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COMMISSION STAFF WORKING DOCUMENT

On a light deployment regime for small-area wireless access points

Accompanying the

COMMISSION IMPLEMENTING REGULATION

specifying the characteristics of small-area wireless access points pursuant to Article 57 paragraph 2 of Directive (EU) 2018/1972 of the European Parliament and the Council of 11 December 2018 establishing the European Electronic Communications Code

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1. Introduction

5G technology is seen as a game changer, enabling industrial digitalisation and transformation through gigabit connectivity. The deployment of 5G is expected to generate 213 billion EUR in revenues worldwide in 2025 and could lead to 113 billion EUR in benefits per year[1]. A high capacity 5G network enhanced by dense small cell deployment, that provides high-speed and low-latency services combined with extensive coverage, will offer the prospect of novel business models, including for the Internet of Things (IoT), which will benefit specific 'vertical' sectors such as transport and automotive, factory automation, healthcare, utilities and smart cities (hereafter verticals). While these developments have already started on the basis of existing networks, it is anticipated that they are to reach their full potential only with the deployment of 5G in the coming decade.

Therefore, in order to achieve various 5G capabilities[2], such as area traffic capacity[3], connection density or available capacity per user[4], the densification of network deployment, in particular through small cells[5], is crucial. Over the last two years the numbers of small cells

[1] According to the study SMART 2014/0008 on " Identification and quantification of key socio-economic data to support strategic planning for the introduction of 5G in Europe"
[2] Recommendation ITU-R M.2083-0 "IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond", (September 2015)
[3] Total traffic throughput served per geographical area (in Mbps/m^2)
[4] Projections of a 1000x increase in capacity demand over the current decade. Source: Ericson
[5] Small cells are areas covered by small-area wireless access points. Therefore, the term "small cells" is equivalent to "small-area wireless access points" for the purpose of this document.

in use have grown significantly[6]. Some operators are planning to roll out 200 or even more cells per square kilometre for high traffic environments, like urban city centres and open places like stadiums in the coming years. Density is projected to increase further, i.e. to support approximately one million connections per square kilometre, which could require 1000 small cells in some scenarios.

"5G for Europe: An Action Plan" (5GAP)[7] invites Member States, the industry and other stakeholders to work with the Commission to accelerate and monitor the progress of wireless, (including cellular) deployment scenarios, in order to meet the targets of uninterrupted 5G coverage in at least all urban areas and all major terrestrial transport paths by 2025 and to identify best practices. This can increase the consistency of administrative conditions and time frames to facilitate denser cell deployment. The Radio Spectrum Policy Group (RSPG) adopted an Opinion[8] (as part of its 5G spectrum roadmap) indicating that Member States should assess the need for national actions that will enable easier site authorisation and installation, in particular for small cells, in order to make timely 5G deployment possible. This is in line with the provisions of the European Electronic Communications Code[9] ('the Code') which promotes investment in high-capacity networks by facilitating network densification through small-area wireless access points (SAWAPs or small cells).

Indeed, with regard to facilitating deployment of denser networks, the Impact Assessment[10] for the Code identified obstacles to the roll-out of small-area access points needed for wireless services. A development that is critical to estimating the costs of future connectivity of 5G is the increased prevalence of small cells. The 5G Manifesto for a timely deployment of 5G in Europe[11], endorsed by key industry and telecom players, underlines the need for improved regulatory conditions in terms of local installation of cells to facilitate the construction of denser networks.

For this purpose Article 57 of the Code on *"Deployment and operation of small-area wireless access points"* provides that *"The Commission shall, by means of implementing acts, specify the physical and technical characteristics, such as maximum size, weight, and where appropriate emission power of small-area wireless access points"* that will be exempted from any individual town planning permit or other individual prior permits except where *"competent authorities may require permits for the deployment of small-area wireless access points on buildings or sites of architectural, historical or natural value protected in accordance with national law or where necessary for public safety reasons"*.

[6] Source: Small Cell Forum
[7] https://ec.europa.eu/digital-single-market/en/news/communication-5g-europe-action-plan-and-accompanying-staff-working-document
[8] http://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion_5G.pdf
[9] Directive (EU) 2018/1972 of the European Parliament and of the Council establishing the European Electronic Communications Code (OJ L 321, 17.12.2018, p. 36)
[10] Impact Assessment of the Code: https://ec.europa.eu/digital-single-market/en/news/proposed-directive-establishing-european-electronic-communications-code
[11] https://ec.europa.eu/digital-single-market/en/news/commissioner-oettinger-welcomes-5g-manifesto

Therefore, by 30 June 2020, the Commission has to adopt an implementing act which specifies the *physical and technical characteristics, such as the maximum size, weight, and where appropriate emission power of the small-area wireless access points* or small cells that will benefit from the exemption from *any individual town planning permit or other individual prior permits* across the Union (hereafter the 'EU light deployment regime'). The selection of these characteristics is critical for generating public acceptance and trust as well as a significant market scale for equipment.

Article 2(23) of the Code defines 'small area wireless access points' as follows: *" 'small-area wireless access point' means low-power wireless network access equipment of a small size operating within a small range, using licenced radio spectrum or licence-exempt radio spectrum or a combination thereof, which may be used as part of a public electronic communications network, which may be equipped with one or more low visual impact antennae, and which allows wireless access by users to electronic communications networks regardless of the underlying network topology, be it mobile or fixed".* The definition addresses qualitative aspects of the small cell such as the underlying network structure and topology, spectrum use and a low visual impact. Furthermore, it is explained that it comprises mobile base stations that are often referred to as femtocells, picocells, metrocells or microcells[12].

2. Problem description

2.1. Problem definition

A study on a 'Light Deployment Regime for Small-Area Wireless Access Points (SAWAPs)' has been conducted for the European Commission (SMART 2018-0017)[13]. It provides analysis of the procedures for the deployment of wireless (in particular cellular) access points and identifies possible criteria to be used in order to determine the small cells that should fall in the scope of the EU light deployment regime. The study concludes that the main issues when granting permits for base stations are the protection of public health and a coherent visual landscape in terms of aesthetics. Local authorities often seek to strike a balance between a high quality of wireless services and meeting the general public's concerns about the health impact and visual clutter of antenna masts. The protection of public health is most often addressed by limiting the emission power, and therefore limiting the exposure of the public to electromagnetic fields. The visual appearance is often addressed by mandating an approval process for protected buildings or sites (of architectural, historical, cultural value or natural value) and providing permit waivers when the installation fulfils specific aesthetic or other relevant requirements[14].

[12] See Recital (139) of the Code.

[13] Link: https://op.europa.eu/en/publication-detail/-/publication/463e2d3d-1d8f-11ea-95ab-01aa75ed71a1/language-en/format-PDF/source-112125706

[14] In Denmark, local permits are not needed for panel antennae for mobile communication with associated radio modules and transmission links in neutral colours, set on existing masts used for public mobile communications, when the height of the building is not increased. In Sweden, antennas (and thereby small cells) are exempted from building permits if they do not materially change the appearance of the building. Some municipalities have

Furthermore, the study undertaken for the Commission indicates that in most Member States, existing rules for granting individual deployment permits are targeted for high-power base stations which ensure wide coverage and thus are overly complex when applied to low-power small cells. While only some Member States have a definition of a 'small cell', these definitions are different. The most recurring physical and/or technical characteristics used to differentiate small cells from other access points are size (mostly expressed as a volume), weight, antenna height and/or emission power level. The criteria applied in Member States that have a specific light deployment regime for small cells are heterogeneous (sometimes even within a Member State from region to region or between municipalities). Typically these criteria include a limitation of the emission power (such as equivalent isotropic radiated power (EIRP) limits) and a minimum installation height of the base station antenna(s). Different characteristics may be required for indoor versus outdoor deployment.

The study further illustrates that cell deployment rules are set at different administrative levels: national, regional and local (municipal). This makes it even more complicated for operators to manage and comply with a large variety of applicable rules. Permits are generally requested and granted at local level, often implying a physical submission to the relevant authority.

The Commission has conducted two open public consultations[15,16] in order to collect relevant input from public as well as different stakeholders such as industry and public authorities. The second open public consultation (see annex) specifically focused on an initial draft of the implementing act. The results of the consultations show that the average time to obtain all necessary individual permits amounts to six months. Mobile network operators indicate that issuing permits in view of a dense network deployment requires involvement of several public authorities (because of site identification, site rental, permit requests based on different expertise, site construction and network integration). The complexity, delays and inertia in the permit approval process can significantly delay deployment and increase costs.

Therefore, on the basis of the study and consultation process, the major issues to be addressed by scoping the SAWAP characteristics for a light deployment regime are:

1. **Public acceptance:** the applicable technical and physical characteristics of small cells that are exempted from any individual town planning permit or other individual prior permits should prevent uncontrolled ('wild') deployment generating visual clutter and should ensure protection of public health, in compliance with the applicable EMF exposure limits and internationally recognised norms.

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considered specific measures to support low visual impact installations (e.g. Amsterdam and Barcelona), including public campaigns for the aesthetical designs of SAWAPs (Helsinki supporting a nationwide design competition in Finland on "standard model designs" that smoothly fit in a variety of environments and are easily scalable for mass production: https://www.open-ecosystem.org/challenges/helsinki-5g-base-station-design)

[15] First public consultation in 2019: https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-5660684/public-consultation_en

[16] Second public consultation in 2020: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1981-Light-deployment-regime-for-small-area-wireless-access-points

2. **Regulatory fragmentation**: "light deployment regimes" for small cells in the Member States (if present) are heterogeneous in terms of choice of technical and physical characteristics. In some cases, applicable rules are inconsistent as they were originally designed for macro-cells. This inconsistency jeopardises economies of scale for equipment manufacturers and also poses difficulty for setting compatible EU-wide criteria. Therefore, there is a need to establish a minimum common regime for a light deployment regime applicable throughout the Union.
3. **Regulatory complexity**: the issuance of individual prior permit(s) for cellular base stations, including small cells, involves different administrative levels[17] and authorities in different fields (e.g. urban planning, power emissions, aesthetics, etc.). Rules vary not only across Member States but in certain cases also at regional or local (municipal) level within a Member State. Such environment makes it difficult for operators to oversee the variety of rules and to establish reproducible processes for obtaining the necessary permits.
4. **Time delay**: the time period for obtaining all necessary *individual permits* can be quite long in the light of the complexity and fragmentation described above and also due to the resource bottlenecks experienced by local authorities, which would increase with growing network densification.

All the identified problems have to be taken into account when determining the appropriate legal form of the implementing act and an optimal (upper) threshold of the selected physical and technical characteristics of a SAWAP to define the EU light deployment regime. This requires a balancing exercise of the different interests and objectives involved such as those of the telecom industry, including manufacturers, national/regional/local authorities and European citizens, taking into account in a proportionate manner the need to promote network deployment by reducing time delays, network deployment costs, administrative costs and, at the same time, the need to ensure a high level of protection of public health as laid down in Council Recommendation 1999/519/EC[18] (hereafter Recommendation 1999/519/EC).

2.2. Who is affected, in what ways and to what extent?

A wide range of stakeholders, including telecom and infrastructure operators, equipment manufacturers, verticals, national and local authorities, and citizens and businesses as mobile broadband users, would be affected in a variety of different ways by the introduction of an EU-wide light deployment regime for small cells. This is confirmed by the public consultation results[15], where 58% of the responses came from companies, business organisations and trade unions, including manufacturers, telecom operators and verticals, 20% from public administrations, 13% from EU citizens and 9% from others, including academic and research institutions.

[17] A summary of the national fiches from the study should give us more details on the heterogeneity of the situation.
[18] Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz), OJ L 199 of 30.7.1999, p.59.

Public administrations stress the sensitivity of the aspects of EMF and visual pollution, and citizens and academic institutions typically raise concerns about EMF exposure. These aspects need utmost consideration to address public concerns regarding health aspects and visual clutter arising from widespread small cell deployment.

Mobile operators emphasise the need for a light deployment regime for small cells to minimise delays and ensure legal certainty in order to modernise and upgrade their networks. Equipment manufacturers emphasize that a consistent regulatory environment will create economies of scale with the corresponding benefits. Content and applications providers, as well as handset manufacturers, will launch and develop advanced services in Europe due to adequate connectivity[10]. The Impact Assessment for the Code indicates that manufacturers supported a common definition of small-area wireless access points and the harmonisation of technical characteristics about their design, deployment and operation to meet the above objectives.

2.3. How would the problem evolve?

Wireless traffic continues to grow significantly by 60% on an annual basis[19], due to the increasing number of connected devices and data requirements. 5G is expected to carry 35% of data traffic in 2024. Data growth calls for higher network capacity delivered also by network densification based on small cells. A 5G study[20] estimates that cell density will increase by a factor of 10 between 2014 and 2020. Small cells become necessary to supplement, or in certain scenarios replace, macro-cells in order to fulfil the requirements of 5G services such as area traffic capacity, connection density or available capacity per user and connection. Despite their similarities, what differentiates outdoor small cells from macro-cells is that while small cells ensure more capacity, macro-cells ensure wider coverage. Therefore, in urban areas that are densely populated, small cells can cope with the high demand and high capacity that macro-cells cannot handle. Therefore, the number of small cells is set to grow significantly by 2025, at an average annual rate of 22-29%, driven both by the outdoor and indoor uses, the latter estimated to represent 73% of the small cell market in 2020[21].

In particular, the move to 5G signifies a higher small cell density through the use of new 'mm-wave' frequency bands above 24 GHz. Because of its high bandwidth and limited propagation characteristics, the pioneer 26 GHz band offers very high capacity and data rates per user but requires very dense network deployment, i.e. a large number of small cells. A Commission study[22] reports that in 2025 half of the (non-residential) 5G-capable cell sites would be small cells and their number would reach 1 million in the EU. Out of these about 10% of the 5G small cells would support mm-waves. A light deployment regime should boost

[19] See "Ericsson Mobility Report" of June 2019, https://www.ericsson.com/en/mobility-report/reports/june-2019
[20] Global 5G Study on "Small Cells and Dense Cellular Networks Regulatory Issues" (http://www.global5g.eu/sites/default/files/Global5G.org_D3.1-Study%20on%20small%20cells%20and%20dense%20cellular%20networks%20regulatory%20issues_v1.0_rev3_0.pdf)
[21] See "Small cells market status report" (December 2018) of the Small Cell Forum, Document 050.10.03
[22] "Study on using the millimetre waves bands for the deployment of the 5G ecosystem in the Union" (SMART 2018/0017)

further deployment beyond this prognosis in terms of numbers of deployed small cells, earlier deployment and meeting market demand.

Given the predicted rapid increase of deployed small cells, the number of individual permit applications will grow proportionately. If the current rules on deployment of macro-cells, remain applicable also to small cells, without exceptions, this would have a multiplicative effect on the administrative effort to request, assess and grant individual permits. The resource burden both on the operators' side and on the public administrations' side would become excessive and thus cause long delays and finally stifle investment. A light deployment regime based on commensurate physical (e.g. visual) and technical limitations should reduce the deployment time for operators and the administrative burden currently experienced to deploy SAWAPs and also facilitate public acceptance of the network densification needed for 5G services. This can in turn enhance the key role played by wireless communications networks in the response to and recovery from the COVID-19 crisis.

3. Policy objectives

The 5G Action Plan points to the need to simplify the deployment conditions for dense wireless (including cellular) networks to reduce costs and support investments. It indicates that administrative aspects related to local planning procedures, the high site rental charges, the variety of specific limits on EMF emissions as well as of methods required to aggregate the requests for permits create unnecessary burdens for the installation of small cells.

The Commission's implementing act has to take into consideration the policy objective of preventing the undue restriction of small cells deployment, while taking due account of the potential impacts on health, aesthetics and concerning the safety of such a simplified deployment regime.

The implementing act follows the objectives of the Code, i.e. to simplify the conditions for the deployment of dense wireless networks by establishing appropriate and publicly acceptable (in terms of visual and health impact) physical and technical constraints on small-area wireless access points in order to scope a light deployment regime and by increasing the geographic uniformity of the applicable rules.

An additional objective of this implementing act is to promote a single market for small-area wireless access points through the EU light deployment regime. As the equipment which shall meet the technical and physical characteristics in the foreseen implementing act will benefit from a privileged installation regime, it shall be subject to intensive research, innovation and optimisation efforts from manufacturers and operators, which will be incentivised to produce and, respectively, make use of such equipment, stimulating competition and investment. An effective light deployment regime can also help towards the digital sector's contribution to Europe's economic recovery from the COVID-19 crisis.

4. Setting the criteria for permit-free small cells

Based on the outcome of the study for the Commission[23], the public consultation[15] as well as various contributions from the Member States and the industry, the proposed regulatory approach to an EU light deployment regime for SAWAPs focuses on ensuring (1) aesthetical visual appearance and (2) sufficiently low emission power. These characteristics match the definition of a SAWAP, which refers to low power equipment and low visual impact antennae, and also ensures compliance with EMF exposure limits pursuant to the Recommendation 1999/519/EC for reasons of public health protection. As SAWAPs are expected to be deployed in big numbers, these two aspects are crucial for building public trust and acceptance of SAWAP deployment.

4.1 Low emission power

To set the general context, small cells operate at low emission power levels, which are optimised to ensure sufficient coverage and low levels of harmful interference between adjacent cells. In addition, it is necessary to ensure that small cells operation complies with EMF emission limits set in Recommendation 1999/519/EC, which is paramount for ensuring public health protection. Emission power levels differentiate small cells[24] from large macro-cells using higher power levels (typically above 100 W EIRP[25]), on the one side, and from short range devices which are subject to much lower emission power limitations[26] (such as a few hundred mW EIRP), on the other side. Such a limit, alongside other relevant characteristics, will provide predictability to manufacturers and operators and facilitate economies of scale of small cell equipment as well as wireless network deployment planning.

The Recommendation 1999/519/EC provides limits for exposure of the public to electromagnetic fields (EMF) in line with the 1998 International Commission on Non-Ionising Radiation Protection (ICNIRP)[27] guidelines. In this regard, EMF exposure limits for the general public applicable at EU level set out in the Recommendation include a Reduction Factor of 50 against adverse health effect thresholds to account for biological variability,

[23] Including a public workshop of November 2018

[24] Art. 2(23) of the Code defines a SAWAP as a "low-power network access equipment" among others.

[25] Note that Watt and Watt EIRP (W EIRP) is not the same in terms of measuring emission power.

[26] These low emission power limitations are meant not to protect public health but to avoid technical harmful interference between equipment.

[27] These limits are based on the guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is an independent non profit scientific organisation based in Germany founded in 1992 by the International Radiation Protection Association (IRPA), specialising in non-ionizing radiation protection. According to ICNIRP, its financial resources consist of subsidies from national and international public institutions such as the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU), the European Union Programme for Employment and Social Innovation ("EaSI") 2014-2020 and IRPA, in support received to organize meetings or workshops from national ministries or radiation protection agencies, and in private donations from private individuals or from businesses not related in any way to the field of non-ionizing radiations, which are listed in the ICNIRP donors' report. ICNIRP insists that it is free of vested interests as its members cannot be employed by industry, must comply with the ICNIRP's policy of independence and must publicly declare their personal interests. ICNIRP's annual financial report is published online.

uncertainties, and variation in external factors. The new guidelines[28] released by ICNIRP in March 2020 confirm the health safety margin of existing EMF exposure limits at the EU level set out in the above Recommendation. Some new elements of the guidelines address aspects concerning the use of spectrum in higher bands (such as mm-wave), which will be especially relevant for future 5G networks. New elements also relate to the measurement methods and protection limits regarding those high frequencies. Member States monitor the EMF public exposure levels and relevant network measurements[29] confirm that they are well below the recommended limits of the Recommendation. The Commission services are assessing the ICNIRP's findings, and whether there is a need that Recommendation 1999/519/EC is reviewed.

In order to ensure protection of public health, the study undertaken for the Commission recommends (confirmed by the public consultation results) to use the relevant European standards EN 50401[30] and EN 62232:2017[31], which provide a methodology ensuring compliance of wireless access points put into service with the EMF exposure limits set in Recommendation 1999/519/EC. These standards are already applicable for the so-called 'passive' antenna systems[32]. Specific methods are under development for the so-called 'active' antenna systems (e.g. capable of beamforming) which will be increasingly used as part of the 5G networks. In the current phase of small cell deployment, SAWAPs are typically equipped with passive antennas and thus fall within the scope of the existing standards[33].

Table 2 of clause 6.2.4 of the European standard EN 62232:2017 defines installation classes for different categories of wireless access points, including for small cells, based on different emission power limits. These classes could therefore be used in order to determine the technical characteristics for the small cells benefiting from the light deployment regime[34] in the relevant frequency range of up to 100 GHz. As explained below, the Commission services consider that the lowest product installation classes E0, E2 and E10 defined in Table 2 of EN 62232:2017 are relevant to SAWAPs. These specify an overall emission power limit not exceeding 10 W of equivalent isotropic radiated power (EIRP) (applicable to E10) as well as class-dependent requirements, provided in the standard, for a particular SAWAP installation to ensure compliance with the EMF exposure limits set in Recommendation 1999/519/EC as follows:

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[28] https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf

[29] http://eye.sbc37.com/m2?r=uDVkNTE1OGVlMTFjZTYyNWRiOTUxYjAwNcQQPChVCkLQhUTQ1tCc0LMO0MjQnTjxKsQQ7NC1eOTQqdDcQ0zQsdDB0J1iUH4K6rZnaWxsZXMuYnJlZ2FudEBhbmZyLmZyoJaqQ09OVEFDVF9JRLY3TFY0NUtuY1EweXh3WjFpVUg0SzZns0VNQUlMX0NPUlJFQ1RJT05fSUSgsU9SSUdJTl9DQVBUSU9OX0lEoK5PUklHSU5fS0lORF9JRKZNQU5VQUyzUEhPTkVfQ09SUkVDVElPTl9JRKCoU1RBVEVfSUSmTk9STUFM

[30] EN 50401 is a European harmonised standard published in the OJEU C389 of 17 November 2017, p. 68.

[31] The European standard EN 62232:2017 is referenced in EN 50401.

[32] An active antenna is an antenna that contains active electronic elements (such as signal processing units) as opposed to traditional passive antennas which consist of passive elements such as metal rods, capacitors and inductors.

[33] This is confirmed by a report of the German Ministry for Transport and Digital Infrastructure, link: https://www.bmvi.de/SharedDocs/DE/Publikationen/DG/mitnutzungspotentiale-kommunale-traegerinfrastrukturen-ausbau-5g.pdf?__blob=publicationFile (s. Section 3.4.4.3).

[34] Small Cell Forum Release 9.0, document 190.09.02: "Small cell siting: Regulatory and deployment considerations", February 2017.

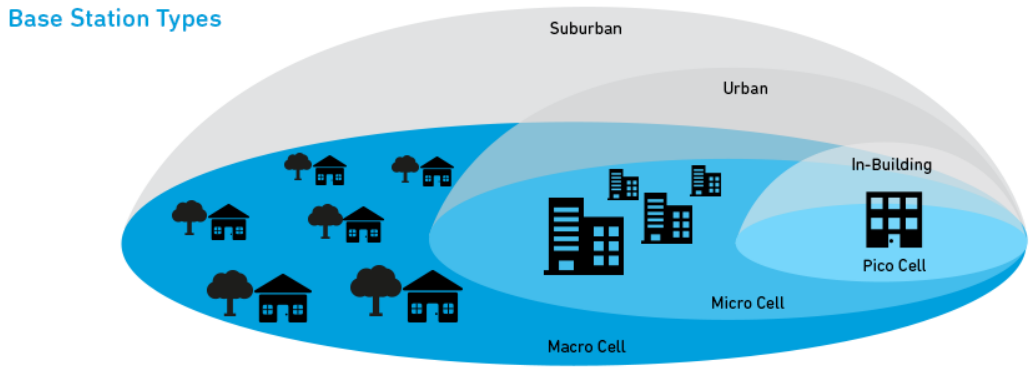
- Class E0 is for touch-compliant SAWAPs of very low power (below 250 mW EIRP) which is inherent to home WiFi routers as well as cellular equipment (i.e. part of a mobile network). Touch compliance requires that no harm can be induced to people by EMF no matter how close they are to the SAWAP. This class includes in particular SAWAPs for indoor use, such as on premises where people live or work, and ensures compatibility with rules applicable to existing radio local area network (RLAN) or WiFi equipment. This class corresponds to the categories 'home base station' or 'local-area base station' used by the 3GPP[35] (based on the power input to the antenna) or the notion of a so-called 'femtocell' covering a very limited area.
- Class E2 specifies a higher power limit of 2 W EIRP and a safety distance threshold of a few centimetres from people as provided in the standard. This category favours SAWAP deployment in narrow urban spaces, both indoors and outdoors, which imply close proximity to people. The range of a SAWAP operating at such an emission power would be in the order of a few tens of meters. However it is limited to mobility at walking speeds due to the need for frequent handovers between SAWAPs. This class corresponds to the 3GPP category of a 'medium-range base station[35]' or the notion of a so-called 'picocell'.
- As shown in Table 2 of clause 6.2.4 of the standard, Class E10 specifies a power limit of 10 W EIRP and, by difference to classes E0 (no distance) and E2 (from 0 up to 10 centimetres), requires in all cases a specific minimum antenna height above the general public walkway in order to ensure a minimum distance to people. Under this class, the height of 2.2 meters of the lowest radiating part of the antenna above the general public walkway ensures a distance of at least 20 cm[36] of the main antenna lobe from the human body of a 2 m tall person[37]. Compared to the E2 class, the E10 class allows for wider coverage of a few hundred meters, supports increased mobility and enables economically viable wireless broadband services and vertical applications outdoors at very high (mm-wave) frequencies[38]. Class E10 falls within the 3GPP category of a 'medium-range base station[35]' or the notion of a so-called 'microcell'.

Considering the installation safety distances to be respected under the standard and since the Electronic Communications Code provides that small-area wireless access points should be low power equipment, the envisaged implementing act should only apply to installation classes of a maximum emission power of 10 W EIRP. SAWAPs transmitting at more than 10W EIRP would depart from the notion of a 'low-power wireless network access equipment' under the Code, in particular in comparison to deployed RLAN low-power wireless access systems or Wi-Fi points, as well as the aforementioned 3GPP base station classes with limited

[35] See Section 3.1 of the document 182.09.01 "Simplifying small cell installation" of the Small Cell Forum (February 2017)
[36] Furthermore, the study on using mm-wave bands for the deployment of the 5G ecosystem in Europe (SMART 2017/0015), undertaken for the Commission, indicates that at a distance of more than 29 cm from a SAWAP with an emission power of 10 W, which is much higher than 10 W EIRP, the EMF exposure level is well below (100 times) the precautionary limit of the Recommendation 1999/519/EC.
[37] Annex C.4 of EN 62232:2017
[38] SMART 2018/0017, Section 5

range, which all operate at maximum power levels of a few Watts. Therefore, the next higher installation class E100 of 100 W EIRP cannot benefit from a light deployment regime.

Figure 1 illustrates the different types of base stations (or 'cells') with relevance to small-area wireless access points.



Cell Type	Output Power (W)	Cell Radius (km)	Users	Locations
Femtocell	0.001 to 0.25	0.010 to 0.1	1 to 30	Indoor
Pico Cell	0.25 to 1	0.1 to 0.2	30 to 100	Indoor/Outdoor
Micro Cell	1 to 10	0.2 to 2.0	100 to 2000	Indoor/Outdoor
Macro Cell	10 to >50	8 to 30	>2000	Outdoor

qorvo

Figure 1: Common categories of cells (Source: Qorvo[39])

Out of these classes, class E0 and class E2 could be deployed both outdoor and indoor. Unlike the class E2, which can be deployed in any indoor space, the class E10 could only be deployed in large indoor spaces, such as museums, stadiums, convention centers, airports, metro-transport stations, railway stations, or shopping centers, with a ceiling high enough to aesthetically accommodate the maximum visible volume limit of 30 litres. Such installations will also ensure an additional margin when complying with the safety distance of 2.2 meters imposed by EN 62232. The Commission services, having regard to the public consultation results as well as the safety distances to be respected under the EN 62232, consider that such equipment should be installed only in spaces with a ceiling height of at least 4 meters in order to avoid visual clutter.

It should be noted that the inclusion of the installation class E10 with a power limit of 10 W EIRP increases the cost effectiveness and reduces the density of outdoor SAWAP deployment subject to the light deployment regime. The higher the emission power limit, the larger the coverage of a SAWAP and the lower the cost and density of urban SAWAP deployment. Class E10 will significantly enhance network coverage and capacity in terms of the number of served users. Figure 1[40] shows that moving from 1 W to 10 W in the output power is equivalent to an enhancement factor of up to 20 in capacity and more than 10 in cell coverage

[39] https://www.qorvo.com/design-hub/blog/small-cell-networks-and-the-evolution-of-5g

[40] Note that output power (from the antenna) is expressed in watts and not in watts eirp. However, for the purpose of proportionality between output power and coverage distance, the figure remains relevant.

area. The same factors approximately apply mutatis mutandis to class E10 expressed in Watt EIRP regardless of the wireless technology (4G or 5G). Use of the class E10 would also facilitate the take-up of mm-wave frequencies for small cells (to counter higher path loss[41]) and enhance the multi-band support of a single small cell by allowing a higher cumulative power of a SAWAP over several frequency bands.

A limit of below 10 W EIRP is used in Germany[42], while a few Member States apply lower power limits (1 W EIRP in Spain or 5 W EIRP in France), and a few Member States apply higher power limits (164 W EIRP in Greece, 64 W EIRP in Estonia, 50 W total power at the antenna input in Luxembourg) in their national light deployment measures.

The use of EN 62232:2017 for SAWAPs will need to take into account any amendment of the underlying standard based on the latest technological developments. Hence, the implementing act will require regular review to determine if updates of this standard have to be included. In particular, the use of an EIRP limit with the installation classes referred to above may not be applicable, due to beamforming characteristics of active antenna systems, for assessing, measuring and enforcing compliance at the national level[43]. In this regard, the further development of the European standard EN 62232:2017, also in view of the new ICNIRP guidelines to address SAWAP installations employing active antenna systems, may be needed at a very early stage[44], which will be analysed for the regulatory purposes of the light deployment regime at a subsequent stage. In any case, as long as the applicable standard does not cover SAWAPs with active antenna systems, such SAWAPs should not be covered by the EU light deployment regime, for the purpose of ensuring transparent and adequate protection of public health. Therefore, the implementing act, which is expected to be adopted by the end of June 2020, duly reflects state-of-the-art EU-level EMF regulation and EMF compliance standardisation. Any subsequent update of the Recommendation 1999/519/EC and/or the relevant European standards will be taken into account in considering the need for a review of the implementing act.

It is important to define the notion of 'indoor' and 'outdoor' in the implementing regulation in order to avoid potential implementation problems. The definition should be as inclusive and as clear as possible. 'Indoor' (or enclosed) areas should be defined to include any space covered by a roof and wholly enclosed by walls or sides, regardless of the type of material used for the roof, wall or sides, and regardless of whether the structure is permanent or temporary.

[41] The reduction in power density (attenuation) of an electromagnetic wave as it propagates through space.
[42] This emission power limit is applied in Germany for a permit-free regime according to the 26th Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (26. BImSchV) and "Verordnung über das Nachweisverfahren zur Begrenzung elektromagnetischer Felder (BEMFV)"
[43] With active antenna systems an emission power limit based on total radiated power (TRP) instead of EIRP seems more appropriate.
[44] According to industry sources a revision of the standard IEC 62232:2017 is under way to reflect inter alia new antenna technology, and first adoption is scheduled for 2021.

4.2. Low visual impact

With regard to aesthetical visual appearance, based on recommendations included in the study undertaken for the Commission, there are two categories of small cells which should be taken into consideration for the purposes of the implementing act, as they would ensure no or only low visual impact of the SAWAPs: fully integrated (invisible), and visible (either outdoors and indoors):

- Fully integrated (invisible) –the SAWAP constitutes an integral part of the design of a distinct installation or structure and is not mounted as an external addition. It also includes installations which are completely underground, including the antenna;

- Visible – when the SAWAP, or at least a part of its antenna systems, is mounted on a supporting structure in an outdoor or indoor area. Relevant indoor areas are large indoor public spaces where the SAWAP installation would normally require a deployment permit. Such areas, such as airports, railway stations, shopping malls or stadiums, gather a significant number of end-users e.g. for the purpose of shopping, entertainment or traveling.

The fully integrated category should not be subject to physical limitations other than the ones intrinsic to the object they are integrated in, including weight requirements. This category has the advantage of completely avoiding visual clutter. Economies of scale for equipment could potentially be achieved by the development of commonly accepted "smart solutions" regarding designs which fit into a particular category of supporting structure such as street lamps or bus stops.

The visible category, in particular outdoors, should be subject to physical or technical limitations, in order to ensure that the small cells comply with the requirements of low visual impact - low visual clutter (such as coherent shape, concealed cabling, neutral colours) and small size, as provided in the SAWAP definition in the Code.

Therefore, the small-area wireless access point should comply with visual characteristics which ensure visual consistency with the supporting structure and have a proportionate size relative to the overall size of the supporting structure, coherent shape, neutral colours and concealed cables, and should not, together with other small-area wireless access points that are already installed in adjacent sites, create aggregate visual clutter.

With regard to the volume limitation, in the public consultation, operators and equipment manufacturers backed a maximum value of 50 litres. This was justified (in their replies) by reference to the size of the different hardware components of a SAWAP according to state-of-the-art technology, and the needs to support multiple bands and technology generations as well as to accommodate shared (multi-operator) solutions. At the same time, aesthetical considerations and low visual impact are key for the acceptance by citizens and local authorities.

Volume dimensions defined in litres gives the most flexibility for exterior design. The study conducted for the Commission concluded that a volume range of 20-30 litres is sufficient to accommodate the SAWAP's components (i.e. antenna arrays, power supply, cabling connections, etc.)[45]. For comparison purposes, a traffic light may have a volume of about 30 litres. Operators and equipment manufacturers as well as some public authorities have provided input during the public consultations on the volume needs of separate SAWAP components (see annex). Considerations on a volume limit are without prejudice to bigger volumes allowed in less restrictive national regimes or installations subject to the permission of competent national authorities, who maintain an important role in such cases.

The public consultations[15,16] showed substantial industry support for a volume of 50 litres based on existing equipment. At the same time, the second public consultation showed that there are successful tests for a neutral host model using a volume of 25 litres. Taking into account the views expressed in the public consultation, as well as the view of the Member States expressed in the COCOM, a maximum total volume of 30 litres for the visible part of a SAWAP is considered appropriate and meets the minimum volume of 30 litres considered necessary by the industry, that follows a maximalist approach (see annex). This limit also allows infrastructure (radio access) sharing between at least two operators on the same SAWAP with the current state of technology. This limit represents a compromise solution to meet aesthetic requirements while not compromising state-of-the-art functionality (e.g. necessary Radio Frequency components) as well as ensuring its continued enhancement in the future as hardware designs would shrink. This volume limit applies to the visible part of one small-area wireless access point installed either in one complete part or in several separate elements, as well as to the total volume of the visible parts of multiple separate small-area wireless access points which share the same infrastructure site of small surface, such as a light pole, a traffic light, a billboard or a bus stop.

Such volume limit is likely to promote the development of compact designs at lower cost (economies of scale) and a wider use of the invisible category. Such designs may also address compact power supply solutions, which consume only a minimal portion of the visible part of SAWAPs.

It should be pointed out that the EU light deployment regime as proposed is agnostic as to the type of a SAWAP - whether multi-mode, multi-band or multi-operator (shared). The proposed approach does not exclude the application of less restrictive national rules, including the application of a permit free regime for additional classes of SAWAP.

5. Impacts

The vast majority of the responses to the public consultation (80%) considered that the implementing act will positively impact deployment speed. Respondents also identified

[45] In a rectangular form, such a volume can house an industry standard rack (19 inch, 48.26 cm width, with 20 cm length and depth of 20 cm or 19 inch, 48.26 cm width, with 24.5 cm length and depth of 24.5 cm respectively) to contain the main component elements.

benefits related to network deployment costs (70%), administrative costs (68%), visual pollution (39%) and energy consumption (32%).

Over the last years, the numbers of small cells in use have grown significantly[46]. Some operators are planning to roll out 200 or more cells per square kilometre for high traffic environments, like urban city centres and open places like stadiums in the coming years. Density is projected to increase further, i.e. to support approximately one million connections per square kilometre, which could involve 1000 small cells in some scenarios.

Therefore, there is a clear need for simplification of administrative procedures for operators to reduce the administrative complexity of the deployment process for small cells to the benefit of both the operators and the administrative authorities. The proposed regime would ensure administrative consistency across the Union and thus provide predictability for market players immediately upon its date of application. In addition, it would reduce administrative burden for competent national, regional or local authorities as it will eliminate a high number of permit requests that these authorities are otherwise likely to face. This would contribute to financial and resource savings for national administrations and spur 5G deployment on their territories.

Measurements conducted for ANFR (the French spectrum management authority)[47] show that small cells improve the data throughput available to users in both the uplink and downlink and thus consumer experience. A study[22] undertaken for the Commission indicates that the shift to a 5G network incorporating both macro and small cells is likely to cause only a very modest increase in exposure of the population to EMF. Furthermore, the emission power of a mobile device when connected to a small cell base station is generally much lower than when the device is connected to a macrocell base station at a large distance. The deployment of small cells has therefore the potential to reduce EMF exposure in evolving connectivity scenarios where macro-cells are not active for users connected to small cells. This is because the emission power level generated by small cell base stations and portable devices in a typical end-user scenario would be much lower than the levels generated by a macrocell. In addition, the technical characteristics of indoor small cells will be suitable to avoid interference with important machinery such as hospital equipment.

In order to facilitate the mapping of infrastructure as well as to determine the cumulative EMF exposure resulting from the colocation or the aggregation of several SAWAPs in a specific area, undertakings concerned should be requested to submit notifications of Classes E2 or E10 to national competent authorities on the installation of SAWAPs falling within the scope of the light deployment regime.

The deployment of small cells subject to the EU light deployment regime would reduce visual pollution as they can be integrated much more discretely into an existing landscape outdoors

[46] Source: Small Cell Forum
[47] See https://www.anfr.fr/fileadmin/mediatheque/documents/Actualites/2017-04-26_-_Rapport_résultats_Annecy.pdf.

or into an existing building with particular aesthetic merit. In some cases, SAWAPs can also be integrated directly into already existing infrastructures such as *traffic lights*, *lamp posts* or *bus and tramway stops*. Additionally, the volume limitation of 30 litres would allow for the colocation of relevant SAWAP equipment from two network infrastructure operators on the same site, even if such colocation under the implementing act may be limited in terms of antenna systems and supported frequency bands according to feedback received in the public consultation. It should be kept in mind that a higher degree of colocation is still fully possible with a permit. Without prejudice to the competition rules, this improves the business case for operators and the visual impact for small cell site owners (municipalities or other) and citizens. An operator responding to the public consultation indicated that 'rules based on total overall volume and total overall power will encourage and reward operators with space and power efficient designs while promoting the neutral host model creating economies of scale'.

Research and innovation on the design of small cells falling within the scope of the implementing act could be stimulated by the enhanced confidence in the possibility for their deployment.

The mass deployment of small cells may be perceived by the general public as polluting and harmful. In this regard, the supervision and enforcement of the EU light deployment regime shall fall within the competence of national authorities, which need to have at their disposal the means to prevent any 'wild' deployment of SAWAPs. In any case, the deployment of SAWAPs has to comply at the same time with other national rules related to private property rights, connection to utilities (such as electricity), the rights of way related to the connection of the small-area wireless access point with wide-area network in compliance with Union law, or competition. Equally, the national authorities have the competence to monitor compliance with the applicable requirements with respect to electromagnetic fields. Such (typically ex post) rules may require change of installation or de-installation of small cell(s) if these are in breach of relevant requirements. Moreover, by derogation from the regime envisaged, competent authorities may require permits when such SAWAPs are deployed on buildings or sites of architectural, historical or natural value or where necessary for public safety reasons.

6. Choice of legal instrument

The risk of further fragmentation of rules on small cell deployment at the different administrative levels across Member States (national, regional, local) should be addressed by choosing a type of implementing act with a direct and immediate effect which avoids the need for transposition of the rules at stake, which would provide a margin of discretion to Member States to adapt those rules at national level. For this purpose, the adoption of an implementing regulation would be appropriate as it would be directly applicable and enforceable in all Member States.

Therefore, an implementing regulation is the most effective and coherent instrument which would facilitate small cells deployment across all Member States as well as within a given Member State – it avoids any delay or divergences which might result from differences across different administrative levels within a Member State or from different national approaches to

adapt to the increasing pressure on the issuance of permits for small cell deployment. This will avoid market fragmentation and contribute to a rapid and coherent development of 5G. At the same time, it shall not prevent the application of more beneficial regimes at national level.

Developments in standardisation on the EMF compliance of wireless equipment may necessitate subsequent reviews of the implementing Regulation, to adapt it to the developments in the standardisation process.

7. Application of the envisaged measure

In accordance with Article 57 of the Code, the foreseen implementing regulation provides a framework for the exemption of SAWAPs, which are about to be put into service, from *any town planning permit or other individual prior permits* related to their deployment. These would typically comprise the following types of permits:

- Town planning – related to the location of sites for SAWAP deployment;
- Environmental – for protecting the environment.

By way of derogation, even for SAWAPs which would fall within the scope of the implementing regulation, Member States may require permits for their installation for reasons of protecting historical, architectural and cultural assets or public safety[48]. Member States have to apply this derogation to the extent that they do not unduly restrict SAWAP deployment. In addition, as requested by Article 7 of Directive 2014/61/EU and Article 57 (1) of the Code, all relevant information concerning conditions and procedures for granting such permits have to be available via the single information point and published in advance of their application. When Member States rely on the aforementioned derogation[48], as well as in the cases which do not fall within the scope of the light deployment regime, the permits have to be granted or refused within four months, except in exceptional, duly justified cases.

Moreover, Member States have to ensure that operators have the right to access any physical infrastructure controlled by national, regional or local public authorities which is technically suitable to host small cells, where relevant, in compliance with Directive 2014/61/EU.

At the same time, the permit-free regime to be laid down by the implementing regulation for small cells is without prejudice to the powers of the Member States to establish more stringent measures than those foreseen in Recommendation 1999/519/EC, with regard to EMF compliance in accordance with Article 58 of the Code.

The evaluation process for EMF compliance, in particular the determination of aggregate EMF levels, depends on standardised methodology and enforcement at the national level. The methodology for monitoring EMF compliance is a matter of national competence in line with applicable national framework rules established pursuant to Article 7 of Directive

[48] Article 57(1), paragraph 3 of the Code: By way of derogation from the second subparagraph of this paragraph, competent authorities may require permits for the deployment of small-area wireless access points on buildings or sites of architectural, historical or natural value protected in accordance with national law or where necessary for public safety reasons. Article 7 of Directive 2014/61/EU shall apply to the granting of those permits.

2014/53/EU. A number of Member States apply limits on EMF exposure in line with Recommendation 1999/519/EC, whereas several Member States apply stricter national limits. In the latter case, Member States are subject to the obligations provided in Directive (EU) 2015/1535, pursuant to Article 58 of the Code as mentioned above.

At the same time, Member States are also subject to the obligation under Art 45(2)(h) of the Code to pursue consistency and predictability throughout the Union regarding the way in which use of radio spectrum is authorised in protecting public health, taking into account Recommendation 1999/519/EC, for the purpose of promoting harmonised and efficient use of spectrum for electronic communications services. In this regard, Article 57(3) of the Code states that Article 57 is without prejudice to the authorisation regime applicable for the use of the relevant radio spectrum.

Furthermore, as already explained, SAWAPs deployment is without prejudice to applicable national law, as the case may be, related to private property law, permits for access to utilities/ducts/wayleaves and safety regulations for mounting and/or construction. Nevertheless, Article 57(1)[49] of the Code stipulates that Member States are bound not to impose undue restrictions on SAWAP deployment. In addition, Article 57(4)[50] of the Code stipulates that Member States shall grant access to operators to access public infrastructure for the purpose of SAWAP deployment.

In order to effectuate the desired policy objective of the implementing regulation – namely to set the characteristics of the small cells which may be installed without a permit – inclusion of an ex-post *notification requirement* for SAWAP operators can be considered appropriate as an ancillary provision, inextricably linked to its scope. SAWAP deployment subject to the implementing regulation follows the principle "first come, first served", in terms of aggregate visual impact and EMF levels. The notification ensures that the operator marks its place in the sequence of installed SAWAPs. If for reasons of ex-post monitoring and enforcement at national

level, an operator may be requested to remove its SAWAP equipment, a notification mechanism can mitigate disputes and any litigation at national level, as it would be comprehensible who is the (last) provider having to remove its equipment. As the implementing regulation allows the installation of several SAWAPs within the same area, it is important that national competent authorities have the tools to exercise a proactive approach as regards protection of public health under the applicable EMF limits of Recommendation 1999/519/EC. Notifications will assist them in monitoring aggregate EMF levels. This is

[49] Article 57(1) of the Code: "Competent authorities shall not unduly restrict the deployment of small-area wireless access points. Member States shall seek to ensure that any rules governing the deployment of small-area wireless access points are nationally consistent. Such rules shall be published in advance of their application."
[50] Article 57(4) of the Code: Member States shall, by applying, where relevant, the procedures adopted in accordance with Directive 2014/61/EU, ensure that operators have the right to access any physical infrastructure controlled by national, regional or local public authorities, which is technically suitable to host small-area wireless access points or which is necessary to connect such access points to a backbone network, including street furniture, such as light poles, street signs, traffic lights, billboards, bus and tramway stops and metro stations. Public authorities shall meet all reasonable requests for access on fair, reasonable, transparent and non-discriminatory terms and conditions, which shall be made public at a single information point.

already the case in many Member States (e.g. France, Belgium, Greece, Luxembourg, Italy and Germany).

8. Monitoring

The table below outlines the indicators of progress that will be monitored to evaluate whether the objectives of this initiative are met. In line with the 'better regulation' policy of the Commission and in order to assess the developments in the band, the preference should be for regular reporting from the Member States to the Commission on the implementation of the telecoms framework on the basis of existing tools such as during country missions and with targeted questionnaires on specific topics. These indicators aim at evaluating the attainment of policy objectives related to the widespread deployment of small cells via the streamlining and simplification of the permit request process, the choice of the criteria for a light deployment regime, and the promotion of research and development (notably on equipment which can benefit from the permit exemption regime).

Any incomplete data relating to the complexity and timing of the permit request process could be complemented through information gathering from complementary sources including the Commission's annual fact-finding missions carried out in Member States, input from stakeholders, other market data received from industry and public authorities. These are processes already in place that can be exploited effectively.

The relevant amendment of standards on the EMF compliance of SAWAP to reflect any relevant technology development needs to be monitored in the framework of the Radio Equipment Directive (Directive 2014/53/EU) and, if necessary, stimulated in order to address for example future deployment scenarios at all relevant frequencies and for all antenna types.

Table 1 – Indicators of progress

Objective	Core indicators
Reduce barriers to small cell deployment	Complexity and diversity of existing regimes Delay of installation
Foster public acceptance of small cells	Number and topics of complaints and applied remedies
Spur research and innovation on small cells	Size and spectrum efficiency of available equipment
Adaptation to relevant updates in standards	Change/amendment of referenced standard(s)

ANNEX

MAIN FINDINGS OF THE SECOND OPEN PUBLIC CONSULTATION ON THE DRAFT IMPLEMENTING REGULATION

During the second open public consultation (27 February - 16 April 2020) contributions have been received by both *telecom industry* and *local authorities*. All these contributions are available on the Better Regulation Portal[51].

Telecom industry

The telecom industry has made suggestions on (i) adding a review clause in order for the implementing regulation to cover later also Active Antenna Systems, following the expected update of the EN 62232:2017 standard at the end of 2021, and (ii) a notification mechanism based on current best practices.

With regard to the maximum volume of the visible part of an installation, the industry is in favour of a volume limit of 50 litres (analysed in the following table of the joint response of GSMA, ETNO, Small Cell Forum, Digital Europe and GSA) in order to cover multi-technology and multi-operator SAWAPs. However, industry considers a minimum volume limit at 30 litres.

Estimated volumes (2019, based on current technologies)	Single SAWAP	Tri-sector SAWAP
Radio Unit (not including the Base Band Module, which is assumed to be placed in a different centralized location)	10 L	3x10 L
Antenna	3-5 L	10-15 L
Transmission/backhaul (wireless)	0,4/4-5 L	0,4/4-5 L
Power supply (auxiliary)	18 L	18 L

With respect to the maximum emission power, the industry is in favour of inclusion in the scope of the implementing regulation of all classes included in the EN 62232:2017, and proposes an emission power (at the antenna input) of 10 Watt. This may produce emission power at the antenna output which well exceed 10 W EIRP in contradiction with Class E10.

The industry also supports the *non-introduction* of further restrictions than those set in EN 62232 on the deployment of small cells of class E10 in large indoor spaces such as office blocks, museums, stadiums, convention centres, airports, metro-transport stations, railway stations, or shopping centres.

[51] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1981-Light-deployment-regime-for-small-area-wireless-access-points)

Local authorities

Public local authorities from Spain, Netherlands and Ireland responded to the second open public consultation with focus on the volume limit. The Dublin City Council reported having tested solutions of about 25 litres on poles and traffic infrastructure, while proposing an increase of volume limit to 30 litres. These installations in Dublin implement a neutral host model, meaning that there is a tested example of a multi-operator solution, which can be realised with the 25 litres volume limit. The Barcelona City Council supported the current 20 litres and the Dutch Cities (Eindhoven, Almere and Rotterdam) proposed only 10 litres. All City Councils have expressed concerns about the fees, the connection with the electricity network as well as the notification mechanism. For the latter, they supported a "pre"-notification mechanism (ex-ante).

In a number of aspects, the suggestions from public authorities fall out of the legal scope of this implementing regulation as set by Article 57(2) of the Code. Moreover, inserting a "pre"-notification obligation would create delays, legal uncertainty and undermine the scope of the implementing regulation as it would add to the procedural obligations and give the opportunity for competent authorities to exert a preliminary verification of the conformity of the equipment, while the purpose is to rely on the application of the standards under the Radio Equipment Directive to ensure a proper installation of the equipment.