed broadband connection.

Fixed broadband prices	FI-2016	FI-2017	EU-2017
Fixed broadband price index [values between 0-100]	94	94	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

There are currently 13 mobile operators in Finland: three mobile network operators (and one operating in the Åland Islands) holding spectrum eligible for the provision of mobile services, and eight mobile service providers. In addition to the three mobile network operators, there is one further network operator utilising the 450 MHz and 2.6 GHz bands to provide mobile broadband services (no speech) for specific user groups e.g. for critical connections and also locally for fixed wireless access. Over the reporting period, the number of mobile subscriptions has been very stable compared to 2016 (9 480 000 subscriptions in Q1 2017 against 9 500 000 subscriptions in Q1 2016)[128]. The following main trends were observed: mobile call minutes are decreasing. Calls decreased by 3%, SMS messages by 15% per year, while mobile data traffic is increasing over 50 percent per year[129].

Mobile market	FI-2016	FI-2017	EU-2017
Market share of market leader	39%	38%	35%
Market share of second largest operator	34%	34%	28%
Number of MNOs	5	5	not available
Number of MVNOs	7	11	not available

[127] Source: Ficora
[128] Source: Ficora
[129] Source: Ficora

Market share of MVNO (SIM cards)	not available	not available	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

Market shares of the three main mobile market players have remained stable over the reporting exercise and can be summarised as follows: the market leader had 38%, the second largest operator had 34% and the third largest operator had 27% as of 30 June 2017.

Mobile broadband prices [EUR/PPP]	FI-2016	FI-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€19	€19	€24
Least expensive offer for tablet and laptop (5 GB basket)	€7	€17	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Finland features some of the least expensive mobile broadband prices in the EU (€19 for handset (1 GB + 300 calls basket) against €24 for the EU.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Finland, 76.15% of the spectrum harmonised at EU level for wireless broadband electronic communications services has been assigned.

900 MHz and1.8 GHz bands: The operators Telia Company and Elisa had been granted licences in both of those bands until end of November 2017. Both companies applied for the renewal of their licences. In August 2017, the Finnish Government granted licences to Telia Company and Elisa Corporation for the 900 and 1.8 GHz spectrum bands until 2019.

1.5 GHz (L-band) and 3.4-3.8 GHz bands: On the L-band (1452-1492 MHz) and the 3.4-3.8 GHz (the "3.6 GHz") band, the Finnish Authorities have reportedly difficulties to reach coordination agreements with Russia. Especially on the higher 3.6-3.8 GHz band, there are severe restrictions on the use of wireless broadband in Finland.

The 3.6 GHz band is already available for pilot and trial networks for 5G services. FICORA has granted five licenses (to Telia, Elisa, Nokia, Ericsson and Aalto University) for 5G testing in Helsinki, Espoo, Kirkkonummi, Oulu and Vantaa. [130] In addition to the 3.6 GHz band, FICORA has granted several other 5G test licenses to other frequency bands, namely the 26 GHz and the 28 GHz.The purpose is to test and investigate the features and functionality of 5G base stations.

b. National and EU investment in broadband

The execution of Finland's "fast broadband project" is ongoing. As a reminder, in its 2008 '*fast broadband project'*, Finland made a commitment that, by the end of 2015, there would

[130]https://www.viestintavirasto.fi/taajuudet/taajuuksiadigitaalisiinkokeiluihin/testiluvat3400-3800mhz/myonnetyt5g-testiluvat.html

be an optical fibre or cable network enabling connections of 100 Mbps within two kilometres of 99% of all permanent residences and offices. According to Ficora, by the end of 2016, roughly 52% of Finnish households had access to a fast broadband connection of 100 Mbps.

The timeline for completing the project has been extended until the end of 2019 and there are €25 million in State aid available for new projects. So far, the allocation of State aid has enabled to build overall 20 000 km of network and cover 83 000 homes with Fibre to the Home (FTTH). In practice, network building companies have had difficulties to find financing to their part of the costs. Therefore they have not been able to run the project in time as planned in the initial phase of the "fast broadband project".

The Ministry of Transport and Communications has reviewed the State aid rules applicable to broadband with the view to remedying the situation. Indeed, a number of amendments to the "Laajakaistatukilaki" ("Act on aid to broadband") came into force on 15 July 2017. The amendments aim at incentivising market players to apply for State Aid and ultimately generate more broadband offers on the market. The amended rules apply to ongoing projects (initiated before 15 July 2017) and projects to come. They aim at facilitating the financing of the relevant projects by relying on a number of instruments. For instance, the aid intensity could be raised up to 90% for ongoing projects and 100 % for projects to come. The geographical coverage of the State aid scheme increases for projects to come. The State Aid can be applied to all NGA white areas and the Aid can be used to finance costs up to 100 meters from customer premises.

Finally, the Ministry of Transport and Communications has started the preparation of a new national broadband strategy. The new national broadband strategy aims at defining Finland's broadband targets for the years 2025 and 2030 and the means to achieve them. The strategy will be technology neutral, which means it will be promoting the construction of both optical fibre connections and wireless broadband connections.

c. Implementation of the Broadband Cost Reduction Directive

As a reminder, on 23 March 2016, the Commission had initiated infringement proceedings against Finland for failure to transpose the Broadband Cost Reduction Directive[131]. According to the Finnish authorities, the Directive has been fully transposed into Finnish law in mainland Finland. However, transposition was still incomplete in the Åland Islands at the end of 2016. On 1 November 2017, the Government of the Åland Islands notified implementing measures of the Directive to the European Commission. The Commission services are currently assessing the compliance of the notified measures with the provisions of the Broadband Cost Reduction Directive.

3. Regulatory function

On 1 June 2017, Ficora notified twenty one draft market analysis decisions to the Commission: one for market 3a (wholesale local access provided at a fixed location), and market 3b (wholesale central access provided at a fixed location for mass-market products) and twenty one draft market analysis decisions for market 4 (wholesale high-quality access provided at a fixed location)

[131] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

The draft market 4 decisions did not give rise to any Commission comments. Final decisions were adopted by Ficora in September 2017 and have been in force as of October 2017. The operator Elisa Oy has lodged an appeal against the decision addressed to it. The appeal is currently pending before the Administrative Court.

The Commission expressed serious doubts as to the compliance with EU Law of the proposed remedies for markets 3a and 3b and both and the relevant draft decisions were subsequently withdrawn by Ficora on 4 July 2017[132].

4. Consumer matters

By 16 October 2017, Ficora had received 189 consumer contacts which have been classified as complaints including postal cases and 97 not including postal issues. Most of those complaints have been resolved through guidance without opening formal administrative proceedings. Many complaints related to matters falling outside of Ficora's jurisdiction, in which cases the complainants were referred to the appropriate Authorities for handling the issues raised. Quality of service or telemarketing practices were among the most frequent matters complained about.

Besides, some consumers also complained about the behavior of one network operator as regards roaming. Indeed, one operator stopped providing roaming services after 15 June 2017 without prior notice to some of its customers who used to enjoy roaming services via their regular subscriptions. This behavior was reported to Ficora which ordered the relevant operator to restore the roaming services as provided for initially as this behavior was deemed to be in breach of National regulation pertaining to change of contractual conditions.

On its part, the Competition and Consumer Authority reported that the amount of complaints about communications services has been reducing in the past years. They now amount for about 5.5% of all contacts taken with its services and broadly cover mobile communications and broadband services[133]. For Internet-connections, complaints typically related to differences between the marketed maximum speed and the actual real speed. Finally, as far as roaming is concerned, it should be noted that between 15 June 2017 and 26 October 2017, the Competition and Consumer Authority only received 18 complaints.

a. Roaming

On 15 June 2017, FICORA granted the operators DNA, Elisa, Moi Mobiili and Telia an authorisation to apply surcharges to their customers' roaming consumptions in the EU and EEA countries. In accordance with the EU regulatory framework[134] applicable to roaming provision within the EU, those authorisations are valid for a year. Besides, the application by the Mobile Network Operator Ålands Telekommunikation was rejected due to insufficient data.

---

[132] Ficora notified new draft decisions on 26 January 2018. Those did not give rise to serious doubts from the Commission, so Ficora was able to adopt the final decisions on 15 March 2018. Those decisions will enter into force on 15 June 2018. The operators have 1 month to appeal the decisions.

[133] In 2017, 73225 contacts were taken with the services of the Competition and Consumer Authority. The contacts include phone calls and electronic contacts to the national Consumer Advisory Service as well as written tip-offs on supervision and various enquiries to the Consumer Ombudsman

[134] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

It should be noted that even though the operators mentioned above were granted derogations, most of the Finnish subscribers enjoy either Roam Like At Home (RLAH) or Roam Like At Home + (RLAH+) services[135]. Indeed, following the introduction of RLAH in June 2017, Finnish subscribers consumed 1.1 times more voice and 2.1 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[136].

Over the reporting period, there was one case of potential non-compliance with the rule of automatic application of RLAH to customers. The operator in question continued to apply an alternative tariff to business customers that had chosen this relevant tariff prior to 15 June 2017. Nevertheless, no formal assessment of the case was conducted as the provider agreed to send relevant information to those of its customers who had been affected by the instance and ultimately compensate them accordingly.

b. Net neutrality

Finland has laid down rules on the penalties applicable to infringements of Articles 3, 4 and 5 of Regulation (EU) 2015/2120[137] and the necessary measures to ensure that they are implemented in accordance with Article 6 of Regulation (EU) 2015/2120. Under Section 304 of the Information Society Code, Ficora is entitled to impose a conditional fine for failure to comply with the Net Neutrality rules stemming from Regulation (EU) 2015/2120. Ficora did not impose any such fine over the reporting exercise.

c. 112

112 is the only emergency number in use in Finland. As far as disabled users are concerned, the legislation included requirements for network operators to implement 112SMS already in 2015. Finnish emergency centres have had the capability to handle 112SMS from the beginning of December 2017.

d. Universal service

There have not been any changes in the scope of universal service[138] since January 2017. As a reminder, a broadband connection of 2 Mbit/s should be offered in Finland as part of a universal service, in addition to access to a fixed or mobile phone, a text message service for hearing and speech-impaired people, an Internet service for hearing and speech-impaired people and a comprehensive contact information service. Ficora analysed the market in November 2017 and did not propose changes to the existing regime[139].

5. Conclusion

[135] According to the International Roaming BEREC benchmark Report (April 2017-September 2017), 69% of the Finnish subscribers enjoy RLAH services and 29% of them enjoy RLAH+ services (namely RLAH plus a surcharge)

[136] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[137] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[138] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

[139]https://www.viestintavirasto.fi/attachments/toimialatieto/Selvitys_tarkoituksenmukaisen_internetyhteyden_vahimmaisnopeudesta.pdf

While Finland has good fixed broadband and 4G coverage overall, coverage in rural areas could be further improved. Market players have not invested enough in the sparsely populated rural areas of the country. In this context, it remains to be seen whether the amendments to the State aid rules of 15 July 2017 will generate the expected results in practice both as far as ongoing and future broadband roll-out projects are concerned.

In the meantime, FICORA has granted Telia Company a licence for the purposes of testing 5G base stations in Helsinki, Espoo and Vantaa. Overall, FICORA has granted about 20 licences for the purposes of testing 5G base stations in Finland.

FRANCE

Market developments

1. Competitive environment

a. Fixed Markets

Coverage	FR-2016	FR-2017	EU-2017
Fixed broadband coverage (total)	99.95%	99.95%	97%
Fixed broadband coverage (rural)	100%	100%	92%
Fixed NGA coverage (total)	47%	52%	80%
Fixed NGA coverage (rural)	31%	37%	47%
Ultrafast coverage (total)	no data	42%	58%
4G coverage (average of operators)	78%	89%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The following four main operators are active on the French fixed market: the incumbent Orange (formerly France Télécom), SFR, Free and Bouygues Telecom.

While fixed broadband coverage is ubiquitous in France, fixed NGA coverage, including in rural areas, remains significantly below the EU average, as a result of the low coverage of cable networks and the relatively high average length of the copper network sub local loop compared to other European countries. This is why France has engaged in nationwide FTTH network rollout plans. In the meantime, new PSTN (Public Switched Telephone Network) lines will no longer be provided from 2018.

While in July 2017 SFR had expressed its intention to cover the whole French territory with its own fibre network by 2025 without any public financing, it declared in December 2017 that it would not proceed with that project.

According to Arcep[140], as of 30 September 2017, the number of subscriptions to high speed Internet ("haut débit", between 512 kbit/s and 30 Mbit/s) and very high speed Internet ("très haut débit", at or above 30 Mbit/s) amounted to 28.2 million, that is 780 000 more than at the same period in 2016. While this figure represents mostly subscriptions to high speed DSL, over the last two years, only subscriptions to very high speed Internet have been increasing, at a pace of a little over a million a year (+1.5 million over the elapsed year). The share of subscriptions to very high speed Internet has increased by five points within a year and reached 23% of all access types by the end of September 2017.

Most of the increase in subscriptions to very high speed Internet is driven by subscriptions to end to end optical fibre (2.9 million, an increase of 990 000 subscriptions within a year) which now amounts to 10% of the Internet access on the French market, all technologies alike.

[140] Observatoire des marchés des communications électroniques en France 3ème trimestre 2017

At the end of September 2017, the number of subscriptions to very high speed Internet amounted to 38% of eligible households all technologies alike (an increase of five points within a year).

The subscriptions to high speed Internet are composed of 98% of xDSL access with a throughput under 30 Mbit/s which are constantly decreasing (-680 000 within a year). The number of subscriptions to other high speed Internet access means (cable, satellite, wifi) is relatively stable.

Fixed broadband market shares	FR-2016	FR-2017	EU-2017
Incumbent market share in fixed broadband	-	-	40.3%
Technology market shares			
DSL	84.9%	81.7%	64.2%
Cable	7.4%	7.6%	19.4%
FTTH/B	6.4%	9.4%	12.9%
Other	1.3%	1.4%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	FR-2016	FR-2017	EU-2017
Own network	-	-	0.5%
Full LLU	85.1%	85.7%	72.8%
Shared Access	4.3%	3.7%	4.1%
Bitstream	10.6%	10.6%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband prices	FR-2016	FR-2017	EU-2017
Fixed broadband price index [values between 0-100]	94	94	87

Source: Communications Committee. Data as of July 2016 and July 2017.

b. Mobile market

Mobile market	FR-2016	FR-2017	EU-2017
Market share of market leader	-	-	35%
Market share of second largest operator	-	-	28%
Number of MNOs	4	4	not available
Number of MVNOs	50	50	not available
Market share of MVNO (SIM cards)	9%	8%	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

Mobile broadband prices [EUR/PPP]	FR-2016	FR-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€20	€9	€24
Least expensive offer for tablet and laptop (5 GB basket)	€14	€14	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

The French mobile telecommunications market is characterised by good 4G coverage and strong competition between the same main four operators as on the fixed market: Orange, SFR, Bouygues Telecom and Free (the latter entered the mobile market in 2012).

The market appeared to be stable over the reporting period. Indeed, three of the four main operators improved their respective turnovers within that timeframe.

Besides, France has some of the least expensive mobile broadband offers in Europe.

As far as Mobile Virtual Operators (MVNOs) are concerned, the market has been stagnating and its main trend has been to have prepaid offers.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Metropolitan France, 63.3% of the spectrum harmonised at EU level for wireless broadband electronic communications services on terrestrial mobile networks has been assigned.

Licences for substantial parts of the 900 MHz, 1.8 GHz and 2.1 GHz band will expire between 2021 and 2024. In January 2018, the French government agreed to forego an auction for the 900 MHz, 1.8 GHz and 2.1 GHz licences coming up for reassignment in 2021-24 and decided to maintain a stable level of annual fees for the subsequent years. In this context, Arcep has worked out conditions for reassigning the licences while incorporating new coverage requirements in the future licences. Fees have not been determined yet. Work is ongoing at national level.

The aim is to ensure ubiquitous 4G coverage on mobile networks, drastically reduce 'white spot' areas currently not covered by mobile networks, speed up coverage of priority transport routes, improve quality of service, and generalise indoor telephony coverage.

Meanwhile, in exchange for the stability of spectrum fees in the coming years, operators made commitments, which will be added to the terms of their existing licences in 2018[141]. They pertain, on the one hand, to improving mobile voice and data services and, on the other hand, to using 4G to improve fixed Internet access.

Arcep was expected to hold a public consultation on the competitive reassignment procedure, including the new obligations shortly[142]. Those obligations will be binding and failure to meet them could result in sanctions from Arcep.

In the meantime, according to Arcep, most of those frequencies have been neutralised, i.e., they are not restricted to 2G or 3G anymore. Arcep has decided to assign the 3410 - 3460 MHz spectrum for the deployment of superfast wireless solutions for fixed internet access, which come to complete the toolkit available to the regions for ensuring broadband and

[141]A historical deal was made public on 12 January 2018 between the French Government, Arcep and the four main telecommunication operators (Mobile Network Operators), in order to reduce "white spot areas" currently not covered by mobile networks.

[142] The relevant public consultation was launched on 5 April 2018 and is running until 16 May 2018.

superfast broadband coverage. To this end, on 11 December 2017, Arcep published the terms and conditions for the relevant assignment procedure, following a public consultation. Two applications are currently being handled namely one in the Loiret department and another one in the Seine et Marne department. First licences are expected to be awarded in early 2018.

On 13 December 2017, the French Authorities launched a public consultation on 5G technologies with the view to setting up a national strategy in that field. Stakeholders were invited to participate until 16 February 2018. The aim of the public consultation is to identify which key measures would be needed to address 5G-related challenges such as finding favourable conditions for 5G roll-out, experimenting new use cases and fostering the emergence of new technologies and services. On the basis of the replies received to the public consultation, the French Government shall publish a national strategy for 5G in 2018[143]. In the meantime, the following two frequency bands have been identified as being usable for 5G: the 3400-3800 MHz band and the 26 GHz band. In the 3400-3800 MHz band, some frequencies are already available in a number of cities e.g., Lyon, Bordeaux, Nantes, Lille, Le Havre, Saint-Étienne, Douai, Montpellier and Grenoble[144].

Finally, Arcep has decided to dedicate the central 40 MHz of the 2.6 GHz TDD band (i.e. the 2575 - 2615 MHz sub-band) to enabling professional mobile radio (PMR) networks' upgrade to LTE, in Metropolitan France.[145]

b. National and EU investment in broadband

According to the 2013 French National Broadband Plan 'Plan France Très Haut Débit' (France's Plan for Ultra-Fast Broadband), all French households and businesses should be covered by broadband speeds of 30 Mbit/s and above by 2022. The plan supports the roll-out of different technologies, with a large share of FTTH. The plan features a Government funding of 3.3 billion euros, with an equivalent funding from local public authorities.

As of 30 June 2017, 16.7 million of dwellings were eligible to fixed broadband at or above 30 Mbit/s all technologies alike. Among those 16.7 million of dwellings, 10.9 million were located outside of very dense areas.

8.9 million of dwellings were eligible to get Fibre To The Home (FTTH) (+37% increase within a year), 12.3 million of dwellings were eligible to fixed broadband at or above 100 Mbit/s.

In July 2017, French President Macron declared that he wished to offer "good high speed" Internet (at or above 8 Mbit/s) to all by 2020 and very high speed Internet to all by 2022. In

[143]It should be noted that, on 16 January 2018, Arcep opened, on its part, a "5G pilot" desk (5G@arcep.fr) with the view to facilitating information exchange with interested stakeholders and ultimately frequency assignment for 5G testing purposes.

[144] On 23 February 2018, Arcep allocated frequencies to Bouygues and Orange in the 3.6-3.8 MHz bands for 5G testing.

[145] On 6 March 2018, Arcep launched a public consultation until the 22 April 2018 on the terms and conditions for allocating 2.6 GHz TDD band spectrum for broadband professional needs. The purpose of the consultation is to set out the terms and methods that Arcep plans to use, along with the obligations, to allocate those frequencies through the future licenses. Contributions and remarks can be submitted until 22 April 2018.

order to achieve this goal, France aims to speed up the roll-out of fibre network and considers alternative means to fibre in remote areas, e.g. fixed 4G or satellite solutions[146].

A total of 3.3 billion euros will be allocated by the government to support the deployment of NGA networks in areas where private initiative is lacking. In December 2017, the government announced a specific investment of 100 million euros with the view to addressing the digital divide while fibre roll-outs take place and enabling those end-users based in remote areas to get access to alternative technology to fibre, through end-user subsidisation schemes.

Finally, a Senate-proposed bill to better secure public and private FTTH investments was tabled on 10 November 2017[147]. The bill's aim is to provide the relevant public authorities with the appropriate legislative and/or regulatory means to avoid any risk of overlaying of an FTTH network deployed or in the process of being deployed by another existing FTTH network (overbuild). This initiative is said to be designed to promote a more effective implementation of France's National Broadband Scheme, *Plan France Très Haut Débit* mentioned above. The bill notably details Arcep's possibility to impose fines on operators that would not comply with network roll-out binding commitments they would have undertaken in accordance with the Electronic and Postal Communications Code (Article L33-13).

c. Implementation of the Broadband Cost Reduction Directive

In so far as France had not yet fully transposed Directive 2014/61/EU[148] of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks by the first of January 2016, the Commission launched infringement proceedings against France in March 2016. Indeed, while legislation to transpose the Directive into French Law had been adopted, some secondary legislation was still missing to complete its full transposition. On 23 November 2017, the French Authorities notified a number of additional national implementing measures for the Cost Reduction Directive. The Commission Services are assessing those measures.

3. Regulatory function

After receiving the Commission's observations, Arcep adopted three analysis decisions on 14 December 2017 about broadband and superfast broadband markets, for the period running from 2017 to 2020[149].

---

[146] In April 2018, French companies have signed an agreement for launching by 2021 a high throughput satellite over Europe that would offer very high speed connectivity for all French and European citizens at affordable price

[147] https://www.senat.fr/leg/ppl17-083.html

[148] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[149] Décision n° 2017-1347 de l'Autorité de régulation des communications électroniques et des postes en date du 14 décembre 2017 portant sur la définition du marché pertinent de fourniture en gros d'accès local en position déterminée, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur sur ce marché, Décision n° 2017-1348 de l'Autorité de régulation des communications électroniques et des postes en date du 14 décembre 2017 portant sur la définition du marché pertinent de fourniture en gros d'accès central en position déterminée à destination du marché de masse, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur sur ce marché, Décision n° 2017-1349 de l'Autorité de régulation des communications électroniques et des postes en date du 14 décembre 2017 portant sur la définition des marchés pertinents de gros

The purpose of those decisions is to define asymmetric regulation which applies only to the incumbent operator Orange for the following three markets: wholesale local access provided at a fixed location (Market 3a); wholesale central access provided at a fixed location for mass-market products (Market 3b); wholesale high-quality access provided at a fixed location (Market 4).

On the basis of those decisions, Orange shall grant access to reasonable requests to its copper local loop, its civil engineering infrastructure, and shall publish information about the relevant accesses to its network. The latter obligation is designed to enable potential investors in networks to decide whether or not it would be worth investing on a case by case basis depending on the market dynamics at hand. In the meantime, Orange shall also grant access to its optical fibre local loop as a result of the symmetric regulation applying to any operator rolling-out FTTH networks.

As to the supervisory regime for Orange's residential FTTH access, Orange has reportedly proposed changes designed to address the operational difficulties its competitors have been facing in marketing their fibre products. Arcep has taken note of those changes and will monitor that Orange implements them by performing an assessment before 1 September 2018.

Besides, as far as the business market is concerned, Arcep has imposed on Orange to provide passive fibre offers with or without improved quality of service (QoS) with the view to allowing the development of a competitive wholesale bitstream market for retail market business operators to build on. In the meantime, Orange has to provide for wholesale resales of its business FTTH retail products.

In addition, Arcep has adopted (i) an updated decision on the prices charged for using Orange's local loop civil engineering with the view to providing market players with a more simplified and thus more predictable framework[150], as well as (ii) a new decision on price caps for access to Orange' copper local loop for the years 2018-2020[151].

Moreover, Arcep reviewed the markets for access to the public telephone network at a fixed location (market 1 of the 2007 Recommendation) and for wholesale call origination (market 2 of the 2007 Recommendation)[152].

The provision of wholesale services in those markets allows Orange's competitors to provide stand-alone fixed telephony offers (not bundled with internet broadband or other services) to their residential and non-residential customers, using Orange's public switched telephone network (PSTN). Arcep found that the market for access to the public telephone network aimed at residential customers was no longer susceptible to *ex ante* regulation. As regards the market for non-residential customers, Arcep proposed to maintain the current regulation imposed on Orange.

---

des accès de haute qualité, la désignation d'opérateurs exerçant une influence significative sur ces marchés et les obligations imposées à ce titre.

[150] Décision n° 2017-1488 de l'Autorité de régulation des communications électroniques et des postes en date du 14 décembre 2017 définissant les conditions économiques de l'accès aux infrastructures de génie civil de boucle locale d'Orange,

[151] Décision n° 2017-1570 de l'Autorité de régulation des communications électroniques et des postes en date du 21 décembre 2017 fixant un encadrement tarifaire de l'accès à la boucle locale cuivre pour les années 2018 à 2020,

[152] Arcep's draft measures were notified to and reviewed by the Commission under cases FR/2017/2038-2039, C(2017) 8890

The notification of the draft analysis decisions for market 1 and market 2 of the 2007 Recommendation gave rise to Commission comments. After receiving the Commission's comments, Arcep adopted a final decision on 21 December 2017[153].

Finally, Arcep also reviewed the markets for wholesale fixed and mobile call termination (market 1 and 2 of the 2014 Recommendation)[154].

4. Consumer matters

Since October 2017, Arcep has put into use a new dialogue tool via its website: it is called "*J'alerte l'Arcep"* Through this functionality, end-users can notify the Authority of issues they have experienced with telecommunication operators and receive dedicated feedback in return (regarding the obligations of operators and means of redress available to the end-user). It should nevertheless be stressed that this functionality is not designed to officially seize the Authority of a complaint but is dedicated to information exchange only.

Overall, there has been an increased number of consumer complaints about services offered by telecommunication operators. Since *"J'alerte l'Arcep"* started running, Arcep received about 20000 alerts within three months related to matters such as the quality of service of fixed or mobile internet and increased prices for mobile services without prior notice. By way of comparison, Arcep had received 6 500 complaints in 2016.

On its part, the mediator for electronic communications received 13 030 complaints in 2017 (namely an increase of 8% compared to 2016) out of which the main topics of complaints were mobile telephony (48%), Internet and bundled offers (38%), fibre (11%), fixed telephony (3%). More specifically, the main complaint types related to contracts (27%), billing (21%), and technical issues (24%)

a. Roaming

Overall, since 15 June 2017, operators have noticed that consumers have been increasingly using data roaming. Indeed, following the introduction of Roam Like at Home[155] (RLAH) in June 2017, French subscribers consumed 1.6 times more voice and 4.2 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[156].

No significant issue pertaining to roaming is to be noticed on the consumers' side, besides a reportedly limited number of cases where roaming was confused with international calls.

On the operators' side, a distinction should be drawn between mobile network operators and mobile virtual network operators. While the four main mobile network operators have not

[153] Décision n° 2017-1568 de l'Autorité de régulation des communications électroniques et des postes en date du 21 décembre 2017 portant sur la définition des marchés pertinents de l'accès au service téléphonique pour la clientèle non-résidentielle et du départ d'appel en position déterminée, la désignation d'opérateurs exerçant une influence significative sur ces marchés et les obligations imposées à ce titre,

[154] Arcep's draft measures were notified to and reviewed by the Commission under cases FR/2017/2028-2029, C(2017) 8078

[155] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[156] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

requested to use the sustainability mechanism (some of them even offered roaming services without any surcharge before 15 June 2017), a number of operators have obtained derogations from Arcep in that regard. Indeed, Arcep has granted derogations to three MVNOs and eight resellers (representing altogether less than 3% of the mobile market) allowing them to apply surcharges still to retail roaming[157].

b. Net neutrality

Regarding net neutrality[158], on 11 December 2017 Arcep launched a public consultation on the open Internet[159]. It is the follow-up to some dedicated work the Authority has been carrying out in 2017. Indeed, a number of specific workshops were organised in October and November 2017 so as to exchange views with stakeholders notably on the specific issue of the impact that devices can have on users' ability to access the internet and its different contents.

c. 112

While the European emergency number 112 is in service in France, the Commission services are monitoring whether the obligation of caller location laid down by Article 26(5) of the Universal Service Directive 2002/22/EC is properly implemented in practice. It has in particular been brought to the attention of the Commission services that not all relevant public entities would yet be properly connected to the PFLAU ("plateforme de localisation des appels d'urgence", technical platform dedicated to establishing caller location) which would generate delays in readily establishing the 112 mobile caller location.

d. Universal service

As regards fixed telephony, on 27 November, the Minister of economy and finances designated the operator in charge of providing the plug in and telephony related part of the universal service[160] as provided for by Article L-35-1 of the "Code des postes et communications éléctroniques" (Electronic and Postal Communications Code). The operator would be the incumbent Orange for a period of three years.

5. Conclusion

In order to further improve its high speed connectivity coverage throughout the country, France aims to speed up the roll-out of fibre network and considers alternative means to fibre in remote areas, e.g. fixed 4G, as a transitory complement.

A total of 3.3 billion euros will be allocated by the Government to support the deployment of NGA networks in areas where private initiative is lacking. French Authorities are also looking

[157] The following operators may apply roaming surcharges until 14 June 2018: Adista, Afone, Budget Telecom, Euro-Information Telecom (NRJ Mobile, CIC Mobile), Euroditel, International Telecommunication Network, ITC Ariane Services, MC Infinity, Scopelec, Sybord, Thales Communications & Security (zdnet.fr)

[158] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[159] Following the public consultation, Arcep adopted a report on 15 February 2018, which sets out some proposals for guaranteeing an open internet.

[160] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

at ways of making deployment commitments more effective and avoid overbuild of new networks in less dense areas.

Finally, French Authorities are steering new investment into mobile networks with the view to reducing zones without coverage and improve quality of services, including indoor coverage. In exchange for investing more than EUR 3 billion in improving network coverage, the French mobile operators would not have to face new spectrum auctions in the years to come as current spectrum licences expire. Instead, reinforced requirements would be introduced in their licence obligations.

Both strategies are expected to contribute to better high speed connectivity results throughout the country by 2020 already.

Germany

Market developments

1. Competitive environment

The most prominent change on the German telecom market was the takeover of the MVNO Drillisch by United Internet (1&1) completed on 8 September 2017[161]. The move resulted in the fourth largest telecommunications provider in Germany next to Deutsche Telekom, Vodafone and Telefónica.

Regarding fixed-to-mobile substitution, only a weak substitution effect can be detected in traffic volumes. While the growth rates in mobile minutes were low in recent years, there is still a significant loss each year in fixed telephony minutes. The number of outgoing mobile minutes increased by 4.6 billion between 2014 and 2016, while the number of fixed call minutes decreased by around 21 billion minutes over the same period. Overall, the total number of outgoing voice minutes decreased by about 16 billion. The decline in landline-based call minutes results only slightly from a shift in calls to mobile networks. In essence, other factors seem to be driving this evolution, such as the transmission of voice by over-the-top providers. There was a further decline in the number of SMS as well, from 16.6 billion SMS in 2015 to 12.7 billion in 2016.

Bundled products have increased significantly during the last years. In the fixed market, as of end 2016 around 95% of the approximately 32 million broadband connections (more than 144 kbps download rate) were contracted as bundled offers, i.e. around 30.5 million fixed-network-based bundled offers. With approximately 23.0 million double-play and approximately 7.4 million triple-play bundles, offers consisting of two or three services are the most frequently requested variants of bundles. It is hardly possible for new customers to obtain services as a single offer; this is especially true for pure voice telephony subscriptions, but also for Internet connections.[162] The only nationwide provider, where the Internet service can be booked without telephony, is the cable network operator Unitymedia. From the beginning of 2017, Deutsche Telekom (DT) had the offer Magenta Zuhause Surf in its portfolio, which makes it possible to use fixed internet without landline telephony. However, this tariff is bookable only in connection with a DT mobile contract and only for subscribers below the age of 27 years.

Fixed broadband prices	DE-2016	DE-2017	EU-2017
Fixed broadband price index [values between 0-100]	95	91	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

[161] https://www.united-internet.de/news-presse/pressemitteilungen/meldungen-detail/news/united-internet-und-drillisch-schliessen-gesamttransaktion-erfolgreich-ab.html

[162] *Bundesnetzagentur: Jahresbericht 2016* (Federal Network Agency: 2016 Annual Report), p. 53-54, published on 5 May 2017.

Fixed broadband prices increased from 2016 to 2017, however Germany's performance is still slightly better than the EU average.

a. Fixed Markets

Coverage	DE-2016	DE-2017	EU-2017
Fixed broadband coverage (total)	98%	98%	97%
Fixed broadband coverage (rural)	89%	89%	92%
Fixed NGA coverage (total)	82%	84%	80%
Fixed NGA coverage (rural)	49%	54%	47%
Ultrafast coverage (total)	no data	65%	58%
4G coverage (average of operators)	86%	88%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

In recent years, there have been no significant changes in market shares. Until mid-2017, Deutsche Telekom's competitors were able to reach about 60% of all broadband connections. Among the competitors of the incumbent are United Internet, Vodafone Kabel Deutschland, Unitymedia, Tele Columbus, NetCologne, wilhelm.tel, M-net, Deutsche Glasfaser, EWE TEL and others.

In the company list of the Federal Network Agency (Bundesnetzagentur), the number of municipal utilities (*Stadtwerke*) and of their spin-off subsidiary companies, that provide telecommunications services is growing steadily. Some of these companies build infrastructure for selling wholesale telecoms services to telecoms service providers; others provide services directly on telecommunications retail markets.

Fixed broadband market shares	DE-2016	DE-2017	EU-2017
Incumbent market share in fixed broadband	40.7%	40.1%	40.3%
Technology market shares			
DSL	76.0%	74.8%	64.2%
Cable	22.0%	22.8%	19.4%
FTTH/B	1.6%	2.1%	12.9%
Other	0.3%	0.3%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL included)	DE-2016	DE-2017	EU-2017
Own network	0%	0%	0.5%
Full LLU	65.5%	56.1%	72.8%
Shared Access	0.2%	0.0%	4.1%
Bitstream	13.3%	18.3%	14.7%
Resale	20.9%	25.5%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Coverage with ≥ 100 Mbps was 65% in 2016, as compared to 58% on EU average. Take-up of broadband connections with ≥ 100 Mbps was 11.1% in 2017 versus 7.8% in 2016. This is still below the EU average of 15.4%.

The supply of ≥ 50 Mbps connections has further improved. By the end of 2017, these connections were available to 80.5% of the approximately 40.8 million households in Germany, compared to 75.5% by the end of 2016. The growth was mainly driven by DSL/VDSL connections.

b. Mobile market

In mid-2017, almost 97% of all households in Germany could use broadband over LTE with speeds of at least 2 Mbps. The availability of LTE with speeds of at least 6 Mbps was at 89.1% vs 86.2% in mid-2016.

In October 2017, 4G coverage in Germany (average of operators) was slightly below the EU average (88% versus 91%).[163]

Mobile market	DE-2016	DE-2017	EU-2017
Market share of market leader	39%	38%	35%
Market share of second largest operator	32%	33%	28%
Number of MNOs	3	3	not available
Number of MVNOs	4	4	not available
Market share of MVNO (SIM cards)	-	not available	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

In addition to the three mobile network operators (MNOs), T-Mobile, Vodafone and Telefónica Germany (O2), there are four full mobile virtual network operators (MVNOs): Lycamobile Germany GmbH, Truphone GmbH, Sipgate Wireless GmbH and Voiceworks GmbH.

Service providers' market share by subscribers remained almost unchanged at around 24%. However, continuously increasing service provider revenues contributed to an increase in their market share by revenues from 16% in 2014 to 19% in 2016.

Due to the proliferation of OTT services, the demand for data is increasing, which in turn impacts mobile network operators' spectrum needs and may also lead to more investment in infrastructure.

Mobile broadband prices [EUR/PPP]	DE-2016	DE-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€27	€19	€24
Least expensive offer for tablet and laptop (5 GB basket)	€24	€19	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Mobile broadband prices for handset offers have dropped significantly from February 2016 to February 2017, below the EU average. The prices of mobile broadband offers (5GB basket) for tablets and laptops have dropped as well in the same period; however, these are still above the EU average.

As regards domestic data service, the average consumption per subscriber per month in Germany increased slightly from 0.96 GB (prepaid + post-paid) in Q2 2017 to 1.06 GB in Q3 2017.[164]

[163] Broadband Coverage Study (IHS and Point Topic). Data as of October 2017.
[164] BEREC CN (18) 13 International Roaming BEREC Benchmark Data Report, page 19.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Germany is the only EU country to have assigned 100% of the overall harmonised spectrum for broadband. In 2015, spectrum from the 700 MHz, 900 MHz, 1.5 GHz and 1.8 GHz bands was awarded.[165] No auctions were held in 2016 or 2017.

It should be noted that all spectrum bands harmonised for electronic communication services (ECS) are available for 5G already today because of the principle of service and technological neutrality. This applies namely to the 700 MHz, 800 MHz, 900 MHz, 1.5 GHz, 1.8 GHz, 2 GHz and 2.6 GHz band. It is expected that industry will focus on 3.4-3.8 GHz first, because of the Europe-wide availability of 400 MHz continuous spectrum providing for large channel bandwidth and today's limited use. Concerning spectrum above 6 GHz it is expected that the 26 GHz range will be targeted first by the industry. The Radio Spectrum Policy Group has identified both bands as pioneer bands for Europe.

Regarding the award of the 2 GHz and 3.6 GHz spectrum in 2018/2019, a demand assessment was carried out by the Federal Network Agency. According to the draft consultation[166] the Bundesnetzagentur found that the amount of spectrum available for nationwide assignment for wireless access in the 2 GHz and 3.6 GHz bands is insufficient. Therefore the award proceedings will be conducted in the form of an auction. A final decision is expected to be published later in 2018.[167]

Spectrum above 24 GHz – in particular the 26 GHz band – is also to be provided for 5G, account being taken of existing uses, at the earliest possible time and in line with demand. Given that existing uses in these bands are subject to specific protection requirements, assignment in the form of a general assignment does not appear feasible. The Bundesnetzagentur will initially draw up an application procedure for the 26 GHz band.

Telefonica holds 2 GHz spectrum until 2025, therefore it asked for competitive payment terms, i.e. "pay when available". If the auction revenues would be used as expected for broadband deployment, stakeholders expressed their concern of distortion in the bidding process, as DT would benefit most from the broadband subsidies and could be ready to place higher bids. The bundling in one auction of lots which become available at different times (three lots in 2 GHz in 2026, the other 2 GHz lots and the 3.6 GHz spectrum in 2021) might create additional challenges for the auction design. The Federal Network Agency included in the consultation, whether MVNO access should be included in license conditions. Another issue will be the coverage obligations attached with the licenses.

---

165 http://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/FrequencyManagement/ElectronicCommunicationsServices/MobileBroadbandProject2016/project2016_node.html.

166 The draft consultation was open until 28 February 2018. https://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/FrequencyManagement/ElectronicCommunicationsServices/ElectronicCommunicationServices_node.html

167 As of March 2018 it was planned to award the frequency band between 3.7 and 3.8 GHz (i.e. 100 MHz) to local providers on application. The intention is to auction nationwide (3.4-3.7 GHz, altogether 300 MHz) and to assign regional/local (3.7-3.8 GHz). In particular, reserving spectrum in the 3.7–3.8 GHz band for regional/local assignments would provide the opportunity for dedicated, self-supporting networks.

b. National and EU investment in broadband

The Federal Government's Digital Agenda 2013-2017 has defined broadband availability of at least 50 Mbps by the end of 2018 as the target for broadband expansion in Germany.

The 'Act to Facilitate the Efficient Expansion of Digital High-Speed Networks' (*DigiNetz-Gesetz*[168]) that transposes the Broadband Cost Reduction Directive 2014/61/EU[169] came into force on 10 November 2016 and further facilitates the deployment of high-speed broadband networks. In addition to the transposition of the Cost Reduction Directive the DigiNetz-Gesetz contains the obligation to deploy ductwork and fibre cables along with suitable civil works on transport services fully or partially financed by public means.

In January 2017, under the broadband funding programme, a special call '*Sonderprogramm Gewerbegebiete'*[170] was launched, with €350 million specifically to promote network deployment in underserved industrial and commercial areas as well as harbours. However, this programme was not used due to too strict conditioning.

On 7 March 2017, the Network Alliance and The Federal Ministry of Transport and Digital Infrastructure (*BMVI*) set out the strategy '*Zukunftsoffensive Gigabit-Deutschland'*[171] by declaring the need to install fibre infrastructure on a large scale. The roadmap envisages four stages and outlines the following goals: 50 Mbps for all households (by the end of 2018); deployment of fibre infrastructure in underserved industrial areas (by the end of 2019); creating the preconditions for nationwide 5G rollout (by the end of 2020); and gigabit-capable converged infrastructure (by 2025). In order to reach these goals, the Network Alliance commits itself to further expanding its already high financial investment into the broadband networks in Germany. Altogether, the Network Alliance plans to invest around €100 billion until 2023 in order to realise gigabit capable converged infrastructures by 2025.

The Commission decision of 15 June 2015 in case SA.38348 Next Generation Access Germany authorized the measure "Scheme of the Federal Government in support of the expansion of comprehensive next generation broadband access (NGA)" and defined that vectoring may be used by any beneficiary of the scheme under the condition that an adequate virtual unbundled local access (VULA) product, subject to a separate notification to the Commission, is made available. In August 2017, the European Commission has endorsed (SA.46805 DE) under EU state aid rules three German VULA products that will allow the use of vectoring technology in state funded high speed broadband networks.[172]

On 12 July 2017, the Federal Government published the 5G strategy for Germany. The Federal Government aims to position Germany as a lead market for 5G applications and to

---

[168] *Gesetz zur Erleichterung des Ausbaus digitaler Hochgeschwindigkeitsnetze* (Act to Facilitate the Efficient Expansion of Digital High-Speed Networks) (Official publication: Bundesgesetzblatt Teil 1 (BGB 1); Number: 52; Publication date: 09/11/2016; Page number: 02473-02487).

[169] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks.

[170] https://www.bmvi.de/SharedDocs/DE/Pressemitteilungen/2017/002-dobrindt-sonderprogramm-gewerbegebiete.html

[171] http://www.bmvi.de/SharedDocs/DE/Artikel/DG/eckpunkte-zukunftsoffensive-gigabit-deutschland.html http://www.bmvi.de/SharedDocs/DE/Publikationen/DG/netzallianz-digitales-deutschland.pdf?__blob=publicationFile

[172] http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_46805; http://europa.eu/rapid/press-release_IP-17-2502_en.htm

support a rapid and successful introduction of 5G technology. The goal was confirmed with the coalition agreement of 12 March 2018[173] to build a new German Federal Government. The agreement also announces to continue and intensify research, development and trials. Therefore a 5x5G-Strategy will be set up to early equip five regions with the required radio infrastructure to accelerate network rollout.

Following the 2017 elections in Germany a €10-12bn Gigabit Investment Fund was included in the coalition agreement to be spent until 2021 (i.e. during the next four years). Industry participants expressed concerns about such huge amount of state aid that could crowd out private investments. Bottlenecks and related price hikes in civil engineering capacities are expected as well. Industry suggests promoting only white areas, not such areas that could be economically viable.

Also part of the coalition agreement is the legal right for all citizens to fast internet from 1 January 2025, to be designed until 2019, and direct fibre connections for socio-economic drivers until 2021 (schools, hospitals, business parks etc.).

In the 2014-2020 programming period, Germany plans to devote € 596 million of European Structural and Investment Funds (ESIF) to support interventions in different ICT areas (i.a. broadband, SMEs, intelligent transport systems and energy distribution systems, eSkills and eHealth). These include notably € 361 million devoted to the improvement of high-speed broadband networks, under the European Agricultural Fund for Rural Development (EAFRD - € 224 million) and the European Regional Development Fund (ERDF - € 137 million).

c. Implementation of the Broadband Cost Reduction Directive

Germany transposed the Broadband Cost Reduction Directive[174] by the 'Act to Facilitate the Efficient Expansion of Digital High-Speed Networks' (*DigiNetz-Gesetz*[175]), which was published in the *Bundesgesetzblatt* on 9 November 2016 and entered into force on 10 November 2016. There are several challenges with the implementation of the DigiNetz-Gesetz, mainly concerning fair and reasonable compensation,[176] co-usage, co-deployment, access to physical infrastructure, transparency, etc. To speed up the implementation process the Federal Ministry of Transport and Digital Infrastructure set up a working group including several sub working groups.[177] The working group consists of participants among others from the Federal States (*Länder*), municipalities and telecommunication associations. Furthermore the Federal Network Agency was appointed as the national dispute settlement body for questions arising from the implementation of the DigiNetz-Gesetz. The Federal Network Agency is dealing with about twenty cases of dispute resolution, covering cases within the full range of the DigiNetz-Gesetz, such as co-usage, co-deployment and related questions of transparency.

---

[173] https://www.bundesregierung.de/Content/DE/StatischeSeiten/Breg/koalitionsvertrag-inhaltsverzeichnis.html
[174] See footnote 9.
[175] See footnote 8.
[176] On 6 February 2018, the Federal Network Agency launched a consultation regarding remuneration ranges for co-usage and co-deployment in high-speed broadband roll-out in the context of the DigiNetzG (***B****reitbandausbau: Konsultation zu Entgeltmaßstäben für Mitnutzung und Mitverlegung*) (https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2018/20180206_konsulationdiginetzG.html?nn=265778).
[177] Working Group Digital Networks divided into: 1) Sub Working Group (SWG) Material Concept for civil works; 2) SWG Access-Pricing; 3) SWG In-Building; 4) SWG Questions of Principle Regarding Transparency Issues; 5) SWG (for 2018) Access for the Mobile Gigabit Society (Converged High-Speed Networks/5G).

3. Regulatory function

The 2018 coalition agreement could lead to changes for the telecom industry. According to the agreement, the Federal Network Agency would continue to safeguard competition and act as ex-post dispute settlement body. As to the new elements, it would publish an annual monitoring report regarding mobile coverage in order to support actions to reduce and ultimately remove white areas.

As to the decisions of the Federal Network Agency, the fees for carrier Ethernet leased lines and carrier SDH leased lines were approved with effect from 1 January 2017. As of 1 July 2017, due to the expiry of the approval period, the provisioning fees for carrier SDH leased lines (bandwidths from 2 to 10 Mbps and over 10 to 155 Mbps inclusive) and for carrier Ethernet leased lines were approved.

On 21 July 2017, the Federal Network Agency approved new fixed termination charges for Telekom Deutschland GmbH for the period from 1 January 2017 to 31 December 2018. On 20 October 2017, the Federal Network Agency approved the fixed termination rates for 74 alternative network operators the same period. The fixed termination rates were adopted at 0.1 €cts/min and are valid until end 2018. As the proposed calculation method was not based on the pure LRIC approach, recommended by the Commission's 2009 Termination Rates Recommendation,[178] but based on a benchmarking approach, the Commission, following an in-depth or Phase II investigation, criticised the Federal Network Agency's proposals in this respect and asked the regulator to amend or withdraw the remedies relating to price caps for fixed call termination services in Germany.[179]

On 6 March 2017, the mobile termination rates were approved for seven MNOs and MVNOs for the period from 1 December 2016 to 30 November 2019, which were calculated for the first time based on the pure LRIC approach, in line with the Commission's 2009 Termination Rates Recommendation.[180] The following mobile termination rates can be charged: 1.10 €cts/min from 1 December 2016; 1.07 cents/minute from 1 December 2017 and 0.95 €cts/min from 1 December 2018 until the end of November 2019.

On 31 July 2017, the Federal Network Agency has defined the final technical, operational and legal details for the use of near-shore (*Nahbereich*) vectoring in four decisions. Specific conditions were established for the use of near-shore vectoring in the decision on the standard reference offer verification process. These include in particular the cancellation rules of the subscriber line used for VDSL at the main distribution frames and the rules for the migration to other wholesale products. It also includes the design of the alternative VULA access product, which must be very close to the characteristics of the unbundled local loop. Finally, it regulates the details of financial compensation to competitors, if vectoring prevents them from gaining access to the unbundled local loop in the near-shore area (DE/2017/2002: Wholesale local access provided at a fixed location in Germany – Remedies (amendments to the reference offer)).[181] In addition, fees for the virtually unbundled access product (VULA)

[178] Commission Recommendation of 7 May 2009 on the regulatory treatment of fixed and mobile termination rates in the EU, OJ L 124, 20.05.2009, p.67.
[179] See cases DE/2017/1961 (for DT) and DE/2017/1997 (for the 74 alternative fixed operators).
[180] Commission Recommendation of 7 May 2009 on the regulatory treatment of fixed and mobile termination rates in the EU, OJ L 124, 20.05.2009, p.67.
[181] https://circabc.europa.eu/sd/a/1b4268a7-d335-4a1d-b8c2-4d7567082c5d/DE-2017-2002%20ADOPTED_EN.pdf

to be offered by Deutsche Telekom have been approved (€7.48/month). These fees were calculated based on the cost of efficient service delivery. Additionally, a fee has to be paid for the transfer of the vectoring infrastructure (DE/2017/2000 Market 3a: Wholesale local access provided at a fixed location – Remedies).[182]

In addition, the Federal Network Agency has adopted two further decisions concerning the Layer 2 Bitstream. According to this, Deutsche Telekom may consider a one-time quota (or contingent) payment (so-called "upfront") already agreed with competitors or made by them for another access product when agreeing on a layer 2 contingent model. In addition, Deutsche Telekom may offer competitors contingents of Layer 3 and Layer 2 connections for a transitional period, which increases the attractiveness of higher-level Layer 2 Bitstream connections. Since these are fee-relevant conditions for the layer 2-bitstream, they were subject to approval (DE/2017/2001: Wholesale central access provided at a fixed location for mass-market products in Germany – Remedies (Pricing for Layer-2 Bitstream Access)).[183] Finally, by making a decision in a standard reference offer process, the technical conditions for the Layer 2 Bitstream have been adjusted to increase the frame length of an Ethernet frame packet from 1 526 bytes to 1 590 bytes, allowing data packets to carry more content (DE/2017/2003: Wholesale central access provided at a fixed location for mass-market products in Germany – Remedies (Size of Maximum Transmission Unit)).[184]

Prices for wholesale local access (Market 3a) are: LLU from the main distribution frame (HVt-TAL) €10.02/month, SLU from the cabinet (KVz-TAL): €6.77/month, VULA at the street cabinet (KVz-VULA): €7.48/month.

Prices for Layer 2 Bitstream (Market 3b - Wholesale Central Access) were the following until 30 November 2017: VDSL 16/25/50 Mbps €18.56/month and VDSL 100 Mbps €19.10/month. From 1 December 2017 the prices are: VDSL 16/25/50 Mbps €18.02/month and VDSL 100 Mbps €19.10/month, ADSL €15.17/month.[185]

To support the international marketing of M2M-services and devices the Federal Network Agency formally allowed in 2017 for the case of M2M communication the use of German mobile phone numbers abroad and – vice versa – the use of foreign numbers in Germany. Therefore, rules for the extra-territorial use of numbers for mobile services were implemented in the German numbering plan for mobile services.[186] The extra-territorial use of foreign numbers for M2M communications within the territory of the Federal Republic of Germany was formally allowed with the administrative order No. 80/2017, Official Gazette No 16/2017 of 23 August 2017.

In this way, the rules were brought into line with similar regulations that were adopted in 2016 regarding International Mobile Subscriber Identities (IMSIs). According to the German regulation, IMSIs may be used extra-territorially for M2M communication, both German

[182] https://circabc.europa.eu/sd/a/8dad9e39-7335-417d-8023-a2f110c9cf22/DE-2017-2000%20Adopted_public_EN.pdf
[183] https://circabc.europa.eu/sd/a/48d5adde-1ce7-4896-8731-b5f4526929a7/DE-2017-2001%20Adopted_public_EN.pdf
[184] https://circabc.europa.eu/sd/a/bac112cc-0d35-48b8-a678-f4e0c830d368/DE-2017-2003%20Adopted_EN.pdf
[185] Press release of the Federal Network Agency, 1 December 2017: https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2017/01122017_Bitstrom.html
[186] Version applicable from 23 November 2017, Administrative Order No 78/2017, Official Gazette No 16/2017 from 23 August 2017.

numbers abroad and foreign numbers in Germany. Beyond that, the use of ITU global numbers in Germany is permitted under German regulation.

4. Consumer matters

In 2016 about 83 000 and in 2017 approximately 81 000 consumer complaints were handled by the Federal Network Agency. As in previous years, the two main categories of complaints were those regarding switching (continuity of service, number portability and questions related to the switching process) and contractual issues. Other complaints were related to moves, fault repair, network coverage and data protection. In addition, around 164 000 consumer complaints and requests regarding the misuse of numbers were handled by the Federal Network Agency in 2017 (2016: around 78 000). Of these, almost 77 000 consumer complaints focused on “ping calls” (2016: 2 000). Furthermore, in the category of unpermitted telephone advertising ("Cold calls"), the number of written complaints has increased from around 29 000 in 2016 to around 57 000 in 2017. The Federal Network Agency publishes a list of its measures against misuse of numbers on its website.[187]

a. Roaming

Since 15 June 2017 the Federal Network Agency, has identified several infringements of the roaming rules[188]. The Federal Network Agency has requested the relevant roaming providers to comply with the Roaming Regulation and in two cases has started administrative procedures against Telekom Deutschland and Vodafone regarding their zero–rated offers “StreamOn”[189] and “Vodafone Pass”. While offering the underlying tariffs for roaming usage, both operators restrict their zero rated option to domestic use. These tariffs do not comply with the provisions of the Roaming Regulation with regard to applying the same charging mechanism of the domestic retail price when roaming in the EU EEA. In both cases, the charging mechanism is changed when consumers roam. While the zero-rated option of the tariff is not deducted from the monthly domestic volume allowance when the customer is at home, the zero-rated volumes are counted against the domestic allowance when the customer roams. This indirectly leads to imposing surcharges, because users are forced to buy additional data volumes to their tariff plans.

In addition to the aforementioned cases, the Federal Network Agency also identified non-compliance with the new roaming rules by another operator (Lycamobile). In particular, the operator applied a fair use policy, which is not in line with the provisions of the implementing act. The Federal Network Agency requested the operator to comply with the Roaming Regulation and will commence a formal proceeding should the operator not cease breaching the legal provisions.

The Federal Network Agency received several complaints after the start of RLAH and a variety of requests for detailed information about the RLAH principle from consumers.

187

https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Verbraucher/Rufnummernmissbrauch/Massnahmenliste/Massnahmenliste-node.html

188 Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

189 Press release of the Federal Network Agency of 15. Dec. 2017 regarding its decision to prohibit certain aspects of the “StreamOn” tariff:
https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2017/15122017_StreamOn.html.

Compared to the previous years, the number of consumers who contacted the Federal Network Agency's consumer protection service regarding roaming issues has increased. The main reason for this was most likely the switch to a completely new roaming tariff regime. The main issues were the following: the application of RLAH with a view to business tariffs; the automatic switch to the regulated RLAH–tariff after 15 June 2017; not receiving a "welcome SMS" when roaming and incorrect or incomprehensible billing. With the view to making consumers aware and to giving an overview of the RLAH provisions, the Federal Network Agency also published FAQs on its website.

The Federal Network Agency received consumer complaints about significantly lower transmission speeds when roaming in the EEA. In this regard, the Federal Network Agency took note that in the summer 2017, in the case of the UK, O2 UK confirmed that they were throttling roaming data transmission speed because in the UK networks were not able to handle the significantly increased consumption volumes.

The Federal Network Agency has not received any applications for a derogation since the start of RLAH. The Federal Network Agency observed increases of domestic prices during the transitional period. The two big MNOs have introduced tariff plans for new customers with a €5 mark-up. In the summer of the year 2017, an MVNO charged €3 more for tariffs including RLAH. Following the introduction of Roam Like at Home (RLAH) in June 2017, German subscribers consumed 1.4 times more voice and three times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[190]

One operator, Transatel, claimed to face huge difficulties to get wholesale roaming access in line with the Roaming Regulation from MNOs in Germany. According to Transatel, it could secure commercial 4G MVNO access everywhere in the EU but in Germany.

b. Net neutrality

Article 6 of Regulation (EU) 2015/2120[191] stipulates that 'Member States shall lay down the rules on penalties applicable to infringements of Articles 3, 4 and 5'. The Third Law Amending the Telecommunications Act[192] that came into force and was notified to the Commission on 4 July 2017 sets out the rules on penalties under Article 6 of Regulation (EU) 2015/2120. In particular, it stipulates administrative fines for certain infringements of Article 3 and Article 4 of Regulation (EU) 2015/2120. The maximum fine is €500 000 for certain infringements of Article 3(3) (applying the mentioned traffic management practices), and for infringements of executable administrative orders of the Federal Network Agency based on Article 5(1). The maximum fine is €100 000 for infringements of Article 4(1) (not providing the information in the contract) and maximum €10 000 for infringements of Article 5(2) (not

[190] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[191] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[192] *Drittes Gesetz zur Änderung des Telekommunikationsgesetzes* (Third Act amending the German Telecommunications Law) of 27 June 2017, official publication: Bundesgesetzblatt Jahrgang 2017 Teil I Nr. 42, published in Bonn on 3 July 2017.
(https://www.bmwi.de/Redaktion/DE/Artikel/Service/dritte-aenderung-telekommunikationsgesetz.html; https://www.bmwi.de/Redaktion/DE/Downloads/Gesetz/drittes-tkg-aenderungsgesetz.pdf?__blob=publicationFile&v=4)

providing information at all, correctly, completely or in time to the national regulatory authority (NRA)).

At the national level, additional transparency requirements were enacted under the Transparency Ordinance, which sets out the publication of information and other cost control measures in the telecommunications market. The Transparency Ordinance entered into force on 1 June 2017. It requires fixed and mobile operators to increase the transparency of Internet access services.

Providers of Internet access services are required to provide product information sheets in which the consumer can see quickly and easily the essential terms of the contract prior to concluding the contract. The product information sheet contains details of the available data transfer rate, the duration of the contract and the monthly costs. Consumers are also informed about the contractually agreed volume of data (if relevant).

In addition, consumers are entitled to obtain reliable data on the quality of their Internet access service, in particular the available data transfer rate and its ratio of the contractually agreed maximum speed. The format for this information is set out in the Annex to the Ordinance. The Internet access service provider must therefore inform the consumer of possible ways of measuring speed, e.g. by reference to the broadband measurement tool offered by the Federal Network Agency (see https://breitbandmessung.de).

On 27 March 2017, the Federal Network Agency published its first report on broadband speed measurements.[193] [194] Industry stakeholders are questioning the reliability of the speed measurement tool of the Federal Network Agency and have concerns about legal consequences.

In July 2017, the Federal Network Agency published its first net neutrality monitoring report[195] covering the period from May 2016 to April 2017 according to the requirements of Article 5 of Regulation (EU) 2015/2120.

The Federal Network Agency started administrative procedures regarding net neutrality and roaming issues against Deutsche Telekom and Vodafone Germany (see also under Roaming). They delivered their decision on StreamOn to Telekom Deutschland GmbH (DT) on 15 December 2017[196] and published their decision later.[197] From a net neutrality perspective, the

193
https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2017/27032017_Breitbandmessung.html;jsessionid=F29E096B0BAE77FA0C03FAC988F4E003

194 On 17 January 2018, the Federal Network Agency published its second report on broadband measurements (https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2018/20180117_Breitbandmessung.html?nn=265778).

195 Net Neutrality in Germany - Annual Report 2016/2017 (https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Breitband/Netzneutralitaet/Net%20Neutrality%20in%20Germany%20Annual%20Report%202016_2017.pdf?__blob=publicationFile&v=2)
Netzneutralität in Deutschland Jahresbericht 2016/2017 (https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Breitband/Netzneutralitaet/Netzneutralitaet_Jahresbericht%202016_2017.pdf?__blob=publicationFile&v=6)

196 https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/EN/2017/04122015_Streamon.html

Federal Network Agency found that Deutsche Telekom was in breach of Regulation (EU) 2015/2120, because it reduced the data transfer rate for video streaming in certain tariffs. The Agency also started an administrative procedure against Vodafone Germany. From a net neutrality perspective, the Agency was concerned about the Vodafone Pass offer as reserving a possibility of non-compliant "optimisation of traffic" in the future.

c. 112

Regarding caller location accuracy and reliability, there were no changes in 2017; the accuracy is still the civic address for fixed networks and the area of the mobile cell for mobile networks. Although handset-based caller location is not deployed, the Federal Ministry for Economic Affairs and Energy has launched a pilot project for a smartphone app utilising caller location information.

As regards equal access to emergency services for customers with disabilities, in Germany, people with hearing or speech impairments can make a 112 emergency relief request by fax transmission only.[198] Such communication is cumbersome, is not seamless, and cannot be used on the move, for instance through mobile phones.[199] Fax transmission is thus unsatisfactory in that it does not ensure equal access to emergency services for this group of people. No new measures were implemented in this regard during 2017, but the planned smart phone app (the pilot project mentioned before) will support text communication. From 07:00h to 23:00h end-users with hearing or speech impairments can also use a particular human translator service providing video transmission and speed texting for their emergency calls.

d. Universal service

There have been no changes to the universal service[200] regime in 2017. It is considered that universal service in Germany has been sufficiently provided by the incumbent (Telekom Deutschland GmbH), therefore, there is no designated universal service provider. The Federal Network Agency analysed in its 2016/2017 Activity Report[201] to which extent could be recommended to include broadband internet in the scope of universal service. In this context, the Federal Network Agency concluded that the inclusion of broadband internet in the scope of universal service was not appropriate.[202]

197

https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Breitband/Netzneutralitaet/Netzneutralitaet-node.html

198 The current wording of Article 108(2) of the German Telecommunications Law (*Telekommunikationsgesetz*) that transposes Article 26(4) of the Universal Service Directive (USD) provides for a specific technical solution for disabled end-users, i.e. fax transmission.

199 Other alternative means of access that ensure equal access are reported in EU Member States: applications implementing total conversation, real-time text, SMS, video streaming, and text relay services.

200 Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

201

https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Allgemeines/Bundesnetzagentur/Publikationen/Berichte/2017/TB_Telekommunikation20162017.pdf?__blob=publicationFile&v=3

202 Whereas the coalition agreement of March 2018 makes no mention of universal service requirements it contains the announcement of a right for all citizens to fast internet access that shall become law before 2025. The first draft of the aforementioned law shall be issued before the middle of the current legislative term.

5. Conclusion

The Federal Government will face several challenges on the German telecom markets. There is an obvious urban-rural digital divide regarding fixed NGA coverage (rural coverage at 54% though still above EU average of 47%) in Germany, where targeted broadband funding would seem to be crucial. The share of fibre connections is very low (only 2%), thus Germany is lagging behind several EU Member States. The incumbent's focus on vectoring technology could further delay deployment of very high-speed connections. Commitments from the Federal Government and from operators to deliver nationwide high-speed infrastructures will contribute to improve the currently very low availability and take-up of gigabit connections. The 2018 coalition agreement includes such a commitment to full-coverage with gigabit-ready networks and prioritizes fibre. Access to emergency services for disabled users is unsatisfactory and should be improved. Several zero-rating services are emerging on the market that would have to be amended to be compatible with roaming and net neutrality rules.

GREECE

Market developments

1. Competitive environment

a. Fixed market

Coverage	EL-2016	EL-2017	EU-2017
Fixed broadband coverage (total)	99%	99%	97%
Fixed broadband coverage (rural)	97%	97%	92%
Fixed NGA coverage (total)	44%	50%	80%
Fixed NGA coverage (rural)	1%	14%	47%
Ultrafast coverage (total)	no data	0.4%	58%
4G coverage (average of operators)	80%	88%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Greece covers 99% of its households with basic fixed broadband, and despite its challenging geography has a high coverage of rural areas (97%), which lies above the EU average of 92%. Its coverage of households with next generation access (NGA) networks increased by 6 percentage points to 50%, but remains still very low comparing to the EU average of 80%. It is important to underline that while NGA coverage in rural areas has increased remarkably from 1 % to 14%, it remains still quite low comparing to the EU average 47%. This further emphasises the importance of the deployment of 4G, where Greece is doing reasonably well, as the coverage stands at 88% of the households, very close to the EU average of 91%.

The slightly increased NGA has not led to a higher NGA take-up, which is the second lowest in the EU. The low NGA take-up may be also attributed to the increase of fixed broadband prices in 2017, which are significantly higher than the EU average. Only 10% of the actual subscriptions are between 30 Mbps and 100 Mbps and 0% subscriptions are above 100Mbps[203]. The lowest fixed broadband price (12-30 Mbps) is at 23.66 euro, compared to 21.96 euro at EU level[204]. It is important to note that apart from data derived from the operators' pricelist, the operators are continuously offering discounts on the pricelist tariffs, as well as bespoke offers.

There is however reasonable expectation that as far as NGA network deployment is concerned there will be positive developments in the near future as the market has already entered a phase of deployment, following new regulatory measures adopted in the markets for wholesale local access and wholesale central access for mass-market products. The new vectoring regulation put in place by EETT seems to be implemented smoothly and is actually triggering significant investments in NGA rollout by the three main players (OTE, Wind, and VF).

According to the allocation scheme, at the end of 2019, 60% of the total access lines will be covered by NGA networks. FTTC/VDSL vectoring will be the basic architecture/ technology

[203] COCOM data on Fixed Broadband Subscriptions by speed, July 2017.

[204] Source: Fixed broadband prices in Europe in 2017 (Empirica, project SMART 2016/0044) - forthcoming. Prices expressed in EUR/PPP, VAT included.

of the NGA deployment, since it will cover almost 90% of the subscribers (approx. 2 600 000 subscribers) in the allocated outdoor cabinets. The rest of the subscribers in these areas will be divided between FTTC/G.Fast & VDSL vectoring (110 000 subscribers) and FTTH/GPON (135 000 subscribers).

Apart from the network providers investing currently in Greece in the implementation of NGA networks on the basis of the vectoring regulation (OTE, Vodafone, WIND), another business model has developed with the example of INALAN, a sole shareholder company that implements FTTH in restricted areas (suburbs of Athens and suburbs and center of Thessaloniki) and offers broadband services of 100Mbps/100Mbps, combined with voice services if requested by the customer.

Fixed broadband market shares	EL-2016	EL-2017	EU-2017
Incumbent market share in fixed broadband	44.3%	45.7%	40.3%
Technology market shares			
DSL	99.7%	99.6%	64.2%
Cable	-	-	19.4%
FTTH/B	-	-	12.9%
Other	0.3%	0.4%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	EL-2016	EL-2017	EU-2017
Own network	-	-	0.5%
Full LLU	99.2%	99.3%	72.8%
Shared Access	0.2%	0.3%	4.1%
Bitstream	0.6%	0.4%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Despite other market players participating in NGA deployment, the incumbent's market share increased by almost two percentage points from July 2016 to July 2017, reaching 45,7%, well above the EU average of 40,3%. Alternative operators continue to rely heavily on Local-Loop-Unbundling (LLU) at the main distribution frame (MDF). According to data available by EETT, the trend in favour of bundles continues to grow in 2017 and accounts around 77% of all fixed telephone subscriptions (4,705M). The “triple play services” represent 36% of the bundles, while the “double play services” account for 60% of the bundles.

Fixed broadband prices	EL-2016	EL-2017	EU-2017
Fixed broadband price index [values between 0-100]	71	69	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile market	EL-2016	EL-2017	EU-2017
Market share of market leader	-	-	35%
Market share of second largest operator	-	-	28%
Number of MNOs	3	3	-
Number of MVNOs	1	1	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of July 2016 and July 2017.

Mobile broadband prices [EUR/PPP]	EL-2016	EL-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€61	€48	€24
Least expensive offer for tablet and laptop (5 GB basket)	€22	€27	€17

Source: Mobile Broadband Price Study (Van Dijk). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February 2017.

Greece showed an increase in 4G coverage but it still has the second lowest percentage of mobile broadband penetration per all active users in the EU. This could be due to mobile broadband prices being significantly higher than the EU average, (mobile take up for Greece 59.1%, EU average 90.2 %).[205] EETT has recently received and examines a notification from two operators (Vodafone and Wind) that they plan to extend their network sharing agreement on 4G networks. According to data available from EETT, the SMS market size continues to decline by 20% while the voice market decreased by a mere 1.2%, mainly due to international calls. The above mentioned phenomena are partially a result of the OTT penetration and of the economic crisis.

In terms of competitive dynamics, the Greek telecoms market, in particular the mobile market undergoes a market consolidation phase[206]. Cyta is the only MVNO currently active in the Greek market and operates in the local market with less than 1% market share. Another fixed operator (Forthnet) has requested to be granted access by MNOs in order to operate as an MVNO but did not finalise an agreement with one of the MNOs. It has filed though a request for dispute resolution with EETT, which is still open.

Regulatory developments

2. Supporting measures for deployment and investments in high speed networks

a. Spectrum

In Greece 67.52% of the spectrum harmonised at EU level for wireless broadband is assigned.

Under the Ministerial Decision 53742/1090/3-8-2017[207], an auction process for spectrum licensing in the 1800 MHz band was carried out by EETT in August 2017 after a public consultation and was completed in December 2017[208]. The rights of use were assigned for 15 years to the incumbent and for 17 years to the other 2 operators[209].

Commission Implementing Decision (EU) 2017/191[210] has been partially implemented in 2017. In particular, the implementation with respect to the 2.6 GHz bands (by amending the

[205] COCOM data on Mobile Broadband penetration-all active users, July 2017.Statistical evidence indicates a negative correlation of mobile take-up with high prices.
[206] The takeover of Cyta from Vodafone was signed on 23 January 2018 pending its approval by EETT and the deadline for submission of binding bids for the buyout of Forthnet has been set for 16 March 2018.
[207] Ministerial Decision 53742/1090/3-8-2017 on the"Limitation of the number of rights of use to be granted and the determination of the type of auction procedure to be followed for the granting in accordance with article 25 of Law 3431/2006" published in the Government Gazette (ΦΕΚ 2760/B/8-8-2017).
[208] EETT Decision 822/1/ 11-8-2017.
[209] The incumbent's rights of use expire in 2020. For this reason and in order to have the same expiration date (2035) for all the operators, the rights of use were assigned to the incumbent for 15 years starting from 2020.
[210] Commission Implementing Decision (EU) 2017/191 of 1 February 2017 amending Decision 2010/166/EU, in order to introduce new technologies and frequency bands for mobile communication services on board vessels (MCV services) in the European Union (notified under document C(2017) 450).

relevant spectrum rights) has not been completed due to the termination of the mandate of the EETT Plenary by the end of 2017. In general the Ministry of Digital Policy, Telecommunications and Media which is the competent authority for the harmonisation of Commission implementing decisions, such as (EU) 2017/2077 (automotive short-range radars in the 24 GHz)[211] and (EU) 2017/1438 (UWB)[212], has incorporated most of them in the Greek legislation. For those decisions that are still not incorporated in the legislation, such as the Decision (EU) 2017/1483 (SRD)[213], the Ministry of Digital Policy, Telecommunications and Media is in the process of implementing them.

No specific plans exist for the future assignment of WBB spectrum and no licence renewals for WBB have been carried out within 2017. However, in general Greece has implemented the spectrum harmonisation Decisions issued according to the RSPP, without prejudice to the spectrum that already has been used by the Greek armed forces. For instance a public consultation for the 1452-1492 MHz (i.e. 1.5 GHz) band was concluded in 2017, but the market showed no interest for immediate usage of this band. Nevertheless, it is intended to repeat the consultation in the near future to include any expansions of this band that may have been harmonised at EU level.

As regards the 700 MHz band the main difficulties for the transition include the current usage of part of the band by the Greek Armed Forces and also the need for spectrum coordination with neighbouring countries. Concerning the latter, during 2017, Greece participated in the SEDDIF and Trans - Adriatic Ionian regional fora which concluded the relevant multilateral agreements. Bilateral Agreements with Turkey, Bulgaria, FYROM and Montenegro have also been signed. The expected timetable for the broadcasting migration is being planned taking into account the dates provided in the relevant EC Decisions[214], i.e. use for mobile services by the 30th June 2020, at the latest by 2022, if justified in line with the exceptions provided for in the EU law. There are no details available yet on the specific TV migration dates but they are expected to be announced in 2018.

The first frequency bands likely to be used for 5G are the 3.6 GHz band (below 6 GHz) and the 24.25-27.5 GHz (above 6 GHz). During 2017, in total 2x55 MHz of radio spectrum in the 1800 MHz band was reassigned through an open tender process.

b. National and EU investments in broadband

The Greek RURAL Project (Broadband Network Development in White Rural Areas of Greece) won the European Broadband Award 2017 in the category 3 (Territorial Cohesion in Rural and Remote Areas). It is an EU-funded project with a total cost of EUR 199.7 million (of which EUR 143.8 million come from EU Structural funds) financed through two different

[211] Commission Implementing Decision (EU) 2017/2077 of 10 November 2017 amending Decision 2005/50/EC on the harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short-range radar equipment in the Community.
[212] Amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community.
[213] Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC (notified under document C(2017) 5464). The Ministry in cooperation with EETT is preparing an amendment of the National Frequency Band Allocation Regulation (ΕΚΚΖΣ), in which the Decision (EU) 2017/1483 (SRD) is going to be incorporated.
[214] Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union.

financing periods (2007-2013 and 2014-2020). The project is a PPP (Public Private Partnership) and was carried out in three lots over 41 months. It is expected to be finalised in May 2018 but more than 80% of the project has been implemented. It provides broadband coverage to remote and scarcely populated areas (white areas) with gradual increases to 30 Mbps and a future proof infrastructure for greater speeds. It covers almost 45% of the Greek territory from North to South. The infrastructures deployed in the framework of Rural Broadband project have been recently made commercially available. A monitoring process is in place and an assessment will be performed in due time. The project will be extended to cover additional white areas in the present financing period. The actual funds to be allocated are still under discussion.

The initially accepted NGN under ex-ante conditionality 2.2 plan included two main projects: a Superfast Broadband Project for individuals and one for business (SMEs) and the extension of the Rural Broadband Project. There have been a number of discussions about the Superfast Broadband Projects amongst the Greek authorities and the European Commission. None of the projects has started yet[215]. The projects, the financial allocations and the form are still under discussion with all parties involved.

Limited availability of NGA infrastructures and high prices are serious barriers for broadband penetration. However, the announced plans for ISPs network roll out, together with the public intervention through the projects of the National Broadband Plan, are expected to change the situation.

c. Implementation of the Broadband Cost Reduction Directive

The Broadband Cost Reduction Directive[216] has been transposed to the national legislation with the Law 4463/2017 which came into force on the 30th March 2017. Despite the complete transposition of the Directive, Greece has to take further measures for the effective practical implementation of the Directive especially concerning the delays on antennae licencing and the cooperation across sectors. As far as the cooperation across sectors is concerned, there are many difficulties with the synergies between the telecom and energy companies and working on a common plan for infrastructure seems difficult to be achieved. Moreover, there are significant delays, demonstrated to EEETT, in providing electricity by DEDDHE (HEDNO S.A., the Hellenic Electricity Distribution Network Operator S.A.) to newly built NGA cabinets.

Missing implementing rules on the Single Information Point (SIP) and incomplete mapping of infrastructure can be partly reasons for the ineffectiveness of the transposition in practice so far. Permit granting procedures (both for fixed and mobile networks) remain a main obstacle

[215] The operational design to implement the NGA planning has been updated along the following:
1. an Ultrafast Broadband Project to be implemented by means of a PPP co-financed by the ERDF with blending of white and grey areas; this would be the follow up project to the successful "Rural broadband" project co-financed in 2007-2013;
2. a voucher scheme to be co-financed by the ERDF targeting SMEs;
3. a voucher scheme targeting citizens to be financed exclusively by the national budget;
4. a voucher scheme to be co-financed by the ERDF in order to support intra-building wiring in areas covered by, and as a complement to, the above Ultrafast Broadband Project .
The project preparation is under way and the rules and procedures for the Community co financing should be followed.

[216] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

for network rollout in Greece and for the implementation of the Broadband Cost Reduction Directive. Despite the implementation of the Directive's articles concerning licencing, there are still substantial delays by the urban planning authorities and the municipalities. All the mobile operators complain about the big delays on obtaining a permit and express concerns on how the four months deadline, stipulated in the Directive and in the transposing law can be enforced in practice. Until today there are many urban planning authorities that are not linked with the SILIA one-stop-shop for antennae licencing. EETT has still some backlog of permit applications for existing antennas to be cleared. According to EETT data, during 2017, 648 new licences and licence modifications have been issued in total with an average total licensing delay of around 21 months.

Announcements by the Ministry to address this issue with a new primary legislation have not been substantiated yet. The goal is to create a common electronic system with all the permit granting positions and the decisions from the relevant authorities and a registry with independent engineers with the cooperation of the Technical Chamber of Greece, who will issue the permits. Public consultation on this new legislation is intended to open in the first half of 2018.

By the end of 2017 no use has yet been made of the exception to the access to passive infrastructure (Article 3(f) nor of the exemptions foreseen in the Directive. Also, there have not been any requests for dispute resolution.

3. Regulatory function

The mandate of the EETT's Plenary was terminated at the end of 2017. The new members of the board were appointed in January 2018[217]. In 2017 Commission's contacts with the Greek authorities were ongoing with a view to addressing the issues raised in infringement proceedings concerning the independence of the national regulatory authority[218].

In its latest notification concerning broadband markets (3a and 3b of the 2014 Recommendation on relevant markets)[219], EETT proposed to maintain the obligations to provide access to local loops and sub-loops through full unbundling. The provision of sub-loop unbundling was nevertheless not imposed in the areas which are allocated for VDSL vectoring deployment. In addition, EETT imposed the obligation of access to additional facilities such as collocation and access to sub-ducts, ducts (especially in the part from the outdoor cabinet to the incumbent's MDF - Multi Distribution Frame), dark fiber, manholes and masts[220]. EETT also proposed to impose wholesale line rental services (WLR) as a regulatory access remedy in market 3a. Moreover, EETT required the incumbent operator, OTE to offer bitstream products delivered at a central point (i.e. national or regional).

[217] The new EETT's president, Mr. Masselos, was finally appointed on 09/02/2018 by the Ministerial Decision 72/09.02.2017 published in the Government Gazette.

[218] The Law 4530/2018 adopted on 22th March 2018 and officially published in the no. A '59 Government Gazette on 30.3.2018 introduced amendments to the provisions of the Greek Law 4070/2012, as amended by the Law 4339/2015, in accordance with the European Telecommunications Regulatory Framework. Specifically, Art. 6, 9 and 10 of the law 4070/2012 and Article 16 of the law 4339/2015 were amended by the Law 4530/2018.

[219] Notification under Article 7 of the Framework Directive, reviewed by the Commission under case EL/2016/1936, C(2016) 8300.

[220] EETT explained that in addition, all operators in Greece have a symmetric obligation to provide access to their ducts and pipes in reasonable terms according to separate regulation regarding collocation and facility sharing.

EETT's final measure on market 3a (Decision 792/07/2016) defined a procedure regarding the deployment of NGA access networks in Greece. In particular, EETT sets up an allocation process of MDF-areas, based on the proposed percentage of SCs (Street Cabinets) to be deployed with NGA, as a precondition to use vectoring technology. EETT gives the exclusive right to use vectoring technology in street cabinets, against an obligation to deploy NGA technology capable of delivering at least 100 Mbps to retail users (VDSL-vectoring or FTTB/H). In addition, the assignment of a MDF area does not prevent operators from deploying any technology that is compatible with the use of vectoring in any MDF allocated to another operator at any time of the process. According to EETT, such allocation process allows to strike a balance between the need to ensure effective competition and the need to enhance new infrastructure deployment.

Moreover, every operator that implements an NGA network in an area allocated to it through the procedure of the introduction of VDSL vectoring, is obliged to offer a wholesale virtual product that will allow all other retail providers to offer the same retail services as the ones that the former offers to its customers. EETT decided that it is important to ensure that all VULA wholesale products in the market have common characteristics regardless of the wholesale provider. Accordingly, a regulation was issued on April 2017 (EETT Decision 808/002/27-4-2017) regarding the technical and operational specifications of the VULA product (VLU) that OTE and any alternative operator are obliged to offer, when deploying NGA networks in the context of the procedure for the introduction of vectoring technology in the access network in all outdoor cabinet areas that have been allocated to them (Official Government Gazette 1743/B/ 19-5-2017).

Since April 2017 a working group was formed by EETT, OTE and the alternative operators in order to elaborate on different issues regarding the specifications of the VLU product that were left pending. The final measure of the VLU regulation is under public consultation until the end of February 2018 and a final EETT's decision is expected in April 2018.

Regarding the fixed termination rates, the FTR is set at 0,0545 c€/min from 1/1/2017[221] until the issuance of a new decision in the next market analysis round of the relevant market. FTRs are symmetric for all operators and are calculated through a Bottom Up Pure LRIC model. Regarding the mobile termination rates, EETT is in the process of updating the existing Bottom Up Pure LRIC model. Until its completion, price caps for MTRs are applied based on EETT's Decision 815/002/22.6.2017 and are set at 0,958 c€/min from 1/01/2018 to 31/12/2018 and at 0,946 c€/min from 01/01/2019.

The 3rd round of market analyses of the markets for leased lines and trunk segments of leased lines (i.e. market 4/2014, market 7/2003 and 14/2003) is scheduled for Q3 2018. Those market analyses are not yet completed as EETT encountered difficulties in gathering consistent and timely data from market players. Specifically, after changing the data collection questionnaires, EETT requested from the operators detailed geographical data in order to estimate if there are distinct geographical markets in Greece. The operators replied with delays to this request due to the inconsistency of the data they had already submitted. The public consultation for the abovementioned markets is scheduled for Q2 2018.

[221] The last notification on M1/2014 dates in 2014 (EL/2014/1563) and the FTR set for 2017 was EUR 0.0638c/min according to this notification. However, the FTR is set at 0,0545 c€/min from 1/1/2017 after EETT took into consideration the comments from the Commission (C(2014)1690 final, Brussels, 10.3.2014) and adjusted the prices for the adopted measures(See EETT's Decision N. 714/09/10-4-2014 (ΦΕΚ 1049/B/2014).

The 4th round of analysis of the interconnection markets (i.e. market 1/2014 and 2/2007) is scheduled for Q4 2018. In addition, the analysis of markets 4/2014, 7/2003 and 14/2003 are expected in Q3 2018 and for markets 1/2014 and 2/2007 the analysis is scheduled for Q4 2018 or Q1 2019.

Market analysis decision for market 2/2014 was issued by EETT the 22th of June 2017 and was published in the Official Gazette on the 20th July 2017.

4. Consumer Matters

Based on data from the Greek Consumer Ombudsman, there was an increase of 38.4% in the numbers of complaints concerning prices in the electronic communications market. An increase of about 30%[222] in consumer complaints in general has been observed by EETT's consumer complaints department in 2017.Taking into consideration the statistics from complaints per market category there was an increase as far as the fixed telephone services and mobile telephone services are concerned.

During 2017 EETT amended and codified the EETT Decision 676/41/20-12-2012 "General Authorisation Regulation". The new regulation emphasizes on the protection of consumer rights and gives them a variety of tools, in order to control their telephony and Internet charges efficiently. On the 30th November 2017 EETT issued a Resolution amending some aspects of number portability's procedure taking into account the numerous consumers' complaints on the negative consequences resulted from the ambiguity of the relevant legal framework.

a. Roaming

There are no issues with potential non-compliance with the new roaming rules and the introduction of Roam Like at Home[223] (RLAH) in Greece. Increasing inbound volumes apparently have led to revenue increases at least for the incumbent. According to the most recent BEREC Benchmark Data Report there is a definite upward trend for consumption of roaming services in Greece. The mobile operators in Greece continue their prices increases in their available products throughout 2017. These increases could be attributed to the changes of the roaming regulation, although no official assessment has been made on this.

Following the introduction of RLAH in June 2017, Greek subscribers consumed 1.9 times more voice and 5.2 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016. [224]

Greek law provides for no particular penalties for breaching the Roaming Regulation. General penalties are applied according to the administrative sanctions described in Article 77 of the Greek Law 4070/2012 also for breaching the Roaming Regulation and allow EETT to impose fines of up to €3 million and, in the case of serious and recurrent infringements, suspend or

[222] According to EETT's statistics, EETT has received 7 339 complaints for 2016 and 10 305 complaints for 2017.

[223] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[224] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

withdraw the general authorisation. EETT has not yet received any sustainability derogation requests.

b. Net Neutrality

EETT is currently preparing a decision with more specific requirements for the implementation of the Regulation (EU) 2015/2120[225], e.g. requirements on the estimation of speeds, 0-rating, and information transparency. These requirements are largely based on the BEREC guidelines. The decision was on public consultation from 2 October 2017 to 18 December 2017. Until this new decision is issued and in order to secure consumer protection, EETT issued a recommendation to ISPs (Internet Service Providers) about speeds[226]. This recommendation will address user complaints about their actual speed being much lower than the nominal speed and about being requested by ISPs to pay a high penalty for early termination of a fixed-term contract and for switching to another offer with a lower rated download and / or data upload speed closer to the realistic speed.

EETT has not laid down specific rules on penalties applicable to infringements of Art. 3, 4 and 5 of Regulation (EU) 2015/2120. General penalties are applied according to the administrative sanctions described in article 77 of the Greek law 4070/2012 and allow EETT to impose fines of up to €3 million and, in the case of serious and recurrent infringements, suspend or withdraw the general authorisation.

EETT has not certified yet any monitoring mechanism on speed and other QoS parameters. No official decision or opinion on concrete breaches of the Regulation has been yet issued. There has been no decision to impose requirements on technical characteristics, minimum QoS and other appropriate necessary measures as specified in Art. 5(1) of the Regulation.

c. 112 and access for disabled end-users to emergency services

According to the data collected for the Key Performance Indicators Report, the time needed to receive caller location information for calls to the single European emergency number is 8min 40s[227]. Greece also reported an abnormally high ratio of false calls (95.5%) and is currently investigating the reason for this. According to the data collected for the Key Performance Indicators Report, the average answer time for Greece is less than 9 sec. Awareness among Greek consumers of 112 remained fairly low (14% knew that they could use 112 in the EU compared to 49% across the EU, while only 6% knew they could use it in Greece, compared to 61% in the EU).

d. Universal Service

There are no new developments and changes concerning the scope, designation or financing of universal service[228] in 2017. Broadband is not included in the scope of the universal service

[225] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).
[226] EETT's Recommendation (N.842/13, 22-02-2018) to Internet Service Providers on Connection Speeds.
[227] According to the COCOM 18-03 report on 112 implementation, Key Performance Indicators, Brussels, 09 February 2018.
[228] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

and at this moment there is no discussion for its inclusion under the scope of universal service. EETT after receiving incumbent's claims for unfair burden has accepted in December 2017 that the net cost calculations constitute an unfair burden. EETT plans to proceed with the financing mechanism in early 2018.

5. Conclusion

Greece lags considerably behind in relation to the Digital Agenda for Europe targets established in the Broadband Strategy, including with respect to NGA coverage, not least in rural areas. In order to close the gap with the other Member States, the right conditions for private investment and for a prompt release of public financing resources need to be created. Following the complete transposition of the Broadband Cost Reduction Directive, Greece needs to address the significant delays in permit granting proceedings and promote synergies across sectors, in order to achieve an effective implementation of the Directive with significant benefits for NGA roll out. In addition to this, Greece should secure the timely and correct implementation of regulatory decisions. A full independent regulator is the prerequisite to address the challenges ahead.

HUNGARY

Market developments

1. Competitive environment

The most prominent market development of 2017 was the takeover of a local incumbent, Invitel, by a challenger cable operator, DIGI. DIGI, a challenger in the cable services market and the fourth player in the fixed market, acquired Invitel's retail operations. Invitel is a local incumbent active in one third of Hungary, in the legacy fixed market of the geographically segmented former state monopoly and which gradually divested its services (international wholesale services were sold in 2010 and business services were divested into a new company in 2016). The takeover is currently under the investigation by the Competition Authority, and the merger may have considerable effects on the structure of the market, as in some geographic areas DIGI and Invitel are directly competing. In some market segments, the joint market share of DIGI and Invitel surpasses the market share of the largest incumbent Magyar Telekom.

There have been a number of smaller acquisitions in 2017, affecting local and regional providers. Thus the year 2017 saw a further decline of the number of fixed service providers from 414 to 402 as of 30 September 2017. These acquisitions are signs of further consolidation, but did not considerably affect the market shares of the main providers.

Pay TV continues to play an important role on the Hungarian electronic communications market. National surveys show that nearly 90% of all households are provided pay TV service and most of them (61%) have it in bundle. At the same time, fixed phone and fixed-line Internet services are more likely to be in bundle (80 and 80%, respectively)[229].

a. Fixed Markets

Coverage	HU-2016	HU-2017	EU-2017
Fixed broadband coverage (total)	95%	95%	97%
Fixed broadband coverage (rural)	86%	86%	92%
Fixed NGA coverage (total)	81%	82%	80%
Fixed NGA coverage (rural)	47%	50%	47%
Ultrafast coverage (total)	no data	74%	58%
4G coverage (average of operators)	92%	91%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Although fixed broadband coverage remained unchanged for two consecutive years, at 95% of homes, and NGA coverage went up slightly to 82% in 2017 from 81% in 2016, ultrafast coverage grew considerably, and at 74% it is now well above the EU average of 58%). In the Hungarian fixed market, there is strong platform competition between xDSL and cable

[229] Source: Electronic Communication Services Usage by Households and Individuals, 2017. Research Summary for the National Media and Infocommunications Authority

broadband, but FTTx gained also ground. About two thirds of homes are covered by cable technology providing at least 30 Mbps in most cases.

According to the information published by Magyar Telekom, 270 000 households were connected or upgraded to a broadband service in 2017 as part of its multiannual roll out strategy. In addition, by the end of 2018, Magyar Telekom aims to realise over 100 000 new broadband connections in white areas, co-financed by the broadband subsidy scheme in the frame of Superfast Internet Programme. Both Magyar Telekom and Invitel plan to deploy vectoring in the near future. UPC plans to roll out a fibre-to-the-home (FTTH) network throughout the territory of the numbering area 29, while gradually phasing out the former xDSL technology.

Fixed broadband market shares	HU-2016	HU-2017	EU-2017
Incumbent market share in fixed broadband	41.3%	40.7%	40.3%
Technology market shares			
DSL	29.2%	26.9%	64.2%
Cable	48.8%	49.2%	19.4%
FTTH/B	17.3%	19.6%	12.9%
Other	4.8%	4.3%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

The Hungarian fixed telephony market is characterised by intensive platform based competition, that is now overriding the legacy structures of earlier local telephony operators, originally created through a geographical division of the former state monopoly area into three concession areas. The infrastructure-based competition is best illustrated by the fact that two of the three local telephony operators (Invitel and Monortel) belong now to cable operators (DIGI and UPC respectively). These local operators remain leading operators in their area, where they are each designated as a significant market power (SMP), while outside their areas, they can challenge other operators without regulatory remedies. The former concession area of Magyar Telekom covers about two thirds of the area of Hungary including Budapest, while that of Invitel covers the remaining third, and the former concession area of UPC covers one numbering area (numbering area 29).

At the same time, the three incumbents' market shares have continued to decrease (slightly to 40.7%) over the past few years as they face increasing competitive pressure from cable operators, while cable operators are also increasingly competing against each other in urban areas. The five major cable operators (including the incumbents outside their SMP geographical areas) account for the vast majority of cable subscribers, and are further consolidating smaller providers. At the same time, associations enable smaller cable operators to benefit from economies of scale without giving up their legal independence (such as the National Broadcasters' Cluster, covering about 50 operators with over 140 000 households).

New entrants' DSL subscriptions by type of access (VDSL excluded)	HU-2016	HU-2017	EU-2017
Own network	-	-	0.5%
Full LLU	14.7%	12.6%	72.8%
Shared Access	0.1%	0.0%	4.1%
Bitstream	85.2%	87.3%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

In 2017, the vast majority (87.3%) of new entrant DSL subscriptions were bitstream lines (further growth from 2016), while the 12.6% market share of full LLU is clearly below the EU average of 72.8%.

Fixed broadband prices	HU-2016	HU-2017	EU-2017
Fixed broadband price index [values between 0-100]	82	85	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile market	HU-2016	HU-2017	EU-2017
Market share of market leader	44%	44%	35%
Market share of second largest operator	30%	29%	28%
Number of MNOs	3	3	-
Number of MVNOs	4	4	-
Market share of MVNO (SIM cards)	1%	1%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Despite earlier regulatory efforts to enhance competition by attracting new entrants, the Hungarian mobile market continues to show a rather stable market structure with three mobile network operators: the incumbent Magyar Telekom's subsidiary, and its competitors, Telenor and Vodafone. Cable operator DIGI, a potential new entrant into the mobile market, acquired further spectrum in 2016 but has not started to offer mobile services yet. Two new mobile virtual network operators (MVNOs) (UPC and Netfone) entered the mobile market in 2015, whereas Tesco Mobile left the market in April 2016. In 2017, cable operator TARR launched its MVNO offers.

Mobile broadband prices [EUR/PPP]	HU-2016	HU-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€79	€62	€24
Least expensive offer for tablet and laptop (5 GB basket)	€24	€22	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

A major driver behind growing M2M take-up has been the mandatory introduction of online cash registers, which rely on a permanent roaming solution provided by mobile operators.

When assessing fixed-to-mobile substitution, National Media and Infocommunications Authority (NMHH) has consistently held that there is no convincing evidence as to the critical level in substitution. Concerning OTT substitution, the number of sent SMS messages significantly decreased between 2010 and 2016, although it increased in 2017 again. According to the data of the Hungarian Central Statistical Office, the number of sent SMS was 1 941.8 million in 2010, 1 780.4 million in 2016 and 1 873.9 in 2017. National surveys indicate a gradual switch-off from traditional SMS to online texting. Although, less than half (45%) of the Hungarian population (aged 14+) use chat applications on mobile phone, the

vast majority of them (83%) substitute SMSs with texting apps to some extent. Moreover, a significant increase was reported in the last two years.[230]

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Hungary has assigned 61[231]% of the spectrum harmonised at EU level for wireless broadband, which is below the EU average of 70.21%. The current radio spectrum strategy of national regulatory authority was published in 2016 and covers the period of 2016-2020. Concerning the use of the 700 MHz band, NMHH launched a consultation (public hearing and a consultation paper) during the summer of 2017 and as a result of it the National Roadmap has been published[232]. No new award procedure took place in 2017, but in the course of the year, spectrum has been rearranged in the 3400-3800 MHz ("3.6 GHz band") frequency band on the request of the holders. In 2015, NMHH has approved a spectrum sharing agreement between Magyar Telekom and Telenor regarding 800 MHz telecommunications networks. This cooperation entails the collective use of spectrum for a limited period and location

In June 2017, the Government established a 5G Coalition consisting of various stakeholders from academia, vendors, and manufacturers, as well as network operators, regulatory authority and governmental players. The objective of the Coalition is to promote the rapid development and proliferation of 5G technologies in Hungary.

b. National and EU investment in broadband

The development of digital infrastructure is one of the pillars of Hungary's 2014-2020 national infocommunication strategy. This strategy was updated at the end of 2015 with the adoption of the Digital Success Programme and the launch of the Superfast Internet Programme. The Superfast Internet Programme aims to cover the whole country with NGA networks of at least 30 Mbps by the end of 2018. The programme started in 2016 with a mapping exercise to identify areas where telecom operators are expected to make the full investment on their own. For areas that are not economically viable, a €250 million State aid scheme has been developed to ensure broadband roll-out. The programme is co-funded from the European Structural Funds and by the Hungarian State, except for Budapest and its suburban area, for which only domestic resources will be used. The vast majority of projects under the Superfast Internet Programme will deploy FTTH technology, enabling speeds in line with the gigabit society targets.

To boost demand, the government has launched two initiatives directly affecting retail prices. First, a preferential VAT rate is applied to broadband subscriptions as of January 2017, with possible further reduction to 5% as of 1 January 2018. Second, a 'digital welfare basic tariff' trademark has been created. This targets non-users by offering them a basic broadband package (fixed or mobile) at a 10-15% price discount. While the newly constructed NGA and

[230] Electronic Communication Services Usage by Households and Individuals, 2017. Research Summary for the National Media and Infocommunications Authority (to be published soon)
[231] This percentage slightly differs from the one used in the EDPR country profile following feedback from the authorities concerned and reflected in the above table.
[232] http://english.nmhh.hu/document/190192/uhf_vhf_3_national_roadmap_eng.pdf"

backhaul optical network sections are exempted from the infrastructure tax for 5 years, market players report that the various levies on the telecom sector may limit the capabilities of telecom operators to invest.

c. Implementation of the Broadband Cost Reduction Directive

Following the expiry of the deadline for transposing the Broadband Cost Reduction Directive[233], the Commission opened infringement proceedings against Hungary for failure to notify transposition measures in March 2016. Since then, Hungary has adopted a series of measures to transpose the Directive. In particular, amendments were made to the primary legislation, such as Act C of 2003 on electronic communication, Act CXL of 2004 on Administrative Procedures, Act CLXXXV of 2010 (the Media Act), Act XXII of 2013 on the Hungarian Office for Energy and Public Utility regulation, as well as to several ministerial and government decrees. Following the notification of the complete transposition, the Commission closed the infringement proceedings in May 2017.

Authorisation proceedings and dispute resolution are vested with the NMHH, whereas the single information point is operated by a separate organisation, Lechner Nonprofit Ltd. The detailed rules for dispute resolution are laid down in an NMHH Decree.

In December 2017, the Government adopted a Decree to promote the roll out of mobile (4G and 5G) networks to underpin the national 5G strategy facilitating the planning and approval of network roll out.

3. Regulatory function

The National Media and Infocommunications Authority is a converged media and telecommunications regulator. As of 1 January 2017, the general consumer protection tasks were transferred to the State Secretariat for Infocommunication of the Ministry of National Development, following a major restructuring of agencies.

The markets included in the 2014 Recommendation on relevant markets are all subject to (at least partial) regulation in Hungary. There is also regulation of a market included in the 2007 Recommendation (call origination on fixed network) and of a market included in the 2003 Recommendation (broadcasting transmission services).

NMHH entered into significant delays with regard to the analysis of markets 3a, 3b and 4, thus the Commission launched an infringement proceeding against Hungary in October 2017.

In October 2017 NMHH notified to the Commission measures regarding markets 3a and 3b (wholesale local access provided at a fixed location and wholesale central access provided at a fixed location for mass-market products). NMHH identified six geographic areas matching the three SMP local telephony operators, each of the three former concession areas are divided into two submarkets. The more competitive submarkets include settlements (towns and villages) where at least two significant alternative operators has at least 15% market share each and 50% market share together, while the less competitive submarkets include all other settlements. In market 3a, the three regional SMP operators (Magyar Telekom, Invitel and UPC) have to provide: i) full and shared unbundled access to copper loops and sub-loops,

[233] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

including full access to unused copper loops and sub-loops; ii) unbundled access to fibre loops and access to dark fibre in case of point-to-point FTTH networks; iii) access to terminating segments in case of NGA networks (GPON FTTH networks and HFC networks), including access to unused terminating segments; iv) local L2 virtual wholesale access (VULA) on GPON fibre networks and copper networks with vectoring; and v) access to ducts and poles of their access networks. VULA has to be offered upon the request of an access seeker, after a negotiation process. In market 3b, the SMP operators are required to provide local bitstream access (in case VULA is not offered) and national bitstream access. On both markets backhaul services are available to facilitate the use of the access services.

The NRA still needs to address the delays accumulated in analysing market 4 (wholesale high-quality access provided at a fixed location).

NMHH decree No. 1//2016 on numbering management amended the national numbering plan and inter alia removed the so called blue numbers (NDC=40) that were shared cost numbers as of 1 January 2018.

The telecommunication sector in Hungary has been subject to extensive taxation and various levies in recent years that may limit the capabilities of telecom operators to invest[234].

4. Consumer matters

In 2016, the government carried out a major restructuring of agencies, leading to the dismantling of the National Consumer Protection Authority from 1 January 2017 and the transfer of its tasks to the Ministry of National Development, specifically the State Secretariat for Infocommunication.

An amendment of the Act on Electronic Communications has been adopted to restrict binding contracts to 1 year maximum, and it contains detailed provisions on what contractual incentives can be reclaimed as of October 2017. Also, upon expiry of the binding period, the contracts continue for indefinite period and services have to be provided at the same rates and under conditions that are at least as favourable to the subscriber as before. The new provisions also foresee a free unlocking for devices following the expiry of the binding contract period at the request of the subscriber.

a. Roaming

Following the introduction of Roam Like at Home[235] (RLAH) in June 2017, Hungarian subscribers consumed 1.5 times more voice and 4.6 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[236]. Based on the findings of NMHH's monitoring activities, the President or the Office of NMHH may order roaming providers to terminate unlawful conduct or a breach of the official resolution and restore the situation that existed previously, if deemed necessary. According to Sections 48-49 of Act C

[234] In February 2018, the European Court of Justice received a request for preliminary ruling from the Metropolitan Administrative Court on the compatibility of the special tax levied on electronic communication services with EU law see Case C-75/18 Vodafone

[235] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[236] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

of 2003, NMHH could impose fines on the operator/managers for breaches of Laws and Regulations governing electronic communications services.

In the transitional period running until 14 June 2017, NMHH monitored roaming providers' compliance with EU roaming rules, in accordance with Articles 6e and 6f of Regulation (EU) 2015/2120. Since 15 June 2017, NMHH intervened in two potential cases of non-compliance, a time-limited add-on offer was only available domestically for tariff plans which otherwise were roaming enabled, and following exchanges, the operator decided to cease the offer. In another case, a 100 minute limit on incoming calls for pre-paid tariffs were introduced to prevent abusive usage of regulated retail roaming services. The operator agreed not to have recourse to this fair use policy term.

b. Net neutrality

In line with Article 6 of Regulation (EU) 2015/2120[237] requiring Member States to lay down rules on penalties applicable to infringements of Articles 3, 4 and 5 and take all measures necessary to ensure that they are implemented, the Hungarian NRA can impose a wide range of penalties, as provided for in Act C of 2003 on electronic communication. Penalties range from a simple warning to fines of up to 0.5% of the annual revenue of the company concerned.

NMHH Decree 2/2015 laid down detailed rules for electronic communications subscriber agreements, that sets out transparency measures to ensure open internet access. The existing transparency regime concerning quality of service of internet access services is based on a 2012 NMHH recommendation proposing that major internet service providers commit to producing a unified, comparative service description table setting out the main parameters and traffic management procedures applied in their internet access packages. From 2015 onwards, all providers of internet access services are mandated to publish these tables. The transparency tables are available on internet service providers' websites and must be linked to from all locations of providers' websites where tariff packages are described.

In 2016, NMHH launched an investigation into mobile operators' practices regarding zero rated services. In the case of some operators' services, NMHH found that operators discriminated access to other services. In all cases, the decisions have been appealed and the second instance (NMHH president) upheld the first instance's decisions.

c. 112

Hungary is still developing its solution for callers with disabilities. The long awaited call centres are still unable to receive calls from users with disabilities, and the Commission services are now assessing the legal and factual situation to verify if Hungary has fulfilled its obligation under the EU law concerning 112. In addition to Hungarian, calls can be answered in English, German and in some cases in Romanian. In addition to 112, there are three other emergency numbers dedicated to emergency services.

[237] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

d. Universal service

The current universal service[238] regime was enacted in 2015 and entered into force in November 2015. In Hungary, universal service includes functional internet connection, fixed telephony services, directory enquiry services and directories, as well as public payphones. Magyar Telekom, Invitel and UPC have been designated as universal service providers on the geographical retail markets where they are SMPs, and were designated to provide access to fixed telephony network, public pay phones and directory information services in their relevant geographical areas. Invitel was appointed for the provision of national directory enquiry services.

5. Conclusion

In accordance with the Digital Success Programme and the Superfast Internet Programme, a number of initiatives targeting both fixed and mobile markets as well as demand are being implemented with a view to further increase coverage and take-up of broadband and NGA in Hungary, including in less profitable areas.

While the above initiatives targeting both fixed and mobile markets, as well as both demand and supply, aim at further increasing the coverage and take-up of broadband in Hungary, their effects may be mitigated by the fact that the telecommunication sector in Hungary was subject to extensive taxation and various levies in recent years that may limit the capabilities of telecom operators to invest, and that price competition in mobile broadband appears to be mitigated. Predictability of investment and competitive conditions could have been supported in recent years by more timely review of wholesale market regulation. NMHH accumulated in some cases even significant delays with regard to the analysis of the broadband markets 3a, 3b and 4, which led to the opening of infringement proceedings in October 2017. Following notifications of markets 3a and 3b in late 2017, the NRA still need to complete and notify the analysis of Market 4.

Hungary is still developing its solution for callers with disabilities to the single European emergency number 112, and the long awaited new 112 call centres are still unable to receive calls from users with disabilities.

[238] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

Ireland

Market developments

1. Competitive environment

SIRO, a joint venture between national electricity company ESB (Electricity Supply Board) and Vodafone Ireland, is gradually rolling out its network in certain geographic areas providing an emerging infrastructure based competition on the Irish broadband market, having passed 125 000 premises at the end of December 2017. In December 2017, the French telecommunication group Iliad announced the acquisition of a controlling stake in the incumbent operator Eir.

In 2017, single play subscriptions, (which since the end of 2017 now include single play TV subscriptions), have continued to remain prevalent. By the end of 2017 49.9% of fixed market retail subscriptions were single play while 28.5% of subscriptions were double play and 21.5% of subscriptions were a combination of triple play (a bundle of three services) and quadruple play (a bundle of four services).

a. Fixed Markets

Coverage	IE-2016	IE-2017	EU-2017
Fixed broadband coverage (total)	96%	97%	97%
Fixed broadband coverage (rural)	93%	94%	92%
Fixed NGA coverage (total)	82%	89%	80%
Fixed NGA coverage (rural)	50%	82%	47%
Ultrafast coverage (total)	no data	53%	58%
4G coverage (average of operators)	92%	92%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

NGA coverage further increased over the last year in Ireland (to 89% of households, well above the EU average at 80%). At the same time, fixed broadband coverage improved slightly to 97% and is at the EU average. Ultrafast coverage reached 53%, which remained below the EU average of 58%. Given the current dependence on VDSL in providing NGA coverage by commercial operators, a key challenge remains to ensure future proof ultrafast coverage, where, as part of a commercial roll out strategy, fibre would not be rolled out to reach all the premises.

Fixed broadband market shares	IE-2016	IE-2017	EU-2017
Incumbent market share in fixed broadband	33.7%	32.2%	40.3%
Technology market shares			
DSL	67.7%	67.3%	64.2%
Cable	27.2%	26.5%	19.4%
FTTH/B	0.4%	1.4%	12.9%
Other	4.7%	4.9%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

The market share of the incumbent in total fixed broadband further decreased to 32.2% (from 33.7%), clearly below the EU average, while cable subscriptions also lost some ground (26.5% in 2016, down from 27.2%). The share of FTTH remains marginal at 1.4%.

In April 2017 Eir formally committed to previously announced plans to roll out a wholesale, open access, fibre-to-the-home (FTTH) network to cover 300 000 premises by 2018, and by December 2017 had reached over 125 000 premises. SIRO is building an FTTH network on the ESB's existing overhead and underground infrastructure that offer download speeds up to one gigabit. SIRO itself remains a wholesale only operator, while Vodafone and other operators began offering retail broadband services over the SIRO network since December 2015. In September 2016, SIRO announced its mid-term roll-out strategy. In phase one, SIRO aims to reach 500 000 premises in 51 towns by the end of 2018. Since its launch, SIRO has passed approximately 100 000 premises in 17 towns. Virgin Media's platform addresses over 800 000 (mostly residential) premises mainly in large urban centres relying on DOCIS 3.0 and Virgin have announced plans to cover a further 200 000 premises.

In September 2017, Enet and SSE Airtricity announced the launch of a commercial joint venture to bring FTTP to 115 000 homes and businesses in regional Ireland by the end of 2019, offering virtual access services to downstream service providers.

New entrants' DSL subscriptions by type of access (VDSL excluded)	IE-2016	IE-2017	EU-2017
Own network	-	-	0.5%
Full LLU	3.8%	4.0%	72.8%
Shared Access	18.6%	19.3%	4.1%
Bitstream	77.6%	76.7%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband prices	IE-2016	IE-2017	EU-2017
Fixed broadband price index [values between 0-100]	73	77	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

By the end of 2017, the Commission for Communications Regulation (ComReg) reported over 6.02 million mobile subscriptions, including mobile broadband and machine to machine subscriptions, in Ireland, with a penetration rate of 125.3%. Excluding mobile broadband and machine to machine, mobile voice subscriptions only had a penetration rate of 101.9%.

Mobile market	IE-2016	IE-2017	EU-2017
Market share of market leader	38%	38%	35%
Market share of second largest operator	35%	34%	28%
Number of MNOs	3	3	-
Number of MVNOs	6	6	-
Market share of MVNO (SIM cards)	9%	9%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Following the 2014 takeover of O2 Ireland by 'Three', two new mobile virtual network operators (MVNOs) Virgin Media and iD Mobile entered the market in August 2015,

bringing the total number of MVNOs to six. However, iD Mobile has recently announced that it is exiting the market in April 2018. In 2017, Vodafone remained the largest mobile operator with 38%, followed by 'Three' with 34%, while the incumbent's subsidiary Meteor is third. The six MVNOs account for 9% of mobile subscriptions.

To date, ComReg has not found mobile services to be an effective substitute for fixed telephony services. Mobile voice telephony subscriptions have been broadly static in 2017, by the end of the year having increased by 0.5% to 4 898 872 subscriptions. In terms of fixed telephony, subscriptions decreased each quarter between 2014 Q3 and 2016 Q3. Subscriptions have fallen by 3.8% since the end of 2014 to a total of 1 468 548 by the end of 2017.

Mobile broadband prices [EUR/PPP]	IE-2016	IE-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€29	€19	€24
Least expensive offer for tablet and laptop (5 GB basket)	€18	€19	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Ireland has assigned 760 MHz, which is 69.72% of the spectrum harmonised at EU level for wireless broadband. This is slightly above the EU average of 69%. The increase in assignment is due to recent assignments of the higher frequency band.

The current spectrum strategy covers the period of 2016-2018, and sets out ComReg's work plan items that includes completing the assignment process for the 3.6 GHz band, actively engaging with stakeholders to repurpose the 700 MHz band, and further developing award proposals in relation to the 700 MHz, 1.4 GHz, 2.3 GHz, and 2.6 GHz bands.

In 2017, ComReg completed the assignment process for the 3.6 GHz band. This auction resulted in the successful assignment to five bidders (three mobile operators and two wireless broadband providers) who acquired all 350 MHz of TDD spectrum on offer (in 594 lots spread over nine (four rural and five urban) geographic regions). Winning bidders include a new entrant broadband wireless operator providing services to smart utilities, transportation and public safety, the largest Wireless Internet Service Provider and three existing mobile network operators.

In 2017, Ireland concluded further preparations to finalise the repurposing of the 700 MHz band by 2020. The international coordination of Ireland's DTT plan with relevant neighbouring Member States (the United Kingdom and France) was completed by the end of March 2017. National broadcaster RTÉ is required to migrate its DTT services from the 700 MHz band by 4 March 2020.

Operators noted that conditions attached to some licences do not allow the use of LTE in the 2 GHz band. While a consultation is in the work programme of ComReg, the current licence

conditions await amendment to be brought in line with Decision 2012/688/EU that harmonises the technical conditions for using the band[239].

b. National and EU investment in broadband

While NGA coverage in rural areas is considerably above the EU average, a key challenge remains to cover the more sparsely populated remote areas, where the 'digital divide' remains significant. In 2017, however, the National Broadband Plan (NBP) encountered significant challenges with the departure of two main applicants.

The 2015 NBP Intervention Strategy provides for a minimum download of 30 Mbps and a minimum upload of 6 Mbps to be delivered to all premises via a mix of private and public intervention. The State led intervention is eligible for €75 million under the European Regional Development Fund (ERDF) programme for 2016-2020, and a gap-funding investment model has been chosen, whereby the winning bidder will provide a wholesale service. The contract aims to build a wholesale open access network to fixed locations, to be built as swiftly as possible and then operated over a 25 year term. Re-use of existing infrastructure is encouraged where feasible and new infrastructure built by the winning bidder shall be owned by that bidder.

Nevertheless, the last year has seen the withdrawal of two of the three companies bidding in the procurement process for the State led intervention. In April 2017, the intervention area was reduced by removing about 300 000 households that were to be supplied by Eir on market terms, following a binding agreement between the Department of Communications and the Incumbent. In September 2017, SIRO announced its withdrawal from the National Broadband Plan tender process, in the absence of a competitive business case to justify continued participation. At the same time, SIRO confirmed its commitment to proceed with its plans to build a Gigabit broadband network in 50 regional Irish towns. In January 2018, Eir announced its withdrawal from the national broadband plan, due to complexity in the tender process, together with growing regulatory uncertainty outside of the NBP process. At the same time, Eir remained committed to the deployment of high speed broadband to the 300 000 predominately rural premises. The competitive dialogue procurement continued in 2018 with the remaining bidding consortium comprising Enet, SSE, Granahan McCourt and John Laing plc. About 540 000 premises are to be covered by this State led intervention.

In implementing the Programme for a Partnership Government, the Irish Government established in 2016 the Mobile Phone and Broadband Taskforce, a cross-Government initiative to identify solutions to broadband and mobile phone coverage deficits and investigate how better services could be provided to consumers prior to full build and rollout of the network planned under the National Broadband Plan state intervention. The Task Force published an Implementation Review on 21 February 2018, detailing improvements in the area of planning, availability of consumer information and the establishment of new forums that provide for structured engagement between industry and Government on rollout issues. The review highlighted the revision of infrastructure installation that are exempt from the planning process, particularly for mobile services; the removing of the development

[239] Commission Implementing Decision 2012/688/EU of 5 November 2012 on the harmonisation of the frequency bands 1920 - 1980 MHz and 2110 - 2170 MHz for terrestrial systems capable of providing electronic communications services in the Union OJ L 307, 7.11.2012, p. 84 http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012D0688

contribution charges when building infrastructure and the standardisation of fees for road opening charges. This Review also contains a work programme for 2018.

In 2017, the Irish government designated dedicated Broadband Officers in local governments (regions). This structure serves as a "field office" for broadband competence office. Broadband Officers shall act as a single point of contact within the local authorities for engagement with telecommunications providers. These officers shall assist with the preparation for the roll out of the National Broadband Plan, both by commercial operators to more urban and suburban areas and by the winning bidder to the intervention area. They shall also create awareness of broadband services in each county (Local Authority area). Local Authorities will have a crucial role in the roll out of the NBP, and they are charged with removing barriers faced by telecoms operators in their Local Authority Area.

c. Implementation of the Broadband Cost Reduction Directive

Following the expiry of the deadline for the transposition of the Broadband Cost Reduction Directive[240] (BB CRD) on 1 January 2016, the Commission opened infringement proceedings against Ireland for failing to notify transposition measures. Ireland enacted the Broadband Cost Reduction Regulations (S.I. 391 of 2016) effective from 20 July 2016, which transposed the BB CRD into Irish law. ComReg published the relevant dispute resolution procedures, and was also designated as the single information point. Given the notification of complete transposition, the Commission closed the infringement procedure in November 2016. Nevertheless, Ireland did not amend its laws to ensure that all newly constructed buildings, for which applications for building permits have been submitted after 31 December 2016, are equipped with a high-speed-ready in-building physical infrastructure. The Commission services are assessing the matter. In the meantime, local authorities have integrated into their planning applications procedures the practice to require developers to allow telecommunications infrastructure access in any new developments.

3. Regulatory function

ComReg is responsible for the main tasks assigned to national regulatory authorities under the regulatory framework since 2002, and is led by up to three Commissioners. Following the reappointment of a Commissioner in 2015, all three Commissioner positions are filled.

Operators expressed consistent concerns over considerable delays in many policy areas, such as decision on USO unfair burden, spectrum strategy, market review dispute resolution (such as on service level agreements), and lack of response on net neutrality compliance to preliminary approaches by operators. In the past few years, ComReg staff has been considerably reduced in some key areas, such as market analysis, and it does not have an autonomy to decide on its staff resources.

ComReg's regulatory decisions can be appealed to the High Court within 28 days. An aggrieved party can also call for a judicial review to challenge a ComReg decision (including regulatory and competition decisions). Such a challenge would be heard and determined by the High Court. Under Irish law, ComReg is not vested with powers to impose fines, which is the courts' prerogative, and ComReg is thus out of step with other NRAs with regard to timely and effective intervention.

[240] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

Following an action for a major penalty, Eir challenged the Irish government (in a separate proceeding) for the constitutionality of the provisions transposing Art 19 of S.I. No. 334/2011 that lay down the legal basis for enforcement actions. The High Court (acting as first instance court) issued a stay (interim injunction to suspend) on the action for penalties, effectively suspending the application of the provision concerned. As a similar court suspension may be expected for future actions for penalties, ComReg can only launch action on the basis of the Criminal Code.

The markets included in the 2014 Recommendation on Relevant Markets are all subject to regulation in Ireland, along with a few legacy markets from earlier recommendations (for example, on access to PSTN for residential and non-residential, as well as on call origination on fixed network from 2007 and broadcasting transmission from 2003).

In October 2017, the Commission launched infringement proceedings against Ireland concerning delays of analysing markets 3a, 3b and 4. In 2017, ComReg relaunched consultations but did not notify any new markets (including the ones concerned by the infringement proceedings). In October 2017 ComReg published a consultation document regarding the review of the Fixed and Mobile Voice Call Termination markets. The proposed remedies entail price control obligation of cost orientation. The details of this cost orientation obligation, and the associated maximum termination rates, are to be further specified in a pricing paper which ComReg intends to publish in 2018.

In 2016, ComReg had initiated investigations of the incumbent, following a December 2015 compliance report published by Eir, regarding certain practices toward wholesale clients that may lead to discriminatory business activity (such as fault-repair times). In April 2017, Eir received a €3 million fine from ComReg for failing to fulfill its universal service obligation with regard to fault-repair times. In July 2017, Eir was fined €1.5 million for breaching fault-repair obligation targets for 2016.

4. Consumer matters

In June 2017, ComReg published a Decision on new minimum requirements for complaints handling. Operators shall provide freephone number or landline or mobile or a number that is free to all consumers, and an electronic means of contact for consumers. In addition, consumers cannot be transferred by the Operator to another section, if the call is charged higher than a call to a landline or mobile number. The decision establishes new deadlines for acknowledgement and response and shall be effective as of 1 January 2018.

The provision of text relay service is now mandated on Service Providers with more than 100 000 subscribers, to ensure that consumers have equivalent access and choice. The Irish Text Relay Service (ITRS) translates text into voice and voice into text 24 hours a day, as a supplement to the existing Minicom service.

According to information provided by the NRA, during the period 1 January 2017 – 31 December 2017, a total of 31 409 issues were raised by residential and business customers to ComReg's Consumer Line. 5 830 of these were complaints and 25 579 were queries. Of the 31 409 issues recorded by ComReg's Consumer Line, the top classification types that account for 81% of all issues show as premium rate services (44%), billing (15%) (including disputed charges), contractual matters (12%) (such as contract termination requests or terms and conditions) and service issues (10%) (such as loss of service). Billing, contractual matters and

service issues account for 79% of all ECS issues recorded (including matters outside of ComReg's competence).

a. Roaming

Following the introduction of Roam Like at Home[241] (RLAH) in June 2017, Irish subscribers consumed 1.5 times more voice and 4.8 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[242]. In Ireland, the Commission for Communications Regulation is the competent authority for enforcement of the Roaming Regulation. ComReg is currently monitoring compliance with the new roaming regulations, but did not report any findings of systemic non-compliance in respect of RLAH. Complaints and queries concerned raise individual cases of non-application of RLAH conditions (where charges were subsequently waived by the operators), non-delivery of welcome SMSs and roaming in third countries.

Under the Irish Constitution, no body other than a court of law can impose sanctions or penalties, and no specific penalties are established for non-compliance of the roaming regulation. Failure by an undertaking to comply with its obligations under the Roaming Regulation is a criminal offence in Ireland liable to a fine of up to €5 000 (on conviction by a court). Where an undertaking has not complied with an obligation or requirement under the Communications Regulation, the Regulator may apply to the High Court for an order of compliance, including an order directing the remedy of any non-compliance. The Regulator may also apply for an order to pay to the Regulator a financial penalty for the period of non-compliance. The court shall decide on the amount of the penalty on the basis of the duration and effect on consumers and on other operators affected, but also with due regard to the submission by the Regulator on the appropriate amount. The High Court is not limited in the amount of a penalty it can impose.

b. Net neutrality

With the adoption of Regulation (EU) 2015/2120[243], net neutrality is fully harmonised at EU level with directly applicable rules which do not need to be transposed. Article 6 of the Regulation states that EU countries shall lay down the rules on penalties applicable to infringements of Articles 3.4 and 5 and take all the measures necessary to ensure that they are implemented. Ireland has not yet laid down the rules on the penalties referred to in Article 6.

ComReg has limited powers to enforce Regulation (EU) 2015/2120, as it cannot impose fines, as explained in the section on roaming. Non-compliance by undertakings with their obligations under Articles 3, 4 and 5 will be a criminal offence, liable to a fine of up to €5 000 (on conviction by a court). Where an undertaking has not complied with an obligation or requirement under the TSM, the Regulator may apply to the High Court for an order of compliance, including an order directing the remedy of any non-compliance. The Regulator

[241] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[242] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[243] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

may also apply for an order to pay to the Regulator a financial penalty for the period of non-compliance. The court shall decide on the amount of the penalty on the basis of the duration and effect on consumers and on other operators affected, but also with due regard to the submission by the Regulator on the appropriate amount. The High Court is not limited in the amount of a penalty it can impose.

In the absence of powers, ComReg did not carry out any enforcement actions regarding net neutrality in 2017.

c. 112

Advanced Mobile Location has been deployed on Android devices in Ireland on all mobile networks, and officially launched on 19 October 2017.

As of 2017, every service provider with more than 100 000 subscribers (including over 90% of landline providers and more than 95% of mobile providers) must provide access to a Text Relay Service (TRS).

d. Universal service

In July 2016, following public consultation concerning universal service[244], Eir was designated as Universal Service Provider for a period of 5 years to 30 June 2021 to provide access at a fixed location. In February 2017, following public consultation, ComReg issued a decision imposing new quality service obligations applicable for a period of 18 months, subject to review during the duration of the designation.

As for earlier years, ComReg has also received Universal Service Obligation (USO) funding applications in respect of the years 2010-2016. Operators expressed concerns over the regulatory uncertainty, as they may face costs that relate to USO financing of 5 years earlier, making financial planning rather difficult. To allow operators to ascertain the possible extent of the financial impact of any unfair burden decision, ComReg has issued information notices upon receipt of each application outlining the amount claimed by the USP. ComReg has also issued consultations in respect of Eir's applications for 2010-2014 and ComReg's preliminary views in relation to the net cost and unfair burden.

5. Conclusion

The National Broadband Plan encountered significant challenges during the reporting period. By 2018, two major applicants withdrew from the tender, and the window is narrowing to adjust the scheme to achieve the objectives of the Plan as scheduled. Ultrafast coverage was at 53%, which remained below the EU average of 58%. Given the dependence on VDSL in providing NGA coverage, a key challenge remains to ensure future proof ultrafast coverage, where fibre would not be rolled out to the premises as part of any operator's commercial roll out strategy.

On the other hand, in view of persisting delays in the analysis of broadband markets 3a, 3b and 4 by ComReg, the Commission launched infringement proceedings against Ireland in October. To date, Ireland did not proceed with the notifications of those markets.

[244] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

The constitutional requirements of Ireland preclude that ComReg could directly impose sanctions and the Irish legislative framework for enforcement provides that ComReg applies to the Irish High Court to impose sanctions. Since October 2017, the first instance court issued a stay on ComReg's civil penalties actions and now ComReg can only have recourse to action launched on the basis of the Criminal code. This would apply to violations of the national telecommunications law, as well as infringements of the EU provisions on net neutrality and roaming.

ITALY

Market developments

1. Competitive environment

The Italian market is characterised by an increasing level of infrastructure-based competition mainly due to the entry into the market of Open Fiber (OF) a non-vertically integrated operator with a "wholesale-only" business model. At the end of 2016 OF completed the acquisition of the entire share capital of Metroweb Italia S.p.A. from F2i SGR S.p.A. and FSI Investimenti S.p.A[245].

Other elements that contributed to the increasing infrastructure competition were (i) the Strategic partnership Fastweb and TIM entered into during 2016 aimed at connecting 3 million households with FTTH in 29 cities (already covered by FTTC) by 2020 with a total investment for the deployment of the FTTH network of €1.2 billion; (ii) additional FTTC investments by other operators (Fastweb and Vodafone) covering more than 30% of population and (iii) the steady increase of FWA accesses, which reached almost 1 million lines in the third quarter of 2017.

In 2017 the Italian Competition Authority (AGCM) has launched an investigation into the above mentioned joint venture set up by TIM and Fastweb on grounds that it may breach competition rules: the AGCM found that the joint venture could result in a "consistent prevention, restriction or distortion of competition" in the country's wholesale and retail broadband and ultra-broadband markets. Commitments presented by the parties have been put to a market test[246]. Additional investigations were launched by AGCM against TIM for abuse of dominant position *inter alia* for conducts adopted in the context of the implementation of the Italian Ultra broadband (UBB) strategy[247].

A consolidation trend in the sector is in progress. The consolidation has involved three alternative operators active specifically in the supply of broadband and ultra-broadband services to business and residential consumers: Infracom, Mclink and KPNwest have been acquired by the Italian Infrastructure Funds (F2i) and the Marguerite Fund, both sponsored by

[245] https://www.enel.com/media/press/d/2016/10/enel-signs-agreement-for-the-acquisition-of-metroweb Metroweb is a company operating in the City of Milan as a dark fibre access provider that sells only passive services on GPON fibre optic networks connecting the end user. Thanks to the acquisition of Metroweb and the construction works in course, Open Fiber already has the largest Fibre to Home (FTTH) network in Italy (2 million Property Units - PU) In the first quarter of 2017 Open Fibre completed works in Milan, Turin and Bologna. At the end of 2016 works started in Catania, Venice, Cagliari, Padua, Bari, Palermo, Naples, Florence and Genoa, cabling more than 280 000 property units.

[246] According to Law. n. 249/97, the Italian Communications Authority (AGCOM) was requested to provide comments on a draft decision by AGCM.

[247] See http://www.agcm.it/stampa/comunicati/8824-a514-banda-ultralarga,-avviato-procedimento-nei-confronti-di-telecom-italia-per-possibili-abusi-di-posizione-dominante.html

Cassa Depositi e Prestiti (CDP), a company completely owned by the Ministry of Economy and Finance (MEF).[248]

Another important trend registered in 2017 is the increasing convergence between telecommunications and content: in this respect on 30 May 2017 the Commission approved Vivendi's acquisition of Telecom Italia, subject to conditions[249]. As a consequence of the merger Vivendi became the largest shareholder of Telecom Italia. With the decision no. 178/17/CONS adopted on 18 April 2017[250], the Italian Communications Authority (AGCOM) found Vivendi to be in breach of Article 43, paragraph 11 of Legislative Decree 177/2005 by exceeding the concentration limits within the Integrated System of Communications (SIC), as a consequence of the shares owned in Telecom Italia S.p.A. and Mediaset S.p.A. Vivendi was thus ordered to take appropriate steps in order to comply with the relevant law within the following 12 months. After presenting several plans that were not accepted by AGCOM, on 13 September 2017 Vivendi submitted to AGCOM new measures aimed at removing the position in breach of the national concentration limits[251]. The national authority will monitor the correct implementation of the plan. In parallel, the Italian Government, considering that the acquisition of the *de facto* control of Telecom Italia by Vivendi posed a threat to national security interests, decided to exercise the so called "Golden Powers" thus imposing a number of requirements in the field of governance and organization on the group[252].

Legacy network access remedies include the obligation of providing passive access to copper (LLU, SA and SLU), WLR and active access (bitstream access, which includes an access component and a backhaul component). NGA access remedies include the obligation of providing access to civil infrastructures (ducts, trenches) and dark fibre[253], as well as VULA and bitstream access (which includes VULA together with backhauling access component).

VULA and SLU access services have started to be requested by other authorised operators since, respectively, the beginning of 2014 and the end of 2013. Currently the most used NGA

[248] http://www.f2isgr.it/f2isgr/investimenti/portafoglio/index.html

[249] See http://europa.eu/rapid/press-release_IP-17-1475_en.htm

[250] AGCOM Decision n. 178/17/CONS is available in IT at the following link: https://www.agcom.it/documentazione/documento?p_p_auth=fLw7zRht&p_p_id=101_INSTANCE_2fsZcpGr12AO&p_p_lifecycle=0&p_p_col_id=column-1&p_p_col_count=1&_101_INSTANCE_2fsZcpGr12AO_struts_action=%2Fasset_publisher%2Fview_content&_101_INSTANCE_2fsZcpGr12AO_assetEntryId=7533934&_101_INSTANCE_2fsZcpGr12AO_type=document

[251] The plan presented by Vivendi is available in IT at the following link: https://www.agcom.it/documentazione/documento?p_p_auth=fLw7zRht&p_p_id=101_INSTANCE_2fsZcpGr12AO&p_p_lifecycle=0&p_p_col_id=column-1&p_p_col_count=1&_101_INSTANCE_2fsZcpGr12AO_struts_action=%2Fasset_publisher%2Fview_content&_101_INSTANCE_2fsZcpGr12AO_assetEntryId=8475243&_101_INSTANCE_2fsZcpGr12AO_type=document

[252] The IT investment screening law (Decree-Law 15 March 2012, n. 21) provides the Italian Government with "special powers" aimed at safeguarding the ownership structures of companies operating in sectors considered strategic and of national interest; these powers can be exercised in particular in two sectors : defence and national security (Art.1 of Decree Law 21/2012) and energy, telecommunication and transport (Art.2 of DL 21/2012). Both Telecom Italia and Vivendi appealed to the President of the Italian Republic against the Golden Power decree. In parallel, discussions on the possible spin-off of the Telecom Italia's network started. In February 2018 Telecom Italia presented its network spin-off plan to the Italian Government.

[253] Including access to the following passive elements of the access network: i) primary segment of the network; ii) secondary segment of the network; iii) access segment to the curb; iv) access segment to the local exchange; v) terminating segment; vi) in-building's wiring (copper and fibre); vii) co-location at the local exchange and at the intermediate concentration points (cabinets).

wholesale services are SLU access services (about 949 000 lines sold by December 2017, 572 000 by June 2016) and VULA access service (about 936 000 lines sold by December 2017, 173 000 by June 2016). The total number of NGA wholesale services (about 1.9 millions of lines sold by the end of December 2017) has significantly increased in one year

a. Fixed Markets

Coverage	IT-2016	IT-2017	EU-2017
Fixed broadband coverage (total)	99%	99%	97%
Fixed broadband coverage (rural)	94%	95%	92%
Fixed NGA coverage (total)	72%	87%	80%
Fixed NGA coverage (rural)	16%	39%	47%
Ultrafast coverage (total)	no data	22%	58%
4G coverage (average of operators)	86%	89%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

NGA coverage rose significantly from 72% of households in 2016 to 87% in 2017. Thanks to this further improvement, Italy managed to go above the EU average (80%).

As for rural areas, roll-out data shows a significant increase in NGA coverage, from 16% in 2016 to 39% in 2017. Despite this progress, Italy is still lagging behind the EU average (47%).

Fixed broadband prices	IT-2016	IT-2017	EU-2017
Fixed broadband price index [values between 0-100]	90	87	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

Fixed broadband market shares	IT-2016	IT-2017	EU-2017
Incumbent market share in fixed broadband	46.2%	45.5%	40.3%
Technology market shares			
DSL	92.0%	90.7%	64.2%
Cable	-	-	19.4%
FTTH/B	2.6%	3.4%	12.9%
Other	5.3%	6.0%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

The fixed market is in a stage of substantial modification, in view of the growing NGA coverage and the subsequent take-up of ultra-broadband services. A first relevant point is the growth of fixed access lines (starting from 3Q 2016), which is the first inversion of trend since 2007. The growth of fixed access lines is due to the relevant increase of the ultra-broadband services offered on FTTC networks and, at lower rate, through FTTH networks.

The decreasing number of xDSL service is related, on one side, to the competition with Fixed Wireless Access (FWA) services in low density area, and on the other side, to a substitution effect with NGA services, offered through FTTC and FTTH networks.

New entrants' DSL subscriptions by type of access (VDSL excluded)	IT-2016	IT-2017	EU-2017
Own network	0%	0%	0.5%
Full LLU	72.1%	71.6%	72.8%
Shared Access	0.7%	0.6%	4.1%
Bitstream	27.2%	27.8%	14.7%

Resale	-	0.0%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

b. Mobile market

Mobile market	IT-2016	IT-2017	EU-2017
Market share of market leader	33%	32%	35%
Market share of second largest operator	30%	21%	28%
Number of MNOs	4	4	-
Number of MVNOs	16	19	-
Market share of MVNO (SIM cards)	7%	8%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Following the European Commission's approval of the proposed merger on September 1st, 2016 Wind and H3G have begun offering services under the combined 'Wind Tre' brand. The firm became the first Italian mobile operator in terms of market shares/number of customers, with more than 31 million users, just ahead of TIM and Vodafone, while it also serves 2.4 million broadband fixed line customers. As part of the merger, Wind and H3G agreed to sell certain spectrum and network assets to the French firm Iliad, allowing it to set up a new mobile network operator (MNO) in Italy. Iliad's "Mobile project in Italy" aims at creating a 4th fully independent MNO within a decade, through access to a large number of decommissioned sites from Wind Tre, more than 10 000 sites available on the main TowerCos and the transfer of frequencies which have been secured in cooperation with the Ministry for Economic Development (MiSE).

The entrance of Iliad in the Italian market is expected for the mid-2018.

Mobile broadband prices [EUR/PPP]	IT-2016	IT-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€17	€13	€24
Least expensive offer for tablet and laptop (5 GB basket)	€9	€4	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017.

The merger of Wind and H3G Italia and the upcoming arrival of Iliad have already led to reactions in the Italian mobile market. The most important are the introduction of low-cost no-frills brands by competitors: TIM launched its own low-cost second brand, Kena Mobile, at the end of March 2017, and Vodafone is preparing to launch a low-cost MVNO and has already created a company called Vei SRL for that purpose.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Italy, 64.77% of the spectrum harmonised at EU level for wireless broadband is assigned. In absolute terms this means 706 MHz, below the EU average of 751.6 MHz.

The Italian budget law for 2018, adopted by the Parliament and published in the Official Journal on 27 December 2017[254] includes important provisions on 5G and a national roadmap for the refarming of the 700 MHz band.

According to the law, by 30 April 2018 AGCOM will have to set the rules of a competitive selection procedure for the 700 MHz, 3.6-3.8 GHz and 26 GHz (26.5 - 27.5 GHz) bands, without prejudice to the temporary assignments in the 3.7 – 3.8 GHz band for the 5G projects (4 years) and the current assignments for FSS and earth exploration services. Rights of use will be assigned by 30 September 2018[255]. If refarming and migration of current users are needed in the two higher bands, these will take place by 1 December 2018. Spectrum in the 700 MHz band will be available as of 1 July 2022.

By 31 May 2018, AGCOM will update the National Frequency Allocation Plan for Digital Terrestrial Television (DTT) services, taking into account the most recent technological standards and using exclusively the channels assigned to Italy on the basis of GE06 (in the VHF band III) and other agreements with neighbouring countries. DTT network operators' current rights of use will in parallel be amended to refer to DVB-T2 technology. The budget law also includes compensation measures[256].

In line with Decision (EU) 2017/899[257], a roadmap will be established by 30 June 2018 and a transition period is foreseen from 1 January 2020 to 30 June 2022 to free and refarm the UHF band, as well as to restructure the public broadcaster's "regional multiplex"[258].

In addition €2.86 million will be made available in view of promoting 5G development and supporting relevant activities.

In 2017 Italy signed the necessary cross-border spectrum coordination agreements with the following Countries: Slovenia, Croatia, Montenegro, Greece, France, Vatican City State, Monaco, Spain, Switzerland, Austria and Malta.

In 2017 Italy has officially requested the European Union's assistance for negotiations with third (non-EU) countries: Algeria, Albania, Tunisia and Libya.

The Budget Law 2017[259] had regulated the extension of rights of use of the 900 and 1.8 GHz frequency bands from 30 June 2018 to 31 December 2029 (also in order to line up the expiry

[254] Law 27 December 2017 n. 205. Full text is available at the following link: http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2017-12-27;205

[255] The rules of the assignment procedure will in particular take into account ongoing work at technical level within CEPT on defragmentation of the 3.4-3.8 GHz band on the one hand and on compatibility and coexistence studies concerning the 26 GHz band on the other.

[256] € 276,8 million in total until 2022 for replacing network operators' active equipment in the UHF band (and in the 3.6 – 3.8 GHz and 26 GHz, if necessary); € 304.2 million in the 2020-2021 period for local network operators giving back their rights of use; € 100 million in the 2019-2022 period as financial support to end-users for equipment replacement.

[257] Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union, OJ L 138, 25.5.2017, p. 131–137

[258] By 30 September 2018 MiSE will launch the selection procedure of network operators for local broadcasting. These operators will then negotiate commercial agreements with audio-visual service providers selected on the basis of rankings established by MiSE before 31 December 2018.By the same date AGCOM will set the rules for the assignment of rights of use for the 470 – 694 MHz band (the so-called sub-700 MHz band), which will take place by 28 February 2019 (at the same time, spectrum in the VHF band III will be assigned to RAI for regional/local public service broadcasting).

date of all rights of use of mobile frequencies) and the possibility to refarm the bands to UMTS/LTE from GSM[260]. On the basis on this law, the interested MNOs applied for the extension of their rights of use. Since the Budget Law 2017 was silent about the 2G phasing-out after the deadline of 30 June 2018, in the relevant public consultation AGCOM had proposed to impose GSM minimum service obligations until 30 June 2022 (subject to further analysis to be carried out by 2020), in order to ensure the continuity of GSM service to safeguard 2G-only users as well as the growing 2G M2M applications[261]. On the basis of the outcome of the consultation, AGCOM adopted its final decision[262] confirming the GSM obligations (not necessarily using all the relevant spectrum bands, but only the parts sufficient to maintain the quality of service) until the deadline of June 2022. This date was chosen by taking into account the technical-financial plans of MNOs, which envisage to keep GSM service for the next years, mainly due to the high volume of GSM traffic registered in their networks, including M2M applications, and a study about the forecasts of M2M service developments.

As to the long lasting problem of the cross border broadcasting interferences, on 13 December 2017 MiSE provided the Commission Services with an official note stating that in the period between 9 and 16 January 2017 the switch-off of the interfering channels was completed. Residual broadcasting interference issues with Croatia are being addressed through bilateral discussions also in the context of the RSPG good offices working group[263].

With regard to FM interference, Italy is addressing the issue in the context of the RSPG good offices where it was noticed that some actions have been undertaken by the Italian administration to cease FM interference cases on some priority channels identified by its neighbors. In this respect, while good progresses were made with France and Malta, problems still persist in respect to Slovenia and Croatia. Italy informed the RSPG about the 2018 Budget Law[264], which will make mandatory that all radio devices include digital radio. This will become compulsory on 1st June 2019 for wholesaler and on 1st January 2020 for retailers. According to the Italian authorities this could be considered as preliminary step towards migrating some of the FM programs to digital radio thus facilitating the removal of the FM interfering transmitters.

---

[259] Law 11 December 2016, n. 232

[260] A process that was already initiated on some blocks both in 900 and 1800 MHz band for all operators.

[261] See https://www.agcom.it/documentazione/documento?p_p_auth=fLw7zRht&p_p_id=101_INSTANCE_2fsZcpGr12AO&p_p_lifecycle=0&p_p_col_id=column-1&p_p_col_count=1&_101_INSTANCE_2fsZcpGr12AO_struts_action=%2Fasset_publisher%2Fview_content&_101_INSTANCE_2fsZcpGr12AO_assetEntryId=8617176&_101_INSTANCE_2fsZcpGr12AO_type=document

[262] AGCOM Decision no. 296/17/CONS.

[263] The RSPG's Good Offices function was established in 2012 to assist in bilateral spectrum management negotiations between its members. Any Member State may request the RSPG Chairman to put a coordination and/or interference issue on the agenda of an RSPG meeting. The RSPG may decide to respond positively to this request and set up relevant actions.

[264] See above footnote 8

b. National and EU investment in broadband

In 2017 the National Ultra Broadband Plan entered the implementation phase[265] The first two tenders were awarded to Open Fiber (first contract signed in June 2017 and second contract in November 2017)[266]. Preparatory activities for the launch of the third and final tender for the regions of Sardinia, Apulia and Calabria were carried out at the end of 2017: in particular, a new public consultation on the investment plans for the deployment of ultra-broadband in white areas in these three regions was launched in order to assess the areas where public intervention is still necessary. The third tender should be launched in the first months of 2018.

On 7 August 2017, the CIPE ("*Comitato Interministeriale per la programmazione economica*") has completed the allocation of resources for the Ultra Broadband Plan, allocating additional € 1.3 billion of the Development and Cohesion Fund (FSC). The total amount of resources allocated adds up to € 3.6 billion that will be used for the implementation of phase two of the Ultra Broadband Plan[267].

The II phase of the Italian Ultra Broadband Plan foresees infrastructural intervention in grey areas and vouchers to stimulate the demand.

At the end of 2016 (a detailed consultation document was published at the end of March 2017), AGCOM launched a fact-finding survey on frequency-related matters for the development of 5G networks (decision no. 557/16/CONS), with also the aim to support the European 5G Action Plan and to collect information on various general 5G regulatory issues such as frequencies, licensing, coverage, verticals, network architectures, etc. AGCOM has stated that availability of spectrum for 5G will follow the on-going harmonisation process in EU, CEPT and ITU, taking into account the necessity of a maximum coordinated approach among EU member states and the first RSPG Opinion on spectrum related aspects for next-generation wireless systems (5G), as well as the RSPG second Opinion, adopted in January 2018[268].

In March, 2017, Italy launched a public call to undertake 5G pre-commercial trials in the 3.7 - 3.8 GHz radio spectrum made available by the State. The call closed in June 2017. According to MiSE's roadmap, the trials started in December 2017 and will finish by December 2021.

In 2017 the so called "WiFi°Italia°It" project was launched with the aim to allow users to connect easily to a free of charge and widespread WiFi network throughout the Country through the use of an application for mobile devices that allows each user to access to a federated WiFi networks[269].

[265] For details please refer to the 2017 telecom country chapter: https://ec.europa.eu/digital-single-market/en/news/europes-digital-progress-report-2017-country-profiles-telecom-country-reports

[266] The infrastructural interventions foreseen under the first and second contract involve, respectively, the regions of Veneto, Tuscany, Molise, Emilia Romagna, Abruzzo and Valle d'Aosta, Umbria, Sicily, Autonomous Province of Trento, Piedmont, Marche, Liguria, Lazio, Friuli Venezia Giulia, Campania and Basilicata for a total of 6,743 municipalities and more than 13M citizens.

[267] At the beginning of 2018, AGCOM has published a Report providing a breakdown of investment allocation for selected areas, available at: https://goo.gl/Dw15NC.

[268] The RSPG Second Opinion on 5G networks was adopted on 30 January 2018

[269] For more information on the WiFi°Italia°It" project see http://wifi.italia.it/en/

c. Implementation of the Broadband Cost Reduction Directive

The Directive 2014/61/EU[270] (the "Broadband Cost Reduction Directive") has been fully transposed in Italy with the Legislative Decree no. 33/2016 of 15 February 2016. The Decree applied as from 1 July 2016. In the Decree, AGCOM was designated as the dispute settlement body, while MiSE, by its in-house company Infratel Italy S.p.A. ("Infratel"), was designated as the body to perform the functions of the Single Information Point.

AGCOM implemented the provision of Article 10 of the Directive 2014/61/EU (transposed in Article 9 of the Legislative Decree n. 33/16) with Decision no. 449/16/CONS. This decision sets terms and conditions to manage a dispute procedure and it includes the procedural rules to open, manage and settle a dispute, providing also the possibility to reach agreements between the parties[271]. AGCOM, as dispute settlement body, have solved 3 disputes regarding requests of access to physical infrastructures by network operators deploying high-speed electronic networks.

The Legislative Decree 33/2016 of February 2016 transposed the Broadband Cost Reduction Directive, but in 2017 the single information point (SINFI) was not fully operational yet[272]. The persisting issues related to the delays in the local authorisation/permit granting are expected to be resolved by means of preliminary technical agreements between Infratel and the municipalities.

3. Regulatory function

In 2017, AGCOM approved a number of decisions regarding the implementation of some of the measures imposed on Telecom Italia within the last access market analysis review (Decision no. 623/15/CONS) regarding the enhancement of non-discrimination guarantees[273] and the implementation of access obligations aimed at allowing the delivery of provisioning

[270] Directive 2014/61/EU of 15 May 2014 on measure to reduce the cost of deploying high-speed electronic communication network (OJ L 155, 23.5.2014, p. 1–14).

[271] It is worth mentioning that national laws and regulation aimed at facilitating the deployment of ultra-broadband were established in Italy between 2002 and 2014 independently from the CRD. Such obligations are extended by the Directive, but they also integrate it in some cases (e.g. specifying in more details the procedures).

National laws:

- Law n. 166/2002: coordination of civil works
- Law n. 133/2008: access to physical infrastructure
- Law n. 133/2014: transparency concerning physical infrastructure
- Law n. 164/2014: in-building physical infrastructure

Regulatory decisions (Agcom):

- Decision no. 538/13/CONS: symmetric access to in-building physical infrastructure
- Decision no. 622/11/CONS: access to existing physical infrastructure, coordination of civil works, permission granting
- Decision no. 538/13/CONS imposed symmetric access to in-building physical infrastructure, under Art. 12 Framework Directive, of undertakings providing electronic communications who controls the infrastructures (independently of SMP).
- Decision no. 622/11/CONS imposed access to existing infrastructure (cables, ducts, manholes) owned by public body (or private body managing public resources, e.g. highways managing body), installed underneath roads, highways, train roads, or installed inside water or electricity transport systems. Infrastructures involved are only in the backbone section of the networks.

[272] According to the information provided by the Italian Authorities, SINFI is currently under field trial test with 10 operators and is expected to be fully operational by the end of the first quarter of 2018.

[273] Decision no. 652/16/CONS.

and assurance services also by third parties[274]. As a result in particular a new model of equivalence (NME) has been adopted by Telecom Italia which has significantly strengthened the current Equivalence of Output (EoO) system through the introduction of: i) re-organisation of TI wholesale division; ii) a new delivery chain; iii) optimisation of back-office for delivery and assurance; iv) improvement of performance of delivery and assurance; v) new tracking order system; vi) simplification of the refusal (KO) tagging system; vii) joint single enhanced database (NetMap) available for TI retail division and OAOs, removing information asymmetry; viii) joint tests of the new release software. In the context of provisioning and assurance service a new provisioning and assurance system will be implemented with the objective of improving efficiency and quality of wholesale services, also reducing the risk of anti-competitive behaviour.

Beside the work of the technical group for the implementation of remedies and related monitoring activities, a number of reference offers regarding the major access products have been approved during 2017[275].

Moreover, in 2017 the reviews of some markets have been finalised and are expected to be notified under the Article 7 procedure during 2018. They concern in particular the wholesale market for voice call termination on individual mobile networks[276]; the wholesale market for high-quality access provided at a fixed location[277]; the wholesale markets regarding local access provided at a fixed location and the wholesale market for central access provided at a fixed location for mass-market products[278].

As to the division of competences between the Italian Communication Authority and the Competition and Consumers authority (AGCM) following the memorandum of understanding (MoU) signed by the parties on 26 December 2016, the two Authorities are now cooperating and coordinating the respective activities in particular by setting up joint working groups in charge of carrying out preliminary activities in case of *e.g.* sanction proceedings. In parallel, a request for preliminary ruling - precisely seeking clarifications on the relationship between the Unfair Commercial Practices Directive and the sector-specific provisions, in particular clarification on the interpretation of the '*lex specialis*' principle enshrined in Article 3(4) of the Unfair Commercial Practices Directive - is pending before the Court of Justice of the European Union[279].

4. Consumer matters

In 2017, AGCOM has received 90 000 dispute resolution applications, through the 17 delegated regional communications Committees ("Corecom" the Region's consulting and management entity in charge of communications, which is also a functional body of AGCOM with territorial mandates regarding disputes resolution between users and telecoms). In 83%

[274] Decision no. 321/17/CONS.
[275] In particular the reference offers for WLR, ULL, Bitstream/VULA and wholesale high-quality access.
[276] Market no. 2 of Recommendation 2014/710/EU.
[277] Market no. 4 of Recommendation 2014/710/EU.
[278] Markets no. 3a and 3b of Recommendation 2014/710/EU.
[279] The request for a preliminary ruling can be retrieved at the following link: http://curia.europa.eu/juris/fiche.jsf;jsessionid=9ea7d0f130de4a41b779397a4bc6a72b8465af651f2a.e34KaxiLc3eQc40LaxqMbN4PaNyPe0?id=C%3B54%3B17%3BRP%3B1%3BP%3B1%3BC2017%2F0054%2FP&pro=&lgrec=en&nat=or&oqp=&dates=&lg=&language=en&jur=C%2CT%2CF&cit=none%252CC%252CCJ%252CR%252C2008E%252C%252C%252C%252C%252C%252C%252C%252C%252C%252Ctrue%252Cfalse%252Cfalse&num=C-54%252F17&td=%3BALL&pcs=Oor&avg=&mat=or&jge=&for=&cid=383138.

of cases the parties came to an agreement. The average value of the agreements on the customer-side was €450, so the total amount of compensation paid to users was over €30 million.

AGCOM has also received about 7 000 complaints and reports from users and consumer associations regarding unilateral modifications to terms of contracts; withdrawal costs and difficulties in changing provider.

After several initiatives by AGCOM and AGCM aimed at sanctioning and banning the widespread telco operators' practice introducing a billing period of 28 days, in November 2017 the Italian Parliament approved an amendment to the "Fiscal Decree" introducing the compulsory monthly billing for all the fixed and mobile electronic communication services[280]. The above mentioned amendment also imposed transparency obligations on the operators as to the characteristic of the physical infrastructure used to provide their services: the provision aims at ensuring transparency as to the kind of fibre connection offered to the final client (FTTH, FTTC etc.)[281]. At the end of 2017 AGCOM adopted guidelines and specific measures aimed at ensuring the correct implementation of the new provisions[282].

In addition, the level of sanctions that can be imposed by the national authority in case of breach of the new provision has increased.

Another set of provisions aimed at improving the transparency of contracts was included in Law no. 124, August 4th 2017. In particular the new Law *inter alia* aims at increasing the level of transparency of the costs borne by the customer in case of withdrawal from contracts or switching to a different operator and making the relevant process easier.

Nevertheless, according to the information provided by Consumer Associations, overall problems related to transparency and unilateral modifications to contracts still persist and the new law may not be as effective as expected.

a. Roaming

Following the entry into force of the Regulation (EU) 2015/2120[283] on 29 November 2015, the retail roaming charges were abolished in the EU as from 15 June 2017. AGCOM has allowed 3 derogations (all MVNO), with a 4th currently under assessment.

While the months preceding the 15 June 2017 were still characterised by widespread non-compliance by the operators in particular with the default-reduced transition retail price ('Roam Like At Home+', or 'RLAH+'), against which AGCOM's enforcement efforts proved ineffective also due to the insufficient sanctions available to AGCOM at that time (as also already registered in the last year's Telecom Chapter), in view of the introduction of Roam

[280] Decree-Law 16 October 2017, n. 148 converted into Law 4 December 2017, n. 172 (Italian O.J. 05/12/2017, n. 284) available in Italian at the following link http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2017-10-16;148!vig=

[281] The Law provides that AGCOM will have to define the technical characteristics and correspondent denominations of the different kinds of physical infrastructure, defining as "full optical fibre infrastructure" the one that ensures the fibre connection up to the customer's living unit. Lack of compliance with the technical characteristics set by the Authority will represent an unfair commercial practice.

[282] See in particular AGCOM Decision no. 495/17/CONS and AGCOM Decision no. 496/17/CONS.

[283] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access (OJ L 310, 26.11.2015, p. 1).

Like At Home (RLAH) as of 15 June 2017 AGCOM intensified its monitoring activity on the main national mobile operators (both MNO and MVNO) registering an overall good level of compliance with the new provisions and intervening, where cases of lack of compliance were pointed out[284], with warning letters to the relevant operators requiring full compliance with Roam Like at Home[285] (RLAH) rules.

Against this background, in November 2017 Italy adopted the "European Law" whose Article 4 amends Article 98 of the Italian Electronic Communications Code attributing specific interim powers to the National Regulatory Authority and introducing a new set of sanctions to apply in cases of breach of the Roaming Regulation. New penalties range from €120 000 to €2 500 000[286].

Following the introduction of RLAH in June 2017, Italian subscribers consumed 3.6 times more voice and 9.5 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[287].

b. Net neutrality

During 2017 the Italian NRA carried out general monitoring activities[288] on the correct implementation of the Net Neutrality rules enshrined in Regulation (EU) 2015/2120 with a focus on zero-rating offers, traffic management practices, and specialised services. The NRA also reported about an informal ongoing cooperation with the Italian Data Protection Authority on matters related to Article 3(4) of the above mentioned Regulation. On 15 March 2017, AGCOM adopted a Decision (no. 123/17/CONS) to address two “zero-rating” offers found to be in breach of Article 3(3) of Regulation (EU) 2015/2120. In particular, AGCOM noted a discrimination between the general purpose traffic, which is often blocked or slowed down, compared to the zero-rated traffic, which flows without being blocked or slowed down. Regarding compliance of the offers mentioned above with Article 3(2), the Authority's assessment is currently ongoing.

In November 2017 Italy adopted the "European Law" whose Article 4 amends Article 98 of the Italian Electronic Communication Code introducing a new level of sanctions for the breaches of the Net neutrality provisions included in Regulation (EU) 2015/2120. New penalties range from €120 000 to €2 500 000[289]. Rules on penalties were recently reinforced also with Law 4 August 2017, n. 124 ("*Legge annuale per il mercato e la concorrenza*"), which increased the applicable sanctions for indirect infringements of Articles 3, 4, 5 of

[284] *Inter alia*, the cases detected included (i) incorrect application of FUP (fair use policy); (ii) limitation to the national territory of free promotions; (iii) corporate offers excluding RLAH.
[285] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[286] See Article 4, Law 20 November 2017 n. 167.
[287] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.
[288] The Italian NRA also cooperated with technical bodies for more specialised traffic measurements at server and client level on fixed and mobile networks. AGCOM circulated requests for information to ISPs and organized formal meetings with vendors and ISPs with the aim to provide a clear and useful set of information to stakeholders about the content of Regulation (EU) 2015/2120 and in order to stimulate an effective compliance by ISPs.
[289] See above, footnote 43.

Regulation (EU) 2015/2120, *i.e.* the sanctions apply if the operators refuse to provide the information requested by the NRA or does not implement or execute NRA's orders[290].

c. 112

In 2017 there were no changes to the legislation relevant for emergency calls location. The accuracy of the location via the available APPs, based on GPS positioning, is < 20 m. In 2017 the First Level PSAP Model was introduced in four Italian regions (Friuli Venezia Giulia, Sicilia, Trentino Alto Adige and Piemonte). In total (including the Italian regions already switched to the PSAP1 model: Lazio, Liguria and Lombardia) the APP is available for more than 25.5 million Italian citizens.

SMS as an alternative means of access to emergency services is available in Italy but only to a long number. A call abandon rate of more than 20% was reported. Italy introduced the Emergency applications "Where Are U" in all the Regions adopting the first level PSAP model, "FlagMii" in Piedmont[291]. As to the average time needed for receiving the caller location by the 112 operator, due to the implementation of the "push" system or the automatic "pull" system, near instant times (up to 10 seconds) were reported in Italy. In 2017 Lombardy region joined as partner the pilot project 'HELP 112' that aims at improving caller location information transferred to Public Safety Answering Points (PSAPs)[292].

d. Universal service

Broadband is currently not included in the scope of universal service[293]. With Decision n. 253/17/CONS AGCOM has published the outcomes of an assessment on the review of universal service obligation aimed at considering the possible inclusion of broadband services in the universal service obligation in line with European Commission Communication (COM (2011) 795). In this respect AGCOM acted as advisor of the Ministry of Economic Development that, according to Article 65 of the Italian Communication Code, is in charge of the periodic review of the universal service obligation.

At this stage, as the Commission believes that Member States could be asked to consider including broadband connections in USO where the data rate in question is used at national level i) by at least half of all households and ii) by at least 80 % of all households with a

[290] In addition to the above, with regard to the freedom of choice of the terminal equipment, at the beginning of 2018, AGCOM launched, with the Decision no. 35/18/CONS, a public consultation on possible measures to ensure the free choice of terminal equipment by consumers and end users. Furthermore, AGCOM, with the Decision no. 68/18/CONS, adopted a warning against an operator regarding the commercial practice of allowing the use of the mobile terminal in tethering mode only by paying an additional fee. AGCOM considered this practice as a breach of Article 3, paragraphs 1 and 2 of EU Regulation no. 2015/2120.

[291] Emergency applications are another handset based location solution that uses the GNSS or Wifi capability of the smartphone. Emergency applications are being deployed at a Member State or regional level. These applications require prior action from the citizen – as opposed to AML – as it has to be downloaded. The transmission of location data is possible only when an active data connection is available. These applications can provide a much more accurate GNSS/Wifi location than network based location solutions

[292] HELP 112 is the pilot project on the design, implementation and execution of the transfer of GNSS data during a 112 call to a PSAP. Project partners will look at available technologies and future opportunities, test and assess them, as well as define requirements and recommendations for technologies enhancing caller location information at the European level in a cost effective manner. In this context, several solutions will be examined in four pilot sites. This project will also use the European GNSS solutions (Galileo, EGNOS).

[293] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

broadband connection, AGCOM has verified that the European requirements are met for a 2 Mbps connection. It is anyway up to the Ministry to decide whether to include the 2 Mbps connection in the USO.

In order to promote equivalent choice and access to telecom services for disabled users, in March 2017 AGCOM approved a decision (n. 46/17/CONS), which introduced an obligation on telco operators to apply discounts on offers for visual and hearing impaired users[294].

5. Conclusion

Thanks to increasing infrastructure-based competition and a combination of private and public investments, Italy is significantly improving the level of fibre-based next generation access (NGA) roll-out, in line with the goals of the European Commission's Digital Agenda strategy. This certainly also produced a positive effect on the demand side that is increasing in parallel but at a slower pace. On another note, regarding the Multi Operator Vectoring (MOV), a technical Committee of operators promoted by AGCOM has developed in June 2015 the guidelines for technical characteristics for MOV, which Telecom Italia and operators wishing to adopt vectoring transmission systems have to comply with, as established in a regulatory measure of 2015[295]. While trials continued on the basis of the 2015 measure no business model on MOV has been launched yet.

On the other hand, several factors, including delaying tactics by the incumbent operator are suspected by the national Antitrust authority to have produced a negative impact on the process of implementation of the Ultra-broadband National plan[296].

With regard to the implementation of the Broadband Cost Reduction Directive, as mentioned above, Italy was the first Member State to fully transpose the legislation but in 2017 the single information point (SINFI) was not fully operational yet[297]. The persisting issues related to the delays in the local authorisation/permit granting are expected to be resolved by means of preliminary technical agreements between Infratel and the municipalities.

Italy is a pioneer with regard to 5G mobile technology thanks to the 5G testing initiatives launched by both the Government and the operators privately in a number of cities. In particular, the Government "5G in 5 Cities" plan assigned, in September 2017, 100MHz in the 3.6-3.8 GHz spectrum band[298].

[294] According to this decision disabled users have the right to receive a 50% discount on each operator best flat/semi-flat fixed offer (voice + data). In addition, hearing-impaired users are entitled to receive a 50% discount on each operator best mobile offer including 50 free SMS/day and at least 20 GB/month of data, while visual impaired users are entitled to receive a 50% discount on each operator best mobile offer including unlimited voice and at least 10 GB/month of data.
[295] AGCOM Decision no. 623/15/CONS Article 20.
[296] See above, footnote 2.
[297] According to the information provided by the Italian Authorities, SINFI is currently under field trial test with 10 operators and is expected to be fully operational by the end of the first quarter of 2018.
[298] The winning bidders will start to test by 2018 infrastructures and services in the metropolitan city of Milan, Prato, L'Aquila, Bari and Matera. See http://bandaultralarga.italia.it/en/5g-5-italian-cities-approved-the-best-projects/.

LATVIA

Market developments

1. Competitive environment

Fixed voice and SMS services continue to decline while mobile voice services have slightly increased. Following a fixed-mobile substitutability analysis on the voice telecommunications market at retail level, the Latvian national regulatory authority (SPRK) concluded that fixed voice services are substitutable by mobile voice services and both should be considered as a part of the same market.

Mobile voice bundled with mobile data is the most common mobile services subscription. Other common bundles are fixed broadband/cable TV and fixed broadband/fixed voice. SPRK expects content to become more important in mobile bundles since MTG group and the third mobile operator, Bite, have the same owner (see below).

a. Fixed Markets

Affordability of fixed broadband in Latvia is comparable to the EU average[299].

Fixed broadband prices	LV-2016	LV-2017	EU-2017
Fixed broadband price index [values between 0-100]	86	87	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

Latvia is among the leading Member States in FTTH penetration. The share of vDSL, FTTH, and FTTB has slightly increased at the expense of DSL subscriptions. The proportion of subscriptions of speeds above 100 Mbps remains at 48% of all fixed subscriptions. Lattelecom's market share is still well above 50% but has slightly eroded.

Fixed broadband market shares	LV-2016	LV-2017	EU-2017
Incumbent market share in fixed broadband	58.6%	57.1%	40.3%
Technology market shares			
DSL	26.2%	24.5%	64.2%
Cable	3.6%	3.7%	19.4%
FTTH/B	62.4%	63.2%	12.9%
Other	7.9%	8.6%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

There is no change in new entrants' access compared to 2016.

[299] The fixed broadband price index weights the cheapest retail offers from: standalone, double play (broadband+ TV, broadband + fixed telephone) and triple play (broadband+TV+fixed telephone) and three speeds categories - 12-30Mbps, 30-100 Mbps and +100Mbps-. This indicator presents values from 0 to 100 (which should not be read as prices) and the higher values, the better the country performs in terms of price.

New entrants' DSL subscriptions by type of access (VDSL excluded)	LV-2016	LV-2017	EU-2017
Own network	-	-	0.5%
Full LLU	-	-	72.8%
Shared Access	1.6%	1.6%	4.1%
Bitstream	40.4%	40.4%	14.7%
Resale	58.0%	58.0%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Overall, while fixed broadband coverage remains stable, operators note that fixed broadband take-up is slowly rising. The low overall fixed broadband coverage compared to most other EU Member States together with the very good fast and ultrafast broadband coverage reflect the digital divide in Latvia.

Coverage	LV-2016	LV-2017	EU-2017
Fixed broadband coverage (total)	93%	93%	97%
Fixed broadband coverage (rural)	83%	82%	92%
Fixed NGA coverage (total)	91%	91%	80%
Fixed NGA coverage (rural)	77%	77%	47%
Ultrafast coverage (total)	no data	88%	58%
4G coverage (average of operators)	91%	98%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Using mobile technology, mobile operators have entered the fixed broadband and TV markets which provide them with new sources of revenues. Where this is the case, mobile technology is used as a substitute to the fixed connection. The first mobile operator (LMT) offers TV on their mobile network. With the acquisition of MTG (see below), the third mobile operator, (Bite) bought TV content. Lattelecom also offers (internet) TV services and invests in its own content.

b. Mobile market

Mobile operators note that market shares have remained relatively stable in the mobile market in 2017. LMT is closely followed by Tele 2, while Bite is the third operator. Independent MVNOs in Latvia occupy very small niche segments and have no meaningful impact on the mobile market. The Latvian authorities clarified that they would not approve the LMT-Lattelecom merger which had been envisaged for several years.

Mobile market	LV-2016	LV-2017	EU-2017
Market share of market leader	37%	38%	35%
Market share of second largest operator	35%	35%	28%
Number of MNOs	4	4	-
Number of MVNOs	3	1	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October2017.

The price of the least expensive mobile broadband offer for handset remained stable in February 2017 compared to February 2016. In contrast, the price of the least expensive mobile broadband offer for tablet and laptop increased by 29% between February 2017 and July 2017.

Mobile broadband prices [EUR/PPP]	LV-2016	LV-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€14	€14	€24
Least expensive offer for tablet and laptop (5 GB basket)	€7	€9	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

In 2017, the owner of Bite[300] bought MTG group, the main commercial TV channels' owner and operator in Latvia. The Competition authority imposed on Bite a wholesale access remedy to that content. Bite also bought Unistar, which holds rights to use 150 MHz in the 3.4-3.8 GHz band.

4G network deployment is nearing completion with all three major mobile operators having very high 4G coverage. 2G and 3G networks are maintained and continue to develop. There has so far been no plan for early 5G trials or deployments.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

No change occurred in 2017 as regards the % of harmonised bands assigned in Latvia.

In 2017, the national radio frequency plan was amended with regard to Wireless Broadband (WBB): the 3.4-3.8 GHz band was rearranged into 8x50 MHz continuous blocks starting from January 2019, and LTE technology was allowed in the 450 MHz band (only CDMA was operated previously in that band). Usage rights were extended for two operators in the 2.1 GHz band.

In the 3.4-3.8 GHz band, six of the eight re-arranged 50 MHz-wide blocks were redistributed among existing rights holders. The two available blocks were auctioned on 27 November 2017 for use from January 2019. Following a change in the frequency plan, existing rights holders in that band were not allowed to participate in the auction. As a result, only one market player (a mobile operator) made a bid and acquired the two blocks at the starting price[301]. On 28 January 2018, the rights of use for one of the previously re-distributed 50 MHz-wide blocks (namely the 3550–3600 MHz block) expired and that block is available for auction. The auction is planned to be carried out by SPRK in autumn 2018.

The 700 MHz band is currently used for TV broadcasting by Lattelecom, whose rights of use expire in 2022. In addition, cross-border coordination with Russia and Belarus is ongoing. As a result, the WBB use of the 700 MHz band (including for 5G) in Latvia is planned for 2022. A working group has been set up by the Ministry of Transport for that purpose. In 2017, LTE tests were conducted in that band.

5G deployments can be introduced in the 3.4-3.8 GHz band from 2019. However, some market players argue that the re-arranged assignments and recent auction within that band does not place them on equal footing. Appropriate frequency resources can be assigned already in 2018 for early 5G trials in some parts of the 24-27 GHz band ("26 GHz" band).

[300] Providence, an American pension fund.
[301] 250 000 EUR for each block.

Finally, Latvia is preparing regulatory measures and coordinating activities with neighbouring countries with the objective to repurpose, in the coming years, the 1.5 GHz band (or at least parts of it) for 5G needs.

The table below shows the number of permits for operating base stations for public mobile communications issued by the Electronic Communications Office (VAS ES) in the relevant WBB frequency bands. All permits respect technological neutrality.

Frequency band	450 MHz	800 MHz	900 MHz	1.8 GHz	2.1 GHz	2.3 GHz	2.6 GHz	Total
Dec. 2016	178	1421	2982	1628	2078	28	323	8638
Nov 2017	177	1856	3204	1878	2179	29	423	9746

Source: Electronic Communications Office (VAS ES).

Spectrum sharing and trading is allowed subject to SPRK clearance if certain conditions are met. If the rights of use the spectrum are acquired in an auction, trade/lease is allowed with some restrictions.

Decision (EU) 2015/750[302] is still not implemented. As soon as coordination agreements with Russia and Belarus are signed, Latvia will amend the national radio frequency plan and make the 1.5 GHz band available for mobile/fixed communications networks, in line with that Decision. Negotiations on these agreements continued in 2017.

b. National and EU investment in broadband

The 'middle mile project'[303], launched in 2012 and co-financed by EU structural funds to connect rural areas to the national backbone infrastructure, has entered its second phase. Like the first phase of the project, the second phase is implemented by the Latvian State Radio and Television Centre (LVRTC)[304]. LVRTC owns the infrastructure built by the project and is not allowed to provide retail services.

In 2017, a public procurement process led to the conclusion of four general agreements on the design and construction of optical network infrastructure for a total amount of 32 million euros. In summer 2017, the design work for the optical network infrastructure to be built in the second phase was launched; the actual construction work of the second phase is planned to start in spring 2018. It will focus on the remaining 221 white areas identified in 2014-2015. It is foreseen that, by 2020, approximately 2 200 km of optical cable and at least 220 optical network access points will have been built. Telecoms operators have the opportunity to create a local loop with a data transmission speed of at least 30 Mbits/sec (the "last mile") utilising the new network for offering retail services to end users. Lattelecom has so far been the main user of the infrastructure deployed.

However, it seems that private investment in the last mile does not occur in all places. Some stakeholders expressed dissatisfaction with a recent change in the tariff scheme for the use of the deployed infrastructure. A study will be launched by the Ministry of Finance in

[302] Commission Implementing Decision (EU) 2015/750 of 8 May 2015 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union (OJ L 119, 12.5.2015, p. 27–31)

[303] Project *"State aid SA.33324 – Latvia Next generation network for rural areas" (C (2011)7699),* also known as the SAP project. During the first phase of this project (2012-2015), 1418 km of cable ducts, 1813 km of optical cable were laid and 177 access points were built in white areas.

[304] State Joint Stock Company "Latvian State Radio and Television Centre".

collaboration with the Ministry of Transport to assess the situation and propose solutions where needed to close the last mile gap, including further state aid schemes and regulatory measures. The delivery of "fixed" services in homes via the mobile technology by mobile operators contributes to closing the gap in some rural areas where fixed investment in the "last mile" does not take place.

c. Implementation of the Broadband Cost Reduction Directive

Latvia notified full transposition of the Broadband Cost Reduction Directive 2014/61/EU[305] in July 2017.

Pursuant to national law on private property, access to some multi-flat buildings by network operators needs permission by all individual owners in the building; according to some market players, this makes the access to those buildings very difficult or even impossible to obtain in practice, so that in such cases the new provisions related to in-building access are of little use and effect according to them.

The Dispute Settlement Body (DSB) foreseen in the Directive is the national regulator (SPRK). It has not resolved any dispute in relation to the application of the Directive yet.

Some stakeholders also complain about the high cost of initiating a dispute with the DSB in relation to these new rules (€5 000), and about the high fees asked by municipalities to access public buildings (outside of the scope of the Directive).

3. Regulatory function

In 2017, SPRK's decisions to deregulate the wholesale fixed call origination market[306] and the retail fixed national voice telecommunications market[307] came into force. This did not have a major impact on the market. Several very small operators entered the retail voice telecommunications market, but their impact has been negligible. The activity in fixed wholesale markets remains very low. An obligation to announce to the customer the retail off-net tariff of a call was imposed if the tariff exceeds a certain level. As a result, the few exorbitant retail off-net tariffs that remained in Latvia are expected to disappear.

In 2017 SPRK reviewed Markets 1 and 2 (Fixed and Mobile Termination Markets). FTR and MTR caps were updated based on a benchmark of rates set by those countries that have implemented the recommended BU-LRIC model. SPRK distinguishes again the FTR and MTR caps for the calls originating in EU/EEA and for the calls originating in non-EEA countries due to much higher FTRs and MTRs in several non-EEA countries bordering Latvia. The regulated levels of MTRs and FTRs are broadly accepted by the market.

The SMP operator must provide local loop unbundling for FTTH (P2P or GPON) and FTTB infrastructure. LLU must be provided to other operators on conditions equal to self-service. In case of GPON, the SMP operator must provide VULA with characteristics and parameters equivalent to physical unbundling. There is limited take up of dark fibre and Bitstream access. The take up of regulated access products altogether remains low. Infrastructure-based

[305] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1–14).
[306] Market 2 of the 2007 Commission Recommendation on relevant markets.
[307] Market 1 of the 2007 Commission Recommendation on relevant markets.

competition prevails in Latvia. One market player signalled its interest to enter the fixed market but finds the wholesale fixed prices too high to do so.

Existing and future bundles have limited impact on the regulatory approach of SPRK.

The review of regulatory decisions on Markets 3a and 3b (wholesale local and central access provided at a fixed location) will take place in 2018, and Market 4 (wholesale high quality access provided at a fixed location) afterwards.

In 2017, no change was made to the national numbering plan. However, SPRK supports the introduction of a special range for M2M/IoT numbering in view of the risk of mobile number exhaustion in the medium term (3-4 years). The responsible authority for the numbering plan is the Ministry of Environmental Protection and Regional Development.

SPRK did not have to settle any disputes between undertakings in 2017. In 2017, two decisions by SPRK to impose administrative penalties for the provision of electronic communications services without registration were appealed. The Court dismissed the appeals.

4. Consumer matters

In 2017[308], SPRK and the Consumer Rights Protection Centre (CRPC) respectively received 74 and 73 consumer complaints regarding electronic communications services. Altogether the key issues were related to bills and tariffs (including roaming and tariffs in fixed network), terms of contracts and quality of service.

An Internet tariffs comparison tool is available at www.gudriem.lv.

a. Roaming

According to SPRK, there has not been any compliance issue as regards the implementation of the new Roam-Like-At-Home (RLAH) rules[309] in Latvia, and no operator applied for the sustainability derogation. SPRK estimates that retail mobile prices have increased by 20-30% in 2017, from a very low level. This price increase is visible on the least expensive offer for laptop and tablet (5 GB, from €7 in February 2016 to €9 in July 2017[310]). In many cases, the price increase was accompanied by higher volumes of data. The Competition authority has been conducting a preliminary enquiry about the price increase[311].

Following RLAH, two of the three mobile operators in Latvia now include international calls in national volumes as the distinction between EU roaming calls and international calls to the EU was a source of confusion and dissatisfaction for mobile users.

Roaming consumption by Latvian travellers increased tremendously under RLAH. Latvian subscribers consumed 3.6 times more voice and 12.5 times more data roaming services when

[308] Until the end of October 2017.
[309] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[310] In EUR/PPP, VAT included. The 2017 price of the least expensive offer for handset (1 GB + 300 calls basket), unchanged compared to 2016, is from February 2017, i.e. prior to RLAH.
[311] The enquiry was still ongoing at the time of drafting this chapter.

travelling in the EU in summer 2017 compared to summer 2016[312]. The share of Latvian consumers using mobile data while travelling in the EU more than doubled after 15 June 2017, while the share of those never using mobile data while travelling in the EU dropped[313].

b. Net neutrality

There are no self-regulatory initiatives in Latvia. SPRK has not detected any breaches of the EU net neutrality rules[314]. It surveyed operators on traffic management and no particular issue arose. Only one mobile operator offers zero rated services which have been assessed as compliant with EU rules by SPRK. According to SPRK, end users are generally satisfied with the service quality.

The Latvian Electronic communications law and General Authorisation rules define the information that should be included in electronic communications contracts. No additional information on the transparency measures has been introduced.

SPRK has its own internet measurement tool called "ITEST", which allows consumers to measure their internet speed and other internet quality parameters. Although measurements performed by consumers are for informational purposes only, consumers can submit a complaint to their ISP in case the measurement results do not comply with values stated in the contract. If the consumer is unsatisfied with the answer given by the ISP, a complaint can be filed to SPRK which will perform the measurement and settle the case. SPRK and Latvian ISPs consider ITEST monitoring mechanism as certified.

Concerning the minimum Quality of Service SPRK set requirements in national legislation several years ago. The Latvian General Authorisation rules stipulates that the minimum guaranteed speed of connection (uploading and downloading) shall be not less than 80% of the maximum speed of connection indicated in the contract.

Some operators note that the number of public institutions and administrations entitled to order them to block certain websites with a wide discretion tends to increase over time. According to them this might be at odds with net neutrality rules. Operators also contest the efficiency and effectiveness of such measures.

According to the Latvian Administrative Violations Code section 1586, in case ISP infringe the requirements related to data transmission speed and data caps, as well in case of non-inclusion of the required information in the contracts, SPRK may give a warning or impose a fine for non-compliance with the legislation

[312] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-Septembre 2017, published on 14 March 2018.
[313] 24% of Latvian roamers used mobile data while roaming in the EU after 15 June 2017, compared to 11% before that date. In contrast, 35% of Latvian roamers never used mobile data after 15 June 2017, compared to 50% before that date. Source: Flash Eurobarometer 454 on the end of roaming charges within the EU, 27 September 2017.
[314] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

c. 112

In 2017, no amendments were made to national legislation concerning 112. The handset-based caller location (Advanced Mobile Location, AML) has not been deployed yet, but AML tests were conducted in 2017. First statistics show that in 62% of the cases the location was identified in a range of 0 to 30 m and in 20% of the cases in a range of 30 m to 2 km. In 18% of the cases, the location was not identified. AML is expected to be deployed in 2018.

End users with disabilities can access the emergency services by sending an SMS. When receiving an SMS, the 112 Call Centre checks if the phone number is that of a person registered on the list of deaf people or people with hearing disability maintained by the Latvian Association of the Deaf. If the phone number is registered, the 112 dispatcher answers with a SMS; if not, the 112 dispatcher answers with a call.

d. Universal service

Since the beginning of 2017 the directories and directory enquiry services have been removed from the scope of the universal service obligations[315][316]. There are currently no discussions concerning a possible inclusion of broadband provision in the universal service obligations.

5. Conclusion

Latvia has been among the EU front-runners in fibre and 4G deployment. However, bridging the digital divide remains a real challenge for the country to be decidedly further tackled. The recent rules transposing the Broadband Cost Reduction Directive should contribute to serve that purpose in practice. In addition, in order to keep up with its fast pace of connectivity developments in the future, Latvia should make sure that appropriate spectrum is timely available to all relevant market players for early 5G trials and deployment. In case shortage of available numbering resources is ascertained, the national numbering plan may need to be adapted to allow for the expected development of M2M/IoT services.

[315] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).
[316] The public payphones have been excluded from the scope of universal service since 1 January 2014.

LITHUANIA

Market developments

1. Competitive environment

Lithuania performs relatively well in terms of fast broadband (NGA) coverage, though a significant digital divide remains regarding rural areas. Ultrafast broadband coverage is significantly higher in Lithuania than in the overall EU. Lithuania has one of the highest levels of 4G coverage, and is well above the EU average. Even though mobile broadband take-up has considerably improved, it has not raised enough to catch up with the EU average.

a. Fixed Markets

During the reporting period, some trends of convergence could be noted in the Lithuanian market. TEO Lithuania (historical fixed operator controlled by Telia Company, AS) and Omnitel (mobile operator, controlled by TEO Lithuania) merged into one company, Telia Lietuva, on 1 February 2017. Cgates completed the integration of 8 IAS and TV providers into its company in January 2017 and Bitė Lietuva acquired VIASAT AS and one of the largest TV broadcasters TV3 in May 2017.

In July 2017, the Commission cleared the creation of a joint venture that will provide mobile payment services to businesses and consumers in Lithuania, jointly owned by telecommunications services providers Bitė, Tele2 and Telia[317].

Fixed broadband prices	LT-2016	LT-2017	EU-2017
Fixed broadband price index [values between 0-100]	92	94	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The incumbent operator Telia Lietuva is the main player in the Lithuanian fixed market. Its market share in the business segment is particularly strong, in the fixed voice (non-residential) market it was at 72.7% in June 2017. Both the incumbent operator and the alternative operators continued to invest in fibre infrastructure.

Fixed broadband market shares	LT-2016	LT-2017	EU-2017
Incumbent market share in fixed broadband	46.9%	50.4%	40.3%
Technology market shares			
DSL	19.2%	18.8%	64.2%
Cable	3.6%	3.2%	19.4%
FTTH/B	62.7%	69.0%	12.9%
Other	14.4%	9.0%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	LT-2016	LT-2017	EU-2017
Own network	-	-	0.5%

[317] For the M.8251 merger case see: http://europa.eu/rapid/press-release_MEX-17-2107_en.htm

Full LLU	0.2%	4.4%	72.8%
Shared Access	4.3%	2.0%	4.1%
Bitstream	95.6%	93.6%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Coverage	LT-2016	LT-2017	EU-2017
Fixed broadband coverage (total)	96%	96%	97%
Fixed broadband coverage (rural)	87%	87%	92%
Fixed NGA coverage (total)	81%	82%	80%
Fixed NGA coverage (rural)	39%	39%	47%
Ultrafast coverage (total)	no data	82%	58%
4G coverage (average of operators)	96%	98%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

There are positive trends when it comes to the evolution of the market in the light of 2020 broadband targets, both from the supply and the demand side. Subscribers are using fast and ultra-fast internet services due to their growing needs and convenience (good deals on internet access and bundle offers with faster connection). Operators are actively investing in NGA networks and strive to compete by offering fast and ultra-fast internet services (standalone and in bundles).

The number of subscribers of internet access that is 30 Mbps or faster has been constantly growing: there were 501 000 subscribers at the end of 2015, 538 800 subscribers at the end of 2016 and 561 000 subscribers in the second semester of 2017. At the same time, the take-up of subscribers of internet access (at least 30 Mbps) was 19.9 per 100 inhabitants and 44.7 per 100 households (compared to 8.1 per 100 inhabitants and 40.5 per 100 households respectively in the previous year).

SMS and fixed voice services continue to decline while mobile voice services have been highly used and continued growing during the first two quarters of 2017. This situation can be explained by the fact that mobile voice services are much cheaper, more convenient and more appealing to the end users. Moreover, SMS services continue to decline due to the fact that end users are choosing OTT services that in their view are more convenient and advanced than SMS services.

The most popular bundle in Lithuania is double play combining mobile telephony and mobile internet. It is due to the fact that all three major mobile services providers in Lithuania offer service plans that include both unlimited mobile telephony services and mobile internet with a certain data package. The majority of mobile services' users choose this package due to its functionality and low price. As for the other bundles, the incumbent operator Telia Lietuva, AB, is the largest provider of both double play fixed telephony and fixed internet (98.8% of subscribers as of June 2017), and of triple play fixed telephony, fixed internet and pay-TV (97.3% of subscribers as of June 2017). The double play package fixed internet and pay-tv bundle is becoming more and more popular in Lithuania as a consequence of increased functionality and low prices. This bundle usually includes ultra-fast internet with smart IPTV. As of June 2017, service providers offer this bundle, the biggest of which is Telia Lietuva with 37.5% of subscribers.

b. Mobile market

Mobile market	LT-2016	LT-2017	EU-2017
Market share of market leader	43%	43%	35%
Market share of second largest operator	30%	30%	28%
Number of MNOs	3	3	-
Number of MVNOs	10	12	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

Mobile broadband prices [EUR/PPP]	LT-2016	LT-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€16	€14	€24
Least expensive offer for tablet and laptop (5 GB basket)	€15	€15	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

At the end of 2017, there were 14 mobile telephony providers: 3 MNOs, 4 MVNOs and 7 resellers. In terms of active SIM cards, the combined market share of the three MNOs was 98%: Tele2 around 43%, Telia Lietuva around 30%, and Bitė Lietuva. MVNOs and resellers on the other hand correspond to just 2% of the mobile telephony market in terms of active SIM cards.

Concerning mobile broadband services, at the end of 2017 seven service providers offered mobile broadband only services: four MNOs and three MVNOs. The 3 MNOs are again market leaders. Their market shares in terms of active SIM cards are the following: Tele2 around 34%, Telia Lietuva around 32.1%, Bitė Lietuva around 29.7%. In the market there is only one other MNO that only provides mobile internet services –Lietuvos radijo ir televizijos centras. Its market share in terms of active SIM cards is around 2.2%. Moreover, the combined market share of three the MVNOs are around 1.9%. Accordingly, LTE networks cover more than 97% of Lithuania's territory as of 15 June 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

The rights of use for the 900 MHz and 1.8 GHz bands expired on 31 October 2017. Therefore, the auction for granting the rights for these bands was organised in 2016. The winners of the auction (Bitė Lietuva, Telia Lietuva (former Omnitel) and Tele2) were granted licenses to use these bands from 1 November 2017.

Due to cross-border coordination issues with non-EU countries, Lithuania expects difficulties in repurposing 700 MHz band for WBB: while Lithuania has agreements with the Russian Federation and the Republic of Belarus concerning the use of the 700 MHz band for terrestrial systems, the coordination of WBB with the broadcasting service is outside the scope of these agreements and shall be carried out separately.

Nevertheless, Lithuania intends to adopt a national roadmap for releasing the 700 MHz frequency band no later than 30 June 2018.

Lithuania envisages using the 3400-3800 MHz (the "3.6 GHz") band for future 5G deployment. This part of the spectrum is currently used only partially. The frequency band 24.25-27.5 GHz (the "26 GHz band") is also under consideration.

b. National and EU investment in broadband

The national broadband plan has been implemented in 2017 by carrying out the preparation of investment project of deployment of NGA network in white areas. Moreover, implementation of the NGA network deployment project in rural areas (PRIP-2) has taken place in 2017. The network equipment has been installed, fiber-optic infrastructure has been designed and currently is under construction. Public consultations with all stakeholders including network operators regarding the planned project Development of Next Generation Access Infrastructure took place during the preparation of the investment project. Public consultations included questions regarding areas of planned infrastructure, technological solutions and service tariffs. Moreover, it was agreed that 5G technologies will be taken into consideration while detecting white areas and choosing the most appropriate technologies. As a result, sustainable investments in NGA infrastructure are ongoing with an estimated cost of around 43 million Euros.

c. Implementation of the Broadband Cost Reduction Directive

On 20 January 2017, the Lithuanian authorities notified to the Commission measures to transpose the Broadband Cost Reduction Directive[318] into national law: an amendment to the Law on Electronic Communications No. IX-2135 (named the Law) and the Order of the Director of the Communications Regulatory Authority amending the Order No 1V-978 of the Director of the Communications Regulatory Authority of 14 October 2011 "On the Approval of Rules for Installation, Marking, Supervision and Use of Electronic Communications Infrastructure"(named the Order). The law was adopted by the Lithuanian Parliament on 15 December 2016, published in the Official Gazette of Lithuania on 23 December 2016 and entered into force on 24 December 2016. Its implementing act, the Order, was adopted on 10 January 2017, published in 12 January 2017 and entered into force on 13 January 2017.

The Lithuanian authorities have notified full transposition of the Directive on 9 March 2017, when they also notified already existing relevant national legislation. Without prejudice to further examination of the conformity of the national measures with the requirements of the Directive, the Commission closed the non-communication infringement case against Lithuania on 17 May 2017.

Under Lithuanian legislation in force, RRT will serve both as single information point and as national dispute settlement body. RRT has not received any disputes related to the Broadband Cost Reduction Directive in 2017.

3. Regulatory function

In 2017, the market of call origination on the public communications network provided at a fixed location was deregulated. Moreover, the reviews of the broadcasting transmission services market, to deliver broadcast content to end users, and the market of the facilities to deliver broadcasting transmission services were completed and notified to the Commission.

[318] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

MTR charges were last changed from 1 April 2016 (reduced from 1.04 Eur ct/min to 0.94 Eur ct/min). Also, FTR charges were last set from 1 January 2016 (0.13 Eur ct/min), based on a pure BU LRIC model. All SMP operators apply symmetric TRs to each other, and there were no disputes reported.[319]

Internet access to the majority (almost all) of subscribers is provided via own or rented ducts. It is due to the fact that wholesale access services in Lithuania are not very popular and operators are keen to roll-out their own infrastructure (using only ducts), leading to mainly infrastructure-based competition.

At the end of the second semester of 2017, wholesale accesses were used in Lithuania as follows: Bitstream – 1 862 accesses, LLU – 141 accesses, dark fibre – 3 216 accesses.

Depending on the market, market reviews take 6 to 16 months. Markets are reviewed every 3 years. The Lithuanian NRA is planning to review several markets in 2018[320].

RRT was entrusted with new functions in several areas in 2017: supervision of trust services[321], regulation of the rail transport sector and implementation of broadband deployment cost reduction measures. The draft Law on the Infrastructure Regulatory Council, which intends to set up a multi-sectorial regulator[322], was submitted to the Parliament before the end of 2016, but has not been further proceeded in 2017.

Moreover, new packages of draft laws, which establish a new area of responsibility, were passed in December 2017 in the Parliament (regarding supervision of tariffs (remuneration) for provision of data from public registers/information systems). This new area implies new tasks and puts challenges as to the necessary experience and knowledge in this specific field inside RRT.

Although RRT was given new powers in 2017, the maximum number of RRT employees (including civil servants and employees) working under employment contracts has remained unchanged since 2013. Therefore, in order to fulfil their tasks, some employees are responsible for different areas, such as telecom, rail transport and postal services. RRT is financed from a separate budget ("administrative charges for services provided and works performed by RRT"). The current available budget would allow additional employees to be hired to carry out the new tasks, but RRT cannot employ more staff because of the maximum number of employees set by the government. All these issues raise concerns in the Lithuanian market that RRT has insufficient administrative capacity. Moreover, according to some market players, Lithuania's Law on electronic communications might not contain transparent criteria regarding the appointment of the members of the board that can ensure the

[319] Lithuania plans to start the next analyses of the Fixed Termination Market and of the Mobile Termination Market in the beginning of 2018.

[320] Notably the market for access to the public network at a fixed location for non-residential and residential customers, followed by the market for wholesale central access provided at a fixed location for mass-market products and of the market for wholesale high-quality access provided at a fixed location as well as the fixed and mobile termination markets

[321] Regulation No 910/2014 on electronic identification and trust services for electronic transactions in the internal market.

[322] A multi-sectorial regulator is to be created by merging into a single institution the following regulatory authorities: the Communication Regulatory Authority, National Commission for Energy Control and Prices and the State Energy Inspectorate under the Ministry of Energy.

independence of the national regulatory body. The Commission services are looking into this matter.

Lithuania initiated a discussion regarding the possibility to have "national roaming" in Lithuania. RRT is preparing a "feasibility study" which will be cover various aspects, such as the situation in the mobile market, geographical coverage, international practice (experience of other EU MS), needs and interests of stakeholders, etc. It was planned to have the final version of the study available for the public discussion at the end of January 2018.

4. Consumer matters

In 2017[323], RRT received 134 total consumer complaints, of which 70 were consumer complaints regarding mobile telephone service. The key issues related to billing and tariffs as well as insufficient knowledge and understanding of the contracts.

a. Roaming

Following the introduction of Roam Like at Home[324] (RLAH) in June 2017, Lithuanian subscribers consumed 1.8 times more voice and 4.6 times more data roaming services when travelling in the EU in summer 2017, compared to summer 2016[325]. According to RRT, there have been some cases of confirmed and potential non-compliance with the new roaming rules applicable from 15 June 2017. Some providers offered alternative tariff plans, but RLAH plans with relevant domestic data allowances were not offered. RRT provided several consultations to the providers and requested to change their behaviour. Providers followed the NRA and changed their pricing practice in order to comply with the Roaming Regulation. In one case, the operator informed end-users about a change of their contract without complying to the national rules, as the notification period was too short (information was published two weeks before changes took place, while the national rules oblige the operators to notify their clients at least one month in advance).

For all three Lithuanian MNOs, RRT issued a decision authorising the use of the exceptional sustainability derogation to the roaming rules, which allows them to charge a small extra amount for the roaming phone calls and data. One service provider (MVNO) submitted an application for a sustainability derogation on 7 September 2017. The request was still in the evaluation stage at the time of writing. RRT found that data submitted was inaccurate and asked the provider to correct and submit additional data. RRT has also asked all four roaming service providers (3 MNOs and 1 MVNO) to renew their data for applications of surcharges in order to evaluate the forecasts made before 15 June 2017.

While it is not yet possible to indicate whether domestic prices have increased after 15 June 2017 compared to the situation before 15 June 2017, the tendency observed was that after 15 June 2017 service providers started offering more data services for a higher monthly charge, while allowances for calls and SMS remained the same.

[323] Until the end of October 2017.
[324] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[325] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

The main issues raised by consumers in complaints related to roaming since June 2017 related to Fair Use Policies (FUP), changing tariff plans or contract conditions and the possibility to apply sustainability surcharges by providers.

b. Net neutrality

There are no self-regulatory initiatives in Lithuania. RRT provided a recommendation to the ISPs about the transparency measures established in Article 4(1) of Regulation 2015/2120/EU[326] to be included in the contracts. The recommendations were prepared in line with BEREC guidelines, and published relevant press releases, including information to the end-user on the expected conditions.

RRT investigated one end-user complaint regarding the violation of net neutrality requirements, namely unjustified traffic management activities of an ISP. RRT issued the order for this ISP to finish its unjustified traffic management practice.

RRT has its own QoS evaluation tools, which are considered "certified" (approved) as reliable. One of the QoS evaluation tools is the modified application matuok.lt. It enables IAS end-users to measure actual download/upload speeds and other QoS parameters, and to compare obtained results with contractual information (e.g. maximum normally available/advertised/minimum speeds). Another QoS evaluation tool, the website matavimai.rrt.lt, provides mobile IAS end-users with information about actually achieved download speeds in the networks of all four major mobile IAS operators in a graphical manner (on a map). This tool enables end-users to compare mobile IAS quality of these operators in particular territories, towns, streets, etc.

c. 112

Since 2017, the caller location data is provided to the Emergency Response Centre by using Cell ID Timing Advance or Cell ID Round Trip Time methods. These methods allow calculating the distance between the caller and the base station, and are expected to help to identify the location of the caller more accurately.

From 1 October 2017, operators are ready to receive an e-Call call and transfer all relevant data to the Emergency Response Centre. All technical issues were resolved by cooperation of operators and the Emergency Response Centre.

Handset-based caller location solutions are deployed, as Android Emergency Location Service is in operation since 2 November 2016.[327] Smartphone app GPIS112 is in use for text chat. A new video chat app is planned to be finalised in 2018. Lithuania took some measures in 2017 to raise awareness of 112, such as video clips, a 3D virtual tour, and dedicated days for lessons for pupils in schools.

[326] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[327] Accuracy percentage ≤50 meters around 60%, accuracy percentage ≤100 meters around 64% of all delivered locations (average accuracy data is based on measurements from 2 November 2016 till 30 September 2017).

d. Universal service

There were no changes concerning the scope of universal services[328] from January 2017 until October 2017. Public payphones and directory enquiry services are in the scope of universal service obligations. In January 2017, the universal service provider has proposed to withdraw payphone obligations from the scope of the universal services. There were several meetings with the universal service provider regarding this matter. RRT is investigating this issue.

Broadband is not included in the scope of the universal services. Universal service obligation in force requires ensuring efficient internet access that shall not be lower than 144 kbps.

5. Conclusion

Concerns expressed by the Lithuanian market players that RRT has insufficient administrative capacity remained. Moreover, according to some market players, Lithuania's legislation might not fully ensure the independence of the national regulatory body. The Commission services are looking into the matter.

Lithuania did not develop a strategy regarding the usage of the 700 MHz band and sub-700 MHz band, due to restrictions stemming from cross-border coordination issues with non-EU countries.

Lithuania needs to intensify public investment in fibre networks alongside private investment in order to develop the next generation access infrastructure in white areas. Moreover, demand-side measures might be necessary to support fixed and mobile broadband take-up and use of internet.

[328] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

LUXEMBOURG

Market developments

1. Competitive environment

Revenues of the incumbent (POST) are increasing while revenues of alternative operators are decreasing. Competition is stronger in mobile than in fixed services. The fixed market is more dominated by the incumbent which is 100% state owned and relatively small in size compared to other European telecoms operators. According to operators, the price level for fixed services is rather high compared to France and Belgium. The price level for mobile services is lower than in Germany and Belgium.

a. Fixed Markets

Coverage	LU-2016	LU-2017	EU-2017
Fixed broadband coverage (total)	>99.5%	>99.5%	97%
Fixed broadband coverage (rural)	>99.5%	>99.5%	92%
Fixed NGA coverage (total)	94%	95%	80%
Fixed NGA coverage (rural)	94%	95%	47%
Ultrafast coverage (total)	no data	87%	58%
4G coverage (average of operators)	95%	98%	91%

Source: Broadband Coverage Study (IHS and Point Topic for Data as of October 2016 and October 2017.

Fixed broadband market shares	LU-2016	LU-2017	EU-2017
Incumbent market share in fixed broadband	66.4%	66.1%	40.3%
Technology market shares			
DSL	70.0%	65.9%	64.2%
Cable	11.1%	10.8%	19.4%
FTTH/B	18.6%	22.6%	12.9%
Other	0.4%	0.7%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	LU-2016	LU-2017	EU-2017
Own network	-	-	0.5%
Full LLU	73.0%	74.4%	72.8%
Shared Access	-	-	4.1%
Bitstream	1.2%	25.6%[329]	14.7%
Resale	25.8%	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

While the total coverage[330] of fixed broadband networks remains at >99.5% of households[331], slightly above the EU average (97% total, 92% rural), fast broadband networks capable of

[329] Figures for bitstream and Resale combined in 2017

[330] including fixed, mobile and satellite networks

[331] Uptake of fixed broadband services stands at 96%, the EU average is 74%. 49% of all subscription are for fast broadband versus 40% one year ago. These figures refer to subscription for 30 Mbps and include fixed and mobile broadband.

providing at least 30 Mbps (next generation access (NGA)) are available to 95% of homes in both rural and urban areas. This is significantly above the EU average (80% total, 47% rural). As fibre roll-out continues, fibre-to-the-premises (FTTP) coverage stands at above 60% now. Residential customers increasingly buy products with download speeds of 100Mbps or more. The 'Institut Luxembourgeois de Régulation' (ILR) expects that this will soon become the standard for residential fixed broadband access in Luxembourg[332] and considers that this evolution is due to providers offering almost exclusively products of 30 Mbps download and due to demand for higher data transport speeds and volumes from customers. The fixed broadband price index in the digital economy and society Index (DESI)[333] fell by one index point in 2017, i.e. it decreased from 89 to 88[334].

Fixed broadband prices	LU-2016	LU-2017	EU-2017
Fixed broadband price index [values between 0-100]	89	88	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

POST intends to pursue a more "opportunity-driven" approach for the remaining fibre rollout areas and only roll out if there are synergies with other infrastructure providers. This results i.a. from the fact that communes in Luxembourg typically would not allow for ten years to re-open the streets once a major infrastructure rollout has taken place. POST's competitors are concerned about the lack of predictability for further FTTH rollout and absence of an update of the government broadband policy strategy. Luxembourg may not meet its national 2020 target of one Gbit/second broadband capacity available for all households.

b. Mobile market

Mobile market	LU-2016	LU-2017	EU-2017
Market share of market leader	50%	47%	35%
Market share of second largest operator	35%	35%	28%
Number of MNOs	3	3	not available
Number of MVNOs	3	4	not available
Market share of MVNO (SIM cards)	not available	not available	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

For the first time, the number of mobile subscriptions has decreased (897 000 SIM cards, including M2M SIM cards in 2016 compared to 906 000 SIM cards in 2015[335]). This is mainly due to the fact that there is no longer the possibility of anonymous use of SIM cards. Rules and systems for registration of prepaid subscribers are substantially different in Luxembourg and in Belgium. According to some players in Luxembourg, it would be good if there would be a harmonised rule as Asian player are willing to buy domestic SIM cards e.g. for tourists or employees working in Europe and in the United Kingdom or the Netherlands registration would not be necessary. According to them, this leads to distortion of competition

[332] See https://assets.ilr.lu/telecom/Documents/ILRLU-1461723625-643.pdf

[333] See https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2017 [to be updated with 2018 link]

[334] The fixed broadband Price index weights the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30Mbps, 30-100 Mbps and +100Mbps-. This indicator presents values from 0 to 100 (which should not be read as prices) and the higher the values, the better the country performs in terms of price.

[335] These are the latest available figures

as players in Luxembourg and Belgium cannot be active on this market. At the same time there had been an increase in postpaid cards (+7.5%) and a sharp increase in M2M cards (+50.8%). In terms of number of subscriptions, the market share of POST stands at 43.7%. The uptake of mobile broadband services increased in 2017. It stands at 126 subscriptions per 100 people, compared to 116 one year ago and an EU average in 2017 of 90 subscriptions per 100 people. As regards 4G, Luxembourg has a coverage rate of 98 %, significantly above the EU average of 91%.

One operator (Join) offers one SIM card with two numbers, one in BE, one in LU. For such offers agreement from the regulator in the host country (BE) is necessary. In addition, service providers need a host MNO (in BE) willing to accept. In technical terms it is necessary that foreign IMSIs are recognised as national IMSIs. Similar deals with DE, NL and FR could not be established mainly as there was no interest from MNOs in these countries, but also because of regulatory hurdles.

As Luxembourg has a small, open economy, many cross-border providers are active in both the country itself and its neighbours.

There is a high consumer demand for bundled services, which are offered by all providers. For several years now the volume of mobile minutes has been larger than that of fixed minutes, while the number of fixed subscriptions has remained stable. Nevertheless, fixed telephony is included 'free of charge' in most subscriber packages. However, many services are no longer available as stand-alone services.

All major operators include TV access services in their bundles, as these are important for increasing revenue. Luxembourg has a very international population, and supplying specific content is very difficult, as providers can only deliver low volumes, with little domestic content being supplied.

Mobile broadband prices	LU-2016	LU-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€19	€21	€24
Least expensive offer for tablet and laptop (5 GB basket)	€13	€13	€17

Source: Mobile Broadband Price Study (Van Dijk). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February 2017.

Mobile broadband prices as set out in the table above for handset offers have increased significantly within one year; they are below the EU average. The prices for tablet and laptop offers have remained stable; they are below the EU average.

Regulatory developments

2. Measures supporting deployment and investment in high-speed networks

a. Spectrum

In Luxembourg, 50.46% of the spectrum harmonised at EU level for wireless broadband has been assigned. In absolute terms this accounts for 550 MHz. This is due to a lack of demand and immediate interest from operators. The harmonised spectrum has however been made available and it can be assigned to operators once they express a need.

Four companies (POST, Orange, Tango and MTX Connect) have been assigned spectrum in the 2 GHz band. The 700 MHz spectrum is not used in Luxembourg and will be made available by the end of 2018/beginning 2019, when its use for broadcasting in neighbouring EU countries (France, Germany and Belgium) comes to an end. The 800 MHz spectrum is in use, while operation in the 2.6 GHz just started. For the 3.4 to 3.8 GHz and 1.5 GHz (1452-1492 MHz) bands, previous consultations, initiated in 2015 and 2016 respectively, had found that there was no need for immediate use. Further public consultations on these two bands are expected to be launched in the near future[336]. If an operator was to express interest there would be scope to launch a new consultation at any time.

As to 5G, operators and also ILR pointed to the significant challenges as regards investment in network infrastructure. ILR and BIPT have launched a joint study on spectrum sharing for 5G[337]. The study concluded[338] that the current scepticism of operators with regard to spectrum sharing in 2G, 3G and 4G could potentially be overcome in the area of 5G, leading operators to call for extending the possibilities provided by the current legislative framework. Several technical options for spectrum sharing are analysed.

b. EU and National investments in broadband

Luxembourg is well on track to achieve the broadband targets at EU level. While Luxembourg is sticking to its aim of having everyone connected by the end of 2020 with coverage of 1Gbit/sec, the country relies mainly on a market-driven broadband roll-out based on competition among operators. Accordingly, there are no plans to use public financing.

No broadband projects are being financed under the Connecting Europe Facility and the Juncker plan. Nor are there any allocations from the European Structural and Investment Fund to broadband, according to operational programmes[339].

c. Implementation of the Broadband Cost Reduction Directive

As regards completeness of transposition, infringement proceedings were closed against Luxembourg in October 2017, as the country had not notified to the Commission the full transposition of the Broadband Cost Reduction Directive[340] (BB CRD), due by 1 January 2016. The law implementing the Cost Reduction Directive has been published on 4 April 2017. As to conformity of transposition further information from market players would be required whether legal provisions and administrative practice in Luxembourg would be considered sufficient to ensure that permits for civil works are granted or refused within four months from the date of the receipt of a complete permit request, while taking into account that Luxembourg may provide that, exceptionally, in duly justified cases, that deadline may be extended.

3. Regulatory function

[336] A recently adopted EC Implementation Decision for L-Band extension bands (1427-1452MHz/1492-1518MHz) requests Member States to launch the public consultation before October 2018. A public consultation on C-Band can be expected to follow after L-Band consultation.
[337] The 700 MHz, the 3.6 GHz and the 26 GHz bands. See the RSPG Second Opinion on 5G networks, adopted on 30 January 2018.
[338] See https://assets.ilr.lu/frequences/Documents/ILRLU-1723895916-261.pdf
[339] See http://ec.europa.eu/regional_policy/en/atlas/programmes .
[340] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

Luxembourg complies with the 2014 Recommendation on Relevant Markets. It has regulations concerning all the markets listed in the 2014 Recommendation.

For both fixed and mobile termination rates, Luxembourg uses pure bottom-up long-run incremental cost (BU — LRIC) cost models for fixing maximum price ceilings.

The Recommendation on non-discrimination and costing methodologies has been fully taken into account in the latest market analyses. These were carried out on markets 4/2007 (wholesale (physical) network infrastructure access (including fully unbundled access) at a fixed location)[341] and 5/2007 (wholesale broadband access[342]) as described in the 2007 Recommendation on relevant markets. This included the 'equivalence of input' principle, the key performance indicators, and the technical and economic replicability tests. The ILR has also published the key performance indicators (KPIs) on these markets.[343]

The ILR has issued decisions on the market definition and the price level for mobile termination (mobile termination rates, market 02/2014).

Currently the ILR is running the analyses under the 2014 Recommendation on relevant markets. It has launched qualitative and quantitative questionnaires on markets 3a/2014 (wholesale local access) and 3b/2014 (wholesale central access), in particular in order to collect data to update it cost model for the fixed network.

The ILR has, after public consultation, adapted the minimum technical and operational requirements for IP interconnection.

4. Consumer matters

a. Roaming

The rules on sanctions have been notified in May/June 2017. The ILR is empowered to fine operators that fail to comply with the Roaming Regulation under the general sanction scheme of the Luxembourg Electronic Communications Code (Article 83 of the Loi du 27 février 2011 sur les réseaux et les services de communications électroniques') by an amendment (Projet de loi 7052 'portant modification de la loi du 27 février 2011 sur les réseaux et les services de communications électroniques'). The maximum amount of fines for failures to comply with the Roaming Regulation would be also one million Euros. Under Article 83 of the Loi du 27 février 2011 the ILR has already the competence to impose sanctions for violations related to the regulatory framework for electronic communications networks and services of up to one million Euros.

[341] A price cap calculated with the ILR BU-LRIC models for the copper unbundling (copper anchor) and the price for fibre unbundling has to be set by the incumbent according to an economic replicability test.
[342] This market comprises non-physical or virtual network access including 'bit-stream' access at a fixed location.
[343] Already back in 2015, ILR had adopted the implementing measures for the regulatory remedies imposed in the markets mentioned above, notifying the BU LRIC+ cost calculation method for services provided over the copper network and derived price caps to be imposed for access to civil engineering, local loop unbundling and sub-loop unbundling, and for access to the public telephone network at a fixed location.

ILR monitoring work regarding the implementation of Roam Like at Home[344] (RLAH) significantly increased in 2017. There were intense discussions with operators on compliance. National-only offers without roaming have emerged which did not exist previously. Metered offers almost disappeared. Monitoring contractual issues has been a significant burden for ILR. Fair use policy (FUP) measures have not been implemented to a large extent. Operators have not asked for derogations from RLAH. The derogation process is considered to be too heavy and therefore may not match the needs of operators in LU. Operators had a very long transition period; changes were and could be anticipated. Nevertheless the impact on operators was significant as approximately 20% of turnover of mobile operators was related to roaming services in the past. According to ILR the implementation of the lower mobile termination rates (MTRs) in conjunction with RLAH was also a major burden as operators' were affected already negatively by MTR regulation.

Following the introduction of RLAH in June 2017, subscribers in Luxembourg consumed 1.4 times more voice and 5.7 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[345]

b. Net neutrality

On net neutrality there were no ongoing investigations by the ILR. The ILR has published a report on its activities.[346] The ILR has focussed on awareness raising with notified operators and has established the requirement for a measurement tool and launched the public procurement procedure for such a tool which is considered to be important for users to ensure their rights with respect to net neutrality are respected.

The amendment (Loi 7052 'portant modification de la loi du 27 février 2011 sur les réseaux et les services de communications électroniques')[347] gives ILR the competence to impose penalties provided for in Regulation (EU) 2015/2120[348] (on open internet access); the maximum amount of fines is one million Euros.

c. 112

In Luxembourg, where 112 is not the single emergency number, more than 50% of the emergency calls were initiated by dialling 112. SMS as an alternative means of access to the 113 emergency number is available in Luxembourg. This is of particular importance for disabled end-users. It is possible to make EU roaming calls to 112, and the caller's location is made available in such cases. 96% of people in Luxembourg know 112 is the national emergency number, while 80% know it also applies elsewhere in the EU.

d. Universal service

[344] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[345] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018
[346] See https://assets.ilr.lu/telecom/Documents/ILRLU-1461723625-616.pdf
[347] This is the same law (Loi 7052) referred to in the previous section on roaming.
[348] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

Luxembourg currently has no universal service obligations[349] in place, as connectivity services are provided on a voluntary basis by the incumbent operator, POST Luxembourg.

5. Conclusion

While Luxembourg is well on track to achieve the broadband targets at EU-level, the likelihood that the more ambitious targets defined by national policy will not be achieved is increasing. While continuing the current market-driven approach it could nevertheless be considered how future policy could encourage more predictability of further FTTH rollout which would be relevant both for fixed ultrafast broadband coverage and for 5G.

Operators and also ILR are aware of the significant challenges as regards investment in 5G network infrastructure. A recent study concludes that operators might call for extending the possibilities for spectrum sharing for 5G provided by the current legislative framework.

The impact of the introduction of Roam Like At Home on operators was significant due to the high proportion of turnover related to roaming services in Luxembourg. The derogation process is considered to be too burdensome to implement and therefore not matching the needs of mainly small operators active in Luxembourg.

[349] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

MALTA

Market developments

1. Competitive environment

There are three major operators in Malta: GO plc, Melita Ltd and Vodafone Malta Ltd.

GO and Melita have a nationwide access network infrastructure and are competing at par in the provision of a whole range of electronic communications services ("ECS"), including fixed and mobile telephony, fixed broadband and pay TV. These services are offered either on a stand-alone basis or as part of a bundle. GO and Melita also target the business sector by offering tailor-made products and solutions, with a line-up ranging from fixed telephony to leased lines.

Vodafone Malta offers a mix of electronic communications services, including mobile telephony, fixed broadband and fixed telephony. In the case of fixed broadband and telephony services, Vodafone only offers bundled subscriptions combining the relevant products. Vodafone does not offer pay TV services.

There are other small-scale service providers that are active in the provision of ECS. Ozone Malta Ltd and Vanilla Telecoms offer several ECS, related to fixed broadband and fixed telephony services only. The coverage of their infrastructure and their commercial presence is however limited to specific locations of the national territory and their market share is also limited.

There are also two active resellers of ECS in Malta. Redtouch Fone is a reseller of mobile telephony services, whilst Space Hellas is a reseller of leased lines. SIS Ltd, which was commercially active in an exclusive private gated community, has ceased operations in the first quarter of the year.

The number of end-users opting for the bundled subscription of electronic communications services has consistently increased year-on-year. Triple-play subscriptions (specifically those including fixed telephony, fixed broadband and pay TV) are the most common in Malta, although dual-play subscriptions combining fixed telephony and fixed broadband are also increasing in popularity. End-users still prefer purchasing mobile telephony on a stand-alone basis, given the personal nature of the service

To date, the Maltese National Regulatory Authority ("MCA") has not regulated bundled offers.

In May 2017, Vodafone Group Plc announced its intention to merge Vodafone Malta Ltd with Melita Ltd, in order to create a fully integrated communications company. The parties cooperated with the Maltese Competition Authority (the “MCCAA”) in order to obtain approval for the transaction. However, in December 2017 the parties concluded that they were unable to satisfy the MCCAA’s requirements and consequently decided to terminate the transaction and to withdraw the notification of concentration.

a. Fixed Markets

Coverage	MT-2016	MT-2017	EU-2017
Fixed broadband coverage (total)	100%	100%	97%
Fixed broadband coverage (rural)	100%	100%	92%
Fixed NGA coverage (total)	100%	100%	80%
Fixed NGA coverage (rural)	100%	100%	47%
Ultrafast coverage (total)	no data	100%	58%
4G coverage (average of operators)	99%	99%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The broadband sector is one of the most positively performing sectors, with growth recorded across most indicators. The overall number of subscriptions keeps increasing year-on-year, particularly for products offering fast and ultrafast speeds[350].

Service providers invested significantly over the years in order to roll-out high-speed fixed and wireless broadband networks on a nationwide scale.

Fixed broadband market shares	MT-2016	MT-2017	EU-2017
Incumbent market share in fixed broadband	49.6%	49.1%	40.3%
Technology market shares			
DSL	45.2%	42.5%	64.2%
Cable	48.0%	47.2%	19.4%
FTTH/B	4.4%	6.6%	12.9%
Other	2.3%	3.7%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

GO operates a nationwide copper network, which has been upgraded to FTTC over the majority of areas of the national territory, bringing about improvements to the services offered (up to 70 Mbps) where such upgrades have been carried out. GO is gradually deploying an FTTH network, now available in selected locations with FTTH's subscribers benefiting from speeds of up to 500 Mbps. In some areas, a 1 Gbps download speed is being offered by GO.

Melita provides broadband connections with download speeds of up to 250 Mbps (upload 20Mbps) over its cable DOCSIS 3.1 network infrastructure on a nationwide scale and download speeds of up to 1 Gbps in limited areas. Effectively, Melita has upgraded its entire existing broadband customer base to a minimum of 30 Mbps download speed in 2016. Melita also provides its subscribers with access to high-speed Wi-Fi hotspots in main public areas and home modems that have been re-programmed to provide mobile data coverage.

The above-mentioned two operators between them enjoy 96% market share, split almost evenly between them. Other operators, namely Vodafone, account for the remaining market share. Vodafone offers a fixed wireless broadband product, bundled with fixed telephony, to residential and business customers. Other fixed wireless broadband products are offered by Vanilla Telecoms and Ozone Malta, but availability of the service by these two operators is very limited to specific locations covered by the relevant wireless access network infrastructures.

New entrants' DSL subscriptions by type of access (VDSL excluded)	MT-2016	MT-2017	EU-2017
Own network	100%	100%	0.5%

[350] The number of subscriptions supporting download speeds of at least 100 Mbps was up by 25,729 in the 12-month period ending December 2017 (data provided by MCA).

Full LLU	-	-	72.8%
Shared Access	-	-	4.1%
Bitstream	-	-	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

As to the broadband take-up, the majority of broadband subscriptions have now a download speed of 30 Mbps or more. More significantly, 20% of the subscriber base at the end of 2017 had access to at least 100 Mbps download speed, up from just 1.4% two years earlier. This change in the customer profile for the sector is mainly attributable to improved rates per Mbps of download, take-up of bundled subscriptions with discounts, and service providers notifying their clients that some legacy products were being withdrawn and eventually leading customers to migrate to connections supporting faster download speeds of 30 Mbps or more. The rise in the number of fixed broadband subscriptions was reflected in a higher fixed broadband penetration rate.

Fixed broadband prices	MT-2016	MT-2017	EU-2017
Fixed broadband price index [values between 0-100]	-	-	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The Maltese fixed telephony market is characterised by the presence of two main operators: GO and Melita, that remain the largest operators in terms of subscribers. At the end of 2017, GO had a market share of 61%, whilst Melita had a market share of 36%. The combined market share of other service providers stood at 3.0%, the latter share mainly accounted for by Vodafone Malta. The latter has seen a rapid rise in take-up over the last year, in particular thanks to its bundle offer combining fixed telephony and a 30 Mbps download connection. Two recent developments relate to SIS Ltd. and Ozone Malta Ltd. The former ceased operations in the first quarter of 2017, whilst the latter notified the MCA that it no longer uses the WLR and CS/CPS solution offered by GO in order to offer fixed telephony services. Ozone Malta is currently providing fixed telephony services only over its wireless access network infrastructure.

The number of fixed telephony subscriptions at the end of 2017 was higher than reported in 2016, which indicates that end-users still value having a fixed line connection at home or at their business premises. However usage of the service continues to decrease, mainly as a result of fixed-to-mobile substitution. A notable change in the fixed telephony subscriber base is the increase in post-paid subscriptions, with service providers enhancing their efforts to switch end-users from pre-paid to post-paid plans. An additional factor contributing to these developments is the increasing proportion of end-users purchasing the fixed telephony service in a bundled subscription.

b. Mobile market

Mobile market	MT-2016	MT-2017	EU-2017
Market share of market leader	45%	44%	35%
Market share of second largest operator	37%	37%	28%
Number of MNOs	3	3	-
Number of MVNOs	2	2	-
Market share of MVNO (SIM cards)	2%	1%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

There are five authorised undertakings providing retail mobile services in Malta, three fully-fledged mobile network operators (MNOs), each with its own infrastructure, and two resellers marketing Vodafone's offers under a different brand name.

In the mobile telephony sector both subscribers' number and traffic volumes continued to rise at a steady pace. Mobile data consumption has also witnessed growth in terms of active usage among end-users.

Subscriptions to pre-paid plans remain the most popular amongst end-users, although the growth rate in the number of post-paid subscriptions by far exceeded the growth rate in the number of pre-paid subscriptions during the timeframe under review. Smartphone subsidies, higher data caps and better call and SMS allowances by operators continue to attract subscribers towards post-paid plans.

The increase in the number of mobile subscriptions ultimately led to an increase in the mobile penetration rate.

Mobile telephony has further consolidated its position as the most commonly used form of voice communication in Malta, with traffic volumes rising rapidly year-on-year.

Mobile broadband prices [EUR/PPP]	MT-2016	MT-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€65	€33	€24
Least expensive offer for tablet and laptop (5 GB basket)	€12	€11	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

In Malta prices for handsets have significantly decreased in the last year but are still above the average EU level (€33 versus €24) whereas the least expensive offers for tablet and laptop (5 GB basket) are cheaper (€11 versus the EU average of €17).

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

No new spectrum for wireless mobile broadband has been assigned during 2017.

The NRA regularly updates its National Frequency Plan ("NFP") to reflect, amongst other changes, approaches towards increased flexibility in spectrum use. The NFP, which was last updated in April 2017, indicates which spectrum bands can be traded/leased in Malta.

There were no cases of trading or leasing of spectrum in Malta for the year 2017.

Currently, the MCA has no plans to carry out spectrum refarming in any of the bands used for 2G/3G services.

As to the 2G and 3G networks phase-out, given that rights of use are reported to be technology-neutral, any decision on this matter is expected to be taken directly by the mobile operators, on a purely commercial basis.

With regard to the management of spectrum in the 800 MHz band, the following activities were carried out:

- The MCA facilitated the migration of digital terrestrial television (DTT) services from the 800 MHz band to TV channel 43. The migration of the transmission network was completed in January 2017;

- During 2016-2017, licences were granted to mobile operators for the carriage of non-commercial technical trials in the 800 MHz band. Amongst other things, these trials investigated and resolved cases of harmful interference between LTE and DTT in localised areas. Similar trials continued during the last quarter of 2017;

- In 2016, the MCA published a call for expression of interest and later a call for applications, for the granting of rights of use of radio spectrum in the 800 MHz band. In March 2017, all applicants participating in the 800 MHz band assignment process concurrently withdrew their market interest and this lead to a premature termination of the assignment process;

- In August 2017, the MCA launched a public consultation to review the Decision[351] establishing the methodology for the assignment and management of spectrum in the 800 MHz, 1.8 GHz and the 2.6 GHz bands[352]. A revised MCA Decision was published in early October 2017[353].

- The 800 MHz assignment process was eventually started in August 2017, following a request by GO plc[354].

As to the reallocation of the 700 MHz band to WBB and the use of the sub-700 MHz band, Malta is carrying out coordination activities with the EU (and Noth African) neighbouring countries. Discussions with Italy aimed at reaching agreement started at the beginning of 2017. In December 2017 Italy and Malta signed an agreement on the distribution of radio frequencies, based on the principle of equitable access to radio frequencies. Malta has also concluded 700 MHz coordination negotiations with Greece.

The Maltese Authorities have formally requested the assistance of the RSPG good offices to address a deadlock in discussions with Tunisia and Libya on the coordination of spectrum in the 700 MHz band.

By June 2018, Malta intends to adopt a roadmap for the UHF band between 470-790 MHz. This will indicate how Malta intends to make the 700 MHz band available for the provision of WBB applications and other national specific applications (e.g. public protection and disaster

[351] Decision MCA/D/14-1933.

[352] The new consultation took into account the latest developments in the local mobile industry, particularly those related to a potential market concentration, coupled with the rapid evolvement of technology, as well as the results of the aforesaid technical trials.

[353]MCA Decision on the assignment process for additional spectrum for wireless broadband is available here: https://www.mca.org.mt/consultations-decisions/mca-decision-assignment-process-additional-spectrum-wireless-broadband Finally, in January 2018, MCA published a call for applications for assignment of additional spectrum for wireless broadband in the 800 MHz band, 1800 MHz band and the 2.5 GHz band. See https://www.mca.org.mt/articles/assignment-additional-spectrum-wireless-broadband-call-applications) This call closed on the 19th February 2018. The Authority received three submissions from the parties who had earlier on expressed their interest in acquiring the spectrum. The NRA reported that the related spectrum authorisation will be granted by not later than June 2018.

[354] The procedure concluded on 9 April 2018, with the assignment of the 800 MHz band and the 2.6 GHz band. Spectrum in the 1.8 GHz band remained unsold.

relief, Internet of Things (IoT), wireless audio programme-making and special events) as well as the sub-700 MHz band[355].

Malta reported that cross border DTTV broadcasting interferences issues (in particular with Italy) have been finally solved in 2017. Progress has also been registered with regard to the resolution of FM interference emanating from Italy.

b. National and EU investment in broadband

The Digital Malta Strategy which was articulated in collaboration between the Malta Information Technology Agency (MITA) and the Malta Communication Authority (MCA) was launched in 2014[356].

Preparations to facilitate the deployment of 5G networks in Malta are ongoing. MCA reported that in 2018, as part of the implementation of the national radio spectrum strategy, it will carry out a feasibility study to identify potential interest and material use cases that tap into the potential of next generation 5G technologies and services for the benefit of the Maltese market.

The study is intended to pave the way to 5G tests and pre-commercial trials in 2019, subject to market interest and involving stakeholders across industry, academia and citizens in line with the EU's 5G Action Plan. 5G trials are expected to support the early introduction of services enabled by 5G technologies in Malta.

According to the Maltese national authority there should not be any impediment for Malta to designate and make available spectrum in the 3.6 GHz and 26 GHz bands for 5G technology following adoption of the relevant instruments aimed to harmonise the use of spectrum.

c. Implementation of the Broadband Cost Reduction Directive

The provisions of the Broadband Cost Reduction Directive[357] were implemented into different already existing laws regulating rights of ways and utilities[358].

---

[355] The national roadmap is currently being prepared and the MCA envisages submitting its proposal to Government in the second quarter of 2018. Meanwhile, the MCA is consulting with the relevant stakeholders on the use of spectrum for wireless audio PMSE, as well as for public protection and disaster relief (PPDR) equipment. A wider consultation process with other key stakeholders is expected to be carried out in the first part of 2018. A review of the national radio spectrum management strategy initiated in 2017 will be finalised and implemented by the first half of 2018. A significant element of the strategy will identify emerging spectrum bands capable of supporting new wireless broadband technologies, such as 5G technology, and services that will require radio spectrum in the near future. The strategy will outline the MCA's policy for the renewal of the radio spectrum licences that will expire in the coming years. It will also set out the work required to prepare for the repurposing of the 700 MHz band for mobile broadband services and the work required to make available other bands identified for 5G technology.

[356] The strategy is a policy document that will guide the country to attain the 2020 Vision that 'Malta will prosper as a digitally-enabled nation in all sectors of society For more information on the Digital Malta strategy see https://digitalmalta.org.mt/en/Pages/Home.aspx

[357] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[358] The Utilities and Services (Regulation) Act, Cap. 81, the Electronic Communications (Regulation) Act Cap. 399 and the Malta Communications Act, Cap. 418 and also the making of subsidiary legislation under the Building Regulations Act, Cap.513.

The measures implementing the Broadband Cost Reduction Directive at national level establish that "Transport Malta" acts as Single Information Point.

No disputes have been presented to a Dispute Settlement Body so far.

The competent infrastructure regulator[359] may mandate access to physical telecoms infrastructure (and other utility infrastructures) under the Utilities and Services (Regulation of Certain Works) Act, (Cap 81 of the Laws of Malta) in order to protect the environment, public health, public security or to meet town and country planning objectives.

All three national electronic communications network operators (GO, Vodafone and Melita) have infrastructure sharing agreements in place with Enelmalta plc (the provider of electricity generation and distribution services in Malta) for the use of poles and brackets. Access is normally granted on a national scale or by the local council. Relevant agreements are concluded on a commercial basis.

3. Regulatory function

The MCA currently mandates asymmetric access obligations on GO Plc's physical telecoms infrastructure in relation to Market 4 of the Recommendation on Relevant Markets (2007). More specifically GO is required to (1) provide virtual unbundled local access (VULA) and/or fibre unbundling where fibre to the home (FTTH) fibre to the building (FTTB) are deployed, given that unbundling is currently not feasible for a GPON fibre network and (2) to negotiate access for related facilities including duct access, dark fibre or Ethernet capacity for the purpose of backhaul for local loop and sub-loop unbundling (LLU and SLU).

To date, there are no markets outside the Recommendation on relevant markets that are subject to review.

MCA's Decision on the ex-Market 2 (2007 Recommendation - Wholesale call origination on public fixed telephony networks) was published in March 2016. The decision is currently under appeal and the final decision on the appeal is expected on 13th March 2018.

In 2017 the MCA published its Decision on Market 4 (new Recommendation on wholesale high-quality access provided at a fixed location) that has not been appealed.

As to the Market 2 (new Recommendation -Wholesale voice call termination on individual mobile networks) national consultation and the notification of draft measures are expected for the first quarter of 2018 and the MCA Decision is expected for the second quarter of 2018.

There is currently a delay on the review concerning the Markets 3a and 3b of the 2014 Recommendation on Relevant Markets, following a notification of concentration registered with the National Competition Authority, the MCCAA, whereby Vodafone Malta Ltd and Melita Ltd have outlined their interest to merge their commercial activities in the provision of electronic communications services. As the merger is no longer taking place, the consultation is expected to be published in the third quarter of 2018.

[359] In line with the First Schedule of The Utilities and Services (Regulation of Certain Works) Act, the Authority for Transport in Malta (TM) is the public sector body designated as a "competent infrastructure regulator".

The Fixed Termination Rate of 0.0443c was established from a decision published in December 2012 and was based on the Commission Recommendation's Pure-LRIC approach.

In March 2014, the MCA issued a decision bringing into force a Mobile Termination Rate (MTR) calculated with a bottom-up model based on the Pure-LRIC approach, as laid down in the Commission Recommendation of May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates. The MTR is 0.4045c per minute. Vodafone had filed an appeal before the Administrative Review Tribunal for the revocation of this decision. In January 2018 the Administrative Review Tribunal decided that there were no grounds to uphold Vodafone's request and accordingly, decided in favour of the MCA.

There were no significant legislative developments in 2017 in relation to the powers of the MCA.

Since June 2017, the ministerial responsibility lies with the Parliamentary Secretary for Financial Services, Digital Economy and Innovation, within the Office of the Prime Minister.

4. Consumer matters

During the reporting year the MCA received 215 complaints in total, 97% of which were closed within 20 working days. The complaints lodged with the Authority during this period, related predominantly to quality of service, billing issues, and termination. During this period the Authority also received 473 requests for information[360].

During 2016, the Authority raised the matter of incorrect billing directly with a particular service provider after it resulted that the majority of the complaints concerned the same service provider. On the basis of enforcement actions taken by the MCA, this service provider implemented a number of measures based on the recommendations put forward following the undertaking of an independent audit. These aimed at strengthening the service provider's internal controls to ensure that the billing system is operating effectively. The measures proved to be effective since the number of complaints on incorrect billing decreased significantly since then..

At the end of 2016, the MCA issued a decision titled Broadband QoS framework[361]. After a transitional period of 4 weeks, internet service providers were required to specify the Broadband Access Speed through the use of the 'Typical Speed Range' parameter using the methodology established in the same decision. This requirement is applicable to all services marketed as fixed broadband, irrespective of the technology employed by the provider. The said decision requires that such information is published in any advertising material (including on the service provider's website) and in subscriber contracts. Other aspects of the decision related with the measurement of a number of QoS parameters carried a nine-month transition period, whereby service providers had to comply with the decision.

As part of its consumer awareness function, during the period under review, the MCA launched an educational campaign on the internet[362]. This campaign delved into various

[360] Full report is available here: https://www.mca.org.mt/articles/mca-end-user-half-yearly-statistical-report-january-june-2017?language=en

[361] View decision on Broadband QoS framework here: https://www.mca.org.mt/sites/default/files/decisions/Broadband%20QoS%20Framework%20-%20Extended%20Decision.pdf.

[362] View information on the internet campaign here: https://www.mca.org.mt/internet

aspects, including the factors end-users should consider when subscribing to an internet package, the net neutrality regulations, how to maximise end-users' internet user experience, how the internet works and end-users' rights and remedies when dealing with internet service issues.

a. Roaming

Penalties and sanctions are regulated in the Malta Communications Authority Act (MCAA)[363]. In case of a breach of relevant EU legislation (Regulation 2015/2120/EU)[364], administrative fines not exceeding €350 000 for each infringement and/or €12 000 for each day of non-compliance may be imposed. If the infringement, in MCA's opinion, has '*especially significant effects on the market to the detriment of competitors and/or consumers*' the amount of the fine may be increased up to 5% of the turnover of the undertaking concerned for the year immediately preceding the infringement. This provision[365] came into force on 30 April 2016. No applications for sustainability derogation were received, and no increases in domestic prices before or after the 15 June 2017 were noticed by the NRA.

In addition, through an internal analysis, the MCA observed a change in data roaming usage patterns where both the Maltese travelling abroad and the foreigners visiting Malta increased their usage. During the initial phases of the RLAH, the main issue raised by the consumers concerned incorrect information provided in the transparency message and the late reception, or non-reception, of the message notifying customers about the data cut-off applicable mechanism when travelling outside the EU.

Following the introduction of Roam Like at Home[366] (RLAH) in June 2017, Maltese subscribers consumed 1.1 times more voice and 2.7 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[367].

b. Net neutrality

Penalties and sanctions are regulated in the Malta Communications Authority Act (MCAA)[368]. In case of a breach of EU relevant legislation[369], administrative fines not exceeding €350 000

[363] More precisely, this is regulated under Part VI of the Malta Communications Authority Act (MCAA), Cap. 418 of the Laws of Malta, introduced following the enactment of Act XVIII of 2016, in particular Article 33 of the MCAA.

[364] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[365] Paragraph 7 of Article 20 of Act XVIII of 2016, which effectively provided for the application of Part VI of Cap. 418, came into force on 30 April 2016, as per Legal Notice 172 of 2016.

[366] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[367] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

[368] More precisely, this is regulated under Part VI of the Malta Communications Authority Act (MCAA), Cap. 418 of the Laws of Malta, introduced following the enactment of Act XVIII of 2016, in particular Article 33 of the MCAA.

[369] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and

for each infringement and/or €12 000 for each day of non-compliance may be imposed. If the infringement in the opinion of the MCA has *'especially significant effects on the market to the detriment of competitors and/or consumers*' the amount of the fine may be increased up to 5% of the turnover of the undertaking concerned for the year immediately preceding the infringement. This provision came into force on 30 April 2016[370].

The Malta Communications Authority Act empowers the MCA to regulate matters concerning Regulation (EU) 2015/2120 on Net Neutrality, including enforcement and penalties.

In June 2017 the MCA notified the Commission of the publication of a report specifying the work carried out by the Authority on the implementation of the EU Net Neutrality Regulation[371]. The report covers the period from 30th April 2016 until 30th April 2017 and details the MCA's approach to compliance activities with Regulation 2015/2120 concerning open internet access. Section 4 of the above mentioned report provides a summary of the non-compliance issues identified by the MCA and the remedial actions undertaken.

By way of conclusion in the report the MCA positively noted that there were no major concerns regarding open internet access in Malta. The MCA did not encounter situations which required deviation from the BEREC guidelines.

c. 112

The following functionalities are operational and fully tested through all local network operators: Caller location, Advanced Mobile location and eCall. In 2017 Malta set up a new and segregated main 112 control room, housed at the Police General Headquarters; a secondary setup is located at the Civil Protection Headquarters, serving as primary PSAPs while Health, Army and Police are serving as secondary PSAPs. The competent Ministry also launched a campaign to raise awareness on 112 that includes: TV commercials; Radio and TV talks; Provision of promotional material (leaflets, stationery etc.).

In addition to the above, the system adopted in Malta includes the following measures for the assistance of disabled end-users: SMS availability; mobile app so that apart from text messaging, one can send photos and eventually videos to the 112 PSAP; caller location through FlagMii services; caller location through Cell ID and ELS; eCall service which can be triggered automatically from inside the car or otherwise manually by the car owner or passenger.

5. Conclusion

Malta is a European leader in fast broadband with full coverage of NGA networks. Malta is already taking specific measures and initiatives aimed at encouraging the demand of NGA broadband and improving the digital skills of the population and these measures should be further pursued.

---

users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[370] Paragraph 7 of Article 20 of Act XVIII of 2016, which effectively provided for the application of Part VI of Cap. 418, came into force on 30 April 2016, as per Legal Notice 172 of 2016.

[371] Full report can be retrieved here https://www.mca.org.mt/articles/report-malta-communications-authoritys-work-implementation-eu-net-neutrality-regulation

As far as spectrum management is concerned, Malta has taken concrete steps in coordinating with EU neighbouring Member States and third countries (namely, North African neighbouring countries) in view of making the 700 MHz band available for the provision of WBB services. The procedure for the assignment of the 800 MHz band was completed in the first quarter of 2018, with the assignment of the 800 MHz band and the 2.6 GHz band. Spectrum in the 1.8 GHz band remained unsold.

With regard to 112, significant progress have been made: during 2017 the Maltese Ministry for Home Affairs and National Security, following a collaboration with emergency stakeholders, communication service providers and the Malta Communications Authority, managed to set-up a new 112 system, which was finally launched on the 23rd March 2018.m The new system should ensure, *inter alia*, a more efficient and precise location emergency tracking[372].

[372] See https://www.mca.org.mt/articles/112-emergency-service-%E2%80%93-more-accurate-location-tracking.

THE NETHERLANDS

Market developments

1. Competitive environment

Fixed broadband prices	NL-2016	NL-2017	EU-2017
Fixed broadband price index [values between 0-100]	88	90	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The Dutch telecommunications services market is still dominated by major players KPN and VodafoneZiggo who, according to the Dutch national regulatory authority (ACM), have – in the absence of regulation - joint significant market power (SMP) on the wholesale and retail markets. At the end of 2017 two of the biggest alternative operators (Tele 2 and T-Mobile) have agreed on a merger.[373] Moreover, the new operator NLE has entered the market, which combines energy services with triple play offers that will include mobile services in the future.

In recent years there is a growing demand for quadruple play packages (fixed mobile) which grew from 10% to 20% within a year. Other popular bundles are fixed broadband/cable TV and fixed broadband and/or fixed voice. Broadband only market services are in decline due to the growth of triple play and quadruple play bundles. Bundled services are becoming more prevalent each quarter. In Q1 2017, only 10% of the fixed internet connections was not sold as part of a bundle. Triple play bundles constitute still the majority of all bundles, but quad play bundles are growing fast and currently, there are three market players offering quad play services.

ACM suspects that bundled services (especially quad play) make the market less transparent and reduce churn. Also, mobile only operators who rely on fixed access to offer quad play may not be able to compete in the long run. ACM expects that the majority of the mobile market will still consist of "mobile only" in the coming 5 years and it will keep monitoring the impact of bundled offers on the mobile and fixed markets.

Most of the content in the market is available to all players, with the exception of HBO to which VodafoneZiggo has the exclusive rights. KPN has introduced its own exclusive content: KPN Presenteert, which is a platform with music, documentaries and series of KPNs own production. These (exclusive) offers do not seem to have a significant effect on market shares.

In the business market the market share of the incumbent (KPN) has been stable (around 55%) in the last two years. Furthermore, several very small operators (like QBIZZ and TrenT) and one large operator (Eurofiber) are rolling out FttO networks to business parks, utilities, universities, education and health-care organisations.

[373] The merger will be most likely notified to the European commission in the coming months.

So far, there is very little evidence for fixed to mobile broadband substitution. The number of fixed internet connections is not declining (instead it is slowly increasing). In preparation for the wholesale fixed access decision, ACM's own research showed that the large majority of users would not substitute a fixed connection with mobile. However, fixed to mobile voice substitution is more widespread.

The number of fixed voice connections has slowly declined over the years, from around 7.5 million in 2006, to around 6 million in 2017. The fixed telephony connection is offered (almost) for free with certain triple play packages, which explains the relatively high number of connections.

a. Fixed Markets

Fixed broadband market shares	NL-2016	NL-2017	EU-2017
Incumbent market share in fixed broadband	41.4%	41.4%	40.3%
Technology market shares			
DSL	42.7%	38.7%	64.2%
Cable	44.1%	45.1%	19.4%
FTTH/B	13.1%	14.9%	12.9%
Other	-	1.3%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Currently there are around 8.4 million households and business locations in the Netherlands. On the KPN-network 2.2 million households are connected by FttH; around 130 000 business locations are on- or near-net (<250m) the FttO-network; 3.5 million households and businesses are connected by FttC; and the other 2.7 million locations are connected from the central office (copper only). The cable companies (VodafoneZiggo, CIF, COGAS, and Delta) cover 7.6 million households and businesses with DOCSIS 3.0 or higher. Other operators have rolled out their own FttH-network towards 300 000 households.

Regarding fixed market developments M7 took over Fiber, KPN took over Solcon, and Vodafone and Ziggo started their joint venture under the name VodafoneZiggo.

Nearly 350 000 addresses in rural areas have only copper access with lower speeds (below 10 Mbps). Virtual Unbundled Local Access (VULA) is growing and therefore access prices are declining. In some rural areas with poor fixed-line broadband coverage MNOs offer LTE services as a fixed broadband replacement.

New entrants' DSL subscriptions by type of access (VDSL excluded)	NL-2016	NL-2017	EU-2017
Own network	-	-	0.5%
Full LLU	65.9%	64.5%	72.8%
Shared Access	3.3%	2.8%	4.1%
Bitstream	30.7%	32.7%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Currently, 74% of the households and business have a fixed Internet subscription of 30 Mbps or higher with their Internet provider while 98% of the households can get a fixed Internet connection of 30 Mbps or higher and 91% of the companies have access to at least 30 Mbps.

Currently, 32% of the households and business have an Internet subscription of 100 Mbps or higher with their Internet provider while around 97% of the households and business can get an Internet connection of 100 Mbps or higher.

Coverage	NL-2016	NL-2017	EU-2017
Fixed broadband coverage (total)	99.5%	99.5%	97%
Fixed broadband coverage (rural)	99.5%	99.5%	92%
Fixed NGA coverage (total)	98%	98%	80%
Fixed NGA coverage (rural)	98%	98%	47%
Ultrafast coverage (total)	no data	97%	58%
4G coverage (average of operators)	91%	100%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The As regards broadband coverage, the Netherlands has already achieved the DAE goals of 2020 and the ACM expects that by 2020 more than 50% of the households and businesses will have a subscription of 100 Mbps of higher. Applications like virtual reality and other video related services are a big driver for BB speeds of 100 Mbps and above. Moreover, applications like precision farming in agriculture or E-health can lead to a surge in demand.

b. Mobile market

Mobile market	NL-2016	NL-2017	EU-2017
Market share of market leader	36%	40%	35%
Market share of second largest operator	26%	21%	28%
Number of MNOs	4	4	-
Number of MVNOs	86	73	-
Market share of MVNO (SIM cards)	19%	20%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

2017 has been a difficult year for mobile only operators since the mobile market is mature and competitive and some additional pressure on MNOs came from new EU roaming regulation. MNOs have started to join with banks to launch an m-payments system.

Mobile broadband prices [EUR/PPP]	NL-2016	NL-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€28	€19	€24
Least expensive offer for tablet and laptop (5 GB basket)	€22	€20	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

In Groningen there is a 5G pilot which is developing several use cases for applications on themes of Agriculture, Care, Energy, Traffic & logistics, and Living environment.[374]

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

[374] https://www.5groningen.nl

Multiple MNOs have started the (partial) phasing out of 3G and have started refarming such spectrum for 4G. For example, T-Mobile has started using a bigger portion of the 2 GHz spectrum for 4G at the expense of 3G. The Ministry of Economic Affairs held a public consultation on the Mobile Communication Memorandum 2017 which provides information on upcoming spectrum awards. One of the elements is a roadmap that outlines which spectrum bands for mobile communications will be awarded and when. The memorandum contains, for example, a general policy objective pursued with the 2019 and subsequent auctions, information about anticipated spectrum caps and information about license conditions (including coverage and usage conditions). The intention is to provide transparency to the stakeholders and to give investment certainty.

The 5G licences in the 700 MHz-band will be most likely auctioned in the second half of 2019 together with the L-band (1500 MHz) and the 2 GHz-band. The potential auction model and coverage requirements (98% geographic coverage per municipality) have stirred criticism by some operators. The auction will not include the 3.6 GHz band as it is currently used for military purposes and by verticals. Furthermore, there are no additional annual fees for the use of spectrum for the winner of the auction since the license holders pay later only an administrative fee.

All licenses are technology neutral and license holders can use any band for 5G. The bands available for nationwide WBB are the 800 MHz, 900 MHz, 1.8 GHz, 2 GHz, 2.6 GHz bands. The 26 GHz band is likely the first band available for 5G above 6 GHz.

Furthermore, it is worth mentioning a Knowledge Platform on Electromagnetic Fields and Health regarding the EMF (Electromagnetic fields).[375] The Knowledge Platform provides clarity on public interest questions and concerns about possible health effects related to EMF. Because of the social organisations involved, the Knowledge Platform is well-informed about concerns, enabling it to comprehensibly present scientific knowledge, while taking the various sensitivities into account, thereby contributing to social debate by providing clarity.

Another good practice in this area is register of antennas on which locations various types of telecommunication antennas in a form of a map are visible to the public.[376]

b. National and EU investment in broadband

In the last two years KPN decreased the out roll of its Fiber to the Home (FttH) network from 300 000 additional households in 2014 to 60 000 additional households in 2016, while at the same time KPN has invested in the rollout of Fiber to the Curb (FttC) for delivering (Vectored) VDSL towards end-users.

In the last three years the investments in fixed networks dropped from around €1.70 billion in 2014 to €1.15 billion in 2016. The main reason for the incumbent to stop the rollout of FttH is that rollout costs for FttC are lower than FttH, and that the merger of Ziggo and UPC lead to investment spent on integration rather than on the deployment of fixed networks.

T-Mobile launched Europe's first commercial NarrowBand IoT (NB-IoT) end-to-end system in October 2016 using 900MHz spectrum. NB-IoT is a Low Power Wide Area Network radio

[375] http://www.kennisplatform.nl/
[376] http://www.antenneregister.nl/Html5Viewer_Antenneregister/Index.html?viewer=antenneregister

technology standard developed to enable a wide range of devices and services to be connected using cellular telecommunications bands.

There is no national broadband plan and/or funding scheme to connect those households that do not have a fast internet connection. Dutch authorities support regional and local authorities to create the right conditions for a market player to roll out fast internet without public funding, by sharing knowledge and best practices (Broadband Expertise Platform, web portal[377]). If this does not succeed, then public funding can be considered by authorities. To support local authorities, Dutch authorities are developing a state aid framework they can use. In this division of responsibilities there has been much dynamics in 2017, with a combination of investments by market players, efforts of local governments and citizens' initiatives.

Market players are investing in fibre roll out (CIF, E-Fiber), upgrades of existing networks (KPN), fixed-wireless solutions (Greenet, Skylinq) and specific 4G @ home propositions (KPN, T-Mobile). The province Overijssel for example is expected to be 100% connected in the near future thanks to FTTH roll out by CIF without public funding. In the province Groningen a public funding scheme of 40 million EUR has been set up by its regional government. The competitive selection procedure is completed and it is expected that in the end of this year the roll out will start.

The EU state aid framework for broadband, including the General Block Exemption, can be challenging for local authorities. For example, the framework distinguishes white, grey, black areas whereas in practice in the Netherlands an area can consist of a mix of white, grey and even black spots. A geographical demarcated rural area can consist of 30% grey premises.

The EU state aid framework for broadband can also be challenging in rural areas with civilian initiatives. This is the case when civilian initiatives are the first players that put the availability of fast internet on the political agenda. They make great efforts to mobilise civilians, explore opportunities and identify possible business cases. If later on a local government is willing to set up a public funding scheme it can become very challenging to make this compatible with the work that has been done by civilian initiatives. Furthermore, investments by KPN often amount to incremental upgrades to meet the 30 Mbps threshold, which can result in unprofitable business cases of citizens' initiatives. In addition the new ambitions of the Commission (100 Mbps for every household) raises the question whether the 30 Mbps threshold should be shifted to 100 Mbps. State aid for areas between 30 and 100 Mbps is not allowed under the General Block Exemption.

c. Implementation of the Broadband Cost Reduction Directive

By the end 2017, the Netherlands has not yet transposed the Broadband Cost Reduction Directive[378]. However, the draft law was pending the parliamentary approval.[379]

An infrastructure database called KLIC has been developed to cover telecommunications and utilities infrastructure. KLIC is managed by the Land Registry (Kadaster) and collects

[377] http://www.samensnelinternet.nl

[378] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[379] On 25 January 2018 the European Commission decided to refer the Netherlands to the Court of Justice of the EU for delay in transposing the Broadband Cost Reduction Directive (Directive 2014/61/EU). However, on 3 April 2018 The Netherlands has notified to the Commission full transposition of the Directive.

information with the main purpose of preventing excavation-related damage to infrastructure. The database is accessible for all network operators, who have to register. Changes are foreseen because of the implementation of the Cost reduction directive.

The procedures for granting rights of way are mainly local. Rights of way are granted for free, in accordance with the Telecommunications Act. The electronic communications provider is obliged to notify the property owner of his intention to install cables and to strive to come to an agreement regarding the place, the time and the manner in which the work will be carried out. The NRA has dispute settlement powers in the area of rights of way, but the number of disputes is limited.

The Telecommunications Act provides a special procedure for public grounds, under which municipalities issue permits prescribing the location, the time and the manner in which the cables can be laid in the ground. The legislation to shorten this procedure to 8 weeks came into force on 1 July 2016). In some municipalities, the electronic submission of applications is available. Only antennas larger than 5 meter need a permit which must be given within 8 weeks by the local authority.

Infrastructure sharing obligations have not been imposed in relation to in-house infrastructure. Yet according to Dutch law, the owner of a building is obliged to allow for in-house wiring and access points.

There are some examples of cross-sector high speed broadband deployment such as in port areas providers using the existing infrastructure, such as pipe bands. Furthermore, sharing of infrastructure for railway (ducts) incidentally occurs and in rural areas fibre is laid in the pumped sewerage.

3. Regulatory function

In February 2017 ACM adopted a fixed telephony decision. ACM does not impose remedies on single calls and multiple calls markets. On the wholesale market for dual calls ACM did impose remedies, although there are less and lighter remedies than before on this market where the ISDN2 is the main product. Furthermore, this service will be phased out.

In June 2017 ACM adopted a decision on fixed (FTR) and mobile termination rates (MTR) (see below). The current rates in the Netherlands are 0.139 € cent for FTR and 0.581 € cent for MTR. Furthermore some tariff decisions (within the scope of market 3a) have been adopted, for MDF Pair Bonding and new FttH services.

ACM is currently in the process of reviewing market 3 with the intention to come to a decision in Q3 2018.

In the first half of 2017 ACM withdrew a draft market 4 decisions from notification after serious doubts of the European Commission. A new decision is intended to be notified in the second half of 2018.

In the scope of general authorization ACM has a dispute with a party that offers ISPs, carriers, content providers access with only one connection to the multitude of IP networks connected to their platform. Furthermore, ACM considers that providers of OTT voice services that have the possibility to make incoming and/or outgoing calls to the PATS are also part of this definition. In this context, there is currently a pending dispute with a party concerning such a service.

Besides being an NRA ACM also acts as a competition authority. There were no competition cases in 2017 on telecoms, but several cases related to content.

4. Consumer matters

From January till October 2017 ACM received 2855 "signals"[380] from consumers related to telecom services. The main source of consumer complaints is malfunctioning services (675) followed by complaints on billing (413) and acquisition of new customers (396). To address consumer issues ACM is in contact with ISPs to increase transparency, especially on their websites.

ACM has established policy rules pursuant to Art. 4 of the Net neutrality Regulation (Regulation (EU) 2015/2120). The policy rules provide definitions of maximum, normal and minimum speeds for broadband connections and will increase transparency. In this context, the ACM Policy rule on the recognition of internet speeds was published in the official Gazette on 27 November 2017.[381]

The ACM is not resolving individual consumer problems but empowers consumers to solve these problems themselves. In this context, the ACM empowers consumers by their website www.consuwijzer.nl where consumers can find information about their rights, cancellations letters, and similar.

a. Roaming

A limited increase of domestic prices occurred already during the process of adoption of the Roam Like at Home[382] (RLAH) regulation. Operators started to offer RLAH-like propositions before the negotiations on the Roaming Regulation were finished or the date of entry into force of the Regulation was known. It was observed that one operator's offer with RLAH had a higher domestic price level (2.50 EURO extra per month) than offers without RLAH.

In the case of excessive roaming charges over a longer period, the ACM can investigate and issue fines. Companies violating the rules can be fined up to 10% of their total relevant revenue. The relevant revenue means revenue that was made with the service(s) that the violation pertains to. In some cases the relevant revenue and resulting fine may not adequately reflect the severity of the violation. In that case, ACM may decide to use a broader definition and may, for example, use the total (annual) revenue of the company. So ACM has some flexibility in determining which revenue to use.

Following the introduction of RLAH in June 2017, Dutch subscribers consumed 1.9 times more voice and 4.3 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[383]

[380] i.e. complaints and questions received through ACM's consumer service centre.
[381] https://www.acm.nl/nl/publicaties/acm-publiceert-beleidsregel-over-kenbaar-maken-internetsnelheden
[382] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[383] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

b. Net neutrality

On 1 January 2013 11 operators including the incumbent have established and voluntarily agreed on a code of conduct on download speeds: the code of practice on traffic-management transparency for broadband services (Transparency Code).[384] This code of conduct is, however, less strict than the Regulation[385] and the BEREC Guidelines. ACM has indicated informally to the ISPs that this Code is not necessarily compliant with the Regulation.

The Netherlands has laid down rules on applicable penalties for infringements of Articles 3, 4 and 5 of the Regulation and the necessary measures to ensure that they are implemented according to Article 6. The legal power to issue penalties for infringements will be laid down in Article 15.1 (3) and 15.4 (3)a of the Telecommunications Act. However, by end of year 2016 ACM did not yet have the power to apply penalties due to an error in the law which assigned it this legal power.[386] The ACM's power to enforce the Regulation (this excludes its power to fine ISPs) has been effective since 3 November 2016 and is retroactive to 30 April 2016.

The level of sanctions is included in article 15.4 of the Dutch Telecommunications Act. In para 3 of this article, it is stated that for violations of net neutrality rules ACM can charge a maximum fine of € 900 000, or, if that is higher, 10% of the company's revenue. Usually this refers in practice to the "relevant revenue" not the "total revenue" of the business. The relevant revenue is the revenue that was made with the service(s) that the violation pertains to.

In some cases the relevant revenue and resulting fine may not adequately reflect the severity of the violation. In that case ACM may decide to use a broader definition and may, for example, use the total (annual) revenue of the company. So ACM has some flexibility in determining which revenue to use.

There was one relevant zero-rating case in the Netherlands in 2017. ACM assessed the zero-rating service Data-free Music of T-Mobile after a complaint from digital rights organization Bits of Freedom. ACM ruled that T-Mobile's Data-free Music service is allowed under the net neutrality regulation and the BEREC Guidelines. The most important reasons underpinning this decision are that T-Mobile's service is offered in a non-discriminatory manner, and that the service does not harm the rights of end-users. Bits of Freedom does not agree with this decision of ACM and will appeal against the decision.

c. 112

The current rules for caller location accuracy have been in place since 2012. Handset-based caller location is currently not being deployed, first and foremost because the PSAP infrastructure is not yet ready to process handset-based caller location. End-users with disabilities can make an emergency text call to the emergency number 112 directly via smartphone, tablet or computer. For this end-users with disabilities need Total Conversation software (ETSI TS 126 114). The cost of this software is covered by the health insurance.

[384] https://www.vodafone.nl/_assets/downloads/algemeen/gedragscode_transparantie_internetsnelheden.pdf
[385] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).
[386] ACM is competent to hand out penalties since 28th of February 2017.

Through a mediation service ('KPN Teletolk') end-users with disabilities can also contact 112 with real time text 24 hours a day. The 112 text-call is then directed directly to 112. In addition, end-users with disabilities can make contact with the emergency number 112 on weekdays from 7:00 to 20:00 and on weekends and public holidays from 10:00 to 16:00 through a sign language interpreter ('KPN Teletolk' mediation). End-users with disabilities that still use their analog textphone can call the emergency number 0800-8112.

d. Universal service

There have been no changes in the scope of the universal service[387] since January 2017. There is no designated provider for public payphones, directories and/or directory enquiry services. Public payphones were removed from the scope in 2008, the printed directory in 2016. Electronic directories and directory enquiry services are still in scope. The printed directory as well as electronic directories and directory enquiry services are still being offered by the market, but the viability of the business case is diminishing.

There have been no changes in the designation of universal service providers. KPN is still the designated universal service provider for the provision of access at a fixed location and provision of telephone services (alternatively a mobile subscription can be offered) and functional internet access, as well as the relay service for the deaf and hearing impaired (KPN Teletolk).

5. Conclusion

The Netherlands is a top performer in the area of connectivity with regard to broadband and fast broadband coverage. Broadband services are available throughout the country (through fixed, mobile and satellite networks) however the take-up of broadband in particular in mobile services and fast broadband is comparably lower.

The Dutch telecommunications services market is still characterised by the very strong positions of major players KPN and VodafoneZiggo, who according to ACM's provisional conclusion (in public consultation) have joint dominance on the wholesale and retail markets in the absence of regulation.

In a near duopoly situation at the fixed network level, the mobile market seems to be under intense pressure due to the fact that bundled packages require access to fixed infrastructure which pure mobile operators lack. This resulted in T-Mobile acquiring Tele2 (still subject to merger control).

Regarding 5G the Netherlands has taken steps to have a leading role in this area while frequency auction is planned for 2019.

[387] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

Poland

Market developments

1. Competitive environment

a. Fixed Markets

Fixed broadband market shares	PL-2016	PL-2017	EU-2017
Incumbent market share in fixed broadband	29.4%	28.8%	40.3%
Technology market shares			
DSL	37.0%	34.2%	64.2%
Cable	35.8%	37.1%	19.4%
FTTH/B	6.7%	9.3%	12.9%
Other	20.5%	19.4%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband prices	PL-2016	PL-2017	EU-2017
Fixed broadband price index [values between 0-100]	87	88	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The incumbent Orange Polska (OPL) remains the biggest operator in the fixed broadband market in 2017, where it held a market share of 28.8%, significantly below the EU average of 40.3%. As regards fixed telephony, it held a 54.7% market share, compared to the second biggest operator (UPC) with 12.1%, the third (Netia) with 9.1%. The remaining operators jointly held around 22%[388].

In terms of revenues, the market of fixed telephony dropped by 21% in 2016 compared to 2015; in terms of subscribers, the market dropped by 8.2%. Concerning fixed telephony business market, Orange remained a clear leader with approximately 82% market share. The second operator was T-Mobile (4.1%) and the third UPC (3.7%)[389].

Regarding the business market of fixed Internet access, Orange also remained a leader with approximately 50% market share in 2016 in terms of users. The second operator was Netia (13%) and the third UPC (5.5%)[390].

In 2017, the most popular technology for fixed Internet access was cable. The biggest increase was noted for FTTH/B access, which has increased by 2.6 pp.

New entrants' DSL subscriptions by type of access (VDSL excluded)	PL-2016	PL-2017	EU-2017
Own network	34%	34%	0.5%

[388] Data for 2016. Source: UKE – Raport o stanie rynku telekomunikacyjnego w 2016.
[389] As above.
[390] As above.

Full LLU	17.4%	17.4%	72.8%
Shared Access	4.4%	4.4%	4.1%
Bitstream	44.3%	44.3%	14.7%
Resale	0.025%	0.025%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Coverage	PL-2016	PL-2017	EU-2017
Fixed broadband coverage (total)	86%	87%	97%
Fixed broadband coverage (rural)	82%	83%	92%
Fixed NGA coverage (total)	64%	67%	80%
Fixed NGA coverage (rural)	37%	41%	47%
Ultrafast coverage (total)	-	53%	58%
4G coverage (average of operators)	91%	91%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Poland's development is still being challenged by its low fixed broadband coverage, fixed broadband take-up and NGA coverage. The main difficulties relate to the geographical conditions, in particular the large rural areas that cause high costs of developing networks. Many of them are not attractive to operators. Another factor impeding the implementation of the objectives is the lack of adequate demand for very high-speed networks (over 100 Mbps) and, as a result, lack of private investment in that access. On the other hand, 4G coverage in Poland equals EU-average.

Concerning the roll-out of Wi-Fi in public places, in 2016, 778 public hotspots were launched by the local authorities, and 1005 hotspots by the end of 2017. In 2017, UKE proposed legislative amendments to the Act of 7 May 2010 on supporting the development of telecommunication services and networks in order to stop issuing decisions in the form of administrative decisions, establish conditions of free access to the Internet in order to ensure the provision of services of at least 30 Mbps and to limit the range of the hotspots provided by local authorities only to public spaces. Once the new rules are adopted, neither a time-limit of an individual session nor a transfer limit will be set (current legislation foresees the maximum speed of 512 kbps or 1 Mbps in the case of hotspots located exclusively in public places; maximum time-limit of 45 minutes per session and a 15-minute break, as well as data limit of 750 MB).

There are further signs of ongoing consolidation in the telecommunications market in Poland. In addition to the possible acquisition of Multimedia Polska by Liberty Global[391], which was announced in 2016, in 2017 Cyfrowy Polsat acquired Netia (initially 32% of shares, with the intention to acquire 66%). Cyfrowy Polsat owns a satellite platform, Plus (MNO) and Polsat TV. By acquiring Netia, it will obtain a nationwide fixed infrastructure, as well as access to 1 million customers. Moreover, in early 2018 P4 (Play) signed an agreement with Virgin Mobile Polska, which foresees that P4 is entitled to acquire all shares of Virgin Mobile Polska by 2020.

In December 2017, T-Mobile started negotiating access to FTTH with Orange Polska. On the basis of the initial agreement, T-Mobile Polska should receive access to FTTH networks encompassing multi-family buildings in 76 communes covering main broadband markets. The technical cooperation foresees a BSA model.

[391] In March 2018 Liberty Global withdrew from the transaction.

Vectoring technology is not applied in Poland. The incumbent OPL carried out tests for vectoring, but it concluded that this technology was not economically feasible under the current conditions. There is no information about alternative operators having tested or used this technology on their networks.

b. Mobile market

Mobile market	PL-2016	PL-2017	EU-2017
Market share of market leader	29%	28%	35%
Market share of second largest operator	26%	27%	28%
Number of MNOs	5	5	-
Number of MVNOs	21	21	-
Market share of MVNO (SIM cards)	4%	4%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

While fixed broadband coverage remains among the lowest in the EU, mobile broadband coverage is above the EU average. Mobile broadband is developing well, including in long term evolution (LTE) services, whose coverage has continued to grow over the recent years. Also, the number of subscribers grew from 5.8 million in 2014 to 6.7 million in 2015, and reached 7.4 million in 2016[392]. In 2016, the number of mobile Internet users exceeded the number of fixed Internet users for the first time.

Mobile broadband prices [EUR/PPP]	PL-2016	PL-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€17	€11	€24
Least expensive offer for tablet and laptop (5 GB basket)	€8	€8	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Mobile broadband prices are among the lowest in Europe (below 50% of the average prices in the EU). The least expensive offer for handset (1GB + 300 calls basket) was 35% cheaper in 2017 than a year before.

Bundles are booming in Poland. In 2014, there were around 3.75 million subscribers to bundled services. In 2015, the number of users increased by more than 2 million to reach 5.87 million in total and in 2016 – 7.86 million (a 34% increase from 2015). The most popular bundle remains mobile telephony and mobile Internet, which accounted for 54% of all subscribers[393].

In 2016, the penetration rate of mobile services was 2% lower than at the end of 2015; however, it amounted to 144.2%. This is due to the obligatory registration of pre-paid cards. T-Mobile lost most users (13%). On the other hand, P4 gained 1.7%. At the end of 2016, Orange remained the leader in terms of subscribers (28.2%), P4 had 27.1%, Polkomtel 22.1% and T-Mobile 18.6% of the total number of SIM cards[394]. MVNOs' market share was at the level of 4.1% of all subscriptions. However, in the third quarter of 2017, P4 overtook Orange

[392] Data for 2016. Source: UKE - Raport o stanie rynku telekomunikacyjnego w 2016.
[393] As above.
[394] As above.

in the number of SIM cards (29.1%). Nevertheless, Orange remains a leader in the post-paid market[395].

The other major developments in the Polish market in 2017 include the Initial Public Offering of P4 (Play) on the stock exchange, announcement of P4 that it will finalise the construction of its own network by the end of 2020, and the establishment of the first wholesale-only operator (Nexera).

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In 2017, spectrum in the 1.8 GHz band was assigned to four mobile network operators: AERO2 sp. z o.o., T-Mobile Polska, Orange Polska and Polkomtel sp. z o.o (two decisions for 0.2 MHz and two decisions for 0.4 MHz). The assignment was aimed at ensuring efficiency, quality, and optimisation of concerned guard bands. Moreover, on request of the parties, the NRA issued a decision to transfer a licence in the 3.6-3.8 GHz band from Sofnet sp. z o.o. to P4 sp. z o.o. No additional obligations were imposed on P4 sp. z o.o. regarding network development. Also, no other licences for mobile broadband access were assigned.

Additionally, as regards the 1.8 GHz band, two decisions marked 2017: the ruling of the Supreme Administrative Court in September upholding the decision of the NRA to discontinue proceedings concerning the transfer of part of 1.8 GHz band from Polkomtel to Orange, and the August decision of the NRA to annul a 2007 tender concerning another portion of the same band as requested by T-Mobile Polska.

Orange Polska requested and subsequently resigned from the renewal of the licence for the 450 MHz band as, according to the company, the valuation of this spectrum made for UKE by an independent expert was excessive. Against this background, UKE started a public consultation. Orange Polska, P4 and T-Mobile Polska responded to the consultation. The second round of the consultation was announced in January 2018.

On 6 December 2017, the NRA started a public consultation concerning a new frequency management plan to manage in the 3.4-3.6 GHz range. The only operator that responded to it was T-Mobile Polska, which underlined the importance of 3.4-3.8 GHz bands for the initial roll-out of 5G, and called for optimisation, as well as effective allocation of 3.4-3.8 GHz preceded by comprehensive consultations with the operators.

The development of the strategy for migration of current users, and making the 700 MHz band available, is ongoing. Nevertheless, due to difficulties in obtaining the relevant agreements with the neighbouring non-EU countries (namely with Russia), the mid-2020 deadline might not be met. Assistance will also be needed for broader coordination of 700 MHz, since it would not be possible to use these frequencies for providing wireless broadband services on a substantial part of the Polish territory. A reform of the Telecommunications Law is also needed in this context as a precondition for seamless spectrum auctions in the future,

[395] Data from Statistics Poland (Główny Urząd Statystyczny – GUS), www.stat.gov.pl

and to address the concerns raised in the ongoing infringement proceedings against Poland on this matter[396].

Operators and industry representatives underline that Poland has one of the strictest national limits on electromagnetic fields (EMF) across the EU[397]. They claim that this is one of the main obstacles for investments in Poland, which might create an additional burden for future 4G/5G roll-out. The Ministry of Digital Affairs would like to introduce fewer limitations regarding EMF; however, the issue is highly sensitive and causes a lot of misperceptions that led to organised actions against the build-up of poles and antennas.

b. National and EU investment in broadband

In 2014, Poland had adopted a National Broadband Plan (NBP, '*Narodowy Plan Szerokopasmowy*'), which builds extensively on the Digital Agenda for Europe (DAE) targets. It envisages 100% coverage with 30 Mbps and 50% of households accessing broadband with 100 Mbps by 2020. According to the Ministry of Digital Affairs, significant progress was achieved in the implementation of the National Broadband Plan in 2017.

Despite a number of tasks completed in the NBP, Poland is still far from achieving the goals of the DAE. The number of households with a broadband connection remains low; with only 87% of households covered by fixed broadband in 2017, Poland was significantly below the EU average of 97%. Regarding fast broadband (NGA), coverage in Poland reached 67% of households, well below the EU average of 80%. The negative effects of low fixed broadband coverage are only partially offset by high mobile broadband take-up. Difficulties relate mainly to the geographical conditions, in particular the large rural areas, which increases the cost of deploying broadband networks. Many areas are not attractive to operators and are therefore targeted by public support measures. Wholesale access to the subsidised infrastructure is provided for in the State Aid Decisions and the General Block Exemption Regulation in order to strengthen choice and competition in the areas concerned. Another challenge for the implementation of the 2020 DAE objectives is the low demand for ultrafast broadband (of at least 100 Mbps) to which only 13% of households subscribed in 2017..

Additionally, local authorities are reported to charge telecommunication operators high fees for using installation space on roads, which would hamper the effective roll-out of broadband infrastructure and raise maintenance costs. Nevertheless, planned fibre networks are distributed evenly and are reaching most of rural areas due to the obligation to connect all educational institutions and due to the prioritisation of unprofitable areas in the Operational Programme Digital Poland (OPDP, '*Program Operacyjny Polska Cyfrowa'*).

Broadband infrastructure funding comes from both EU and state funds, as well as private investments. Poland's broadband plan states that EU monetary resources are made available through the OPDP, which runs from 2014 to 2020 and is operated by the Digital Poland Project Centre (*Centrum Projektów Polska Cyfrowa* - CPPC). In 2017, the second call of the OPDP was finalized. Subsidies were granted to 58 out of 76 areas of support. The biggest winners - three companies from Nokia/InfraCapital group, as well as Orange Polska, obtained support for 12 areas each; Netia obtained support for 16 areas. The total value of financing granted amounts to more than 2 billion PLN (500 million EUR), which translates to 68% of

[396] A draft law aiming to amend the Telecommunications Law in this respect was published in March 2018.
[397] GSMA study *'Arbitrary Radio Frequency exposure limits: Impact on 4G network deployment. Case studies: Brussels, Italy, Lithuania, Paris and Poland',* November 2014.

allocation available for the second call. The declared number of households that will be connected to the broadband access of at least 100 Mbps in 58 areas amounts to 1.35 million (175% of the minimum value indicated in the call documentation). However, the actual realisation of the projects remains to be seen. The implementation under the First Priority Axis of the OPDP is overall well on track.

In 2017, the third call was formally launched with the total budget reaching 2 billion PLN (500 million EUR).

The revision of the NBP is currently being prepared and should be adopted in 2018. It will contain a new action plan and tools for implementing new connectivity objectives contained in the Communication on *'Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society*'.

On 28 June 2017, the *5G Strategy for Poland* was signed off. It contains an agreement and launches the cooperation between the state, research entities and undertakings in order to implement 5G in Poland. On 5 January 2018, the detailed *Strategy*[398] was published and submitted for public consultation.

Telecommunication operators in Poland do not have a common strategy regarding commercial co-investment agreements. In order to address this problem, in its Strategy for 2017-2021, UKE indicated that it would aim at creating good conditions by establishing an approach concerning regulation of networks created in the co-investment model.

c. Implementation of the Broadband Cost Reduction Directive

The Broadband Cost Reduction Directive[399] (BB CRD) was implemented into Polish law in 2016[400]. The new rules entered into force on 1 July 2016, with the exception of the provisions on establishing the (single) Information Point for Telecommunications, which entered into force on 1 January 2017. The European Commission is currently checking the compliance of the measures notified with the BB CRD.

On 1 January 2017, the NRA launched the website of the national Information Point for Telecommunications (*Punkt Informacyjny ds. Telekomunikacji - PIT*). In addition, steps have been taken to raise awareness about the legal solutions related to the BB CRD. To this end, a training program across the country was launched. It is addressed to entities building telecommunication infrastructure, telecommunication operators, construction process participants, local government units and the financial sector.

Regarding in-house cabling, there are issues related to long-lasting negotiations with building owners who typically ask for compensation for providing access to their buildings, or who do not wish to have access to high-speed networks. The NRA often depends on third party actions in order to be able to finalise individual motions, which are usually complex in nature. Disputes also relate to access to existing infrastructure, namely to the suitability of the existing infrastructure to be used by the operator requesting access. Additionally, problems

[398] 5G Strategy for Poland, https://www.gov.pl/cyfryzacja/strategia-5g-dla-polski.
[399] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communication networks, OJ L 155, 23.5.2014, p. 1–14.
[400] Act of 9 June 2016, amending Act on the support of the development of telecommunication services and networks, and certain other acts.

concerning security and continuity of service provision by network operators already present arise. Also, the legal status of buildings and related problems concerning legal representation in the ongoing proceedings add up to the complexity of disputes. Overall, the NRA launched seven administrative proceedings in 2017 aiming to define conditions of access to technical infrastructure.

An increase in the shared use of infrastructure has been reported by the NRA; however, no data is available yet, which makes it difficult to draw conclusions on the effectiveness of the access regime at this point in time. There is no specific 'broadband–ready' label, but buildings having in-building technical infrastructure adapted to high-speed networks are listed in the Register of Land and Buildings.

3. Regulatory function

In 2017, the NRA issued 5 decisions in order to deregulate the market for SMS termination in individual mobile networks. Additionally, a decision approving a proposed framework offer concerning high quality access up to 2 Mbps in permanent locations was issued in respect of Orange Polska. Lastly, in 2017 the NRA issued four decisions establishing conditions of access to technical infrastructure by a telecommunications undertaking.

Regarding the regulation of mobile termination rates, they are set in compliance with the 2009 Recommendation[401] and they have remained unchanged since 2012. However, unlike the mobile termination rates, the fixed termination rates remain regulated on the basis of a fully allocated cost methodology, which is not compliant with the 2009 Recommendation, since the latest assessment of the fixed termination market carried out by the NRA in 2009 predated it.

In 2017, the NRA analysed a complaint from Verizon US concerning asymmetric rates charged by the Polish MNOs in the context of calls initiated outside the EEA. The investigation revealed that despite the existing asymmetry, Verizon did not start a dialogue with the operators who had suggested a solution to the problem.

In October 2017, the Commission initiated infringement proceedings against Poland in the context of lack of notification of four markets (market 3 - call termination on individual public telephone networks provided at a fixed location, market 1 - access to the public telephone network at a fixed location for residential and non-residential customers, market 2 - call origination on the public telephone network provided at a fixed location and market 18 - wholesale broadcasting transmission services) subject to review under the Framework Directive[402]. On 15 November 2017, the NRA notified the market of wholesale broadcasting transmission services.[403] The notification of the remaining three markets is expected in 2018[404]. Moreover, the NRA's notification of its assessment of the markets for local loop unbundling and for bitstream access is also expected in the course of 2018.

[401] Commission Recommendation of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, C(2009) 3359 final.
[402] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services, OJ L 108, 24.4.2002, p. 33–50.
[403] At the beginning of 2018 UKE issued a decision concluding that EmiTel has significant market power on the markets for radio and TV broadcasting transmission services.
[404] On 14 February 2018 the Appeal Court has annulled UKE's 2014 decision (PL/2014/1632) concerning the deregulation of 76 communes (market 3b) on procedural grounds. UKE's 2014 decision followed 3 unsuccessful attempts to regulate market 3b.

Disputes between undertakings in 2017 concerned access to cable infrastructure (5 cases pending), access to electric poles (4 pending cases) and cooperation (11 decisions issued, including adjustments to SOR[405] offer; 40 cases still pending).

According to the NRA, a number of appeals against its decisions were filed in the course of 2017[406]. They mainly concern spectrum assignment (73 cases), subsidy for universal service (56 cases), imposition of fines (19 cases), access to buildings (15 cases) and failure to act (5 cases).

In 2017, the Supreme Court dismissed cassation appeals filed by UKE, Netia and Multimedia Polska concerning the MTR decisions from 2008 that were challenged by T-Mobile Polska. These cases triggered a request for preliminary ruling (case C-231/15).

In 2017, the NRA cooperated with the Polish competition authority (UOKiK) mainly regarding the review of the markets and the prevention of concentration. With respect to the latter, the NRA issued an opinion concerning a planned acquisition of Multimedia Polska by UPC Polska. The competition authority raised concerns over a possible limitation of competition in 15 locations regarding both Internet and television. The decision of the competition authority is expected in 2018.

4. Consumer matters

According to the NRA, in 2017[407] the Office resolved 3753 requests for intervention, 1240 inquiries and 1064 extra-judicial settlements of consumer disputes. They mainly concerned invoicing, conclusion and ending of contracts, unfair market practices, as well as improper performance of services.

The Ministry of Digital Affairs proposed a number of amendments to the Polish Telecommunication Law in 2017. The proposal should be approved in 2018. It encompasses a new alert system to warn citizens (via SMS) about threats that may cause a crisis in a given territory, new forms of concluding contracts with operators (via SMS, e-mail, phone, or using a qualified electronic signature), stricter rules regarding premium services, simplified rules regarding the provision of access to the Internet by local authorities, as well as elimination of arbitration courts at UKE.

a. Roaming

Following the introduction of Roam Like at Home[408] (RLAH) in June 2017, roaming consumption by Polish travellers increased significantly. Retail roaming volumes of data were multiplied by 28.1 in Q3 2017 compared to Q3 2016, by 5.0 for voice and by 2.5 for text messages[409]. All companies operating in the Polish market (MVNOs in particular) claim to be heavily affected by the new roaming rules that entered into force on 15 June 2017, and by the

[405] Offer specifying framework terms regarding telecommunications access.
[406] Data from 1 January to 3 October 2017.
[407] As above.
[408] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[409] *International Roaming BEREC Benchmark Data Report April 2017 - September 2017*, available at: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8011-international-roaming-berec-benchmark-data-report-april-2017-september-2017

related erosion of revenues. All four MNOs (Polkomtel sp. z o.o, P4 sp. z o.o, Orange Polska S.A. and T-Mobile Polska S.A.), as well as nine MVNOs (Virgin Mobile Polska sp. z o.o, VikingCo Poland sp. z o.o, Netia S.A., Internetia sp. z o.o, Telefonia Dialog sp. z o.o, Premium Mobile S.A., ITI Neovision S.A., FM Group Mobile sp. z.o.o and Polskie Sieci Cyfrowe sp. z o.o[410]) applied for derogations. The NRA granted 10 derogations so far, two requests were still pending at the time of writing this report. However, due to strong competition among operators in the Polish market, operators are hesitant about the introduction of surcharges. So far, only P4 (Play) actually introduced roaming surcharges in January 2018, to a limited extent. The Commission is closely monitoring the derogation decisions and the maximum surcharges allowed by the NRA.

According to the NRA, non-compliance with the rules was discovered regarding six operators; in relation to five of them control proceedings have been completed and the remaining one is pending.

UKE also took a number of other steps to check the functioning of RLAH. The preliminary analysis showed that 96% of customers had a possibility to use RLAH as of 15 June 2017. According to the NRA, this rate rose to 99% after the regulatory interventions.

The main issues raised by consumers in complaints related to roaming since 15 June 2017 concerned the functioning of RLAH, information obligations towards customers, as well as whether RLAH is also applicable outside the EU.

b. Net neutrality

The obligations set out in Regulation (EU) 2015/2120[411] concerning open internet access are reflected in Poland in a self-regulatory measure, namely the Memorandum on informed decision-making by end-users of internet access services in public telecommunications networks.[412] Poland notified to the Commission rules on penalties applicable to infringements of the open internet provisions in July 2016.[413] The details concerning the Memorandum and the penalties can be found in the last edition of this report.

The NRA currently does not plan to publish information or guidelines, or to introduce additional requirements for ISPs to support the implementation of the transparency measures included in Article 4 of Regulation 2015/2120.

[410] Polskie Sieci Cyfrowe sp. z o.o withdrew their application and the administrative procedure was discontinued.
[411] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union, OJ L 310, 26.11.2015, p. 1–18.
[412] Document: https://mc.gov.pl/files/memorandum_na_rzecz_podejmowania_swiadomych_wyborow_przez_uzytkownikow_k.pdf; press release: https://mc.gov.pl/aktualnosci/memorandum-na-rzecz-podejmowania-swiadomych-wyborow-przez-uzytkownikow-koncowych-uslugi .
[413] The Act of 9 June 2016, amending the Act on support for the development of telecommunication networks and services and certain other acts, amends Article 209 of the Polish Telecommunications Law Act of 16 July 2016, thus laying down penalties for infringements of the provisions of the Regulation (EU) 2015/2120 laid down in Article 209(29a).

UKE launched public consultations in 2017 in order to establish a certified monitoring mechanism on speed and quality parameters. The NRA wants to launch a dedicated application and an online service for this purpose in 2018.

Concerning consumer satisfaction, most customers are satisfied with the quality of telecommunication services in Poland[414]. Availability of services in mobile networks is high and the use of the new technologies (LTE, LTE-A) is increasingly widespread.

c. 112

No legislative changes laying down caller location accuracy and reliability criteria for the European emergency number 112 were introduced in 2017[415]. Also, there is no legal framework for the handset based caller location, and no new measures are planned for 2018.

There is no specific help for people with disabilities to access the emergency services. However, in January 2018 the Ministry of Digital Affairs announced its intention to launch a pilot programme aimed at facilitating efficient communication with 112 operators for deaf and hearing-impaired persons by means of a dedicated mobile application.

d. Universal service

No changes concerning the scope of universal service[416] have been introduced. Public payphones, public directory and directory enquiry services exist; however, these services lose their importance and are offered on commercial terms. Similarly, broadband is not included in the current scope of universal service. Orange Polska still offers a special tariff plan despite the fact that the obligation to offer a universal service ended on 8 May 2011.

Orange Polska requested compensation for the entire period of offering the universal service. The requests were followed up by an assessment of net costs and unfair burden. Orange Polska was compensated, however on a lower level than foreseen in the request. In 2017, Orange received a higher compensation than the one initially granted for two periods: 8 May – 31 December 2006, and for the year 2007. On the other hand, the compensation granted for the period 1 January – 8 May 2011 was upheld by the court while three cases are still pending (for the year 2008, 2009 and 2010).

5. Conclusion

Poland has continued to make significant progress in mobile broadband. On the other hand, while fast and ultrafast broadband take-up has also been growing, more investment is needed, especially in rural areas. More coordinated efforts are also needed in order to ensure a proper regulatory environment to roll-out 5G networks. In this context, Poland should in particular revise its rules concerning spectrum auctions in view of the 700 MHz band assignments and the ongoing infringement proceedings related to the assignment of 800 MHz spectrum to the Polish operator Sferia. Furthermore, outstanding market reviews should be completed without delay. Finally, further monitoring of the Polish roaming market is needed since it has not yet stabilised after the introduction of RLAH.

---

[414] UKE *Badanie konsumenckie 2017*, https://uke.gov.pl/akt/badanie-konsumenckie-2017,50.html

[415] For a state of play, see COCOM report at: https://ec.europa.eu/digital-single-market/en/eu-actions-112

[416] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

PORTUGAL

Market developments

1. Competitive environment

There are four major operators in the telecoms markets in Portugal: MEO (incumbent), Grupo NOS, Vodafone and Grupo Apax (ONI and Nowo). In total, there are 50 active operators in Portugal.

At the end of 2017, about nine out of ten households in Portugal subscribed to a bundle. "Five-play" offers (which include fixed broadband, fixed telephone service, Pay-TV, mobile telephone service and mobile broadband) became the most popular bundle, reaching 42% of subscribers followed by the "Triple-play" offers (fixed broadband, fixed telephone service, Pay TV), reaching 40.9% of subscribers. Convergent bundles (with fixed and mobile services) accounted for 47% of the total, reaching 1.76 million subscribers (10% more than the previous year). Bundles penetration reached 98.5% of fixed broadband subscribers, 93.7% of TV subscribers and 91.5% of fixed telephony. The penetration of bundles in mobile telephone service subscribers was 42.2%.

Regarding broadband roll-out, following *Autoridade Nacional de Comunicações'* (ANACOM) decision not to regulate access to MEO's fiber network, in September 2017, Vodafone and NOS signed a reciprocal agreement covering 2.6 million households in continental Portugal. Offers based on this agreement are expected to be launched in the beginning of 2018. Moreover, following the approval by the Competition Authority of the Optimus/ZON merger, on September 2013, Vodafone was granted the option to purchase the FTTH network that it shared with Optimus. The definitive purchase and sale agreement was signed on 31 January 2017.

a. Fixed Markets

Coverage	PT-2016	PT-2017	EU-2017
Fixed broadband coverage (total)	100%	100%	97%
Fixed broadband coverage (rural)	98%	98%	92%
Fixed NGA coverage (total)	95%	95%	80%
Fixed NGA coverage (rural)	74%	78%	47%
Ultrafast coverage (total)	no data	95%	58%
4G coverage (average of operators)	93%	94%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

In Portugal, broadband is available to all homes. Moreover, 95% of households have access to networks capable of providing at least 30Mbps (well above the EU average of 80%) and since they are covered either by DOCSIS 3.0 or FTTH (ultrafast networks) those households have access to speeds beyond 100 Mbps.

Fixed broadband market shares	PT-2016	PT-2017	EU-2017
Incumbent market share in fixed broadband	42.3%	39.7%	40.3%
Technology market shares			
DSL	30.7%	23.9%	64.2%

Cable	33.2%	33.0%	19.4%
FTTH/B	29.0%	35.4%	12.9%
Other	7.2%	7.7%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

In fixed broadband, market shares of the incumbent (MEO) have decreased over time, falling below 40% in 2017 (slightly below the EU average). In 2017, MEO decreased its market share by more than 2 p.p. to the advantage of alternative operators, especially Vodafone (with an increase of 1.8 p.p. compared with the third quarter of 2016).

A similar trend is discernible in the fixed telephony market: MEO's market share is decreasing while alternative operators' market shares are increasing. At the end of 2017, MEO's market share was 44.8%, a decrease of 1.7 p.p. compared with the end of 2016. NOS was the second largest provider with a share of 35.2% (an increase of 0.5 p.p compared with the end of 2016) and Vodafone reached a share of 15.9% (an increase of 1.4 p.p. compared with the end of 2016).

New entrants' DSL subscriptions by type of access (VDSL excluded)	PT-2016	PT-2017	EU-2017
Own network	0%	0%	0.5%
Full LLU	85.0%	85.0%	72.8%
Shared Access	-	-	4.1%
Bitstream	14.9%	14.9%	14.7%
Resale	0.0%	0.0%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Broadband take up, both in fixed and mobile, improved in 2017 but still remains a challenge. Fixed broadband take-up has increased 4 p.p. (68% in 2016 to 72% in 2017), narrowing the gap with the EU average (75%). The improvement of Mobile broadband take-up was very substantial and reached 10 p.p. (55% in 2016 to 65% in 2017), but still remains far behind the EU average (90%).

Fixed broadband prices	PT-2016	PT-2017	EU-2017
Fixed broadband price index [values between 0-100]	70	67	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

While Portugal's performance in the Broadband Price Index worsened during the reporting period, it should be noted that convergent bundling (i.e. including fixed and mobile internet and voice services) is the most representative method used by operators to sell electronic communications services in the country, which makes the assessment more complex[417]. As explained above, the context is a convergent market dominated by bundles and characterized by increasing internet access speeds. The fixed broadband price index takes also into account price purchase parity and income per capita.

b. Mobile market

Mobile market	PT-2016	PT-2017	EU-2017
Market share of market leader	45%	46%	35%
Market share of second largest operator	29%	28%	28%

[417] Convergent bundles including fixed broadband, fixed telephone service, Pay-TV, mobile telephone service and mobile broadband (known as 5 play), became the most popular bundle in the Portuguese market in Q3-2017.

Number of MNOs	3	3	-
Number of MVNOs	5	5	-
Market share of MVNO (SIM cards)	2%	2%	-

Source: Communications Committee. Data as of October 2016 and October 2017

There are currently eight entities providing mobile services in Portugal. In addition to the three network operators –MEO, Vodafone and NOS- there are four MVNOs in operation (CTTT-Phone-ix, Lycamobile, Vectone and Grupo APAX) under agreement negotiated between the parties involved. The share of MVNO subscribers increased 0.3 p.p. in the third quarter of 2017 compare to the third quarter of 2016. The MVNO subscribers share had been reduced until March 2016 (to 0.2%) when Grupo APAX entered the market.

Mobile broadband prices [EUR/PPP]	PT-2016	PT-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€42	€30	€24
Least expensive offer for tablet and laptop (5 GB basket)	€25	€19	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Stand-alone mobile broadband prices, for handset offers have substantially decreased in the past year, however continue to be above the EU average. The price for tablets and laptops has also decreased in 2017 although it remains above the EU average.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Portugal 68.72% of the spectrum harmonised at EU level for wireless broadband is assigned. This percentage is mainly due to the fact that the 700 MHz band, the 1.5 GHz band and some remaining spectrum in the 3.6-3.8 GHz bands have not been assigned yet. Currently, ANACOM is planning to submit a public consultation regarding the broadband use including, among others, in the band 700 MHz[418]. Concerning the latter ANACOM reports that the situation in Portugal will be rather complex, as the current single frequency network for digital terrestrial television in channel 56 (with more than 250 transmitters) needs to migrate into a multi frequency network with a minimal consumer impact. The Government, based on ANACOM's proposals, will define the model. Nevertheless, Portugal still envisages that the migration can be deployed until 2020 in accordance with Decision (EU) 2017/899[419].

No spectrum licences (rights of use of frequencies) were granted in 2017. The last spectrum award took place in 2012. Portugal foresees that the national priority for 5G spectrum will be in the 700 MHz, 3.4-3.8 GHz and 26 GHz bands. Notwithstanding the above, during 2017 an update of spectrum fees concerning mobile networks was enacted. This value reflects the opportunity cost taken per MHz (currently 90 800 €/MHz), according to Portuguese Regulation no. 144/2015, of 25 March.

[418] On March 2018, ANACOM has launched a public consultation regarding the band 700 MHz. https://www.anacom.pt/render.jsp?contentId=1430582

[419] Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union (*OJ L 138, 25.5.2017, p. 131–137*)

Licenced shared access (LSA) trials have been launched to study the possibility of its implementation in the band 2300-2400 MHz ("2.3 GHz band"), which at present accommodates Services Ancillary to Programme making / Services Ancillary to Broadcasting (SAP/SAB) applications in Portugal. Spectrum trading is occurring only in a few cases such as in the sound broadcasting as well as in Private Mobile Radio sectors.

Portugal has reported that the coordination process with Spain concerning the 700 MHz band has been already concluded, while with Morocco it is progressing.

b. National and EU investment in broadband

Following the approval by the European Commission in 2011, the Portuguese Government launched five public tenders for the deployment and operation of Next Generation Broadband networks in five rural areas not served by NGA network. Three of them (Center, Madeira and Azores) were awarded to Viatel - Tecnologias de Comunicação, S.A (Fibroglobal– Comunicações Eletrónicas, S.A. was the company set up by Viatel for this purpose) and the remaining two (North and Alentejo/Algarve) to DS Telecom Alentejo & Algarve, S.A. and DS Telecom Norte, SA.

EC State Aid Decision N252/2010 approving the measure foresees that third party operators would have wholesale access to the subsidised broadband networks (including both passive and active infrastructure elements) in a non-discriminatory way during the entire duration of the contract, i.e. for minimum 20 years.

In October 2017, ANACOM proposed to the Portuguese Government a reduction (between 24% and 55% according to the type of access) of the wholesale prices applied by Fibroglobal and the Portuguese Government instructed ANACOM to conduct the process and consult the interested parties. ANACOM also communicated additional information collected regarding contractual relations between Fibroglobal – Comunicações Eletrónicas, S.A. and MEO to the National Competition Authority.

c. Implementation of the Broadband Cost Reduction Directive

Portugal fully transposed the Directive 2014/61/EU[420] (Broadband Cost Reduction Directive or BB CRD) in July 2017 with the publication of Decree-Law no 92/2017, of 31 July, that amends and republishes Decree-Law no 123/2009, of 21 of May. It has to be noted that since 2009 Portugal has a legal framework ruling *inter alia* on the deployment, access and use of civil infrastructure suitable to the deployment of electronic communications networks. The transposition process allowed Portugal to clarify and complete some of the obligations arising from the regime already in force and to strengthen the associated sanctioning regime.

With the new framework, ANACOM's powers of intervention have been expanded. That is the case, among others, with the dispute resolution power or with the power to define the methodology for the remuneration payable by electronic communications companies for the access and use of suitable infrastructures.

Following the entering into force of the new framework, and in order to define the methodology to be used for the establishment of the value of the remuneration payable by

[420] Directive 2014/61/EU, of the European Parliament of the Council of 15 May 2014, on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1–14)

electronic communications companies in exchange for access to and use of the suitable infrastructures, ANACOM started a round of contact/meetings with ERSE (the Portuguese Regulator for the Energy Sector) and also with DGEG (Portuguese Directorate General for Energy and Geology) in cases related to infrastructures of the sectors of electricity, natural gas and transport of crude oil and petroleum product. Thus, it is still in process and new developments are expected during 2018. In the case of infrastructures held or managed by local authorities, the methodology to be used for the establishment of the value or remuneration in exchange for the access to and use of suitable infrastructures is within the competence of the corresponding bodies. As for cooperation with local authorities, this is an ongoing process. ANACOM has been developing contacts with inter-municipal communities in order to make them aware of the new framework and involving municipalities on its implementation.

The Decree-Law no 92/2017 foresees the possibility of a "broadband-ready" label.

Regarding the mapping of infrastructure, there are a number of changes related with the transposition of the Cost Reduction Directive due mainly to the inclusion of the antennas installations and the building entrances, the towers will also now be included. These changes have an impact on the decision of ANACOM related with the format and specification of the data structures used in SIIA (Information system of suitable infrastructures, prior SIC – Centralized Information System) that determine its review.

The legal framework for access to passive infrastructure is defined by two sets of laws. In the context of market analysis procedures, ANACOM has imposed on the SMP operator the obligation of publishing a Reference Duct Access Offer and a Reference Posts Access Offer (asymmetric regulation). Decree-Law no 123/2009, includes a set of provisions aimed to ensure an open access to present and future infrastructures that, on account of their particular features, are suitable for the accommodation of electronic communications networks. Note that these sets of rules are also applicable to public bodies which are submitted to a framework of symmetrical regulation.

Following the transposition of the BB CRD in 2017, Portugal has pursued the operation of the single contact point. As stated above, the main issues are related to the characterization of the mapping objects related to antenna installations and to building entrances.

3. Regulatory function

Seven markets in Portugal are currently regulated: the five markets susceptible to *ex ante* regulation according to the Commission Recommendation on relevant markets of 2014[421], the market for call origination on fixed network for the provision of retail telephony services (market 2 of the Recommendation on relevant markets of 2007[422]) as market for call origination on the public telephone network at a fixed location for the provision of special

[421] Commission Recommendation of 9 October 2014, on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (*OJ L 295, 11.10.2014, p. 79–84*).

[422] Commission Recommendation of 17 December 2007, on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (*OJ L 344, 28.12.2007, p. 65–69*).

services supported in non-geographic numbers (market 2 of the Recommendation on relevant markets for 2007) was deregulated in 2017 and the market for trunk segments of leased lines (market 14 of the Recommendation on relevant markets of 2003[423]).

Regarding the market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1/2014), ANACOM imposed specifications to IP interconnection = that impact all operators, including changes to the reference interconnection offer of MEO, based on a proposal submitted by MEO[424]. The Commission did not comment.

Regarding the wholesale voice call termination on individual mobile networks (market 2/2014), in July 2017, the maximum mobile termination rate (MTR) was set at 0.75 EUR/cents per minute[425]. Since 2015, MTRs in Portugal have decreased more than 40%[426].

In 2016[427], ANACOM reviewed the fixed termination markets and set a new maximum fixed termination rate (FTR) based on an updated version of the pure BU-LRIC cost model. Maximum FTRs were set at 0.0644 EUR/cents per minute from early 2017[428]. It was also decided to set new maximum rates from October 2017 corresponding to the values given by the cost model for those years, adjusted by the inflation value. Currently the new maximum rate that is in place is 0.0635 EUR/cents per minute.

Regarding the market for wholesale market for origination at a fixed location (market 2/2007), part of this market is still subject to *ex-ante* regulation in Portugal. In October 2017, ANACOM notified to the European Commission a draft measure defining two product markets: (i) wholesale call origination market on the public telephone network provided at a fixed location to allow the provision of telephony services (calls to geographical numbers) and (ii) wholesale call origination market on the public telephone network provided at a fixed location to allow the provision of special services (calls to non-geographical numbers). ANACOM proposed to continue regulating the first market, maintaining MEO as the SMP operator (with the obligations to provide a WLRO and CS/CPS) whilst deregulating the second one. Following the European Commission's serious doubts as to the compatibility of the proposed SMP designation with EU law, in November 2017, ANACOM decided to withdraw the notified draft measure regarding the first product market. As per the second product market, the Commission agreed with the deregulation of this market which f took place in December 2017.

---

[423] Commission Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services (*OJ L 114, 8.5.2003, p. 45–49*).

[424] MEO's proposal was submitted following a specific request by the regulator to submit a proposal for an IP interconnection architecture within 4 months following the publication of the final measure. Such obligation was imposed in the context of the full market review in 2016 as part of the access obligation.

[425] Please note that the last market review for mobile termination markets was completed in August 2015.

[426] By decision of 18 January 2018, ANACOM has approved draft decision on the wholesale market for voice call termination on individual mobile networks (market 2 of Commission Recommendation of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, *OJ L 295, 11.10.2014, p. 79–84*) in which the new proposed maximum rate further decreases.

[427] Case PT/2016/1932, C(2016) 7887.

[428] Such rate applies for termination at the local and the single transit (regional) levels. As to the rate applicable at the double transit (national) level, ANACOM proposes to leave it to commercial negotiations.

In March 2017, ANACOM approved the final decision on the market for wholesale local access provided at a fixed location (market 3a/2014) and the market for wholesale central access at a fixed location for mass-market products (market 3b). ANACOM did not follow the European Commission's Recommendation of November 2016[429] to impose access obligations in relation to the optical fibre network of MEO, either in the non-competitive areas in general or in the predominantly rural parishes of those non-competitive areas. In the market 3a review, ANACOM concluded that, notwithstanding the market developments in terms of NGA, it remains essential to maintain the obligation of unbundled access to the copper loop, comprised in the Reference Unbundling Offer (ORALL) of MEO, the SMP operator. On 16 November 2017, ANACOM approved the draft final decision notified to the European Commission, concerning changes to the Reference Unbundling Offer.

The take-up of copper local-loop unbundling (LLU) is steadily decreasing. In the third quarter of 2017 the volume of unbundled loops comprised around 1.9% of total broadband accesses. Take-up of copper bitstream is also steadily decreasing. In the third quarter of 2017 those accesses were around 0.32% of total broadband accesses.

Regarding the market for wholesale high-quality access provided at a fixed location (market 4/2014)[430], ANACOM approved amendments to the Leased Lines Reference Offer (ORCA) and the Reference Ethernet Leased Lines Offer (ORCE)[431].

According to the Multi-Annual Activities Plan of ANACOM for the period 2018-2020, it is foreseen to begin a new analysis of markets 1, 2, 3a, 3b and 4 of the 2014 Recommendation in the beginning of 2018. Regarding the market for wholesale trunk segments (market 14/2003), in 2016 the Commission invited ANACOM to closely monitor the developments of competition in this market taking into account the relevance of new fibre networks and the take-up of passive infrastructure access products such as ducts. ANACOM will monitor the CAM circuits (connecting the mainland and the Atlantic islands of Azores and Madeira) and inter-island circuits' (circuits connecting the islands of Azores), both without distinction of speed, with the purpose of maintaining cost-oriented prices, following a yearly price analysis imposed in the context of the market analysis.

There is no data for take-up of high quality services (typically non-standard products), but the demand for traditional leased lines is steadily decreasing – in the third quarter of 2017 there were less than 2 000 leased lines – and the demand for high quality Ethernet services is slowly increasing – in the third quarter of 2017 there were around 1 000 Ethernet leased lines.

4. Consumer matters

In 2017, ANACOM received 58 000 consumer complaints related to electronic communications were filed in the Portuguese Complaints Book, physically available in all electronic communications service providers' stores and also electronically, through a government's website. The start of operation of the Electronic Claims Book, on 1 July 2017, has brought a significant increase in the number of complaints registered by ANACOM. The main subjects of these consumer complaints were service billing, mobile devices and the termination of contracts. Regarding the complaints directly submitted to ANACOM (14 000),

[429] Case PT/2016/1888-1889, C(2016) 7674.
[430] And also the market for trunk segments of leased lines (market 14/2003)
[431] Case PT/2017/2006, C(2017) 6716.

the main issues complained about were the termination of contracts, lack of or misleading contractual information, service billing and service malfunction[432].

During the second half of 2017, following an ANACOM recommendation, operators began to integrate in the free ANACOM tariff comparison and simulation tool (named COM.escolha) information on the intra-EEA roaming communications included in each domestic tariff plan[433].

In 2017 two new tariff comparison tools (free of charge) were launched by private entities. The first tool allows the comparison of "TV Net Voice" bundled tariff plans made available by the four main operators in Portugal[434]. According to ANACOM this tool does not comply with several key principles for comparison tools of the European Commission. The second tool helps users to obtain "the best proposal". In the Ministry's view, this new tool may raise data protection and privacy issues.

In February 2017, ANACOM decided to initiate the regulatory procedure to amend the Regulation on pre-contractual and contractual information (Regulation no. 829/2016) which required its temporary suspension as well as a stakeholders' consultation procedure. The final decision is currently under preparation. The new regulation namely seeks more flexibility regarding the media to be used in providing the Simplified Information Sheet (FIS) in pre-contractual and contractual situations to end-users as well as to adapt the FIS template to the existing offers.

Pursuant to ANACOM's Decision of 13 July 2017, operators which made contractual changes (mainly price increases) subsequent to the entry into force of Law no. 15/2016 of 17 June and which did not previously and timely notify their customers as to these increases and as to the option of customers to terminate their contracts, were required to advise these customers that they have the right to terminate the contracts without any cost or alternatively obtain restoration of the same conditions as they had prior to the contractual changes taking effect.

a. Roaming

Following the introduction of Roam Like at Home[435] (RLAH) in June 2017, Portuguese subscribers consumed 1.7 times more voice (calls made) and 4.7 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[436].

Last year, Portuguese national operators reported data that indicate that intra-EU/EEA roaming communications increased substantially, in particular for data roaming communications. In fact, voice calls made, voice calls received, SMS and data roaming communications increased, respectively, 66%, 49%, 98% and 370%, from the third quarter 2016 (where the RLAH+ rules were already in force) until the third quarter 2017 (the first quarter since the RLAH rules applied).

[432] The reported data are provisional and may be subject to changes.
[433] This tariff comparison and simulation tools are available to the public on ANACOM's portal consumer webpage, at https://www.anacom.pt/tarifarios/.
[434] This comparator named ComparaJá.pt is available at https://www.comparaja.pt/tv-net-voz.
[435] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[436] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

Based on the number of subscribers of the Portuguese national operators that were roaming at least once in the concerned quarter in the EEA, the intra-EEA roaming communications traffic per user also increased substantially in 2017, in particular for data roaming communications.

ANACOM is still evaluating some possible RLAH non-compliance situations by one MVNO and has also concluded that two MVNOs and some MNOs need to improve transparency in their websites. Some of this lack of transparency issues has already been corrected by operators[437].

The inclusion in the Portuguese regulatory framework of the sanctioning regime applicable to any failure to comply with the provisions of EU Regulation 2015/2120[438] still requires the amendment of the Portuguese Electronic Communications Law.

ANACOM reports that for most tariff plans, a benchmark made by the Body of European Regulators for Electronic Communications (BEREC) of the ratio "revenues/traffic" (average prices) is no longer possible for domestic mobile communications and for roaming intra-EEA communications. A harmonized methodology to be used by all EEA providers shall be defined.

Regarding roaming compliance, since 15 June 2017, ANACOM received 63 complaints mostly related to billing complaints (providers not applying automatically RLAH tariff or users unawareness of the new roaming rules) and less frequently related to the lack of or to wrong information of the fair use policy (FUR), roaming in planes/ships, roaming block.

b. Net neutrality

With the adoption of the Telecoms Single Market (TSM) Regulation, net neutrality is fully harmonised at EU level with directly applicable rules that do not need to be transposed. As with all Member States, the Commission has been monitoring whether Portugal, which has no law covering this area, adopted the TSM Regulation and complies with the guidelines issued by the Body of European Regulators for Electronic Communications BEREC, or whether it deviates from these guidelines. The authorities report that there is no indication of situations of non-compliance with the provisions of the TSM Regulation, in particular, as under the regime set out in Article 3. Nevertheless, a number of issues are still being examined in more detail, such as zero-rating or equivalent offers[439]. As regards the provisions of Article 4 of the TSM Regulation, some improvements are needed in terms of the transparency of information transmitted to end-users.

ANACOM has the necessary powers to monitor and enforce net neutrality rules. Nevertheless, as indicated above, the amendment of the Electronic Communications Law to

[437] The application of RLAH rules in the scope of zero-rating and similar offers was subject of an ANACOM draft decision (February 2018) that is currently under public consultation. After approval of the final decision, operators will have 40 days to correct non-compliant ZR or similar offers.

[438] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[439] The application of RLAH rules in the scope of zero-rating and similar offers was subject of an ANACOM draft decision (February 2018) that is currently under public consultation. After approval of the final decision, operators will have 40 days to correct non-compliant ZR or similar offers.

include the sanctioning regime applicable to any EU Regulation 2015/2120[440] infringement is still pending.

For the time being ANACOM has not published information or guidelines for ISPs to support the implementation of the transparency measures included in Article 4 of the TSM Regulation. However, as indicated in the Consumer matters section above, ANACOM is preparing the final decision on the amendment of the Regulation on contractual and pre-contractual information (FIS). Nevertheless, following the monitoring in 2017 of the implementation by the internet service provider (ISP) of the transparency measures included in Article 4 and also considering that the operators, after the approval of the mentioned Regulation, will have to implement during 2018 several changes to the contracts and to the pre-contractual information included in their websites, ANACOM is evaluating the possibility of preparing also in 2018 some recommendations or communications to operators in order to support or improve the implementation of the transparency measures included in Article 4.

ANACOM provides a monitoring tool on speed and other quality of Service (QoS) parameters[441], whose underlying infrastructure is now being upgraded, in view of the possible future announcement of the tool as certified for the purpose of Article 4(4) of the Regulation. ANACOM is currently assessing the compatibility with net neutrality rules of relevant offerings in the Portuguese market[442].

c. 112

According to the last Communications Committee (COCOM) 112 Implementation Report, calls to the emergency number 112 are answered within five seconds and users with disabilities can use SMS to a long number by the National Guard as an alternative means of access. No more alternative use is provided yet. In Portugal, 112 is the single emergency number, thus no alternative emergency numbers are available. There is a Government initiative in the "Simplex+2017" program regarding the implementation of Advance Mobile Location (AML) for Android handsets. ANACOM is working with the Internal Administration Ministry and operators to implement it next year.

d. Universal service

On 29 April 2016 the Commission had sent a Reasoned Opinion to the Portuguese Authorities concerning the compensation mechanism for universal service. The Commission considered that the mechanism is in breach with the Universal Service Directive, as it obliges operators to compensate retroactively for net cost incurred.

A public consultation on the future of universal service[443] closed in the summer of 2017.

---

[440] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[441] Please see https://netmede.pt

[442] As per ANACOM's draft decision on February 2018 already mentioned in footnotes 23 and 26, ANACOM is currently analysing comments received within the public consultation on zero-rating and equivalent offers, in order to prepare a final decision.

[443] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

The designation procedure(s) and the need for having a designated universal service provider for some components of the universal service were some of the topics covered in this public consultation. ANACOM is expected to make recommendations to the Government in the first half of 2018 which will decide upon it.

Very low levels of demand for fixed telephony access and very low levels of usage of directory services and payphones may suggest significant changes in the provision of those US. This issue is still under consideration and a final decision in this regard is foreseen to be taken by the Government.

5. Conclusion

The extensive deployment of FTTH places Portugal in a good position to achieve the European broadband coverage objectives for 2020 and 2025. Still, an additional effort is required to reach the last 5% of households without NGA coverage and to increase take-up. Moreover, the number of consumer complaints is very significant. However, ANACOM is looking closely into this issue and there are some regulatory actions foreseen to aim for the reduction of consumer complaints. Broadband take up, both in fixed and mobile, improved in 2017 but still remains a challenge for the Portuguese market. The complex socioeconomic reasons for this situation can be tackled from different policy angles, including improving digital knowledge among citizens. However, competition and pricing issues must not be overlooked, especially in rural areas where fixed infrastructure competition is less feasible.

ROMANIA

Market developments

1. Competitive environment

Fixed broadband prices	RO-2016	RO-2017	EU-2017
Fixed broadband price index [values between 0-100]	85	87	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

In 2016 telecom revenues totalled €3.33 billion, slowly growing in the past three years. Meanwhile, the retail broadband revenues steadily increased in recent years, reaching €0.83 billion in 2016 (€0.69 billion in 2015).

a. Fixed Markets

Fixed broadband market shares	RO-2016	RO-2017	EU-2017
Incumbent market share in fixed broadband	24.9%	23.2%	40.3%
Technology market shares			
DSL	22.3%	19.0%	64.2%
Cable	17.8%	17.9%	19.4%
FTTH/B	50.6%	54.5%	12.9%
Other	9.3%	8.6%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	RO-2016	RO-2017	EU-2017
Own network	83%	83%	0.5%
Full LLU	17.5%	17.5%	72.8%
Shared Access	-	-	4.1%
Bitstream	-	-	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

The strong infrastructure-based competition in Romania, mainly in urban areas, is reflected in the indicators where the country's performance is outstanding, namely the fast broadband take-up. A significantly higher ratio of the total number of homes (53%) are subscribing to fast broadband (>=30 Mbps) than the EU average of 33%. With almost three times as many subscriptions to ultra-fast broadband (43.8% of subscriptions to >100 Mbps, second place in the EU), Romania largely outperforms the EU average of 15.4%. This is due to the large share of fibre deployment in the market. In the fixed broadband market, an alternative operator has the biggest market share by relying on FTTx infrastructure, and further increased its market share over 2017.

As the technologies' market shares suggest, the Romanian broadband market is characterised by platform-based competition, while there is marginal uptake of DSL subscriptions by new entrants. As of 31 December 2017, only 21 unbundled local loops were reported. Only very small alternative operators have 'legacy' DSL networks that were historically part of the

incumbent's network. With the incumbent's market share of DSL lines close to 100%, in 2017 the DSL subscriptions' share in the fixed broadband market by technology slid to 19%. While DSL uptake is insignificant, over 40 000 dark fibre circuits to the end-user were made available to other suppliers as part of commercial agreements.

Coverage	RO-2016	RO-2017	EU-2017
Fixed broadband coverage (total)	89%	88%	97%
Fixed broadband coverage (rural)	82%	83%	92%
Fixed NGA coverage (total)	72%	74%	80%
Fixed NGA coverage (rural)	34%	39%	47%
Ultrafast coverage (total)	no data	73%	58%
4G coverage (average of operators)	45%	72%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

In 2017 Romania continued to progress slowly towards achieving the Digital Agenda for Europe objectives. However, Romania's fixed broadband coverage stagnated around 88% in the past year and still lags behind other Member States (27th in the EU according to the Digital Economy and Society index). Broadband take-up reached 67% of households but was still below the EU average of 75%. Romania's urban-rural digital divide is best illustrated by the figures for next-generation access (NGA) coverage, where under 40% of rural areas are covered. Romania also lags behind on mobile 4G broadband coverage despite the leap from 45% in 2016 to 72% in 2017 (the EU coverage average is 91% of households, average/operator).

On the broadband market 653 operators provide fixed broadband internet access, of which 27 by cable network, 164 by fibre, 161 by radio, 5 by xDSL and 516 by UTP/FTP cable. There has been a steady growth in fixed broadband connections over recent years, reaching 4.62 million in July 2016.

In the first half of 2017, 25 new entrants were registered to provide fixed broadband services through optical fibre, radio or UTP/FTP access technologies. 73% of the households are covered by ultrafast broadband (with speeds above or equal to 100 Mbps).

The NRA found evidence of increasing fixed-to mobile substitution in the retail market for access to fixed telephony services. Considering the total number of subscriptions for telephony services (fixed and mobile), the share of mobile subscriptions was of 75%, as of 30 June 2017. On 30 June 2017 there were 31 suppliers of telephony services through VoIP, while 19 suppliers offered managed VoIP services. The number of managed VoIP lines as of 30 June 2017 was 2.2 million of which approximately 12% were business users. The total managed VoIP-originated traffic represented 47 % of the total voice traffic through fixed networks in the first half of 2017.

b. Mobile market

Mobile market	RO-2016	RO-2017	EU-2017
Market share of market leader	40%	40%	35%
Market share of second largest operator	29%	30%	28%
Number of MNOs	5	5	-
Number of MVNOs	1	2	-
Market share of MVNO (SIM cards)	0.4%	0.2%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

There are six mobile operators offering voice services in the Romanian market, while seven operators provide mobile broadband internet access services.[444] One national roaming agreement is in place. By the end of 2017, one mobile network virtual aggregator (MVNA) and four mobile virtual network operator (MVNO) agreements were submitted to ANCOM. Passive network sharing agreements are in place between all mobile network operators and one includes a utility company.

Mobile broadband prices [EUR/PPP]	RO-2016	RO-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€19	€21	€24
Least expensive offer for tablet and laptop (5 GB basket)	€20	€10	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Overall, mobile broadband price trends changed since last year[445] in Romania. The price levels vary compared with the EU average depending on the device on which broadband is used: the offer for the least expensive 1 GB+300 min calls service is still below the EU average (21 EUR/PPP versus 24 EUR/PPP) while the least expensive offer for tablet and laptop for a 5 GB service significantly decreased well below the EU average (10 EUR/PPP versus 17 EUR/PPP).

The average revenue per minute in voice mobile communications was € 0.0143 in 2016. For the same period, the average revenue per user in mobile communications was €47.7.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Romania 73% of the spectrum harmonised at EU level for wireless broadband has been assigned.

Starting with 26 June 2017, ANCOM conducted a public consultation on awarding new rights of radio spectrum use in the new harmonised WBB bands, i.e. 694-790 MHz (the 700 MHz band) and 1452-1492 MHz (the 1.5 GHz band), as well as in the sub-bands not awarded during the selection procedures held in 2012 and 2015 for the 800 MHz (one block of 2x5 MHz), 2.6 GHz (8 blocks of 2x5 MHz) and 3400-3600 MHz bands (2x10 MHz and 2x15 MHz).

The 700 MHz band is already available at national level for WBB communications services, but it can only be used efficiently if the band is not used for digital terrestrial television on the territory of neighbouring countries, whether Member States or non-EU countries.

As for the 470 - 694 MHz band (sub-700 MHz band), this band is in use for terrestrial digital television (DVB-T2). In February 2017 ANCOM completed the fourth auction launched in December 2016 for two Digital Terrestrial Television Multiplexes. Following the four

[444] One operator is majority owned (more than 50%) by a Mobile Network Operators operating in the Romanian market, therefore it is not counted in the table above as MVNO

[445] Based on the February 2016 price survey.

auctions organized so far, three national multiplexes have been awarded to the National Broadcasting Company, this company winning the free to air multiplex and two other multiplexes in the UHF band. Moreover, twelve regional multiplexes and three local multiplexes have been awarded.

b. National and EU investment in broadband

For the 2014-2020 financial framework, the Romanian Operational Programme for Competitiveness (2014-2020) has earmarked €100 million from the European Regional Development Fund (ERDF), while the 2014-2020 Rural Development Operational Programme has allocated €25 million from the European Agricultural Fund for Rural Development (EAFRD).

However, the RoNet project to support deployment of backhaul networks in 'white areas' had ERDF financing of €57 million in the previous financing period but could only absorb €12.6 million by the end of the eligibility period (December 2015). Consequently, Romania re-allocated structural funds (€44.95 million from the ERDF) to finalise the RoNet project in the current financing period, ensuring broadband backhaul infrastructure for 684 localities. At the end of 2017 the authorities reported the reception of works in 212 localities while in 367 localities the works are finalized and ready for reception.

For a significant part of the remaining white areas, a grant scheme of €65 million (€55.45 million finances from ERDF) will provide support to private operators for deploying last-mile access infrastructure. A public consultation was launched in September 2017 by the Ministry of Communications and information society on the grant scheme. The state aid scheme is under preparation and the call is planned to be launched in the first semester of 2018.

ANCOM has well defined competences with regard to publicly financed broadband infrastructures. The conditions of open access to publicly financed network/infrastructure must be approved by ANCOM and it also has the power to monitor the conditions of open access. However, it is the funding authority that enforces penalties in the event of failure to comply with the open access obligations. ANCOM has the competence to draw up the 'white areas' map on the basis of the information provided by electronic communications network providers.

c. Implementation of the Broadband Cost Reduction Directive

In July 2016 Romania notified the Commission the measures it had taken to transpose the Directive[446] into national law, specifically through Law No 159/2016 on the regime of physical infrastructure for electronic communications networks and laying down measures to reduce the cost of deploying electronic communications networks[447] (Infrastructure law). The respective infringement procedure was closed and the Commission is in the process of assessing the compliance of the transposition measures notified by Romania with the Broadband Cost Reduction Directive, in particular with regards to the setup of the single information point (SIP). Under the Infrastructure law ANCOM's decision to set up the SIP was due in October 2016. ANCOM adopted the decision on the establishment of the Single

[446] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[447] *Lege nr. 159/2016 privind regimul infrastructurii fizice a reţelelor de comunicaţii electronice, precum şi pentru stabilirea unor măsuri pentru reducerea costului instalării reţelelor de comunicaţii electronice*.

Information Point only in December 2017, as well as on the establishment of the conditions and modalities for sending information on the physical infrastructure of network operators.

The powers vested in the NRA by the Infrastructure Law could solve the bottleneck caused by the difficult permitting process for physical infrastructure roll-out. ANCOM is tasked with setting maximum tariffs for access to public property, based on the principle of justification and proportionality to the damage of the respective public property, and taking into account some tangible and intangible benefits. These tariff caps shall serve only as a reference limit in the negotiation of access conditions with state or local authorities. Currently, each local authority has its own permitting procedure and conditions that seriously hampers the deployment of telecom infrastructure. Although under the Infrastructure law the decision of ANCOM's president was due in April 2017, the maximum fees are still not determined.

Another provision welcomed by the industry at the time of the adoption of the Infrastructure law was the mandate given to ANCOM, the Ministry of Communications and Information Society (MCSI) and the Ministry of Regional Development and Public Administration (MDRAP) to establish through a joint decision technical norms for the design and development of physical infrastructures and electronic communications networks, as well as on the technical regulations on the design and development of constructions on which they are deployed. This measure was supposed to streamline the cumbersome authorisation procedures at local level and was supposed to be adopted by July 2017 the latest, under art 29.3 of the Infrastructure law. There is still no foreseeable date for the adoption of the technical norms.

ANCOM shall also establish recommended tariffs for access to various categories of physical infrastructure. These will serve as a reference in the negotiation of contracts to exercise the right of access to infrastructure but there is no indication as to when these will be published. In 2017, after more than one year from the entry into force of the infrastructure law, there were no signs of a significant increase of the number of agreements for infrastructure access. ANCOM expects that the publishing of the recommended access tariffs would boost the shared use of infrastructure.

The NRA was given responsibility for the new dispute resolution mechanism. In 2017 no dispute was brought before ANCOM under the Infrastructure law.

3. Regulatory function

In 2017 the independence and regulatory capacity of ANCOM was severely tested. The Commission raised its concerns in 3 political letters by the Director General of DG CNECT in order to urge the Romanian authorities to ensure independence and regulatory capacity of the national regulator.

In April 2017, the NRA was in a decision making vacuum because of the lack of leadership after the voluntary resignation of the former president of ANCOM. Meanwhile, under the draft public sector budgetary remuneration legislation the NRA was under the threat to lose the adequate financial and human resources to carry out the tasks assigned to them under the regulatory framework (Art 3(3) of the Framework Directive).

The Romanian Government adopted Emergency Ordinance no. 33 of 27 April 2017 amending Emergency Ordinance no. 22 of 2009 on the statutory provisions of ANCOM with the purpose of changing the appointing authority of the President of ANCOM: instead of the President of the Republic this power was vested on the Romanian Parliament.

On 11 May 2017 a new president of ANCOM was appointed by the Romanian Parliament. In June 2017 ANCOM was exempted from the applicability of the public sector remuneration legislation. On 20 October the head of NRA resigned amidst accusations of mismanagement by the Parliamentary Committees of the Romanian Parliament.

On 8 November 2017 the former prime minister Sorin Grindeanu, was appointed by the Parliament to lead the NRA.

On 19 December 2017 the Emergency Ordinance no. 33 of 27 April 2017 was amended by the Romanian Parliament to allow the de jure dismissal of the leadership of ANCOM on the basis of the rejection of the yearly report on ANCOM's functioning by the Parliament, while no judicial control of the dismissal decisions is ensured. These amendments were adopted despite the warning of the Commission services that they could seriously undermine the independence of the National Regulatory Authority. The Parliament sent the Law of approval of Emergency Ordinance no. 33, with amendments for promulgation to the President of Romania. On 15 January 2018 the President of Romania contested in Constitutional Court the Law of approval of Emergency Ordinance no. 33, with its amendments, on the following grounds:

a) Objective lack of emergency at the time of adoption of Emergency Ordinance no. 33

b) Disregard of the principle of bicameralism

c) Conflict with EU law, suggesting that the relevant question could be sent for preliminary ruling to the CJEU.

Since 2015 ANCOM deregulated markets 3a (wholesale local access) and 3b (wholesale central access) covered by the 2014 Recommendation.

On 5 October 2017, the European Commission launched an infringement procedure against Romania for significant delays, of over five years, of the analysis of the following markets: markets 1 and 2 of the 2014 Recommendation, market 4 of the 2014 Recommendation (initial due date in 2014); market 18 of the 2003 Recommendation (initial due date in 2012).

Subsequently the Romanian authorities notified the analysis of the termination markets on 10 October 2017. In its notification ANCOM proposed to maintain the current symmetric FTR cap of 0.14 eurocents/min and symmetric MTR cap of 0.96 eurocents/min during the upcoming regulatory period. The Commission by its Decision of 9 November 2017 opened a Phase II investigation pursuant to Article 7a of Directive 2002/21/EC. The Commission expressed serious doubts that ANCOM’s proposal to maintain the currently applicable FTRs and MTRs, which were set in 2014 on the basis of a cost model that is no longer up to date, meets the policy objectives and regulatory principles enshrined in Article 8(2) and Article 16(4) of the Framework Directive. The Commission also expressed concerns that the draft measure was not compliant with Articles 8(4) and 13(2) of the Access Directive and that it would create barriers to the internal market. Following the Commission's decision ANCOM withdrew the notification and re-notified the market analysis of the above markets on 17 November 2017. In its decision of 8 December 2017 the case was closed with the comments of the Commission that took note of the proposal to decrease both the FTRs and MTRs by way of transitional measures that can be quickly adopted and remain in place until a new LRIC model is finalised. The Commission urged ANCOM to start revising its cost model, so that the (soon to be adopted) transitional rates can be replaced by new cost-efficient rates

within the shortest time possible. On 22 December 2017 ANCOM launched a national consultation[448] that ran till 31 January 2018 on a transitory measure concerning the level of MTR to be applied until the new BU-LRIC model is finalised. The proposed[449] tariff of 0.84 eurocents/min. has been set on the basis of an EU benchmark of pure LRIC average as of July 2017.

On 14 November 2017 ANCOM notified the analysis of market for broadcasting transmission services mentioned above proposing the deregulation of the market. The Commission closed the notification with no comments on 13 December 2017.

In 2017, 101 IP interconnection agreements were submitted to ANCOM, of which 92 were IP transit agreements for voice services. Seven operators notified 91 IP international transit agreements. Large operators still require SS7 interconnection for voice termination. ANCOM imposed an IP interconnection obligation as a remedy on the fixed and mobile termination markets which will enter into force starting 1 January 2019, but not sooner than 6 months after issuing the national technical specifications. ANCOM is in the process of defining these national technical specifications.

4. Consumer matters

a. Roaming

ANCOM is vested with the necessary powers to enforce the provisions of the Roaming Regulation[450]. According to article 142 point 55 from the GEO no. 111/2011, non-observance of the obligations deriving from the regulations of the European Union in the field of electronic communications and terminal equipment, where the competence of monitoring and verification of the compliance with these obligations belongs to the national regulatory authority constitutes a contravention.[451]

On 30 June 2017 ANCOM granted a sustainability derogation to the MNO RCS/RDS S.A. on the basis of Articles 6 to 9 of the Commission Implementing Regulation (EU) 2016/2286. ANCOM allowed the operator to levy certain surcharges, in addition to the domestic tariffs, for the regulated roaming services provided to their customers within the EEA for a 12 month period.

ANCOM monitored the compliance of national operators with the RLAH rules as of their entry into force. There were no indication of increase in tariffs for domestic-only bundles before or after 15 June 2017.

[448] http://www.ancom.org.ro/formdata-269-49-348

[449] The draft measure has been notified to the Commission (case RO/2018/2065). The Commission examined the notification and had no comments. See Decision C(2018) 1981 final of 26 March 2018.

[450] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[451] Article 143 of the Government Emergency Ordinance No 111/2011: Contraventions will be sanctioned:
a) with fine ranging from RON 5 000 (€1 100) to RON 60 000 (€13 000) and, if there are repeated breaches, with a fine of up to RON 100 000 (€22 000);
b) […] for persons with a turnover exceeding RON 3 000 000 (€667 000), with fine of up to 2% of turnover, and, if there are repeated breaches, with fine of up to 5% of turnover.

Following the introduction of Roam Like at Home[452] (RLAH) in June 2017, Romanian subscribers consumed 3.7 times more voice and 7.8 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[453]

Certain retail offers were under the investigation of ANCOM in 2017:

Certain pre-paid retail offers by various operators in Romania were under the investigation of ANCOM in 2017. The roaming-enabled offers were sold at a higher price or with comparatively less benefits than the domestic-only offers. Following the intervention of ANCOM, the concerned operators corrected their offers and included additional volumes in the roaming offers with higher prices.

According to ANCOM's assessment all operators complied with RLAH rules by 29 November 2017.ANCOM received approximately 150 roaming related complaints on the following issues:

- Domestic-only tariff plans (the domestic benefits are not available for roaming as the end users have expected)
- Surcharges applied by RCS & RDS as a result of the sustainability derogation requested by this provider
- FUP rules currently applied by providers (especially Vodafone) for roaming services (the rules, including those establishing the monitoring period, are not clear, burdensome means of proof of stable links etc.)
- New roaming options that offer much less traffic included than the domestic ones for the same tariffs;
- Data caps for roaming (lack of information, non-appliance of data caps).

b. Net neutrality

According to the notification sent by the Romanian authorities on 16 May 2016, ANCOM is vested with powers to enforce Regulation (EU) 2015/2120[454]. Non-observance of Articles 3, 4 and 5 of Regulation (EU) 2015/2120 triggers the application of sanctions pursuant to Article 143 of GEO Government Emergency Ordinance No 111/2011[455].

[452] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[453] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[454] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[455] Article 143 of the Government Emergency Ordinance No 111/2011: Contraventions will be sanctioned:
a) with fine ranging from RON 5 000 (€1 100) to RON 60 000, (€13 000) and, if there are repeated breaches, with a fine of up to RON 100 000 (€22 000);
b) […] for persons with a turnover exceeding RON 3 000 000 (€667 000), with fine of up to 2% of turnover, and, if there are repeated breaches, with fine of up to 5% of turnover.

c. 112

Caller location information requirements are set out in ANCOM Decision 1023/2008, as amended. Caller location accuracy is based on the cell ID provided by the mobile network operator, or on the installation address if calls are placed via fixed networks. ANCOM's decision is adapted since 18 November 2016 to extend the scope of obligations on operators to handset handset-based caller location implementation. However, the Advanced Mobile Location is not yet deployed in the Romanian PSAP system. End users with disabilities may access emergency services through SMS to the 113 number while location is ensured for users of this service.

In April 2017 95% of Romanian citizens recognised 112 as a national emergency number and 71% as the European emergency number.

d. Universal service

In 2017, an internal report of ANCOM on users' needs, that will be followed up in 2018, concluded that access to public payphones, directory enquiry services and directories of subscribers should be removed from the scope of the universal service obligations[456]. ANCOM will organise a public consultation in order to define the best-effort speed for "functional internet access".

5. Conclusion

Romania lags behind regarding both fixed and 4G coverage. The Romanian legislative framework, the Infrastructure law in particular, allows the removal of bottlenecks for broadband network deployment, in particular the cumbersome authorisation and permitting process at local level. A better coordination between national ministries, ANCOM and local authorities is needed to deliver outstanding secondary legislation that would ensure a streamlined assistance to operators interested to invest in broadband.

In 2017 the 5G consultation organised by ANCOM is seen as an important step for the organisation of the upcoming 5G auction.

The importance of an independent and effective national regulatory authority in a liberalised electronic communications market is paramount under EU legislation. The amendments adopted by the Parliament to ANCOM's statutory law in December 2017 are under scrutiny of the Commission services.

[456] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

SLOVAKIA

Market developments

1. Competitive environment

According to the Slovak national regulatory authority (RÚ) the evidence for fixed-to-mobile substitution with regard to voice services is evident as such services are available on both, fixed and mobile, platforms. On wholesale voice call termination level, RÚ considers the fixed termination and the mobile termination as two different wholesale markets.

Telecommunications services are offered mainly as bundled offers of various services, including multimedia services. In recent years most significant growth can be seen in offers containing broadband service IPTV in form of double play and triple play.

The owners of two Slovak fixed operators SWAN and BENESTRA announced in May 2017 their intention to merge in order to create the largest domestically-owned alternative operator in Slovakia. The two firms will initially concentrate on combining their respective networks before investing in infrastructure. While SWAN's focus in the fixed line sector is predominantly on residential users, BENESTRA concentrates on the business market. SWAN is also active in the country's mobile market via SWAN Mobile, which trades under the '4ka' brand. Merger clearance procedure was launched by the Slovak NCA on 28 July 2017[457].

The Slovak legislator amended in 2017 the law on electronic communications with effect from January 2018 with regard to the identification of public interest, which is a prerequisite to gain access by a telecom undertaking to immovable property owned by third parties. The Slovak legislator introduced an open-ended enumeration of potential situations where the aim to serve the public interest is present and it now stipulates that public interest is present also in case of a telecom undertaking operating a nationwide network, which according to stakeholders seems to discriminate those operators who do not operate a nationwide network, e.g. local operators.

Slovakia has prolonged the applicability of the special levy on regulated sectors, including the electronic communications, despite the fact that it was originally designed as a measure to tackle the impact of the global financial crisis on the national budget.

Fixed broadband prices	SK-2016	SK-2017	EU-2017
Fixed broadband price index [values between 0-100]	88	88	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The fixed broadband price index in Slovakia confirmed its value which is above EU average.

a. Fixed Markets

[457] The NCA merger clearance decision was made in April 2018.

Coverage	SK-2016	SK-2017	EU-2017
Fixed broadband coverage (total)	88%	89%	97%
Fixed broadband coverage (rural)	91%	91%	92%
Fixed NGA coverage (total)	75%	79%	80%
Fixed NGA coverage (rural)	38%	44%	47%
Ultrafast coverage (total)	no data	68%	58%
4G coverage (average of operators)	71%	82%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Slovakia has made very slight progress on total fixed broadband coverage with 89% of households covered (88% previously) but is still below the EU average (97%). Fixed broadband coverage in rural areas with 91% remained unchanged and appears almost on EU average (92%).

Fixed broadband take-up decreased to 70% of households (72% previously) and is still below the EU average (75%).

Slovakia has made some progress on fast broadband total NGA coverage with 79% of households covered (75% previously) and appears almost on EU average (80%). Fast broadband NGA coverage in rural areas has made some progress with 44% (38% previously) but is still below the EU average (47%). Slovakia has made some progress on fast broadband take-up with 29% of homes covered (23% previously) compared to an EU average of 33%.

Slovakia performed very well on ultrafast broadband coverage with 68% of households covered and is well above EU average (58%). Slight progress has also been made on ultrafast broadband take-up with 9.62% of homes subscribing (8.3% previously), still below EU average (15.4%).

4G coverage increased to 82% (71% previously) but remained below the EU average (91%).

New entrants' DSL subscriptions by type of access (VDSL excluded)	SK-2016	SK-2017	EU-2017
Own network	0%	0%	0.5%
Full LLU	0.3%	0.4%	72.8%
Shared Access	-	-	4.1%
Bitstream	99.6%	99.6%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

The DSL subscriptions offered by new entrants rely to great extent on bitstream access (99.6%) while full LLU access plays only a very marginal role (0.4%).

Fixed broadband market shares	SK-2016	SK-2017	EU-2017
Incumbent market share in fixed broadband	34.2%	35.1%	40.3%
Technology market shares			
DSL	37.1%	36.3%	64.2%
Cable	12.9%	12.2%	19.4%
FTTH/B	26.9%	28.6%	12.9%
Other	23.1%	22.9%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

The incumbent market share in fixed broadband is 35.1% which is below the EU average (40.3%), though it went slightly up recently.

As regards the developments of market shares by technology, DSL technology is still prevailing with 36.3% with continuous decreasing share narrowly followed by FTTH/B with 28.6% share which is continuously rising at the expense of DSL and partially at the expense of WiFi/FWA. Broadband access through FTTx is provided by 55% share through FTTH and FTTB is represented by 43% share. Cable technology holds a stable fourth position with 12.2% share.

With regard to market shares of technologies according to speed, the speed range '2Mbps but less than 10 Mbps' holds a 58.7% share followed by the speed range '30Mbps but less than 100 Mbps' with a 21.4% share while the medium speed '10Mbps but less than 30 Mbps' holds a 17.2% share.

There were no major changes in market shares on the Slovak fixed voice market and Slovak Telekom holds approximately 80% market share in volume of traffic of voice call minutes from the fixed network. The share of the incumbent on the voice services for the non-residential customers calculated according to number of dedicated voice channels was approximately at the level of 70% as of June 2017.

The market for wholesale high-quality access provided at a fixed location is considered by RÚ as competitive as market players have the opportunity to compete with the incumbent with their own infrastructure based on fibre or FWA.

The NGA market segment is more competitive than the DSL segment. The market is highly fragmented with tens of local NGA service providers and several nationwide operators.

There are no wholesale only broadband network operators. The Slovak market has characteristics of strong orientation on deployment of own access infrastructure.

b. Mobile market

Mobile market	SK-2016	SK-2017	EU-2017
Market share of market leader	37%	34%	35%
Market share of second largest operator	33%	32%	28%
Number of MNOs	4	4	-
Number of MVNOs	1	-	-
Market share of MVNO (SIM cards)	-	-	-

Source: Communications Committee. Data as of October 2016 and October 2017.

There are four mobile network operators in Slovakia. Orange Slovensko, a subsidiary of Orange Group, is the mobile market leader with regard to number of customers/SIMs and mobile revenues. It operates a second brand ‘FunFón’. The incumbent Slovak Telekom, subsidiary of Deutsche Telekom Group operating under brand T-Mobile), holds the second place on the mobile market in terms of mobile revenues and with regard to the number of customers/SIMs. It operates a second brand ‘Juro’. O2 Slovakia, a former subsidiary of Telefonica Group, now member of the Czech PPF group, holding the third place on mobile market in terms of mobile revenues and with regard to number of customers/SIMs. It operates a reseller ‘Tesco Mobile’. The most recent fourth mobile market entrant SWAN Mobile, a subsidiary of SWAN/DanubiaTel group, operating under brand ‘4ka’.

The NRA has not yet disclosed its detailed plans for 2G and 3G networks in terms of phase-out or spectrum refarming.

4G network coverage as of 30 June 2017 achieved with regard to the four Slovak MNOs the following figures with regard to area coverage: 60.7%; 41.9%; 37.5% and 22.0%. These figures corresponded in the same time to population coverage: 88.3%; 80.1%; 79.2% and 66.0%, respectively.

30.06.2017	coverage of area			coverage of population		
	2G	3G	4G	2G	3G	4G
operator A	92.3%	72.4%	41.9%	99.8%	94.4%	80.1%
operator B	90.9%	43.5%	60.7%	99.0%	80.9%	88.3%
operator C	80.0%	31.2%	37.5%	97.3%	79.6%	79.2%
operator D	25.0%	x	22.0%	68.0%	x	66.0%

30.06.2016	coverage of area			coverage of population		
	2G	3G	4G	2G	3G	4G
operator A	92.2%	70.0%	33.6%	99.8%	93.3%	71.1%
operator B	90.8%	43.5%	49.4%	99.0%	80.9%	80.5%
operator C	76.4%	13.2%	6.1%	96.3%	64.6%	30.6%
operator D	14.8%	x	12.3%	61.2%	x	60.1%

Source: The NRA.

Mobile broadband take-up increased to 84 subscriptions per 100 people (73 subscriptions per 100 people previously) but is still below EU average (90 subscriptions per 100 people).

The NRA has not yet disclosed its detailed plans for 5G trials or deployments.

RÚ recognizes that the impact of OTT services on the provision of mobile public telephone services will increase. In the opinion of RÚ, OTT services such as unmanaged VoIP are not a full alternative to providing public mobile telephone services.

Legal and commercial disputes between the three incumbent MNOs with the fourth mobile market entrant related to licence conditions requiring provision of national roaming to the fourth entrant took the path of commercial negotiations among certain operators involved, rather than a path which would be embedded in authoritative dispute resolution. SWAN Mobile withdrew its filings against O2 Slovakia and Orange Slovensko in February 2017. Dispute with Slovak Telekom was resolved by RÚ's decision the text of which is not publicly accessible. SWAN Mobile has however signed commercially based national roaming deal with Orange Slovensko.

O2 Slovakia has also signed a new national roaming deal contract with Orange Slovensko (based reference conditions from the national roaming deal signed between SWAN Mobile and Orange Slovensko) while it maintains its contract with Slovak Telecom effective and renegotiating its conditions. These developments led to a decrease in price of wholesale national roaming services on the Slovak market. Mobile broadband prices went slightly down in 2017 if compared to previous year, they are however still well above the EU average.

Mobile broadband prices [EUR/PPP]	SK-2016	SK-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€44	€40	€24
Least expensive offer for tablet and laptop (5 GB basket)	€28	€23	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

Slovakia has assigned 88.44% of the overall harmonised spectrum for broadband, compared to the EU average 69%.

The assignment of frequencies of the 3.5 GHz frequency band (3400-3600 MHz) was completed already in 2016 when frequency licences were assigned on a whole-country basis to three operators (O2 Slovakia, SWAN and Slovanet) and those licences will run until August 2025. During the year 2017 selection procedures for issuing right to use frequencies from the 3.6 GHz (3600-3800 MHz) band on a local (district) level were conducted by RÚ with a view to grant licences until end of year 2024. This process was finalized in June 2017, by when all frequencies from both, 3.4-3.6 GHz and 3.6-3.8 GHz frequency bands had been assigned.

With regard to the implementation of the Decision of the European Parliament and of the Council (EU) 2017/899 on the use of the frequency band 470 - 790 MHz (the UHF band) in the Union there are issues which need solution. There is only one nationwide network operator (Towercom) on the Slovak market who holds the rights to use the 700 MHz spectrum beyond the year 2020. The frequency band 694 - 790 MHz (the 700 MHz band) is to a large extent used for digital terrestrial television broadcasting. Three of a total of four nationwide terrestrial DVB-T/DVB-T2 multiplexes are operated in the Slovak Republic, using the 700 MHz frequencies (almost 50% of operated transmitters use the frequency from the 700 MHz band). Frequencies to operate these multiplexes have been allocated to the network operator by individual licences which are valid until 9 September 2029, except of multiplex 1 where frequencies are allocated until 31 May 2021. Currently, the Ministry of Transport and Construction is negotiating with the network operator the possibilities regarding waiving the individual licences issued for the 700 MHz band before year 2029 (2021). Its goal is to achieve a mutual agreement by substitution of the frequencies from the 700 MHz band without selection procedure. This substitution would be realized in order to ensure continuity for digital terrestrial television broadcasting with regard to maintaining the existing coverage of the territory and inhabitants in the Slovak Republic. According to the Ministry these new frequencies would not constitute any added value for the network operator. In December 2017 RÚ concluded cross-border coordination agreements with national regulatory authorities of the neighbouring countries concerning the new DTT frequency plans for the frequency band 470-694 MHz.

According to RÚ, frequencies from the bands 26 GHz, 28 GHz, 32 GHz and 43 GHz could possibly be taken into account as available for 5G services on the Slovak market.[458]

b. National and EU investment in broadband

One of the long-term issues since approximately 10 years, is the provision of broadband coverage for so-called “white spots” (i.e. uncovered municipalities) in Slovakia. Slovak authorities identified 207 “white spots” in early November 2017. Following public hearings to map current broadband coverage and ascertain market players' future plans relative to the goal

[458] In April 2018 RÚ announced auction for 1800 MHz band.

to achieve broadband coverage of 30 MBps in all municipalities by 2020, Orange Slovensko and O2 Slovakia declared in 2017 their intent to cover all 207 remaining 'white spot' municipalities in Slovakia. As these declarations are not binding another public consultation was launched in 2017 with a view to obtain official commitments by the market players to cover all such 'white spots' in Slovakia by the end of 2020. No binding commitments have however been made yet[459].

In the context of the revision of the Operational Programme on Integrated Infrastructure which has the objective to increase broadband coverage, Slovakia has programmed EUR 118 million for an intervention on backhaul and access networks using ERDF and EAFRD. There are uncertainties if this intervention can be carried out with a view to bring NGA connectivity to 'white spot' areas in Slovakia. The Ministry of Transport and Construction cancelled in May 2017 a public tender for the project *"Atlas for passive infrastructure"*, the purpose of which was to map fixed and mobile telecom infrastructure needed for broadband deployment, but also to map road and energy infrastructure.

The relevant Slovak governmental department has prepared a feasibility study for intended demand oriented measure aimed to reach free WiFi coverage at municipal level *"WiFi for You"* which is supposed to be based on principles of the WiFi4EU. There are however no demand stimulation measures in place yet.

c. Implementation of the Broadband Cost Reduction Directive

The deadline to notify measures transposing the Broadband Cost Reduction Directive[460] into national law expired on 1 January 2016. Since the Slovak Republic had not informed the Commission of the provisions adopted to comply with the BB CRD, as notification of transposition of provisions related to the establishment and operation of the Single Information Point (SIP) was missing, infringement proceedings were launched in March 2016. The Commission referred the case to the Court of Justice of the European Union (CJEU) in October 2017. Following that decision, an amendment to the law on electronic communication was adopted on 29 November 2017, with an entry into force on 1 January 2018[461]. The responsibility for operation of the SIP is entrusted to RÚ from 1 January 2018. RÚ is however sceptical with regard to its budgetary resources available to establish the information system needed for the operation of SIP. RÚ was not asked yet to resolve any dispute under the Broadband Cost Reduction Directive till now.

3. Regulatory function

In January 2017 RÚ notified to the Commission price control remedies on the market for wholesale local access provided at a fixed location (Market 3a). RÚ proposed to impose a Bottom-up Long Run Incremental Costs plus (BU LRIC+) costing methodology for calculating the regulated one-off and monthly maximum price for access to ducts, HDPE

[459] In February 2018, a non-binding memorandum was signed between the relevant Slovak governmental department and the three major Slovak market players (i.e. Slovak Telekom, Orange Slovensko and O2 Slovakia).

[460] Directive 2014/61/EU on measures to reduce the cost of deploying high-speed electronic communications networks, hereinafter referred to only as the "Broadband Cost Reduction Directive" or as "BB CRD".

[461] On 8 January 2018, the Slovak Republic notified those amendments to the Commission and declared the transposition of the Broadband Cost Reduction Directive as complete. This has prompted the Commission to withdraw the case from the CJEU.

pipes and tubes in the market. RÚ expects that the final calculated prices will be lower than the currently applied prices. RÚ intends to notify to the Commission the final calculated prices separately. The Commission issued a 'no comments' letter.

In 2017 RÚ did not adopt any SMP decision or any remedy on relevant markets. In January 2018 RÚ however adopted decisions concerning the designation of Slovak Telekom as SMP operator and imposed remedies on markets 3a and 3b. In that context RÚ adopted a price decision on the methodology for calculation of the price of collocation on markets 3a and 3b based on LRAIC methodology and also a price decision on the methodology for calculation of the price of duct and infrastructure access based on LRIC plus methodology. The previous price obligations for the products on the markets 3a and 3b were replaced by an economic replicability test.[462]

In September 2017 RÚ notified to the Commission price control remedies on the markets for wholesale voice call termination on individual mobile networks. In October 2017 the Commission informed RÚ that it had serious doubts concerning the proposed remedies. The serious doubts concerned:

1) the proposal to set asymmetric mobile termination rates (MTRs) for SWAN Mobile when compared to those of Slovak Telekom, Orange Slovensko, and O2 Slovakia from January 2018. The proposed MTRs for Slovak Telekom, Orange Slovensko and O2 Slovakia (calculated based on a BU-LRIC pure model) were 0.00825 EUR per minute while those for SWAN Mobile were set at 0.00908 EUR from 1 January 2018 until 30 September 2019. The difference between SWAN Mobile's MTRs and the MTRs for the other three mobile operators amounted to 10%. The Commission considered that RÚ did not substantiate whether and to which extent SWAN Mobile incurs higher unit costs for the termination of mobile calls on its network, and the higher termination rates granted to SWAN Mobile (on the basis of low frequency spectrum and higher cost per customer) by RÚ did not appear to be justified. The Commission found that such asymmetries in Slovakia were not justified by objective cost differences and could lead to higher retail prices and the associated loss in consumer benefit.

2) the proposal for the weighted average cost of capital (WACC) and mark-up used in its calculation. RÚ proposed to set the WACC at the level of 5.76%, adding to the standard WACC formula a "size premium" corresponding to 1.62%. According to RÚ, this mark-up would reflect the risk of the variability in the return of the operators' shares in the long run depending on the size of undertakings. The Commission considered that RÚ did not offer a sufficient explanation for the inclusion of the "size premium" into the standard WACC formula leading to inflated costs of capital and mobile termination rates for all Slovak mobile network operators.

During the Phase II investigation BEREC provided its opinion finding that the Commission's serious doubts were justified. During this phase RÚ did not provide additional arguments to justify its proposed use of asymmetric pricing and its WACC calculation.[463]

[462] These were communicated to the Commission as adopted measures under Article 7(7) of the Framework Directive in March 2018.

[463] Based on the above the Commission issued on 22 February 2018 a Recommendation under Article 7a of the Framework Directive, to reiterate the points made in the serious doubts letter, and to recommend that RÚ amends or withdraws the remedies relating to price caps for mobile call termination services in Slovakia. On 23 March 2018 RÚ informed the Commission of its withdrawal of those remedies.

By the end of 2017 RÚ carried out national consultations and in January 2018 also notified to the Commission a proposal of remedies on the markets for wholesale call termination on individual public telephone networks provided at a fixed location. RÚ proposed symmetric price based on pure BU-LRIC calculation on all SMP operators. The notified draft measure concerned the proposal to set a maximum price for voice call termination on fixed networks (FTR) of EUR 0.0976 cent/min applied symmetrically on all 17 SMP operators. FTRs would be based on a pure BU-LRIC methodology. RÚ proposed to set the WACC used in the FTR calculation at the level of 5.21% adding to the standard WACC formula a "size premium" corresponding to 1.72%. According to RÚ, this mark-up would reflect the risk of the variability in the return of the operators' shares in the long run depending on the size of undertakings. RÚ used the same WACC formula as in the previously notified draft measure relating to the mobile termination markets which was one of the reasons for which the Commission opened a Phase II which was followed by a Recommendation pursuant to Article 7a of the Framework Directive.[464]

In 2017 RÚ did not communicate to the Commission any adopted measure under Article 7(7) of the Framework Directive.

There are no delays with regard to notification of market analyses under Article 7 of the Framework Directive.

There seems to be no sign that operators in Slovakia intend to move to ‘bill and keep’. No cross-border issues concerning FTRs and MTRs were reported.

There is no separate market defined with regard to bundled services. Such services are taken into account in the context of analysis of the market for wholesale local access provided at a fixed location and also in the context of analysis of the market for wholesale central access provided at a fixed location for mass-market products.

With regard to bundled services, RÚ' line on this issue is to impose the following obligations on the wholesale central access market at fixed location for mass-market products: ensuring technological replicability of the new NGA products (including services within bundles), ban on discriminatory pricing of wholesale broadband services within bundles, providing non-discriminatory wholesale access to services forming bundles with broadband service.

RÚ issued one decision under the dispute resolution mechanism which confirmed the obligation to provide national roaming established by an individual license.

RÚ deals with 4 cases dealing with universal service obligations, 4 cases concerning frequency management matters, 2 cases under dispute resolution mechanism, and 5 cases dealing with appeals against sanctions. The length of the cases varies from a few months to more than two years.

RÚ has clear concern with regard to amount of resources available to it. RÚ reported that average monthly gross salary in RÚ in year 2016 of a regular employee was EUR 1126.

[464] Therefore, in line with its approach in the previously notified draft measure relating to the mobile termination markets the Commission opened on 20 February 2018 Phase II investigation pursuant to Article 7a of the Framework Directive as RÚ did not offer a sufficient explanation for the inclusion of the "size premium" into the standard WACC formula leading to an inflated cost of capital. During the Phase II investigation BEREC provided its opinion finding that the Commission's serious doubts were justified.

Though this figure does not seem to lag behind average monthly gross salary in Slovakia in year 2016, it seems to slightly lag behind average monthly gross salary in Bratislava capital region where most of the RÚ staff works. The level of budget autonomy of RÚ is on the level of a separate budget line reserved in the budget chapter of the Slovak Ministry of Transport and Construction. The level of budget autonomy of RÚ which operates a separate budget line appears not to be critical. There exist concerns on the market, raised also by at least one fixed alternative operator in 2017, with regard to independence of regulatory environment in Slovakia related to terms and conditions in privatisation agreement of the incumbent.

4. Consumer matters

In the year 2017 RÚ received 197 consumer complaints related to electronic communications services. The main causes of complaints were related to how contractual penalties were applied, to the right to withdraw from the contract, to roaming fees, to the quality of services, to number portability, to non-solicited communication and to the application of contractual conditions. As regards transparency and publication of information RÚ relies on a web search engine and comparison website. Consumers can compare offers from individual undertakings providing broadband access including additional services[465]. There is also a price comparison tool where users can find prices of fixed broadband access, in particular according to address, price, type of connection, transmission speed, data limit and bundle type.

a. Roaming

In 2017 RÚ was dealing with one issue of potential non-compliance.

One MNO applied in mid May 2017 with RÚ for the application of surcharge for roaming services, however the MNO decided to withdraw its application.

RÚ has not received any other application for derogation. No retail derogation has yet been granted. The Slovak market belongs to those with a negative balance for roaming calls as the volume of roaming use carried out by Slovak customers abroad is higher than the volume of calls carried out by foreign customers in Slovakia. Therefore, the Roaming Regulation impacted mainly smaller operators and operators that are not a part of a large multinational group.

Following the introduction of Roam Like at Home[466] (RLAH) in June 2017, Slovak subscribers consumed 2.3 times more voice and 6.2 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[467]. RÚ has not so far observed any increase of domestic prices in relation to launch of RLAH. Based on operators' data, the roaming usage in some popular tourist destinations has risen dramatically (even 10 times higher traffic) after the launch of RLAH. Penalties for violations of the Roaming Regulation are defined by law. RÚ has the power to impose penalties ranging from 200 EUR up to 5 % of the undertaking's turnover of the previous accounting period on an the

[465] Such comparison tool is available on: http://porovnavacinternetu.sk/

[466] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[467] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Data Report, April 2017-September 2017, published on 14 March 2018.

undertaking that has not fulfilled or has violated obligations stipulated in the Roaming Regulation.

b. Net neutrality

There are no self-regulatory initiatives in Slovakia. RÚ has identified minor breaches of Regulation (EU) 2015/2120[468] like e.g. dubious ways of port blocking and full range of speed not defined in the consumer contracts.

No mobile operator had offered zero rated services until the end of 2017. [469]RÚ has issued Recommendation for ISPs related to Art 4(1)(d) of Regulation (EU) 2015/2120. The Recommendation comprises definition of particular transmission speeds to be cited in the contracts, both for fixed and mobile operators.

RÚ plans to certify under Article 4 of Regulation (EU) 2015/2120 a monitoring mechanism on speed and on other QoS parameters. There is no information available on consumer satisfaction in relation to quality of service.

Penalties for violations of the Net neutrality under the TSM regulation are defined by law. RÚ has the power to impose on an undertaking that has not fulfilled or has violated obligations stipulated in of the TSM Regulation penalties ranging from 200 EUR up to 5% of the undertaking's turnover of the previous accounting period.

c. 112

The implementation of fully equivalent access to emergency services for disabled end-users under Article 26(4) of the Universal Service Directive[470] was a persisting problem in Slovakia also in 2017. There was an amendment to the law adopted in November 2017 with regard to free access to 112 by SMS with effect from 1 January 2018. This amendment does however not seem to be guaranteed by sanction mechanism *vis-à-vis* the corresponding duties on the side of the operators. The relevant governmental department reports however that free access to 112 by SMS is operational[471]. The functionality of access to 112 by free SMS messages is excluded for users of foreign SIM-cards. Caller location is cell ID based.

5. Conclusion

The Slovak market appears to have taken its path towards infrastructure based competition. Market players tend to rely to significant extent on own forces and on commercial negotiations and commercial arrangements. This path achieved solid results with regard to ultrafast broadband coverage which exceeds the EU average, however such path had not solved issues with regard to total fixed broadband coverage and coverage by 4G networks. Moreover, the ultrafast broadband take-up is very low relative to network availability. The issue of low ultrafast broadband take-up might be also linked to lack of demand side programs in Slovakia. A swift and effective implementation of the revised Operational Program on

[468] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access (OJ L 310, 26.11.2015, p. 1).
[469] In March 2018 Slovak Telekom introduced a zero-rated package for pre-paid services.
[470] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).
[471] The relevant governmental department reports that 8112 SMS messages were received by the information system in period from 1 January 2018 till 31 March 2018.

Integrated Infrastructure will be essential for Slovak households and companies. More intense coordination between public and private stakeholders might increase the chances of efficient use of the EU funds with regard to total fixed broadband coverage and also with regard to coverage of 'white spots'. Establishment and operation of the single information point under the Broadband Cost Reduction Directive which was notified by Slovakia as newly transposed might contribute to this process. An implementation of remedies on broadband markets imposed faster with focus on detailed practical implementation might catalyze their positive regulatory goal and achieve competition effectiveness quicker. Slovakia will need to address the assignment of the 700 MHz band for wireless broadband, as the rights of one operator to use this band go beyond the year 2020 and swift solution in that regard would positively influence the outlook for 5G network deployment. The implementation of fully equivalent access to emergency services for disabled end-users will need attention as well.

SLOVENIA

Market developments

1. Competitive environment

Fixed broadband prices	SI-2016	SI-2017	EU-2017
Fixed broadband price index [values between 0-100]	75	73	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The Incumbent Telekom Slovenije still holds a 35% market share in fixed broadband connections and 44% of mobile subscriptions. The incumbent continues losing market share on fixed telephony market where it holds 51%. On the other hand, the number of VoIP connections of the incumbent is still growing and has in 2017 exceeded 37% of the total VoIP market. Furthermore, a bankruptcy procedure of the main alternative operator in the fixed infrastructure T-2 was annulled by the constitutional court.[472] In recent years Slovenia experiences a cross sector consolidation of telecommunication operators and media players. Due to increased competition the MVNO Izimobil exited the market and its customers were acquired by the incumbent. Furthermore, Simobil rebranded its name to A1 Slovenija in April 2017.

Currently, there are plans to merge the main commercial pay-TV with Telemach cable operator which is subject to regulatory approval. In particular, the cable operator Telemach who as well provides mobile services was very active in purchasing some smaller players on the market (Total TV, Maxtel). Moreover, KKS Radeče has been merged with Ansat while Elektro Gorenjska and JP LPT started to lease their network (dark fibre) to other operators. The new MVNO HoT mobil started to operate on the A1 Slovenija network.

Due to the decrease of fixed telephony over time and increase of the mobile telephony within the same period AKOS (Slovene National Regulatory Authority) concludes that mobile telephony could be a substitute for fixed telephony. However, according to AKOS such substitution is not valid in the opposite direction because fixed telephony cannot provide mobility which is essential for mobile telephony. Therefore, it is possible that the decrease of the fixed telephony services is moderate due to the bundle offers and end users choose to opt for fixed telephony among other services (internet and IPTV) as the cost increment for fixed telephony services is relatively insignificant. Moreover, when observing fixed to mobile substitution more broadly, that is including also broadband services, it is not possible yet to conclude that end users would switch from fixed broadband connections to mobile services as generally fixed broadband services are still providing better quality of services and a wider variety of TV channels. Therefore AKOS concludes that mobile services for access to

[472] Moreover, in February 2018 the Constitutional court has upheld the Competition Protection Agency decision that the incumbent has between 1 July 2005 and 22 September 2008 abused its dominant position on the market against the T-2. In this context, the T-2 claims it will sue the incumbent for damages which according to T-2 amount to 261 million EUR.

broadband are usually used as ancillary services and in cases where fixed broadband services are not available.

a. Fixed Markets

Fixed broadband market shares	SI-2016	SI-2017	EU-2017
Incumbent market share in fixed broadband	32.9%	35.2%	40.3%
Technology market shares			
DSL	40.3%	36.4%	64.2%
Cable	31.3%	29.2%	19.4%
FTTH/B	26.4%	30.2%	12.9%
Other	2.0%	4.2%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Telekom Slovenije as the Incumbent has the highest market share of fixed broadband connections and is competing against consolidated multinational players (A1 Slovenija - Telekom Austria and Telemach – KKR). There are no capacity based interconnection models in place. There is increased competition on the business market as competitors are gaining market shares.

New entrants' DSL subscriptions by type of access (VDSL excluded)	SI-2016	SI-2017	EU-2017
Own network	-	-	0.5%
Full LLU	38.9%	37.1%	72.8%
Shared Access	3.3%	2.7%	4.1%
Bitstream	57.8%	60.2%	14.7%
Resale	-	-	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

On the market bundles play a large role, which is recognized also by the AKOS and the TV services are the main driver of the market. Based on the quarterly reports, the flagship products are triple play packages (broadband, TV and VoIP). Quadruple play is rising, while the standalone and dual play bundles are further declining. In this context, new bundles were recently offered on the market, which contain as well other services such as electricity together with communications packages.

Coverage	SI-2016	SI-2017	EU-2017
Fixed broadband coverage (total)	98%	98%	97%
Fixed broadband coverage (rural)	92%	93%	92%
Fixed NGA coverage (total)	82%	83%	80%
Fixed NGA coverage (rural)	50%	54%	47%
Ultrafast coverage (total)	no data	75%	58%
4G coverage (average of operators)	90%	96%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

In Q2 2017 most fixed broadband connections were FttH. The number of VDSL and Cable (DOCSIS 3.0) connections are growing while the number of ADSL and Cable modem connections are decreasing. Slovenia is in EU average in terms of NGA connectivity and above average of ultrafast connectivity (83% and 75% respectively).

The highest demand in Q2 2017 is for fixed broadband internet connections with speeds from 10 to 30 Mbps. However, the number of fixed broadband internet connections with higher

speeds are continuously increasing with 24% households take-up for speeds of 30 Mbps and above.

b. Mobile market

Mobile market	SI-2016	SI-2017	EU-2017
Market share of market leader	47%	44%	35%
Market share of second largest operator	30%	29%	28%
Number of MNOs	4	4	-
Number of MVNOs	4	4	-
Market share of MVNO (SIM cards)	3%	4%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

The incumbent has the biggest market share of active mobile telephony users in Q2 2017 (45%), but its share is decreasing. HoT Mobil as a newcomer has gained users and already has a 0.4% market share of active mobile telephony users in Q2 2017 while the number of active users has grown to 1.2% at the end Q4 of 2017.

On the mobile market the merger of Telekom Slovenije and Izimobil was approved by the CPA on 16 august 2017 and by the end of 2017 Izimobil terminated offering pre-paid mobile services. All pre-paid contracts were taken over by Telekom Slovenije. The brand name Izi was also transferred to the incumbent.

Mobile broadband prices [EUR/PPP]	SI-2016	SI-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€18	€9	€24
Least expensive offer for tablet and laptop (5 GB basket)	€15	€13	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

The harmonised spectrum has already been assigned in a technology and service neutral way, so no refarming is needed. With regards to 2G and 3G networks phase-out there is no obligation and operators may choose to phase out any of the technologies according to market needs. Telekom Slovenije has started to phase out the 3G network while the 2G network will not be phased out in the near future. A1 Slovenija and Telemach have an excellent 3G coverage and there are no plans of phasing out the 3G as well as the 2G network in the near future. T-2 has majority 3G coverage with only 2100 MHz frequencies. Moreover, AKOS carried out a supervision of T-2 regarding fulfilment of its coverage obligations.

End 2016 and during the year 2017 AKOS in cooperation with the Ministry of Public Administration launched the initiative for the registration of projects for the first tests and the future use of 5G technology.[473] It was proposed to use the frequency band 3400 - 3800 MHz for testing 5G projects in the cities of Slovenia. Parts of the spectrum in the band 3400 - 3800 MHz and frequencies in UHF channels will be available on the basis of provisional decisions on the allocation of radio frequencies intended for the needs of measurements, attestations and

[473] http://www.akos-rs.si/5g-pobuda-aktivnosti-v-zvezi-s-5g-pobudo-in-dodatni-poziv-k-prijavi-projektov

other tests of radio equipment. Slovene 5G initiative encourages stakeholders to send proposals for 5G projects with an indication of which segment of the economy/society development this project was primarily intended. In accordance with the EU initiative 5G Action Plan for Europe, COM (2016) 588 – Action-8 Slovenia would like to apply for EU founding for the initiative to stimulate 5G innovation and take-up. In December 2017 government of Republic of Slovenia signed memorandum on cooperation with Hungarian government and universities of both countries in the area of 5G on Public Security, Protection and Rescue Technology (5G PPDR).

AKOS is preparing the 700 MHz band auction, which is planned for the year 2018, and will follow principles as to be timely and in predictable manner, encouraging front-runners and supporting peer learning, also with mentioned 5G PPDR pilot project. Some operators claim that planned auction is too early due to lack of compatible electronic communications equipment on the market. Furthermore, other spectrum bands are scheduled for auction in 2019. In this context, several operators complain about the high costs for spectrum which reduces their investment capacity.

b. National and EU investment in broadband

In general, over recent years there was a slight decrease of revenues in the telecommunications sector while investment activities are on the increase.[474] Furthermore, the Ministry of Public Administration has issued two calls for expression of commercial interest which resulted in almost full coverage of Slovenia with private funds. Moreover, operators are investing in building infrastructure in the areas which were submitted to the ministry as the commercially interesting areas. In areas where there are no commercial interests, ministry plans in 2018 to publish three tenders for co-financing investment into high-speed broadband infrastructure.[475]

In the recent years there were several investments by the Incumbent in fixed infrastructure and equipment, base stations and licenses for frequencies. The Incumbent is investing in NGA networks while its initial plans for investments were redefined in 2015/2016 based on the State Strategy Digital Slovenia 2020. The initial plan included the re-usage of copper network, now this is only envisaged in the areas, where there are no other possibilities.

A1 Slovenija has mostly invested in its LTE access network, DSL modems and Femtocells. Telemach has invested in terminal equipment, renovation of fixed network, construction of base stations and frequency licences. T-2 has mainly invested in updates of its UMTS network while most of the investments were limited due to bankruptcy proceedings.

On 29 June 2017 it was the first meeting of the Slovenian Digital Coalition - digital.si which is composed of stakeholders from the economy, science, education, public sector and public administration government, the public sector NGOs, local self-government communities and civil society, digital champion, in order to jointly support the development of Slovenia and the implementation of the Digital Slovenia 2020 Strategy..[476]

[474] In January 2017 the Ministry of information society has published a call for 18.5 Million EUR investment in building of high speed access networks of 100 Mbps speed and above in white areas.
[475] One of them, value of €18.5 million is already in progress from 26 of January 2018.
[476] http://www.digitalna.si/en/

In July 2017 the Ministry of Public Administration has established the Broadband Competence Office –BCO Slovenija with the aim of establishing single contact point for the provision of information in connection with broadband infrastructure. Its purpose is to inform citizens, local communities, electronic communications operators and other interested stakeholders about broadband infrastructure projects.

c. Implementation of the Broadband Cost Reduction Directive

On 20 August 2017, the amended Telecommunications Act, ZEKom-1C stepped into the force. The Act is transposing the Broadband Cost Reduction Directive[477] which Slovenia has notified. AKOS has reported the increase in the notifications for planned building works. However, it does not keep accurate records of actual shared use of infrastructure. Furthermore, interest for co-investment increased significantly in recent years.

Slovenia decided to set two exemptions foreseen in the Directive. According to ZEKom-1C there is an exemption from obligation to notify planned civil works related to its physical infrastructure for civil works of insignificant importance in term of value, size or duration in Article 6(5). Another exemption relates to Article 8(4) of Directive regarding obligations related to in-building physical infrastructure for some categories of buildings. According to ZEKom-1C single dwellings and some other categories, such as buildings with total area up to 50 m2, agricultural and forestry economic buildings, are exempted from obligations.

3. Regulatory function

Amended ZEKom-1C is changing the criteria on the AKOS financing since the government is approving yearly financial plan after it has been adopted by the agency council.[478] The functioning of the AKOS is modified insofar that related ministries may issue its strategic priorities for the preparation of its work and financial plans.

AKOS imposed remedies regarding call termination on individual public telephone networks provided at a fixed location regardless the technology. Those include call termination supplied to any directly interconnected operator in the internal (EU) market for the purpose of terminating voice calls to subscribers of each individual public telephone network operator at a fixed location. Remedies were imposed for all SMP operators. FTR (0.0876 eurocents/min) by „bottom-up" pure LRIC model was prepared with consultant support by BWCS and with cooperation of the incumbent to follow EC recommendation. Furthermore, AKOS imposed access on reasonable request including also period for transition from TDM to all IP network for the incumbent.

In 2014, AKOS imposed also remedies regarding voice call termination on individual mobile networks regardless the technology which includes voice calls which are sent from any directly interconnected operator from the internal (EU) market to be terminated to the SMP operators' end user. Price control based on Price control and cost accounting is imposed. MTR (1.14 eurocents/min) is calculated by „bottom-up" pure LRIC model which was

[477] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[478] The Court of Audit of the Republic of Slovenia has on 27 February 2018 published a negative opinion about the regularity of AKOS business in years 2014 and 2015 based on CoA Revision decision 3264-1/2016/7 issued on 10 March 2016.

prepared with consultant support by BWCS and with cooperation of SMP operators to follow EC recommendation.

After the market analysis and final decisions of April 2016 the non-EU calls are not subject to regulated price for call termination on fixed nor mobile networks. In this context, an issue is reported of non-EEA termination fraud, where a non-EEA number is replaced by an EEA number in order to profit from a price difference since non-EU call termination is not regulated and is usually higher. Because of such fraud, a user's phone displays the wrong calling number or the number does not appear at all. Consequently, the user cannot call back or he gets the wrong person. Moreover, it is observed that operators are also faced with the inability to properly enforce the court orders of the competent authorities for the data retention and the loss of the revenue from the termination of such calls.

In 2017, AKOS carried out market analyses for the three relevant markets: 3a, 3b and 4. New regulatory decisions on markets 3a and 3b were already imposed on Telekom Slovenije, while the process of market analysis 4 has not yet been completed.

Regarding Access obligation for market 3a on copper network the price control and cost account for the Incumbent is set of monthly fee for LLU (8.09 EUR) and for shared LLU (3.27 EUR) which is based on LRIC+ cost model. For NGA network the monthly fee for FTTH and VULA is based on Economic replicability test.[479] Other obligations on market 3a includes provision of access obligation (including VULA), non-discrimination obligation (including technical replicability obligation) and transparency obligation.

For market 3b the obligation includes provision of bitstream access and conditions for migration from copper to NGA networks, Non-discrimination obligation is based on Expression of Interest, and includes technical replicability which is done by incumbent for new retail offers, and transparency obligation in a form of publication of the reference offer. The incumbent as SMP on this market has obligation of price control and cost accounting on NGA products which include flagship products to be tested based on Economic replicability test developed by AKOS. Furthermore, non - NGA products (copper below 30 Mbit/s) cost accounting is based on LRIC+ methodology calculated by SMP operator and taking into account LLU price with other costs such as DSLAM costs and backhaul costs. Cost accounting for other services is based on LRIC+ methodology calculated by SMP operator.

Furthermore, from 27 October 2017 to 1 December 2017 AKOS ran the national consultation concerning the market for wholesale high-quality access provided at a fixed location in Slovenia.[480] In this context, there are some allegations regarding information availability since apparently not all of the relevant information was always available on AKOS web page.

On 5 October 2017 the Commission has sent a letter of formal notice to Slovenia for not notifying the analysis of Market 4. In the notice the commission has set a two month deadline for Slovenia to reply. On 20 October 2017 Slovenia has responded by letter in which it is asking for an extension of the deadline by 5 February 2018. In the request Slovenia has

[479] Which was developed by AKOS.

[480] Consequently, on 9 February 2018 the Commission has by Decision SI/2018/2050 opened an in-depth investigation into the proposal of the Slovenian telecoms regulator AKOS to make adjustments to the standard weighted average cost of capital (WACC) formula leading to higher prices of wholesale high-quality broadband access services because it considers that AKOS' proposal to adjust the standard formula for calculating the WACC in Slovenia is not compliant with EU telecoms rules.

explained that in this extra period it hopes to complete the market 4 analysis and notify it to the Commission. The Commission has on 3 November 2017 responded with letter Ares(2017)5300954 by which it has approved the deadline extension as requested.[481]

AKOS has notified the review of wholesale local access provided at a fixed location market, and the review of wholesale central access provided at a fixed location for mass market products and Telekom Slovenije was designated as having significant market power on both relevant markets. Therefore, AKOS proposed to impose the following obligations, on both relevant markets: i) access to, and use of, specific network facilities; ii) non-discrimination; iii) transparency; iv) price control and cost accounting; and v) accounting separation. The Commission commented on: (i) the geographic differentiation of the price control remedy on the wholesale central access market, (ii) the choice of proportionate and justified access remedies and (iii) analysis of the relevant market since the last market analysis was notified to the Commission in 2010.[482]

4. Consumer matters

In 2017 AKOS received 797 complaints in the field of electronic communications. Total number of resolved disputes reached 812 as some disputes received at the end of 2016 were also resolved in 2107. The large majority of complaints were related to the incorrect invoices and payments. AKOS reached 554 settlements in a mediation process (art. 220 ECA), decided in 122 cases with a binding decision and rejected 130 complaints due to the lack of competence or due to the fact that the complaint has been too late or was incomplete and the applicant has not remedied the deficiencies. In 6 cases the complaint has been referred to a competent authority.

Considering the high percentage of disputes regarding contractual penalties charged due to an early termination of the contract, AKOS in March 2017 organized a consultation with representatives of operators, the Electronic Communications Council and the Slovenian Consumers‘ Association. It encouraged operators to charge the costs proportionally regarding the duration of the contract, irrespective of the reason of termination. Nevertheless, no such costs should apply if the contract is terminated due to confirmed operator's breach of contract (e.g. unavailability of services). Operators embraced such approach while claiming that the majority had already adopted such an approach.

In 2017 two consultations with operators were held on a General act on the monitoring and control of data services consumption and on the form and method of publication of the notice regarding the change to the terms and conditions in the subscriber contract.[483, 484]

[481] On 10 January 2018 the Commission has received a notification of the draft measure from Slovenia notifying the delayed market 4 analysis. Currently, the draft measure submitted by Slovenia is being assessed by the commission services.

[482] The Commission pointed to the fact that, pursuant to Article 16(6) of the Framework Directive, as amended by Directive 2009/140/EC, NRAs must carry out an analysis of the relevant market and notify the corresponding draft measure in accordance with Article 7a within three years from the adoption of a previous measure relating to that market.

[483] http://www.akos-rs.si/predlog-splosnega-akta-o-spremljanju-in-nadzoru-porabe-podatkovnih-storitev

[484] http://www.akos-rs.si/odgovor-na-prejete-predloge-in-pripombe-k-predlogu-splosnega-akta-o-spremembi-splosnega-akta-o-obliki-in-nacinu-obvestila-o-spremembi-pogojev-iz-narocniske-pogodbe

a. Roaming

AKOS provided support to operators in implementation and fulfilment of the requirements of the Regulation, and in this context, organized three public consultations with operators and prepared an extensive document with 146 answers to questions exposed by operators. It has also prepared and published a roaming brochure for end-users with tips on the transition to RLAH (Roam Like at Home), including information on the rules that apply to fair use of services. Since 15 June 2017 AKOS received few disputes regarding non-compliance with the new roaming rules such as a lack of welcome-SMS, the cut-off limit for data did not activate, or the end-user was not informed of charges applicable outside EEA.

Moreover, there was no notice on drop in the usage of operator services due to the availability of OTT services; instead the usage of services in international roaming increased. Moreover, most of the operators have identified a significant data increase since the Roaming regulation and have experienced their retail revenues declined.

In line with the Decree on the implementation of RLAH[485] in case of infringements of the Roaming Regulation, AKOS can impose administrative fines. For violations of Articles 3 (1, 2, 3, 4, 5, 6, 7), 4, 5 (1), 6.a, 6.c (2), 6.d (5), 6.e (1, 3, 4), 7, 9, 11 and 12 of the Regulation fines amount between €50 000 and €125 000 on operators with annual revenue above €200 million, between €20 000 and €50 000 on operators with annual revenue between €50 and €200 million, and between €10 000 and €20 000 on operators with annual revenue below €50 million. Moreover, the Decree provides imposition of fines on responsible individuals in the companies ranging between €1000 and €4100.

For violations of Articles 14, 15, 16(4) of the Regulation AKOS can impose fines between €30 000 and €100 000 on operators with annual revenue above €200 million, fines between €15 000 and €30 000 on operators with annual revenue between €50 and €200 million, and fines between €5 000 and €15 000 on operators with annual revenue below €50 million. Moreover, the Decree provides imposition of fines on responsible individuals in the companies ranging between €400 and €2 000.

Following the introduction of RLAH in June 2017, Slovenian subscribers consumed 1.5 times more voice and 6.4 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016.[486]

b. Net neutrality

The Decree on the implementation of the Regulation (EU) laying down measures concerning open internet access (Official Gazette of RS, Nr. 29/16), adopted on 20 April 2016, laid down the rules on penalties in line with the TSM Regulation[487]. Penalties are specified in Article 4.

[485] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[486] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[487] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

The exact range of fines for infringements of Article 3, Article 4(1), (2) or Article 5(1), (2) of the TSM Regulation is between €500 and €15 000 for a smaller undertaking and entrepreneur and between €20 000 and €50 000 for a medium or large undertaking. Moreover, the Decree provides for the imposition of fines on responsible individuals in the companies or entrepreneur ranging between €200 and €2 000. AKOS is the competent authority to impose such fines. AKOS after consultation with operators also issued Recommendation regarding the implementation of the provisions of Regulation (EU) 2015/2120 concerning the provision of Internet access services.[488]

AKOS has a monitoring system (Akos Test Net) which is a user-oriented measurement tool that allows users to verify the quality and throughput of their broadband connection. The measurements can be done through web browser on the fixed connection or by dedicated mobile app adopted for Google Android and Apple iOS platform.

c. 112

Rising awareness about the importance of the emergency call number '112' as well as the notification of roaming users about the existence and the importance of the emergency call number 112 when they cross the national borders are defined in Art. 134/7 ECA-1C. Every year on February 11, many events take place in Slovenia in order to promote the existence and appropriate use of the EU emergency number. Administration of the Republic of Slovenia for Civil Protection and Disaster Relief which performs administrative and professional protection, rescue and relief tasks prepares on a yearly basis at this day open day events, which include a press conference and open visits of regional notification centres, while AKOS every year publishes an article about the 112 number on its website. According to Amended ZEKom-1C (ECA-1C), Ministry of public administration prepared new Rules on the quality of the service for an EU emergency number 112 and also for police number 113.[489]

d. Universal service

Universal service[490] consists of provision of access at a fixed location and provision of telephone services, Directory enquiry and directories, and Public pay phones and other public voice telephony access points. Measures for disabled users and special rates for disadvantaged are included in every service.[491] The provision of all services is entrusted to the Incumbent with expiration on 2 December 2019. The provision of broadband access was not included in the universal service at the end of 2017.[492]

The market analysis shows that more than 99% of households have at least one commercial offer for broadband service available (either over fixed network or fixed wireless broadband access – FWBA). Only the households without commercial offer are entitled to universal

[488] http://www.akos-rs.si/priporocila-agencije-priporocilo-v-zvezi-z-izvajanjem-dolocil-uredbe-(eu)-2015-2120-glede-zagotavljanja-storitev-dostopa-do-interneta

[489] On 17 April 2018 the Slovene parliament has approved the law ZInfV to transpose the Directive (EU) 2016/1148 concerning measures for a high common level of security of network and information systems across the Union.

[490] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

[491] In this context, on 17 April 2018 Slovene parliament has approved the ZDSMA law to transpose the Directive (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies.

[492] However, on 17 April 2018 AKOS has issued a Decision to include Internet access with speeds of 4 Mbs / 512 Kbs into universal service.

service. The LTE network is enabler for FWBA and was imposed to A1 Slovenija as a part of special coverage obligation that has been fully implemented in July 2017.. It includes 10 Mbit/s download speed on fixed location with an outdoor antenna on rural areas. According to Article 124 of ECA-1C the download speed is defined as a speed subscribed by at least 80% of households with internet access which is currently at 10 Mbit/s.

5. Conclusion

Slovenia is progressing in terms of competiveness of its telecommunications market both on the fixed and mobile segment. Bundled offers, mostly triple-play offers and increasingly quadruple-play offers, keep playing a significant role in communications packages, thus regulated access to Incumbent network is still required as to enable competition of mobile operators without good fixed network coverage.

In 2016 Slovenia has opted for goals to cover 96% of its population with internet speeds of at least 100 Mbps and the rest with speeds at least of 30 Mbps by the year 2020, which is more ambitious goal as in DAE. In order to achieve this target more investments in fixed line connectivity are needed, in particular in rural areas. Because of more ambitious goals of national digital agenda Slovenia might miss the key DAE target to ensure that the entire population has access to internet with speeds of at least 30 Mbps. Furthermore, relatively high prices for broadband connectivity (DESI price index 73) might be the reason for low take-up of fast broadband with speeds of 30 Mbps and above.

At the same time, persisting delays in market analysis of broadband market 4 prompted the Commission to open infringement proceedings in October 2017. Since then, AKOS has completed its analysis of market 4.

The 700 MHz auction for 5G is planned for 2018, especially considering commercially interests and pilot projects to support front runners and exploitation of new technologies and services in timely and in predictable manners. Moreover, AKOS in cooperation with the Ministry of Public Administration has launched the initiative for the first tests and the future use of 5G technology and proposes to use the frequency band 3400 - 3800 MHz for testing 5G projects in the cities of Slovenia.

SPAIN

Market developments

1. Competitive environment

The electronic communications market in Spain is recovering after a decrease in revenues since 2009. Retail revenues were almost constant in 2017 while wholesale revenues increased mainly because of growth in wholesaling of audio-visual services.

Three large convergent operators (Telefónica, Vodafone and Orange) account for more than 90% of the retail market for broadband access, followed by a fast growing fourth national player Masmóvil. With the exception of a stable market share for fixed business services, Telefónica's market share in fixed broadband continues to decrease (41.17% in December 2017), followed by Orange (27.66 %) and Vodafone (23.38 %)[493]. By December 2017, Masmóvil had more than doubled its fixed broadband market share compared to the first quarter (3.51 % vs. 1.4%). Euskaltel has consolidated its position as a regional operator in the North of Spain with the acquisition in 2016 of R-Cable in Galicia and in June 2017 of Telecable in Asturias. Despite its regional footprint, Euskaltel is already the fourth operator in terms of broadband lines.

Bundling remains the most representative way that operators use for commercializing electronic communications services in Spain. 70.39% of fixed access lines and 96.68% of broadband accesses are part of a bundle. "Four-play" (including mobile services but no IPTV) and "Five-play" bundles play a particularly important role and account for more than 79% of all bundles. In the first quarter of 2017, "Five-play" bundles reached 4.8 million, roughly a 20% increase over the previous year, and "Four-play" bundles numbered 6.3 million.

Pay TV services continue to grow and reached 6 million individual subscriptions on the first quarter of 2017. Revenues generated by pay TV services have been more modest: despite a 50% increase in the number of subscriptions over the last three years, total revenue generated by pay-TV services has only increased by 20%.

In this context, content (in particular premium content) has become a key element to compete in the Spanish electronic communications markets, but also has an increasing cost for operators. The availability and access to premium content (in particular football) is key. All operators criticised the upwards price spiral (+60%) of football rights. The obligation for Telefónica to provide access to its football rights is based on a 2015 *Comisión Nacional de los Mercados y la Competencia* (CNMC) merger remedy that included a formula for the calculation of the access price. Since then, the rights ownership has moved from Telefónica to Mediapro that continues to apply the same pricing model on the operator's share in the pay TV market and 20-25% on its share in the broadband market. The sector is concerned as there is no incentive to limit the acquisition price of rights to football association.

[493] http://data.cnmc.es/datagraph/jsp/inf_men.jsp

a. Fixed Markets

Coverage	ES-2016	ES-2017	EU-2017
Fixed broadband coverage (total)	95%	96%	97%
Fixed broadband coverage (rural)	92%	93%	92%
Fixed NGA coverage (total)	81%	85%	80%
Fixed NGA coverage (rural)	28%	37%	47%
Ultrafast coverage (total)	no data	84%	58%
4G coverage (average of operators)	86%	92%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

Fixed broadband market shares	ES-2016	ES-2017	EU-2017
Incumbent market share in fixed broadband	43.4%	41.6%	40.3%
Technology market shares			
DSL	50.6%	41.6%	64.2%
Cable	18.8%	18.0%	19.4%
FTTH/B	29.7%	39.2%	12.9%
Other	0.9%	1.2%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

Investment in fixed services continues to be largely focused on the deployment of FTTH/B networks. In parallel to a decline in the number of DSL lines (from 50.6% to 41.6%), the number of FTTH/B continued to grow at a fast pace from 29.7% to 39.2% in just one year. Telefónica has deployed the largest FTTH/B network reaching more than 17.5 million building units (first quarter 2017), followed by Orange with 10 million building units (after adding 2 million new building units in one year between 2016 and 2017. Vodafone has also sped up its FTTH/B rollout, doubling the number of building units covered by its network, which currently reaches nearly 3.4 million building units.

This strong growth in the deployment of fibre networks have been supported by regulatory measures as described below as well as co-investment agreements, complemented by several commercial wholesale access agreements, as reported in the 2017 Europe's Digital Progress Report.

New entrants' DSL subscriptions by type of access (VDSL excluded)	ES-2016	ES-2017	EU-2017
Own network	-	-	0.5%
Full LLU	78.3%	78.3%	72.8%
Shared Access	1.9%	1.9%	4.1%
Bitstream	19.7%	19.7%	14.7%
Resale	0.1%	0.1%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband prices	ES-2016	ES-2017	EU-2017
Fixed broadband price index [values between 0-100]	70	74	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

The fixed broadband price index for Spain shows an improvement (from the 23th to the 22th position) but prices in Spain remain still more expensive than the EU average. As explained above, the context is a convergent market dominated by bundles and characterized by increasing internet access speeds (supported by a very substantial investment in the deployment of FTTH/B networks) where price increases in the flagship-bundled products of the main operators are generally linked to different improvements (inclusion of more

bandwidth, higher allowances for data and voice traffic, additional mobile lines or the inclusion of premium TV content).

b. Mobile market

Mobile market	ES-2016	ES-2017	EU-2017
Market share of market leader	30%	30%	35%
Market share of second largest operator	27%	27%	28%
Number of MNOs	4	4	-
Number of MVNOs	24	22	-
Market share of MVNO (SIM cards)	11%	9%	-

Source: Communications Committee. Data as of October 2016 and October 2017.

4G coverage in Spain reached 92% of households, slightly above the EU average (91%). This is the result of the substantial investment by the main three mobile network operators (MNOs) that have carried out an important 4G deployment in 2017.

The MNOs have reached network sharing agreements, in a similar way to those previously reached for 3G-2G networks.

Compared to 2016, the MVNOs' market share has fallen by slightly more than 2% due to the mergers that have taken place since 2014. However, the mobile market does not appear to be growing more concentrated since an alternative operator as Másmóvil, the fourth operator as indicated above, has also increased its share.

The obligations that are imposed following the decisions concerning Market 3a/2014 (covering also duct access) and market 4/2014 (covering also terminating segments) are considered to be relevant for the mobile backhaul. Based on such decisions there are a number of standard offers which cover services relevant for mobile backhaul, namely ORLA for access to leased lines, RUO (Reference Unbundling Offer) for access to the LLU and MARCo for access to ducts.

OTTs have a substantial impact on SMS but far less on the consumption of mobile voice services. The growing popularity of messaging Apps, especially Whatsapp, are making the use of SMS residual for the mass market.

Mobile broadband prices [EUR/PPP]	ES-2016	ES-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€39	€21	€24
Least expensive offer for tablet and laptop (5 GB basket)	€28	€24	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

Stand-alone mobile broadband prices, for handset offers have substantially decreased in the past year, and are even below the EU average. The price for mobile broadband for tablets and laptops, a product that is not widely sold on the Spanish market, has also decreased in 2017 although it remains above the EU average.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Spain 68.81% of the spectrum harmonised at EU level for wireless broadband has been assigned. This percentage is mainly due to the lack of assignment procedure for the 700 MHz, 1.5 GHz and 3.6-3.8 GHz bands. Regarding the 700 MHz band, in November 2017 the Ministry of Energy, Tourism and the Digital Agenda, which has all spectrum-related powers in Spain, has published a public consultation about this band and its authorization process for electronic communications services. According to the Ministry, Spain wants to comply with the date established in Decision (UE) 2017/899, of the European Parliament and the Council of 17 May 2017, on the use of the 470-790 MHz frequency band in the Union; however it is necessary to wait until the results of the public consultation.

Regarding other wireless broadband bands, the Ministry also reports that in the first quarter of 2018 it is foreseen to auction the core L-band, 1452-1492 MHz ("1.5 GHz") and the 3.6-3.8 GHz band. A reorganization process of the whole 3.4-3.8 band (yet to be defined) is also foreseen, in order to organize the band for Time Division Duplex (TDD) use and for operators to have a contiguous amount of spectrum. A new update of the national frequency allocation table is expected to introduce the provisions needed to have the bands identified for 5G, including the 26 GHz band.

The above measures are included in the National Plan for 5G (2018-2020) published in December 2017[494].With the approval of the National Plan for 5G at the end of 2017, Spain appears to be preparing the appropriate regulatory environment to enable 5G rollout in the country. Besides the measures to make spectrum available for 5G services, the Plan foresees to fund several pilot projects calls[495].

CNMC concludes that the most efficient would be to start providing wide and deep indoor coverage with the 700 MHz band, and then use higher bands (3.4 -3.8 GHz) to offer additional capacity where required. Nevertheless, due to the expected late availability date of 700 MHz spectrum, the launch of 5G services in Spain will oblige mobile operators to use firstly 3.4 -3.8 GHz[496], delaying the availability of 5G services in rural areas.

In February 2017, the Regulation for use of spectrum has been approved by means of Royal Decree 123/2017. This new regulation introduces less requirements and simplified procedures to deploy low power stations so it will facilitate the deployment of small cells. Moreover, new mechanisms of sharing spectrum within the secondary market have been provided. That is the case of the mutualisation of rights of use being even possible for an operator with no licence to be part of this kind of agreement. It is also provided that a third party can be the one which

[494] http://www.minetad.gob.es/telecomunicaciones/5G/Documents/plan_nacional_5G_en.pdf

[495] The first call will fund two pilot projects with 20 million euros and the government has already approved it. http://www.minetad.gob.es/es-ES/GabinetePrensa/NotasPrensa/2018/Paginas/20180223-aydas-programas-pilotos.aspx

[496] In February 2018, the Ministry of Energy, Tourism and Digital Agenda started the 3.4-3.8 GHz auction process. A draft has been subject to public consultation until 14 March 2018. http://www.minetad.gob.es/es-ES/GabinetePrensa/NotasPrensa/2018/Paginas/limite-frecuencias20180221.aspx

manages the frequencies that has been mutualized. This new mechanisms are additional to others already established like transfer and leasing.

The coordination process with EU neighbouring countries concerning the 700 MHz band has been already achieved, except with Morocco and Algeria.

b. National and EU investment in broadband

The national 'Programme for the extension of next-generation broadband networks' (*Programa de Extensión de la Banda Ancha de Nueva Generación, PEBA-NGA*), managed by the Ministry of Energy, Tourism and the Digital Agenda and co-funded by the European Regional Development Fund, continues to provide financial support for the roll-out of broadband networks in areas where high speed connectivity is neither available nor planed in the next three years. Since 2013, this programme has provided high speed connectivity to 2.8 million households. In 2017 this support increased by 58%, reaching 100 million Euros and focused on the roll-out of very high speed access networks providing at least 100 Mbps download speeds. The program seeks the maximization of the results in terms of number of underserved households covered, without undermining competition. The approach followed by the Ministry allows operators to choose the specific areas where to extend broadband coverage, funding those projects requiring less aid. The aim is to locate the projects in the areas closest to profitability, maximizing the use of public funding in terms of population covered.

Several regions are also implementing complementary support actions to extend broadband coverage. Furthermore, connectivity has achieved a high priority in the national policy agenda as the cornerstone for the digital transformation of the economy and the society[497].

In addition, in 2017 (Royal Decree 898/2017 of 6 October), a new initiative was adopted supporting the subscription by users, including SMEs and municipalities, of connectivity offering at least 30 Mbps download speeds in rural areas where no connectivity offering at least 10 Mbps download speeds with a latency of less than 100 milliseconds was available.

As a support for its broadband mapping and monitoring activities, the Ministry commissioned a Study providing a methodology to calculate the technical parameters necessary for LTE (Long Term Evolution) and HSPA (High Speed Packet Access) technologies to offer certain speeds to end users.

[497] In March 2018, the government has announced for the period 2018-2021 an ambitious plan to reinforce its support for the deployment of very high-speed broadband networks in the whole country. The aim is to reach 95% coverage of the population through the extension of 300 Mbit/s access to 100% of the population centres (Plan 300x100).
http://www.minetad.gob.es/es-ES/GabinetePrensa/NotasPrensa/2018/Paginas/ElGobiernopresentaelPlan300x100parallevarfibraa300Mbitsatodoslosnúcleosdepoblacióndeespaña.aspx
In addition, in March 2018, the government has approved a budget of €150 million for the program in 2018.
http://www.minetad.gob.es/es-ES/GabinetePrensa/NotasPrensa/2018/Paginas/ElGobiernoautorizalaconvocatoriade150M€delPlan300x100paraextenderlabandaanchaen2018.aspx

c. Implementation of the Broadband Cost Reduction Directive

In Spain, the Directive 2014/61/EU[498] (Broadband Cost Reduction Directive or BB CRD) has been transposed through Royal Decree 330/2016 on measures to reduce the cost of deploying high-speed electronic communications networks. Royal Decree 330/2016 also sets in great detail the policy instruments that were already laid down under the Spanish Telecommunications Law (Law 9/2014) regarding access by telecommunications operators to the physical infrastructure of network operators such other telecommunications operators, utilities (e.g. gas, electricity, water companies) or transport companies, as well as to the physical infrastructure of public administrations.

However, the regulation of in-building physical infrastructure is not part of the scope of the Royal Decree 330/2016. Rules for in-building physical infrastructure in Spain have been in place since 1998, and this regulation is already addressed by article 45 of the Spanish Telecommunications Law and incorporated in Royal Decree 346/2011, of 11 March and Order ITC/1644/2011, of 10 June, both addressing the installation of high-speed-ready in-building physical infrastructure in newly constructed buildings. It is to be noted that access to in-building physical infrastructure was already obliged in NRA (former *Comisión del Mercado de las Telecomunicaciones*) Resolution regarding market 4/2007.

CNMC reports that the impact of the transposition of the BB CRD has been limited. This is probably due to the fact that, in Spain, access to the passive infrastructure of the SMP operator (Telefónica) has been available since 2008. Access to the infrastructure of other operators, on the basis of Directive 2014/61/EU, has for the time being been limited in scope, such as e.g. in instances where no infrastructure of Telefónica was available in a particular location, or where access to Telefónica's infrastructure required incurring in some additional costs.

Dispute settlement under the BB CRD is becoming a prominent function within CNMC. Since the entry into force of Royal Decree 330/2016, more than ten dispute settlement procedures have been initiated (three of them have already been solved). Cases are generally focused on the provision of access to physical infrastructure and transparency requirements. Based on CMMC's experience up to date, the main challenges raised in the context of dispute settlement are: (i) the lack of awareness by the network operators (and in particular by public administrations) of the access and transparency obligations they must comply with; (ii) the challenges inherent to calculating the wholesale price of access to the physical infrastructure; (iii) the determination of whether some telecommunications providers (in particular those making use of wireless access networks) are entitled to access under the terms set in Royal Decree 330/2016, taking into account that in some cases the maximum theoretical download speed may not be the real download speed in instances of shared use; (iv) ensuring compliance with the non-discrimination principle.

CNMC also reports that it is endeavouring to provide detailed guidance to telecommunications operators on the way the negotiations regarding access and transparency should be conducted. Along the same lines, CNMC responds periodically to informal consultations and requests for information from telecommunications operators on issues related to the application of Royal Decree 330/2016.

[498] Directive 2014/61/EU, of the European Parliament of the Council of 15 May 2014, on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1–14).

Regarding BB-ready buildings, the regulatory powers are with the Ministry of Energy, Tourism and the Digital Agenda. A new Regulation updating certain aspects of the common telecommunications infrastructures in in-building physical infrastructure is about to be approved. This new regulation reinforces building symmetrical obligations and paves the way to future regulation to share infrastructures in areas with less population density.

3. Regulatory function

CNMC is still exercising in practice some powers that the Law transferred to the Ministry (Registry of the Telecommunications Providers, assignment of numbering resources, end-user database management and all sanctioning and control functions regarding these functions and public resources). The recently enacted Royal Decree 903/2017, of 13 October, on the structure of the Ministry, confirms the attribution of these powers that have been traditionally exerted by CNMC, to the Ministry providing a transfer of the staff within CNMC that undertakes said functions to the Ministry.

Royal Decree 462/2015 conferred to CNMC a role in assessing the conditions set in State aid schemes in relation to access conditions and prices prior to their approval. However, the CNMC report is now addressed to the Ministry, which is in charge of preparing the binding assessment of the overall compatibility of the proposed measures with State Aid rules. The Ministry has kept its powers on net neutrality monitoring (except for dispute resolution faculties) and imposition of symmetrical obligations in buildings. However, the regulation that must develop the imposition of symmetrical obligations has not been approved yet. Regarding roaming, CNMC exercises some of the functions of the Roaming Regulation, but the functions are quite distributed between CNMC and the Ministry.

In 2017, the Ministry passed Royal Decree 123/2017, of 24 February, on spectrum regulation. The Royal Decree only assigns a very limited role to CNMC on issues pertaining with spectrum regulation. Basically, it has removed the previous mandatory CNMC advisory role in spectrum granting processes.

At present, ex ante regulation is imposed in the following markets in Spain: the five markets from the 2014 Recommendation, and also call origination on fixed networks (from the 2007 Recommendation) and three regulated markets from the 2003 Recommendation (trunk segments of leased lines, access and call origination on mobile network and broadcasting transmission services).

Spain has already finished the 3rd round of market reviews and is in the 4th round, In addition, during the course of 2017, CNMC has notified to the European Commission remedies in market 4/2014 (wholesale high quality access provided at a fixed location) in January 2017; the review of market 2/2014 (voice call termination on individual mobile networks) in November 2017[499]; and the review of market 3a/2014 (wholesale local access provided at fixed location) December 2017. The CMNC reports that public consultation, notification and approval of market 1/2014 (wholesale voice call termination on fixed networks) is expected in 2018. In December 2017, CNMC has notified the Commission its preliminary conclusions regarding the economic replicability test that will apply to Telefónica's broadband products destined to the residential segment, as required in the latest revision of markets 3a/2014 and 3b/2014.

[499] Final Decision has been published on 18 January 2018.

Regarding the review of markets outside the 2014 Recommendation on relevant markets[500], the decision concerning the review of market 15/2003 was adopted in 4 April 2017, the review of market 2/2007 was adopted in January 2017, while the draft measures as to the review of market 14/2003 were notified to the European Commission in November 2017. The review of market 18/2003 is expected to be carried out in 2018. Market 1/2007 (access to the public telephone network at a fixed location) was notified to the European Commission in November 2016 and has already been completed.

In addition to the co-investment and co-deployment agreements mentioned above, as reported in the 2017 Europe's Digital Progress Report, Spain's strong growth in the deployment of fibre networks (FTTP) has been supported from a regulatory perspective by the NRA's decision to mandate in 2008 access to the ducts of the incumbent operator Telefónica and to impose in 2009 a symmetrical obligation upon all operators to provide access to in-house fibre cabling. In the last review of Spain's broadband markets, CNMC included fibre access networks as part of the relevant product market. Cable (which belongs only to market 3b) continues to be outside of the market since, according to CNMC, it does not pose a strong direct or indirect constraint at wholesale level.

Telefónica was designated as a significant market power (SMP) operator. CNMC proposed to impose on Telefónica remedies that varied by: infrastructure (copper versus NGA networks); geographical areas with different levels of competition; business and (consumer) mass-market customers.

Telefónica will have to offer virtual access to its fibre network for 60-70% of Spain's population, and bit stream access over copper and fibre with no speed cap for the business market across Spain.

As for fibre, CNMC imposed an obligation for virtual local unbundled access that was differentiated on a geographical basis. Telefónica was obliged to provide virtual access to fibre (known as 'local NEBA') on the whole territory of Spain, with the exception of the 66 'ultrafast broadband (UFB) municipalities', where the wholesale services for access to civil infrastructure and terminal segments (in-house wiring) were deemed sufficient to address potential market failures. The local NEBA would be developed on the basis of the existing fibre-based NEBA service and would not be price-regulated but instead subject to an economic replicability test. The reference offer of the VULA service (NEBA local) was approved in January 2017 with a 12 month implementation period. In December 2017, CNMC approved the NEBA replicability test and set the price for wholesale access to Telefonica's fibre network at EUR 16.38 per month, which is less than the current EUR 19.93 per month. The price and method used to calculate must still be approved by the European Commission and Ministry of Economy before taking effect.

CNMC has established clear rules for Main Distribution Frame (MDF) decommissioning, whereby Telefónica is allowed to discontinue wholesale and retail services based on the copper network in locations where fibre can be used instead. Hundreds of sites are in some stage of the process and dozens of non-LLU sites have already been decommissioned after a 12-month guarantee period. Some LLU sites are already scheduled for decommissioning after

[500] Commission Recommendation 2014/710/EU of 9 October 2014 on relevant products and service markets within the electronica communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services.

a 5-year period. Partial-site decommissioning is analysed case by case by CNMC; there were six such decisions in 2017.

Regarding fixed termination rates, a symmetric pure BU-LRIC price set at 0.0817 c€/min is in place since October 2014. As indicated above, CNMC plans to carry the review of the wholesale market for voice termination on fixed networks (market 1/2014) in 2018.

As to mobile termination rates, a symmetric pure BU-LRIC price set at 1.09 c€/min has been in place since July 2013 following the decision concerning the third review of the wholesale market for voice calls termination on mobile network (market 2/2014) that CNMC adopted in May 2012. However, as indicated above, in January 2018 CNMC has approved the final review of Market 2/2014. CNMC includes an updated pure BU-LRIC based symmetric mobile termination rate that includes mayor changes that happened in the national mobile market since the last market analysis, such as the 4G deployment, the exponential increase of mobile broadband demand, single RAN technology rollout and 2G/3G spectrum refarming for 4G services, in addition to other parameters (WACC, asset unitary cost, among others):

From the final approval and until 31/12/2018	From 1/1/2019 to 31/12/2019	From 11/1/2020
0.70 c€/min	0.66 c€/min	0.64 c€/min

Recommendations on NGA networks and non-discrimination have been largely taken into account in the decision on markets 3a, 3b and 4. Regarding market 4/2014 (high quality access), please note that the recently notified market analysis proposes to deregulate the route Mainland/Canary Islands.

4. Consumer matters

The Ministry of Energy, Tourism and the Digital Agenda, which has the main powers regarding consumer issues, reports that the main sources of consumer complaints in 2017 were billing, withdrawal from contract, service failure, shutdowns and portability. Some 19.216 complaints were received in 2017, 4.2% fewer than in the same period in 2016.

a. Roaming

Since 15 June 2017 one potential case of non-compliance with the new roaming rules has been detected (the case of Lycamobile). The Ministry of Energy, Tourism and the Digital Agenda has opened a preliminary investigation requiring information to the roaming provider about the way it was billing its customers within EU/EEA. This case is still pending.

CNMC reports that there are no pending sustainability derogation requests. On 7 November 2017, CNMC authorized the application of surcharges to a roaming provider (Digi Spain) who was not able to recover its roaming costs. The level of the surcharges authorized is below the wholesale caps.

According to the Ministry, operators have been formally asked as per their compliance with Roam Like at Home[501] (RLAH). In general terms, (i) operators have notified roaming

[501] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

suppression before 15 June 2017; (ii) the general terms and conditions have been modified and clients have been informed accordingly; (iii) there is only one Fair Use Policy (FUP) established of consumption control and of the communication's use in and outside Spain; (iv) content of SMSs to notify when the client is in a different EU country or when FUP is going to be implemented has been notified to the Ministry; (v) in the first half of 2017 only 5.4% of customer complaints referred to roaming. However, the Ministry reported that it is requiring operators to comply with information on consumption warning, through more transparency towards their clients.

Following the introduction of RLAH in June 2017, Spain subscribers consumed 4.2 times more voice when travelling in the EU in summer 2017 compared to summer 2016 and 28.7 times more data roaming services in summer 2017 compared to summer 2015[502].

b. Net neutrality

With the adoption in November 2015 of Regulation (EU) 2015/2120[503], net neutrality is fully harmonised at EU level with directly applicable rules, which do not need to be transposed into national law. Some parts of the General Telecommunications Law regarding penalties and transparency are directly applicable also in the net neutrality field. According to the Spanish Telecommunications Law, the authority in charge of monitoring and enforcing the open internet provisions is the Ministry of Energy, Tourism and the Digital Agenda while CNMC has been granted the competences to resolve disputes that may arise between operators and over the top (OTT) providers, including open internet issues. According to CNMC information, no disputes have been arisen in this respect. Moreover, according to the Ministry there are no complaints from users on zero-rating offers.

c. 112

In Spain, the autonomous communities are in charge of managing calls to 112. According to the last Communications Committee (COCOM) 112 Implementation Report, calls to the emergency number 112 are answered within 5 seconds, and disabled users can count on alternative means of access including text messages, assisted calls (chat), fax and apps. Some regions have started developing specific apps to grant access to disabled end-users. According to the latest E-communications household and telecom single market survey, knowledge of the possibility to use 112 in the event of an emergency within Spain has reached 73% but knowledge of the possibility to use this number everywhere in the EU is only at 30%.

d. Universal service

There were no changes in 2017 to the scope or financing of the universal service[504], which already includes broadband. Public pay telephones and directories are still in the universal service obligation scope as the Ministry has opted to extend it during one year more, until

[502] Figures compare Q3/2017 with Q3/2016 (for voice) and with Q3/2015 (for data) retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.
[503] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).
[504] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

2019 despite of CNMC 2016 Report recommending the Ministry to evaluate the need of maintaining public pay telephones and directories in the universal service scope, given the low and decreasing demand of both services.

5. Conclusion

Building on widely deployed fibre networks and significant efforts in 4G coverage, Spain is well positioned to deliver further on the aim of ensuring that all Spanish citizens benefit from a future-proof and innovative digital economy. Spain should however tackle the interrelated broadband pricing and take-up issues, taking into account the convergent bundling trend.

With the approval of the National Plan for 5G at the end of 2017, Spain started to create the appropriate regulatory environment to enable 5G rollout in Spain. Particular attention will need to be paid to the definition of the national 700 MHz-band roadmap expected in the first semester of 2018.

SWEDEN

Market developments

1. Competitive environment

The Swedish market for internet access services is characterized by good accessibility for end users both in terms of fixed and mobile broadband. Market players are investing in order to meet increasing demand for higher bandwidth and transmission speed.

The role of municipalities in providing local fibre is remarkable in Sweden. The fibre market is fragmented, with approximately 180 local fibre networks complementing the offer of the incumbent and the cable sector. Municipalities offer their services via communication operators operating their networks as an alternative to the incumbent's network.

a. Fixed Markets

Coverage	SE-2016	SE-2017	EU-2017
Fixed broadband coverage (total)	99%	99%	97%
Fixed broadband coverage (rural)	91%	87%	92%
Fixed NGA coverage (total)	75%	78%	80%
Fixed NGA coverage (rural)	21%	23%	47%
Ultrafast coverage (total)	no data	73%	58%
4G coverage (average of operators)	100%	100%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

The Swedish broadband market is characterised by growing consumer demand for ultrafast broadband and a corresponding declining consumer demand for slower broadband. On the fixed broadband market, fibre subscriptions continued to increase over the reporting period (+19% of fibre LAN compared to 2016). The Swedish broadband market also featured a slight increase (+5% between July 2016 and July 2017) in cable TV subscriptions and conversely a substantial decrease in xDSL subscriptions (-11% between July 2016 and July 2017).

Sweden is currently among the EU countries with a very advanced fixed broadband coverage baseline. Sweden scores well above the EU average for overall 4G coverage (100% against 91% for the EU) but lags behind the EU average for fixed next-generation access (NGA) coverage in rural areas (23% against 47% for the EU).

In terms of market trends, bundled services have continued to decrease. The total number of bundled subscriptions in the first half of 2017 amounted to 1.4 million, a 18% decrease on the overall number of bundled offers for the same period in 2016. As to market share, the three largest operators, Telia Company (incumbent), Telenor and ComHem, together account for about 72% of the fixed broadband market.

Fixed broadband market shares	SE-2016	SE-2017	EU-2017
Incumbent market share in fixed broadband	37.7%	37.5%	40.3%

Technology market shares			
DSL	29.8%	26.6%	64.2%
Cable	18.3%	17.4%	19.4%
FTTH/B	51.3%	55.5%	12.9%
Other	0.6%	0.5%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

New entrants' DSL subscriptions by type of access (VDSL excluded)	SE-2016	SE-2017	EU-2017
Own network	-	-	0.5%
Full LLU	44.0%	45.8%	72.8%
Shared Access	28.2%	24.2%	4.1%
Bitstream	-	-	14.7%
Resale	27.8%	30.0%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

Fixed broadband prices	SE-2016	SE-2017	EU-2017
Fixed broadband price index [values between 0-100]	97	87	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

b. Mobile market

Mobile market	SE-2016	SE-2017	EU-2017
Market share of market leader	39%	45%	35%
Market share of second largest operator	27%	25%	28%
Number of MNOs	5	5	not available
Number of MVNOs	41	44	not available
Market share of MVNO (SIM cards)	6%	4%	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

The Swedish mobile market is a fairly competitive market, hosting five mobile network operators: Telia Company, Tele 2, Telenor, Three (HI3G) and Net 1, an operator offering services in the 450 MHz band. There are also several mobile virtual network operators (MVNOs) with very limited market shares.

Over the reporting exercise, the market has seen continuous growth in mobile data traffic.

Mobile broadband prices [EUR/PPP]	SE-2016	SE-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€19	€12	€24
Least expensive offer for tablet and laptop (5 GB basket)	€8	€9	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017.

Sweden features some of the least expensive mobile broadband prices in the EU (9€) for tablet and laptop (5GB basket) against 17€ in the EU.

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

In Sweden, 87.89% of the spectrum harmonised at EU level for wireless broadband electronic communications services has been assigned.

On 7 December 2017, PTS[505] published an update on its study about the 700 MHz band assignment. According to PTS, before 31st December 2017, Sweden would have reached the necessary coordination agreements to enable wireless broadband services in the 700 MHz band with other EU countries. Besides, PTS is confident that most parts of the 700 MHz band will be assigned in the first quarter 2019 at the latest.

An award process for 2x20 MHz FDD spectrum plus 20 MHz SDL spectrum in the 700 MHz band has been resumed. All interested parties were invited to submit their comments on the new proposal by 15 November 2017[506]. As a reminder, in November 2016, PTS cancelled the planned auction for the 700 MHz band that was due to start on 1 December 2016 following a Government decision.

In June 2017, the 800 MHz band coverage obligations were fulfilled. Currently, about 200 4G base stations have been established in the 800 MHz band with a coverage of more than 500 households. As a reminder, an obligation had been placed upon one licensee (Net4Mobility, an infrastructure joint venture between Tele2 Sweden and Telenor Sweden) during the 800 MHz auction to provide service of at least 1Mbit/s or better to a list of stated addresses (identified as being broadband 'not spots', lacking any other forms of broadband connection).

On 19 September 2017, PTS published an invitation to take part in the 450 MHz band auction. The deadline for applications by interested parties was 23 January 2018[507]. The auction concerns one national licence of 2 x 5 MHz in the 450 MHz band. Among the licence conditions is a requirement to cover 80% of the area in each Swedish county with mobile broadband services offering a downlink bitrate of 5 Mbit/s and an uplink bitrate of 128 kbit/s. The term of licence is from 5 March 2020 up to and including 31 December 2044.

Since the release of the spectrum plan for 5G tests in March 2017, PTS has issued 4 licenses for 5G tests. Ericsson performs tests in Kista (a suburb of Stockholm) with 200 and 1000 MHz bandwidth, between 3400-3600 MHz and 26,5-27,5 GHz respectively, as well as in Gothenburg with 100 MHz bandwidth in 3500-3600 MHz. AstaZero performs tests with 200 MHz bandwidth in 3400-3600 MHz outside Borås.[508]

[505] *Post- och telestyrelsen* (Swedish Post and Telecom Authority)
[506] A consultation was carried out with the market in February 2018.
[507] The auction was held on 6 February 2018. The current licensee Net 1 won the auction.
[508] On 19 February 2018, PTS published a preliminary study prior to future assignment of frequencies for 5G (3.4-3.8 GHz and 24.24-27.5 GHz). Through this preliminary study, PTS is beginning its assignment work of wide frequency blocks for 5G in the 3.4– 3.8 GHz and 24.25–27.5 GHz bands. The goal is to make spectrum in those frequency bands available for 5G deployment as of 2020, thus allowing Sweden to complete the European Commission's 5G Action Plan. The results of the dedicated public consultation will be published in April 2018.

b. National and EU investment in broadband

Sweden's new broadband strategy, as adopted in December 2016, aims at having a completely connected country by 2025 and has the following three objectives: by 2020 95% (as opposed to the initial 90% target) of all households and businesses should have access to broadband of at least 100 Mbps; by 2023 the whole country should have access to stable mobile services of good quality; by 2025 the whole country should have access to high-speed broadband.

Over the reporting period, work has continued towards the achievement of the objectives mentioned above. In particular, cooperation work has been ongoing between PTS and the Swedish Broadband forum. The Swedish Broadband Forum is a meeting place for dialogue and collaboration between the Government, public authorities and organisations, business and undertakings that operate in the Swedish broadband market. It is entrusted with the tasks of identifying obstacles and suggesting solutions as to the way forward regarding broadband related issues in Sweden.

In the framework of the forum, it was notably stressed that remaining white areas are becoming increasingly difficult to cover and that, besides, some parts of Sweden would be featuring time consuming permit processes for broadband roll-out. The Authorities are currently assessing those obstacles and the appropriate ways to tackle them. Besides, as part of the first mandate PTS was given in connection with the new broadband strategy, PTS issued a report on 2 May 2017 whereby they proposed 5 Mbps as a new basis level to be guaranteed by the State so as to get functional access to the Internet.

It should be reminded that, in 2011, the Swedish Government set to 1Mbit/s the relevant speed of functional Internet access. Since then, the Internet consumption has increased and become more complex in terms of services offered and it was deemed necessary to assess to what extent the initial value may need to be raised to address connectivity needs against the high speed objectives enshrined in the new broadband strategy.

On behalf of the Government, PTS has investigated the transmission speed required in order to guarantee that all households and businesses have access to Internet services that are fundamental for being able to live and work anywhere at all in the country[509].

c. Implementation of the Broadband Cost Reduction Directive

Following the expiry of the deadline for transposing the Broadband Cost Reduction Directive[510] on 1 January 2016, the Commission opened infringement proceedings against Sweden for failure to notify implementing measures.

On 8 June 2016, Sweden notified the Commission of the measures it had taken to transpose the Directive into national Law. The infringement procedure was closed and the Commission services are assessing the compliance of the measures notified by Sweden.

[509] In January 2018, the Government raised the level from 1 Mbps to 10 Mbps and allocated funding for implementation. PTS was given the task to ensure, in accordance with the national regulation, that individual households and businesses lacking such services get access to telephony and internet access of 10 Mbps.
[510] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

Five disputes were settled on the basis of provisions from the Cost Reduction Directive. Among those five disputes, two related to coordination of civil works and a refusal to communicate requested information. In both cases, municipality-owned energy companies which had initially refused to coordinate civil works or communicate information subsequently accepted to do it in accordance with Article 5 and 6 of the Cost Reduction Directive.

3. Regulatory function

The previous decisions for market 3a (wholesale local access provided at a fixed location) and market 3b (wholesale central access provided at a fixed location for mass-market products) date back to 2015 and PTS is currently reviewing them, with the view to notifying its findings to the Commission by February 2019. PTS had an informal consultation with the market players during summer 2017 which included preliminary market definitions for market 3a and 3b. In this context, it was noted that there were possibly different competitive conditions within the fiber wholesale market (being part of market 3a) which might have an impact on the relevant market analysis' outcome. A formal consultation with the market players is expected to take place before summer 2018.

On 20 February 2017, PTS adopted a market analysis decision for Market 1 (fixed call termination). On the same day, PTS also adopted a market analysis decision for Market 4 (Wholesale high-quality access provided at a fixed location). PTS decided on remedies for market 1 which encompass operators that have networks providing the possibility to call certain numbers associated with fixed telephony.

According to the newly adopted decision for market 1, a new LRIC model will replace the currently existing hybrid model. As a reminder, PTS had been using the LRIC methodology for calculating costs for the fixed network since 2004, through LRIC-models, referred to as "hybrid models" that reconcile a bottom-up and a top-down model. The hybrid model has undergone a number of revisions and updates since it was first launched.

The hybrid model used copper as the "Modern Equivalent Asset" ("MEA") until 2010, when it was revised and fibre became "MEA" in a cost model that was launched in 2011. It was followed by updates in 2012 and 2013, when the current hybrid model, "HY" version 10.1 was launched.

PTS has developed a new cost model which has been on two complete public consultations with the market players. The reason to undertake this work in the short term was to provide cost results for wholesale local copper access and wholesale for fixed termination, and, for the longer term, to enable PTS to intervene, if need be, on the market for wholesale local and central access in order to handle competition issues.

Moreover, a new cost model provides PTS with a tool that is relevant for the broadband strategy, providing cost estimates for deploying fibre networks, which could be useful in future arbitration cases on access to civil works, and when evaluating applications submitted to the County Administrative Boards and other public agencies.

Against the new cost model mentioned above, PTS' Decision of 20 February 2017 contains a remedy whereby the operator Telia Company has the obligation to apply cost oriented prices. Telia Company should apply at most prices generated by the new cost model which are calculated in accordance with a new model reference paper.

It should be noted that both of the decisions of 20 February 2017 about market 1 and market 4 mentioned above have been appealed by the operator Tele2. The relevant legal proceedings are currently pending before the Administrative Court.

4. Consumer matters

From 1 January 2017 to 15 October 2017, PTS received overall 977 complaints, the topics of which were as follows: copper based network, roaming, coverage, availability of services. It should however be stressed that PTS, as a national Regulatory Authority, does not handle individual cases but provides feedback to end-users and refers them to the appropriate forum for the purposes of officially lodging complaints if need be.

Many of the complaints pertained to the fact that Telia Company would be discontinuing the regular land line (copper line) in exchange of more future proof and modern technology such as fibre.

Besides, as far as transparency and publication of information is concerned, it should be noted that PTS publishes a price report every year. This price report includes different price comparisons, for example broadband, telephony, mobile tariffs and compares how prices have evolved within a certain time period. The PTS Price report is based on an international price comparison (in a selection of 16 OECD-countries) for the services concerned. The statistics are available on PTS statistics' portal. The report also describes market trends.

a. Roaming

Since 15 June 2017, Swedish telecommunications operators have noticed an increased use of roaming services from their subscribers. Indeed, following the introduction of Roam Like at Home[511] (RLAH) in June 2017, Swedish subscribers consumed 1.5 times more voice and 4.9 times more data roaming services when travelling in the EU in summer 2017 compared to summer 2016[512].

As far as operators are concerned, the situation is as follows: PTS received one application for derogation from the operator Vector. The application was rejected on 21 June 2017 due to the relevant operator's positive roaming retail net margin.

Besides, PTS was notified seven fair use policies by 15 June 2017 which it analysed accordingly. PTS suspected that two roaming offers would be in breach of the new EU roaming rules. One of the investigations concluded that there were in fact no breach; the other investigation by PTS is ongoing.

b. Net neutrality

Case Telia Company/PTS is still pending before the Stockholm Court of appeal. As a reminder, in April 2016, Telia Company had launched two offers: one for free surf on social media and the other one for free surf listening. According to PTS, the offers from Telia

[511] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[512] Figures compare Q3/2017 with Q3/2016 retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018.

Company infringed the EU regulatory provisions on equal treatment of traffic as laid down in Article 3(3) of Regulation (EU) 2015/2120[513]. The infringement would lay in the fact that once the data cap is reached all internet traffic is blocked except for those services and applications that are part of the offers in question. PTS communicated this opinion to Telia Company in an order served on them on 24 January 2017, whereby PTS banned Telia Company's practice[514]

c. 112

The European emergency number 112 is the major emergency number in use in Sweden (the old 90 000 introduced in 1956 is still working in parallel with 112). The average time to answer a 112 call is 14 seconds. People with disabilities can have access to emergency services through SMS, relay services as well as Total conversation.

d. Universal service

During the reporting period, PTS did not impose any universal service obligation[515] to provide electronic communications on any operator. Besides, the scope of the universal service has remained unchanged.

5. Conclusion

Sweden is a front runner on high speed Internet connectivity in the EU. Nevertheless, remaining sparsely populated areas are increasingly difficult to cover. In those areas, operators have fewer incentives to invest due to decreasing economic profitability but also time consuming permit processes for broadband roll-out. In order to expand high speed Internet connectivity to those remote areas, broadband infrastructure roll-out could be incentivised by alleviating the relevant administrative procedures related to permit granting. Alternatively, any unwillingness to invest on the part of private operators might be offset by more public funding as far as roll-out of broadband infrastructure is concerned. Both of the issues mentioned above have been taken into account by Sweden's new broadband strategy. As recommended in the strategy, PTS has been given the task to analyse in which ways administrative permit-related processes can be rendered more efficient. As to funding, Government funds for broadband expansion are today allocated in the form of governmental support, mainly by way of the EAFRD, but also via the ERDF in the northern parts of the country. In order to better meet evolving connectivity needs, as stated in the broadband strategy, PTS has been given the task to review the most efficient way to allocate future governmental funding. The report was delivered in November 2017[516]. It remains to be seen

[513] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[514] Telia Company however asked for a suspension of the prohibition, which the Court allowed and, pending the outcome of the case, Telia Company keeps with the offers in their original form.

[515] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

[516] Framtida stödinsatser på bredbandsområdet

(http://www.pts.se/contentassets/72d03bb4853f4cb4a24feb346efbaa3e/framtida-stodinsatser-pa-bredbandsomradet.pdf)

whether the implementation of the new broadband strategy will generate visible results by 2020 already.

United Kingdom

Market developments

1. Competitive environment

There is a vibrant telecom market in the United Kingdom, with strong competition both on the fixed and mobile markets. During 2017, there was no consolidation among the major fixed and mobile players.

In the mobile market the established players are launching new, innovative products. There is significant competition from OTTs (Google, Facebook, WhatsApp) as well.

The number of fixed lines (including ISDN channels) decreased in 2016 following a sustained period of growth, falling by 0.6% to 33.5 million at the end of the year. The number of mobile subscriptions (incl. M2M) increased by 0.1% to 92.0 million during the year, due to increasing M2M use. 96% of households had a mobile phone in 2017, while 82% had a landline.

Overall fixed voice call volumes continued to decline in 2016 in comparison to 2015 both in absolute terms (by 11.9% to 65 billion minutes) and relative to mobile calls (which grew by 5.7% to 151 billion minutes in 2016). The decline in fixed voice calls was driven by consumers increasingly using mobile and internet-based voice and messaging services instead of traditional fixed-line calls.

The analysis of the Q4 2016 data collected by Ofcom's mobile research app reinforced the importance of non-traditional communication services to Android smartphone users, with eight of the top 20 apps accessed by the panellists being used for messaging and/or social networking (WhatsApp, Messenger, Facebook, Twitter, Instagram, Gmail, Google+ and Google Hangouts). These apps were also among the most frequently used, with panellists using Facebook almost 12 times a day, on average. WhatsApp also had very high levels of use, averaging ten sessions a day.

Use of SMS and MMS continued to decline, down by 5.5% to 96.4 billion messages in 2016, despite a slight increase of 1.9% in pre-pay mobile messaging, which may be related to the availability of 'add-on' pre-pay services that offer an inclusive allowance of messages. The main reason for declining traditional message volumes is the increasing take-up of smartphones, which provide easy access to alternative communication methods such as email and instant messaging.

Regarding bundles, just over eight in ten households (81%) reported purchasing at least two of their communications services together in a bundle in 2017. Dual packages of landline and broadband, and triple-play packages of landline, broadband and TV were the most popular (at 34% and 33% of households respectively). Communications providers have been more focused on selling bundles rather than standalone services, with a reduction in the number of

operators offering standalone fixed telephony services and those offering standalone fixed broadband services.[517]

Fixed broadband prices remained stable during the last year.

Fixed broadband prices	UK-2016	UK-2017	EU-2017
Fixed broadband price index [values between 0-100]	86	86	87

Source: Commission Services based on Fixed Broadband Prices in Europe (Empirica). Digital Economy and Society Index 2018.

Access remedies are in place for LLU (Wholesale Local Access Market Review), VULA (WLA Market Review), WFAEL (Narrowband Market Review), Physical Infrastructure Access (Wholesale Local Access Review) and Leased Lines (Business Connectivity Market Review).

a. Fixed Markets

Although the UK reached >99.5% fixed basic broadband coverage in 2015, there is still an urban-rural digital divide as regards fixed NGA coverage. As regards ultrafast broadband coverage, the UK performs less well than the EU average (51% versus 58% in 2017). Additionally, Ofcom estimates[518] that around 1.1 million UK premises (4%) cannot access decent broadband, i.e. a connection capable of delivering a download speed of at least 10Mbps and an upload speed of at least 1Mbps (additional information on the Government's regulatory broadband universal service obligation is available in this report under chapter 4. Consumer matters/ d. Universal service).[519]

Coverage	UK-2016	UK-2017	EU-2017
Fixed broadband coverage (total)	>99.5%	>99.5%	97%
Fixed broadband coverage (rural)	>99.5%	>99.5%	92%
Fixed NGA coverage (total)	92%	94%	80%
Fixed NGA coverage (rural)	78%	82%	47%
Ultrafast coverage (total)	no data	51%	58%
4G coverage (average of operators)	93%	98%	91%

Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

On the fixed market, the incumbent BT competes with alternative providers in the retail provision of fixed services. The main alternative operators are the cable operator Virgin Media, as well as Sky and TalkTalk that mostly (but not exclusively) rely on wholesale inputs from BT. There is also a large number of smaller niche networks and resellers.

Openreach is the only "wholesale only" operator in the UK. More than 580 communications providers are customers of Openreach. Openreach provides access and backhaul network and invests in FTTP, FTTC and in G.Fast. Virgin Media has no wholesale business. Cityfibre has a wholesale business operation as well. Cityfibre was also a partner in a joint venture with TalkTalk and Sky,[520] although TalkTalk has since acquired Sky's share. The joint venture sells wholesale to Sky in York. None of these providers has SMP in access markets.

---

[517] Data from Ofcom's Communications Market Report (CMR) 2017, published on 3 August 2017 (https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr-2017).

[518] Ofcom: Connected Nations report 2017, page 3 (https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2017)

[519] This is the specification for the Government's proposed broadband Universal Service Obligation (USO).

[520] https://www.talktalkgroup.com/articles/talktalkgroup/2016/October/Ultra-Fibre-Optic-Trial-set-to-cover-the-whole-of-York

New entrants' DSL subscriptions by type of access (VDSL excluded)	UK-2016	UK-2017	EU-2017
Own network	1%	1%	0.5%
Full LLU	77.3%	77.3%	72.8%
Shared Access	13.8%	13.8%	4.1%
Bitstream	1.1%	1.1%	14.7%
Resale	7.0%	7.0%	7.8%

Source: Communications Committee. Data as of July 2016 and July 2017.

In the context of FTTH/FTTP deployment increasing infrastructure competition versus low demand for higher speeds should be noted. There is growing infrastructure competition coming from Cityfibre, Gigaclear, Truespeed and Hyperoptic. BT Openreach is looking at new technologies such as G.Fast. However, deploying G.Fast could delay the deployment of FTTP. BT Openreach plans to roll out three million FTTP connections by 2020, and has been consulting with industry on a large scale rollout that could reach ten million by 2025. Virgin Media plans to expand its coverage to an additional four million households, split approximately equally between FTTP and HFC, i.e. FTTP covering two million households. Cityfibre, Hyperoptic and Gigaclear intend to use the passive infrastructure products of BT in order to build FTTP networks. As of July 2017, the share of fibre connections was very low compared to EU average (1% to 12.9%).

Fixed broadband market shares	UK-2016	UK-2017	EU-2017
Incumbent market share in fixed broadband	36.6%	36.7%	40.3%
Technology market shares			
DSL	80.1%	79.1%	64.2%
Cable	19.3%	19.9%	19.4%
FTTH/B	0.5%	1.0%	12.9%
Other	0.1%	0.1%	3.6%

Source: Communications Committee. Data as of July 2016 and July 2017.

b. Mobile market

On the mobile market, there are four mobile network operators (MNOs): BT/EE, Vodafone, O2 (Telefónica) and Three (H3G). There are also a number of mobile virtual network operators (MVNOs) and resellers.

Sky launched its MVNO offer on O2's infrastructure in January 2017 (1GB, 3GB and 5GB plans priced at £10, £15 and £20 per month respectively). TalkTalk (MVNO) plans to exit the mobile market[521].

Mobile market	UK-2016	UK-2017	EU-2017
Market share of market leader	-	not available	35%
Market share of second largest operator	-	not available	28%
Number of MNOs	4	4	not available
Number of MVNOs	30	27	not available
Market share of MVNO (SIM cards)	-	not available	not available

Source: Communications Committee. Data as of October 2016 and October 2017.

Mobile broadband prices [EUR/PPP]	UK-2016	UK-2017	EU-2017
Least expensive offer for handset (1 GB + 300 calls basket)	€18	€16	€24

[521] https://www.ft.com/content/6d042812-916b-11e7-a9e6-11d2f0ebb7f0

Least expensive offer for tablet and laptop (5 GB basket)	€16	€14	€17

Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2016 and February (handset) 2017 - July (tablet-laptop) 2017.

As regards domestic data service, the average consumption per subscriber per month in the UK increased from 0.76GB (prepaid + post-paid) in Q2 2017 to 1.87GB in Q3 2017.[522]

Regulatory developments

2. Supporting measures for deployment and investment in high-speed networks

a. Spectrum

The UK has assigned 69.17% of the overall harmonised spectrum for broadband, compared to the EU average of 69%.[523] No Wireless Broadband (WBB) licences have been renewed or extended beyond the original terms in 2017. All WBB licences are of indefinite term subject to a five-year notice provision.

There have been a few developments as regards spectrum use, mainly around sharing. Ofcom has processed one trade of WBB spectrum in 2017. UK Broadband agreed to transfer 448 MHz of spectrum at six sites to Arqiva. There are no additional conditions attached to the transfer as the licence transfer must only confer the same conditions and obligations that were present on the original licence on the new rights holder.

Ofcom decided in July 2017[524] to award by auction 190 MHz of spectrum for mobile use, with a plan to run the auction in October – November 2017.[525] The spectrum consists of 40 MHz in the 2.3 GHz band and 150 MHz in the 3.4-3.6 GHz band.[526]

In light of concerns that the auction could result in unduly asymmetric distribution of spectrum, Ofcom decided to apply two separate caps on the amount a single operator may hold: a cap of 255 MHz on the amount of mobile spectrum that is immediately useable (i.e. excluding the 3.4 GHz spectrum) after the auction and a cap of 340 MHz per operator on mobile spectrum holdings overall after the auction. This represents 37% of the mobile spectrum that is expected to be useable within the same timescales as the 3.4 GHz band. These two caps prevent BT/EE from bidding for spectrum in the 2.3 GHz band. They also restrict BT/EE to winning no more than 85 MHz in the 3.4 GHz band and restrict Vodafone to winning no more than 160 MHz across the 2.3 GHz and 3.4 GHz bands together.

---

[522] BEREC CN (18) 13 International Roaming BEREC Benchmark Data Report, page 19.

[523] Additionally, in April 2018, licenses were granted in the 2.3 and 3.4 GHz spectrum bands to all four MNOs (https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/results-auction-mobile-airwaves).

[524] Ofcom: Award of the 2.3 and 3.4 GHz spectrum bands - Competition issues and Auction Regulations, 11 July 2017 (https://www.ofcom.org.uk/__data/assets/pdf_file/0022/103819/Statement-Award-of-the-2.3-and-3.4-GHz-spectrum-bands-Competition-issues-and-auction-regulations.pdf).

[525] The plan was delayed by legal appeal processes, which were concluded in early February 2018, dismissing the appeals.

[526] Uses of the spectrum in the two bands are likely to be distinct:

- The 40 MHz of spectrum in the 2.3 GHz band can be used immediately, because it is already supported by mainstream mobile phones.
- The 150 MHz of spectrum in the 3.4 GHz band is not currently supported by mobile phones in the UK but is expected to become useful in the period 2019 to 2020. Additionally, it is likely to be used for initial deployment of 5G services because it forms part of the wider 3.4-3.8 GHz which is the priority band in Europe for 5G.

Parts of the 3.4 to 3.6 GHz band are currently being used to provide fixed wireless broadband services,

Ofcom consulted on a number of issues relating to WBB, as follows. Ofcom published a Call for input on 5G spectrum at 26 GHz and update on bands above 30 GHz. Ofcom confirmed their intention to expand spectrum access for mobile services in the 3.6-3.8 GHz band. This band has been identified by the UK and EU as the primary band for 5G. They also enabled access to additional frequencies for broadband fixed wireless access in the 5725-5850 MHz band, known as the 5.8 GHz band.

The UK position on the use of the 700 MHz band is set out in their 700 MHz Statements covering the duplex pair and the centre gap. Ofcom plans to make the duplex pair available for mobile data from mid-2020 (subject to the DTT clearance timetable). Ofcom reviewed progress against the plan and the clearance date in October 2017.[527]

b. National and EU investment in broadband

On 1 March 2017, the government published the UK Digital Strategy,[528] an umbrella strategy to support the digitalization of the country. The strategy set out the government's aim of completing the roll-out of 4G and superfast broadband and of introducing a broadband universal service obligation (USO) by 2020 (additional information on the Government's regulatory broadband universal service obligation is available in this report under chapter 4. Consumer matters/ d. Universal service). It also reconfirmed the £1 billion programme of investment in full fibre broadband and 5G to stimulate private investment in full fibre connections by 2021.

Broadband Delivery UK (BDUK)[529] is responsible for implementing the government's policy on superfast broadband rollout and on the deployment of local full fibre networks.[530]

The Government is implementing a Local Full Fibre Networks (LFFN) programme[531] and a 5G Testbeds and Trials Programme[532] to support full fibre and 5G rollout. The LFFN Challenge Fund is a Government capital grant programme of up to £200m, with £190m remaining for competitive Waves[533], to help deliver fast and reliable digital communications networks.[534] The Chancellor of the Exchequer announced on 22 November 2017 that local

---

[527] 700 MHz clearance programme timescale review, Review of progress, risks and readiness, 12 October 2017, https://www.ofcom.org.uk/__data/assets/pdf_file/0022/106933/700mhz-clearance-timescale-review.pdf

[528] https://www.gov.uk/government/publications/uk-digital-strategy

[529] Part of the Department for Culture, Media and Sport.

[530] https://www.gov.uk/guidance/broadband-delivery-uk#superfast-broadband-programme

[531] The objectives of the LFFN programme are to: i) stimulate more commercial investment to deliver more gigabit-capable connectivity; ii) directly maximise the availability and benefit of gigabit-capable broadband services to public sector, business and residential users; and iii) improve commercial investment conditions in local areas.

Chapter 1 [532] Relevant in this context:

Chapter 2 DCMS press release - 10 March 2018: £25m for 5G projects on the anniversary of the UK's Digital Strategy (https://www.gov.uk/government/news/25m-for-5g-projects-on-the-anniversary-of-the-uks-digital-strategy);

Chapter 3 DCMS press release - 6 July 2017: Three universities to develop £16m 5G test network (https://www.gov.uk/government/news/three-universities-to-develop-16m-5g-test-network);

Chapter 4 DCMS press release - 30 March 2018: Search begins for a UK 5G city of the future (https://www.gov.uk/government/news/search-begins-for-a-uk-5g-city-of-the-future).

[533] The Challenge Fund periodically announces waves of funding available for local bodies to bid into, and bids are selected on a competitive basis (https://www.gov.uk/guidance/local-full-fibre-networks-programme).

[534] https://www.gov.uk/government/publications/local-full-fibre-networks-challenge-fund

bodies could start applying for funding from the Local Full Fibre Networks (LFFN) Challenge Fund.[535] [536]

The Digital Infrastructure Investment Fund is making up to £400m available to support commercial financing for fibre investment that will unlock approximately £1 billion of private investment.[537]

Obstacles regarding the implementation of the national broadband plan include industry capacity to deliver and access to finance by commercial providers. Local implementation issues include wayleaves, power, and highways access.

Commercial overbuilding between commercial providers supports competition and allows greater choice for consumers. Publicly funded projects aim to avoid overbuilding through a process of Open Market Reviews and market consultations to ensure that public funding targets investment at 'white' premises, which would not otherwise gain coverage, in line with the EU State aid requirements, and to ensure good use of public investment.

On July 2017, the government introduced legislation,[538] the Telecommunications Infrastructure (Relief from Non-Domestic Rates) Bill 2017-19, to incentivise full-fibre broadband deployment. Communications service providers building full fibre broadband networks will receive 100% relief on their business rates for new, lit fibre over five years, backdated to 1 April 2017 under this new legislation. On 8 February 2018, the Bill received Royal Assent.[539]

c. Implementation of the Broadband Cost Reduction Directive

The Access to Infrastructure Regulations implemented much of the Directive[540] and came into force on 31 July 2016.[541] Article 8 of the Cost Reduction Directive was transposed separately in England, Wales, Scotland and Northern Ireland by a change to the building regulations.

The Broadband Cost Reduction Directive had almost no impact to date. The dispute resolution process has not been tested yet. Fair and reasonable pricing was reported as a problem, as the underlying cost assessment is unclear. The cost of coordination would be high because some of the infrastructure would not be primarily designed or used for telecoms

[535] This call for bids closed on 26 January 2018, with a subsequent announcement of 13 winning bids - worth £95.5 million of Government funding - on 13 March 2018. (https://www.gov.uk/government/news/95-million-for-local-full-fibre-broadband-projects)

[536] In addition, in March 2018, the UK launched a £67m Gigabit Broadband Voucher Scheme. The voucher scheme is designed to further the strategic objective of the LFFN programme to stimulate commercial investment in full fibre coverage across the UK. The scheme follows a market test, which was launched in November 2017 in four areas across the UK. Under the Scheme, small or medium-sized business can apply for a grant of up to £3,000 to help upgrade their broadband to a gigabit-capable connection. Local communities can also benefit from the scheme - groups of residents can combine with local businesses to access gigabit speeds in community group projects. In a group project each residential user can access grants of up to £500 each to contribute towards the cost of connection. (https://gigabitvoucher.culture.gov.uk/)

[537] https://www.gov.uk/government/speeches/digital-infrastructure-investment-fund-launch-exchequer-secretary-speech

[538] https://www.gov.uk/government/news/business-rates-boost-for-broadband

[539] https://services.parliament.uk/bills/2017-19/telecommunicationsinfrastructurerelieffromnondomesticrates.html
http://www.legislation.gov.uk/ukpga/2018/1/contents/enacted/data.htm

[540] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[541] https://www.legislation.gov.uk/uksi/2016/700/pdfs/uksi_20160700_en.pdf

services. It is considered as an extremely invasive remedy by certain market players. Ofcom's duct and pole access remedy is more known to operators. In order to further simplify processes in a number of areas to ensure effective access to BT's ducts and poles, Ofcom has made several changes to the remedy in its recent Wholesale Local Access market review.

3. Regulatory function

One of the major reforms proposed by Ofcom in its Digital Communications Review[542] was the legal separation of BT and its network division, Openreach. On 10 March 2017, BT notified Ofcom that it had agreed to the legal separation of Openreach. This means that Openreach will become a distinct company with its own staff, management, purpose and strategy. Ofcom considered that BT's notification sufficiently addressed the competition concerns as set out by Ofcom. Ofcom established a dedicated Openreach Monitoring Unit[543], to monitor whether the new arrangements are implemented successfully. Since March 2017, BT and Openreach have taken positive steps towards implementing the new arrangements. Completing the reforms requires the transfer of staff. Necessary administration (such as a legal requirement to consult employees) will take much of 2018, before the formal transfer can be made.

Operators relying on wholesale input from BT reported that the legal separation of Openreach has not shown any impact in 2017 yet and they could not perceive any significant difference in practice in their interactions with Openreach since the separation. On 26 March 2017, in one significant investigation, Ofcom found Openreach cut its compensation payments for delays in connecting high-speed business lines. Openreach was fined £42m for this breach.[544]

On 26 October 2017, Ofcom published its Statement regarding the Review of the market for standalone landline telephone services. Ofcom has been concerned that telephone line rental prices have risen, despite wholesale costs falling. Following a review of this market, Ofcom set out proposals[545] to cut monthly bills for BT's landline-only customers by between £5 and £7. In response, BT will be reducing voluntarily its monthly line rental price by £7, from April 2018, for its customers who take only a landline from BT (voice-only customers).

On 30 November 2017, Ofcom published the Statement on the Narrowband Market Review, which covered five wholesale markets concerning the delivery of fixed voice telephone services. Ofcom decided to regulate BT and (in the Hull Area) KCOM in three wholesale access markets: wholesale analogue fixed telephone lines and two markets that enable the delivery of digital telephone services to businesses. Ofcom will also continue to regulate BT and KCOM's wholesale provision of calls over those lines. Ofcom decided to reduce significantly the wholesale regulation that they currently impose in these markets and to continue to regulate wholesale fixed call termination rates (FTR) based on a pure long-run incremental cost (LRIC) approach. The regulation of FTRs at pure LRIC is consistent with the

---

542 https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/policy/digital-comms-review

543 https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/telecoms-competition-regulation/the-openreach-monitoring-unit

544 https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2017/bt-to-be-fined-for-breaching-contracts

A summary of Ofcom's closed investigations is available here: https://www.ofcom.org.uk/about-ofcom/latest/bulletins/competition-bulletins/all-closed-cases.

545 https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2017/bts-landline-only-customers-set-for-cheaper-bills

2009 EC Recommendation and with Ofcom's current and proposed regulation of MTRs. This regulation applies to all providers of calls to UK geographic numbers (numbers starting 01 and 02). Ofcom will be applying the same charge controlled rate to all fixed calls terminated in the UK regardless of country of origin.

Ofcom issued consultation for the Mobile Call Termination review on 27 June 2017. Ofcom proposed to continue to set MTRs on the basis of pure LRIC using a bottom-up 2G/3G/4G cost model, to impose this using a one-off adjustment rather than a glidepath, and to apply the rate symmetrically to all providers of mobile termination. In both the Narrowband and Mobile Call Termination Review Ofcom has consulted on a proposal that the same termination rate is applied regardless of whether the call originates inside or outside the EEA. The statement for the Mobile Call Termination market review was expected to be published in early 2018.[546]

In spring 2017, in the context of the Wholesale Local Access (WLA) market review Ofcom consulted on their market analysis and remedies. Ofcom proposed to price regulate for the first time the fibre access product of Openreach, which is a 40 Mbps download/10 Mbps upload FTTC product. Ofcom proposed a 25% price reduction in 2018 and 40% in four years. Ofcom also consulted on quality of service issues on BT's fixed access network and on duct and pole access. The statement on the WLA market review was expected to be published in early 2018.[547]

Statements for the Wholesale Broadband Access (WBA) Market Review and a combined WLA/WBA Market Review in the Hull area will be published in the second half of 2018.

BT (Openreach) and Cityfibre appealed the dark fibre remedy of the Business Connectivity Market Review (BCMR).[548] The issue highlighted by BT was the market definition, i.e. that BT is not having SMP on that market. In July 2017, the Competition Appeal Tribunal ruled in favour of BT. Consequently, Openreach did not launch a dark fibre product in October 2017. However, already in the summer of 2017, Openreach launched a consultation with the communications providers regarding their needs as regards FTTP.

---

[546] On 23 February 2018, Ofcom published its draft decision for regulating the Mobile Call Termination market from 1 Apr 2018 (https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-market-review/_nocache). Ofcom designated 68 providers with significant market power in this respect. Ofcom imposed on all providers with SMP a network access obligation and a charge control, based on LRIC. From 1 April – 31 May 2018, the MTR cap will be 0.495 ppm and from 1 June 2018 – 31 March 2019 it will be 0.489 ppm. Ofcom also decided that the same charge control on MTRs should apply for the termination of all calls to UK mobile numbers, regardless of origin (i.e. to calls originated outside the European Economic Area as well).

[547] On 23 February 2018, Ofcom published its WLA (Market 3a) draft statement in three volumes (https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review).
Volume 1 sets out Ofcom's analysis concerning markets, market power determinations and remedies. Volume 2 provides more detail on the charge control designs and implementation. Volume 3 sets out proposals regarding the imposition of a physical access infrastructure remedy.
On the same day, Ofcom also published their draft statement for regulating the quality of BT Openreach's wholesale services (https://www.ofcom.org.uk/consultations-and-statements/category-1/quality-of-service). Key aspects of these two draft statements are:

- Charge controls on Openreach's basic 40/10 superfast broadband service (adjusted from £11.23 to £11.92).
- No wholesale price regulation of Openreach's faster broadband products.
- Physical infrastructure remedies that will require BT to make its passive infrastructure (ducts and poles) open to access seekers in order to make it easier for them to build their own full-fibre networks.
- Stricter requirements on Openreach to repair faults and install new broadband lines.

[548] https://www.ofcom.org.uk/consultations-and-statements/category-1/business-connectivity-market-review-2015

In this context, on 20 November 2017, the Tribunal ordered Ofcom to revoke its significant market power (SMP) findings and regulatory conditions in respect of BT for all Contemporary Interface Symmetric Broadband Origination (CISBO) services.[549] Given these circumstances, on 23 November 2017, Ofcom decided to impose temporary measures in relation to business connectivity services,[550] due to be in effect until March 2019. Ofcom imposed temporary remedies in the Lower Bandwidth Contemporary Interface Symmetric Broadband Origination (CISBO) markets in which BT has SMP. The remedies came into effect on 29 November 2017, with the exception of the charge control and minimum quality standards, which came into effect on 1 December 2017.

The Digital Economy Act 2017[551] represents a major reform regarding (amongst other things) the powers attributed to Ofcom. It clarified Ofcom's powers to impose general conditions in respect of consumer switching and automatic compensation for consumers and gave Ofcom powers to impose financial penalties for breaches of conditions of spectrum licences; powers to make reports on the state of telecoms infrastructure in the UK; wider powers to request information from stakeholders; and powers to require communications providers to provide certain information relating to telephone numbers with which they have been allocated. The Digital Economy Act also changed the standard of review in appeals of Ofcom decisions. When hearing appeals of Ofcom decisions taken after 31 July 2017 and which fall within the scope of the EU Electronic Communications framework, the UK's Competition Appeal Tribunal is required to apply the same principles as would be applied by a court on an application for judicial review. This replaces the previous domestic legislative provision which required the Competition Appeal Tribunal to decide such appeals on the merits, following findings by the UK courts that judicial review is perfectly capable of ensuring that the merits of a case a duly taken into account in accordance with Article 4 Framework Directive.

4. Consumer matters

Ofcom's first annual Comparing Service Quality (CSQ) report was published in April 2017. It shows the quality of service experienced by customers of the UK's largest landline, broadband and mobile providers in 2016. Ofcom published a report on pricing trends[552] in March 2017, which outlines Ofcom's research into trends in the pricing of residential communications services in the UK. Ofcom continued to publish reports detailing complaints data[553] by provider received by Ofcom's Consumer Complaints Team. Such data can be informative for consumers when seeking to compare providers.

Ofcom's Consumer Contact Team (CCT) has received approximately 78 772 complaints about electronic communications services in 2017. (this includes pay TV complaints and nuisance call complaints as well). Ofcom does not investigate and resolve individual complaints; however, their CCT team provides advice to consumers about how to resolve their complaints, including details of the applicable alternative dispute resolution schemes where relevant. Silent and abandoned calls, quality of service (in particular fault repair, line installations and mobile coverage), issues around billing/prices and customer service were the main sources of consumer complaints in 2017.

[549] http://www.catribunal.org.uk/237-9285/1260-3-3-16-British-Telecommunications-.html
[550] https://www.ofcom.org.uk/__data/assets/pdf_file/0019/108019/BCMR-Temporary-Conditions.pdf
[551] http://www.legislation.gov.uk/ukpga/2017/30/contents/enacted
[552] https://www.ofcom.org.uk/research-and-data/multi-sector-research/general-communications/pricing
[553] https://www.ofcom.org.uk/research-and-data/multi-sector-research/telecoms-complaints-data.

In June 2017, Ofcom opened a monitoring and enforcement programme in relation to the Early Termination Charges (ETCs) imposed by communications providers (CPs) under the terms and conditions of their consumer contracts. The objectives for this programme are:

- To ensure that CPs are taking appropriate steps to make consumers aware of any applicable ETCs when they are signing up to a minimum contract period; and
- To ensure that terms and conditions imposing ETCs on consumers comply with GC9.3 and are fair for the purposes of the CRA.

Under this programme, Ofcom collects information from relevant sources, including CPs, in order to assess compliance and take any action, as appropriate. Ofcom was aiming to reach a view on next steps in the programme and investigation by December 2017, but extended the programme for another six months to 28 June 2018.

On 19 September 2017, Ofcom set out improvements[554] to the consumer protection rules, which apply to all UK communications providers under the general authorisation in areas including nuisance calls,[555] complaints, billing, debt collection, disabled people and vulnerable customers. The changes will offer new and stronger regulation to protect consumers (e.g. numbers displayed when receiving calls must be valid, dialable and uniquely identify the caller). The changes also require all communications providers to offer disabled users access to priority fault repair, third-party bill management and accessible bills. These measures previously applied only to disabled people's landline and mobile services, and will now be extended to broadband. Ofcom requires broadband and mobile providers to have fair, transparent debt-collection and disconnection practices in place. This requirement already applies to landline providers. Ofcom extends current rules on billing accuracy, which previously only applied to voice call services, to include broadband. All these changes will come into effect on 1 October 2018.

On 10 November 2017, Ofcom set out plans[556] for customers to be automatically compensated if the quality of service they receive from ISPs falls short of expectations. This is a voluntary arrangement involving the largest ISPs who serve about 90% of broadband customers. Due to the complex changes to IT systems, there will be a 15 months implementation period before the scheme comes into effect in 2019.

On 19 December 2017, Ofcom announced reforms that will make it quicker and easier to switch mobile provider. Under the new rules, mobile customers will be able to switch provider by simply sending a free text message. The changes will give customers control over contact with their existing provider. Mobile providers will be banned from charging for notice

[554] https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/rule-changes-to-protect-consumers-and-aid-enforcement

[555] On 9 February 2018, Ofcom and the Information Commissioner's Office have published an update on their joint action plan to tackle nuisance calls and texts (https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/policy/tackling-nuisance-calls-messages?utm_source=updates&utm_medium=email&utm_campaign=ico-joint-plan).
This update highlights progress made during 2017:

- 'blocking' measures have been routinely introduced by a number of communications providers which are helping to stop millions of nuisance calls from getting through to people;
- targeted enforcement action is ensuring companies making nuisance calls are identified and punished; and
- intelligence sharing and close collaboration with Government, domestic and international regulators, technical bodies, and law enforcement is helping identify new ways of tackling the problem.

[556] https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/automatic-compensation2

periods running after the switch date. This will put an end to people paying for old and new services at the same time. There will be an 18-month implementation period, i.e. providers must comply by no later than 1 July 2019.[557]

a. Roaming

The new Roam-like-at-home[558] (RLAH) rules came into force on 15 June 2017. MVNOs stressed that they are very exposed to the effects of this Regulation, due to the level of wholesale caps applied by MNOs.

Ofcom did not receive any sustainability derogation requests. There was no noticeable increase in domestic prices observed before or after 15 June 2017.

Following the introduction of RLAH in June 2017, UK subscribers consumed 2.6 times more voice and eight times more data roaming services when travelling in the EU in summer 2017 compared to summer 2015.[559]

Since 15 June 2017 Ofcom has received complaints about various issues including: RLAH not being provided, non-RLAH tariffs not being applied, inadvertent roaming onto Turkish networks whilst in Greece/RLAH not being applied in Northern Cyprus, data speeds whilst roaming, the €50 data limit not being applied, changes to non-EEA tariffs, cost of non-EEA roaming, and international calls not being included in RLAH. Ofcom has also received some complaints about the data speeds received by UK subscribers whilst roaming.

Ofcom is actively monitoring roaming complaints and reviewing providers' roaming offers including their fair use policies and it has been engaging with providers to address the identified concerns. In October 2017, Ofcom opened a formal investigation into Lycamobile.[560]

b. Net neutrality

In 2016, the UK laid down the rules on penalties applicable to infringements of Articles 3, 4 and 5 of Regulation (EU) 2015/2120[561] on open internet access in the Open Internet Access (EU Regulation) Regulations 2016.[562]

On 23 June 2017, Ofcom published its first annual report "Monitoring compliance with the EU Net Neutrality regulation", which reflects their approach to monitoring and ensuring compliance with EU Regulation 2015/2120 from May 2016 to April 2017. In this timeframe,

---

[557] https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2017/switch-mobile-provider-with-a-free-text?utm_source=updates&utm_medium=email&utm_campaign=mobile-switching

[558] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (OJ L 172, 30.6.2012, p. 10), as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[559] Figures compare Q3/2017 with Q3/2015 (no data for Q3/2016) retail roaming volumes according to the BEREC International Roaming Benchmark Report, April 2017-September 2017, published on 14 March 2018

[560] https://www.ofcom.org.uk/about-ofcom/latest/bulletins/competition-bulletins/open-cases/cw_01207

[561] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[562] http://www.legislation.gov.uk/uksi/2016/607/contents/made

Ofcom identified two zero-rating products offered in the UK market. The products related to zero-rating of music streaming and messaging services respectively.[563]

There are also self-regulatory schemes in the UK under which fixed and mobile ISPs allow consumers to activate a 'parental filtering service' to restrict access to selected categories of content inappropriate for minors. The UK has notified its position to the Commission regarding this self-regulatory scheme under Article 10(3) of Regulation (EU) 2015/2120. Regulation (EU) 2015/2120 prohibits any blocking of internet traffic save for the three specific exceptions under Article 3(3) (a), (b) and (c) (compliance with Union legislative act or national legislation that complies with Union law, network security, exceptional congestion). The government has introduced provisions on "Internet filters" in the Digital Economy Act 2017[564] authorising ISPs to block access to content or services for child protection or other purposes, if this is in accordance with the terms of the contract with the end-user.

All of the UK's largest ISPs serving residential consumers are signatories to a voluntary Broadband Speeds Code of Practice[565] which commits them to provide speeds information at point of purchase and give consumers the right to exit their contract if speeds are lower than a minimum guaranteed level. In 2016, a new voluntary Broadband Speeds Code[566] for Business services was introduced, which came into force in September 2016.

Ofcom has undertaken work to revise and improve its voluntary Broadband Speeds Codes.[567]

c. 112

Disabled end-users who have hearing or speech impairments can contact the UK emergency services via text relay or emergency SMS. These are both free at the point of use and available 24 hours a day.

Advanced Mobile Location (AML) is operational in UK on all Android handsets. Systematic statistical analysis of accuracy for all calls does not take place, but analysis of sample calls indicates that accuracies of 10-50m are typical.

The requirement in the General Conditions (reflecting the one in the Universal Services Directive) states that communications providers should take all necessary measures to ensure

[563] On 6 March 2018, Ofcom launched an own-initiative enforcement programme into fixed and mobile Internet Service Provider traffic management measures, and other practices covered by the EU Open Internet Access Regulation. The investigation focuses mainly on Three and Vodafone (Vodafone Pass) (https://www.ofcom.org.uk/about-ofcom/latest/bulletins/competition-bulletins/open-cases/cw_01210).
[564] http://www.legislation.gov.uk/ukpga/2017/30/contents/enacted
[565] https://www.ofcom.org.uk/__data/assets/pdf_file/0012/40431/broadband_speeds_code_june_2015.pdf
[566] https://www.ofcom.org.uk/__data/assets/pdf_file/0034/85768/business_broadband_code_2016.pdf
[567] On 1 March 2018 Ofcom published its statement "Better Broadband Speeds Information: Voluntary Codes of Practice", which includes four improvement to the codes: more realistic speed estimates at the point of sale; always providing a minimum guaranteed speed and the right to exit connected to this speed at the point of sale; strengthening customers' rights and extending the right to exit to bundled products; and ensuring all customers benefit from the codes, regardless of their broadband technology. The changes will also mean that the codes can apply fully to all networks, including cable. In addition, Ofcom has sought to align the speed information required under the codes with the speed information required in contracts by Article 4 of Regulation (EU) 2015/2120 (https://www.ofcom.org.uk/__data/assets/pdf_file/0024/111696/statement-broadband-speeds.pdf).
The new codes will come into force on 1 March 2019, which provides an implementation period of 12 months. The existing codes will continue in force until that date, at which point they will cease to apply to any provider.

uninterrupted access to emergency services. Ofcom has further stated that it will assess providers' compliance with this requirement on a case-by-case basis. Ofcom plans to publish guidance on this requirement in 2018 which will take account the widespread use of mobile and cordless phones while recognising the continuing importance of landline telephony to consumers who are vulnerable or do not have access to mobile services.

d. Universal service

In July 2017 BT put forward an offer to voluntarily provide 10 Mbps broadband to 99% of UK premises by 2022, delivered by Openreach, and for the remaining 1% of premises either provide a service using a fixed wireless solution (delivered by EE) or by acting as a service provider for satellite broadband. In August 2017, Ofcom consulted on including the costs of network expansion (incurred by Openreach in delivering this voluntary commitment) within the proposed charge control for Wholesale Local Access services. Ofcom proposed to include the costs of Openreach's network expansion in the WLA charge control that would come into effect in April 2018. DCMS consulted on the design of a regulatory Universal Service Obligation[568] (USO) in the summer of 2017 and decided in December 2017 not to accept BT's offer and consequently to continue with a regulatory USO that offers the advantage of certainty and legal enforceability "that is required to ensure high speed broadband access for the whole of the UK by 2020".[569] Designated operators will be legally required to provide high-speed broadband to customers, subject to a cost threshold.[570]

5. Conclusion

There are several challenges regarding broadband deployment in the UK. 4% of the UK premises have no access to decent broadband of at least 10 Mbps. Regarding NGA coverage the urban-rural digital divide is still obvious (rural coverage was at 82%). The share of FTTH/B connections (1%) is one of the lowest in the EU. The regulatory USO and the measures set out in the UK digital strategy can bring improvements in this regard. The potential of the transposed Broadband Cost Reduction Directive to contribute to the deployment of high speed broadband connections is not fully exploited yet. The benefits of the legal separation of BT and Openreach, which is not fully completed, are not visible on the market yet. Ofcom's increased focus on consumer matters and targeted actions in this regard bring clear benefits.

[568] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).
[569] https://www.gov.uk/government/news/high-speed-broadband-to-become-a-legal-right
[570] The Government set out the design of the regulatory USO in secondary legislation laid on 28 March 2018. The specification for the USO design includes a download speed of at least 10 Mbps, a per premises cost threshold of £3,400 (enabling coverage to around 99.8% of premises), a requirement for demand aggregation, funded by the industry rather than publicly and uniform pricing (https://www.gov.uk/government/news/countdown-to-high-speed-broadband-for-all-begins--2).