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TOWARDS A EUROPEAN NUMBERING ENVIRONMENT

GREEN PAPER

ON A NUMBERING POLICY FOR

TELECOMMUNICATIONS SERVICES IN EUROPE

EXECUTIVE SUMMARY

WHY IS NUMBERING IMPORTANT?

Efficient telecommunications services are a key factor for the emergence of the Information Society. An appropriate numbering policy is an essential element to facilitate access to telecommunications services for all European businesses and citizens.

Telecommunications operators and service providers as well as business users increasingly look towards Europe as their future market place. But this is an evolution which will affect more and more every citizen. Call centres and customer service help desks are often organised on a regional or European basis. New services such as teleshopping rapidly enter the European market with great expectations for the future. Personal communications are on the doorstep and are likely to be broadly available before the turn of the century. At the same time, the regulatory environment is changing with 1 January 1998 as the date by which services and infrastructures will be fully liberalised across the European Union.

Numbering is a key enabler of these developments and is rapidly becoming a key commercial and competitive factor for the telecommunications industry. It is therefore important to develop a European numbering policy. Such a numbering policy must be based on defined political priorities. This includes objectives driven by the process of liberalisation and objectives resulting from the rapidly changing economic and technological environment. Moreover, with the Union-wide introduction of competition, special attention must be given to the take off of pan-European networks and services in order to overcome the effects of commercial forces which might, in the absence of a clear European policy, tend to fragment the European marketplace.

WHAT DOES THE CUSTOMER GET OUT OF THIS?

The debate on numbering must take account of the view of the users. They are the ones that benefit from the effects of numbering reform and the introduction of new mechanisms to enhance customer choice.

For instance, the introduction of carrier selection is likely to bring large direct and indirect benefits to the European society and economy. It is an essential element to bring increased competition on long-distance and international traffic which in turn could save the European users as much as 20 to 25 BECU per year. Number portability is another example that allows the users to retain their number when they wish to change operators and allows them to make the best choice in terms of quality, service and cost.

The opening of service platforms for special pan-European services such as freephone could not only bring important additional revenues to operators but also provide easy and user-friendly access to product marketing and sales organisations with consequential benefits for Europe's economy. By way of example, 435 B\$ of goods were sold on freephone calls in the US in 1993.

National numbering schemes have to be reformed because of the growth of and changes in the market. This presents a unique opportunity to build-in a convergence aim: that is to harmonise national numbering schemes such that the European users in the future will face a more singular structure throughout Europe which is simple to understand and hence would stimulate the propension of using the telephone. Moreover, important psychological barriers associated with making international calls could be removed within the European Union.

KEY ISSUES FOR A NUMBERING POLICY WITHIN THE EUROPEAN UNION

This Green Paper stresses that discussions on numbering must be part of the general regulatory debate. It **therefore invites both general and detailed comments of all interested parties on a range of issues, including comments on the timetable and mechanisms** by which policy can be implemented and on the approaches needed to safeguard the interests of consumers and of all users.

KEY ISSUES FOR NUMBERING POLICY WITHIN THE EUROPEAN UNION

I The role of numbering in ensuring effective competition, and in particular:

- Carrier selection.
- Number portability.
- Restructuring of national numbering plans to foster competition and the role of national regulatory authorities in ensuring adequate numbers are available.

II Facilitating the single market and, in particular:

- The creation of a European Telephony Numbering Space,
and within that the need for common access codes for pan-European services (such as freephone, shared cost, premium rate or mobile network services).
- The need for European numbering to be administered by an appropriate administrative structure at a European level

III Adapting Europe's numbering environment to the needs of the Information Society, and, in particular:

- The creation of a long term numbering plan for Europe
- Naming and addressing in the Internet and other emerging multi-media and on line services.

ESTABLISHING AN AGENDA FOR EUROPE

Summary of proposals for action

In order to achieve these objectives the Commission proposes the following targets:

From 1 January 1998

1. The implementation of **carrier selection** (i.e. users are offered a simple, non-discriminatory mechanism enabling them to select the carrier of their choice on a call by call basis).
2. The implementation as soon as possible of **number portability for the local loop** and, at the latest by 2000 (i.e. allowing users in all major centres of population to keep their telephone number at a particular location when changing to another operator or service provider).
3. The promotion of action at a national level to open up and to ensure the convergence of **national number plans** including the harmonisation of specific access codes and the adoption of a common standard for keypads supporting alpha-numeric dialling (i.e. allowing users to 'dial' names instead of numbers, e.g. 'FLOWERS' for a florist).
4. The implementation of a **European Telephony Numbering Space** (i.e. the implementation of a common numbering scheme and common access codes for special pan-European services : freephone, premium rate and shared cost calls, and, if needed, for personal communications services).
5. The establishment of a **common framework for the regulation and administration** of a common European numbering scheme (including the allocation of European service access codes and carrier selection codes, as well as the promotion of the Community's interest in international numbering fora).
6. The review of the issues associated with **naming and addressing in the context of the Internet** and to consider the need, if any, of regulatory action.

From 1 January 2000

7. The implementation of **carrier pre-selection** (i.e. allowing users a simple, non-discriminatory mechanism enabling them to pre-select the carrier of their choice on a permanent or default basis).
8. The extension of **number portability for users of mobile and personal communications networks as well as for users of special services** (e.g. allowing users to retain valuable numbers for freephone or personal communications services), taking into account the state of network development and the level of demand.

From 2000 onwards

9. The implementation of a **long-term numbering plan**, involving the creation of a European country code ("3"-XX) with the administration and management of the code transferred to the European level.

Comments are invited on each of these proposed measures as well as on the proposed timetable.

The Commission is aware that the introduction of new mechanisms such as those for carrier selection as well as measures aimed at a harmonisation of the numbering plans may bring significant costs to the industry and more importantly to the user. However, the increase of demand for telecommunications services and the introduction of competition mean that numbering plans must be adapted in most countries. The aim of this Green Paper is to ensure that the changes are made taking into account long term planning objectives and European integration.

When establishing the agenda and implementation time schedule for Europe we must take account of the costs and benefits that may be derived from the measures implemented. On balance however, the Commission believes that costs involved will be more than offset by the greater choice, improved quality of service and indeed lower tariffs that numberplan changes can facilitate.

Obviously, the propositions made in this Green Paper reach further than the European Union. For instance, the ultimate goal of establishing a unique European identity (e.g. Europe identified by the initial digit "3" of a three digit country code) would involve the countries in Central and Eastern Europe. The discussion can therefore not be confined to the European Union only but needs to be broadened to involve CEPT ECTRA to find answers to important questions such as how to move forward with a unified numbering environment for Europe but at the same time leave sufficient room for a phased introduction of competition in different markets according to the different liberalisation time scales of the countries involved.

And further mechanisms must be sought to ensure the continuing involvement of all interest groups at a national and European level in the development of Europe's numbering environment.

COMMENTS ARE INVITED

This Green Paper is intended to launch an active discussion involving the Council of the European Union and the European Parliament; the Economic and Social Committee and the Committee of the Regions; the *ad-hoc* high level Committee of National Regulatory Authorities; consumers and business users; fixed and mobile network operators, and service providers; manufacturers of equipment; together with the trade unions and other organisations representing the social interests in the sector. Comments and opinions are invited on all the positions set out in this Green Paper and, in particular, on the proposed targets established in the table above.

On the basis of the Consultation political positions will be developed. The Commission will forward those to the Council and the European Parliament.

Comments should be sent to the European Commission, DG XIII A/1, Rue de la Loi 200, B-1049 Brussels to the attention of Mr. de Cockborne (fax +32 2 2968391) at the latest by Friday 21 February 1997. Comments may also be sent by e-mail to: numbering@bxl.dg13.cec.be with reference to "Numbering Green Paper" (in format Word for Windows or Wordperfect).

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I INTRODUCTION: WHY NUMBERING REFORM?

With the emergence of a liberalised telecommunications market within the European Union, the availability of adequate numbers, allocated on a fair, transparent and non-discriminatory basis, is an essential condition for effective competition, innovation and consumer choice.

Numbering was recognised in the 1995 Green Paper on the liberalisation of telecommunications infrastructure¹ as "*a key facilitator - a pivot in market liberalisation and the introduction of competition*". It was seen as necessary to ensure that the "*development of telecommunications networks and services are not hampered on numbering grounds*" and that "*this challenge needs to be addressed by careful management of the overall numbering schemes, at a global, European and national level*".

Moreover, for the completion of the internal market Europe requires the availability of a European numbering environment to promote the emergence of pan-European services. Easy access to these services through harmonised access codes on a European scale is key for the customer and the industry².

In the transition to full competition in Europe, numbers are becoming as important a resource as frequencies or rights of way³. Over recent years, the number of telephone numbers in use within the European Union has significantly increased and exceeds the growth in the number of subscribers. Such an increase reflects both the growth in business communications and computing. However, even in the home, demand for numbers is increasing as users are beginning to take second or third fixed telephone lines for faxes or for modems⁴, and an increasing percentage of the population carry a mobile telephone or a pager.

In addition there are the new entrants in the market such as the cable TV operators and the mobile network operators. These operators require equal access conditions which in numbering terms means equal quality or equal opportunity numbers.

This substantial increase in demand is putting pressure on existing national numbering plans and leading to important reforms at a national level designed to free extra capacity for operators and, ultimately, for users.

This pattern of reform shows very different national approaches. It does not resolve many of the fundamental competitive and consumer issues created by a multi-operator environment, nor does it provide an immediate response to the demand for unique Europe-wide numbers for certain operators or certain services - numbers which can only be provided if adequately co-ordinated at a European or global level.

¹ Green Paper on the liberalisation of telecommunications infrastructure and cable TV networks - Part II : A common approach to the provision of infrastructure in the European Union (COM(94)682 final, 25.1.95)

² According to Article 129b of the Treaty "*the Community shall aim at promoting the interconnection and interoperability of national networks as well as access to such networks*".

³ Unlike frequencies and rights of way which are physically constrained, numbering is effectively constrained because changes are costly and highly resented by the public.

⁴ More than 6 of the 15 Member States have a residential main line penetration rate per 100 households of over 100%, with the figure reaching 121% in Sweden. See Communication of 13 March 1996 on universal service for telecommunications in the perspective of a fully liberalised environment, COM(96) 73.

Solutions are urgently needed :

- **to offer choice to the customer:** unless users can easily choose or even pre-select competing carriers and can keep their fixed or mobile telephone number when they change telephone companies or service providers, competition will be held back.
- **to minimise total cost of change:** frequent changes in a national numbering scheme involve high costs in re-programming equipment and updating software. For companies providing pan-European services to customers, the pattern of continual and uncoordinated change place significant costs on operators and service providers, as do the existence of difference numbers and service access codes in different countries. A stable long term plan, communicated to the market well in advance, can lead to important cost saving as it allows businesses to reprint stationary, repaint vehicles and inform customers as part of their normal procedures.
- **to facilitate easy and informed access:** in an increasingly complex environment, simple and easily understood numbering schemes help users to make and receive calls, to select different operators for different national and pan-European services both inside and outside their home country. They would also provide important tariff indications to the customer about what they can expect to pay for a call.
- **to bring about further harmonisation across Europe:** the possibility of innovative approaches to numbering, for example replacing numbers with words, will further ease the use of telephone but to achieve this Europe must have a standard telephone keypad. Further, a European Telephony Numbering Space (ETNS) could provide common service access codes across Europe (for example, for European-wide freephone, value-added or mobile services or for shared cost services⁵).

The proposals and positions set out in this Green Paper in respect of these various issues are consistent with the general approach followed by the Community in the area of telecommunications since 1987. This approach, which has been confined to those areas where action is required and appropriate at European level, balances the gradual opening up of markets with an accompanying regulatory framework ensuring fair competition and protecting the public interest, and a case by case application of competition rules.

II THE CURRENT SITUATION

II.1 The organisation of numbering policy at a global, European and national level

Today there is a complex set of rules governing numbering policy established at a national level, through Community action in some areas or by ECTRA / ETO in others, and an overall framework established by the International Telecommunications Union (ITU) with regard to a range of issues having a global impact, from the allocation of country codes to the maximum length of telephone numbers and the introduction of global numbers, for services such as global freephone (based on the 800 number).

⁵ Given that relevant access codes for mobile and value-added services vary between Member States, a user calling such a number from another Member State may often be unaware that he or she is dialling a number to which a premium or higher call rate will apply.

The regulation of country codes is one of the most important functions of the ITU in relation to numbering. A process of review is currently underway as to how the World telephony numbering plan might evolve to meet the demand. In particular, both Governments and operators are pushing for country codes to be allocated not only to new States, but also to specific types of service (for example, satellite-based personal communications services - where each system operator has requested the allocation of a country code for global access), and even to specific networks or network operators. With only 85 country codes remaining, the limits of the current global numbering plan are becoming apparent⁶.

At the national level, numbers have been traditionally owned and managed by the incumbent telecommunications organisation. Those companies allocated the dialling codes for particular cities or particular services (e.g. mobile or paging systems), the individual numbers for their customers and, where they existed, the numbers used by their competitors. Such national numbering schemes vary between Member States, but conform to general rules established at a global level under the auspices of the ITU.

Whilst the day to day administration of national numbering, in line with the principle of subsidiarity, will remain a national function to be carried out by an authority independent of the operators, further action is needed at a European level, both to developing a long term strategy and structure for numbering in Europe and to co-ordinate and present common European positions in relation to external developments, such as those within the ITU. Given the extensive resources required to follow the work within ITU Working Groups a co-ordinated European position represents the only practical way for a number of European countries to ensure that their voice can be adequately heard.

This dual approach will continue the process of co-ordination between national, regional and global action and complete the development of the internal market for telecommunications, whilst protecting basic user needs.

II.2 Much has already been done in the field of numbering

Since the early 1990's, the European Commission, the Council and the European Parliament have been active in developing an open and unified numbering environment within Europe. These initiatives are already achieving key regulatory objectives:

Common Europe-wide numbers for emergency or international calls in Member States.

- A Europe-wide access code for emergency services (112), to operate from 1992 and only in justified cases from 1996 alongside existing national emergency codes⁷.

⁶ The capacity of the global numbering plan cannot be easily expanded because the maximum number length is fixed at 15 digits. Moreover, it is increasingly difficult and time-consuming to obtain the necessary consensus within the ITU to proceed with changes to the current global plan within a workable timescale, given the commercial and political interests involved.

⁷ Council Decision of 29 July 1991 on the introduction of a single European emergency call number (91/396/EEC; OJ L217/31, 06.08.91)

- A Europe-wide access code for international dialling (00) to be introduced between 1992 and 1998⁸.

A clear role for national regulatory authorities

The basic principles governing numbering and number allocation were examined in the 1994 Mobile Green Paper⁹ and in the 1995 Infrastructure Green Paper¹⁰ and attracted wide comment and support¹¹. These positions have now been incorporated into the emerging regulatory framework for a liberalised telecommunications environment.

- Member States must separate operational and regulatory activities in the area of numbering. National numbering plans must be controlled by the National Regulatory Authority and adequate details of them must be published at a national level.
- Additionally, obligations have been placed on Member States or proposed to ensure that :
 - adequate numbers are available for all telecommunications services (by 1 July 1997)¹².
 - numbers are allocated in an objective, non-discriminatory, proportionate and transparent manner and on the basis of individual applications by operators or service providers¹³.
 - adequate numbering ranges are available for all publicly available telecommunications services; and that "number portability" (i.e. the possibility of a user to retain his/her telephone number when changing telephone company at a particular location) is introduced within the fixed network as early as possible and at least in all major centres of population by 1 January 2003 at the latest¹⁴.

⁸ Council Decision of 11 May 1992 on the introduction of a standard international telephone access code in the Community (92/264/EEC; OJ L137/21, 20.05.92)

⁹ Towards the Personal Communications Environment : Green Paper on a common approach in the field of mobile and personal communications in the European Union, COM (94) 145 final, 27.4.94

¹⁰ Green Paper on the liberalisation of telecommunications infrastructure and cable TV networks, Part II, A common approach to the provision of infrastructure for telecommunications in the European Union, COM(94) 682 final, 25.01.95

¹¹ See Commission Communication on the consultation on the Mobile Green Paper, COM(94) 492, 23.11.94 and Commission Communication on the consultation of the Green Paper on the liberalisation of telecommunications infrastructure and cable television networks, COM(95) 158, 3.5.95

¹² Commission Directive 96/19/EC of 13 March 1996 amending Directive 90/388/EEC with regard to the implementation of full competition in telecommunications markets, OJ L 74/13, 22.3.96

¹³ Directive 95/62/EC of the European Parliament and of the Council of 13 December 1995 on the application of open network provision (ONP) to voice telephony, OJ L 321/6, 31.12.95

¹⁴ Common Position (EC) No 34/96 adopted by the Council on 18 June 1996 with a view to adopting a European Parliament and Council Directive on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP), in particular Articles 6, 9 and 12, OJ 96/C 220/03, 29.7.96

Establishing a framework extending beyond the European Community for co-operation on numbering.

- In 1992 the Council set the establishment of a European Telephony Numbering Space as a major goal and called on Member States to work within the CEPT to develop a framework for numbering co-ordination involving the European Commission¹⁵.
- In 1994 the Commission signed a Memorandum of Understanding with the European Committee of Telecommunications Regulatory Authorities (ECTRA), together with a Framework Contract for the European Telecommunications Office (ETO) with the aim of part-financing studies and working groups, involving representatives from 43 European countries, on a wide range of numbering issues. Studies carried out for the Commission on the subject of numbering are listed in Annex VI.
- In 1994 a European Numbering Forum (ENF) was created in order to involve all interested parties in the evolution of numbering policy within Europe. The ENF, which is open to any European organisation having an interest in numbering or addressing¹⁶, prepares opinions, recommendations and reports for both the Community and for ECTRA.
- With regard to numbering activity at a regional and global level, considerable effort is devoted by the Commission in promoting common European positions (within ECTRA), which can then form the basis for negotiations within the ITU and other fora.

Towards a European Telephony Numbering Environment

The 1992 Council Resolution, invited the Member States to start work in the context of ECTRA on the establishment of a European Telephony Numbering Space (ETNS) i.e. a numbering space for parallel implementation to the existing national numbering schemes. A market-oriented study identified demand for pan-European numbered services¹⁷. A later study by ETO concluded that an ETNS would provide Europe with the vital flexibility required to implement pan-European services and necessary to ensure Europe's future competitiveness on the world scene¹⁸.

ECTRA defined an evolutionary strategy for progression from today's numbering environment towards an open and unified numbering environment with a clear

¹⁵ Council Resolution of 19 November 1992 on the promotion of Europe-wide co-operation on numbering of telecommunications services (92/C 318/02; OJ C318/2, 04.12.92)

¹⁶ The following bodies are member of the ENF: the European Public Telecommunications Network Operators' Association (ETNO), the European Telecommunications Standards Institute (ETSI), the European Information Industry Association (EIIA), the European Telecommunications Manufacturers Association (ECTEL), the European Computer Manufacturers Association (ECMA), the GSM MoU European Interest Group (EIG), ECTRA and the European Commission. Further applications for membership are expected.

¹⁷ *Potential Opportunities Afforded by a New European Telephony Numbering Space*, Final Report, Mary Ann O'Loughlin and Stuart Sharrock marketing consultants, 20 April 1994.

¹⁸ *Preparation of submission to ITU requesting a virtual country code for the implementation of a numbering space for special services of pan-European nature*, ETO, 31 March 1995

European identity¹⁹ and launched a broad consultation of participating numbering administrations and the European Numbering Forum (see Annex I). Four options were proposed:

- Option 1 : Maintaining the current situation.
- Option 2 : Implementing an ETNS for special services (e.g. freephone, premium rate and/or shared cost services)
- Option 3 : Creation, in addition to providing numbers for special services, of a clear European numbering identity (three digit numbering codes) by using the number "3" to precede current national country codes (e.g. "333" for France or "344" for the UK). This would liberate up to 50 new country codes within Europe and allow the current codes starting with number "4" to be recycled within the world-wide numbering plan.
- Option 4 : Creation of a single digit country code for Europe, (similar to the use of "1" to call North America from other parts of the world or "1" + the local area code to call long-distance within North America) within a unified European numbering scheme, which would over time merge with national schemes.

The consultation²⁰ showed that whilst Option 1 was widely rejected and there was support for rapid progress on Option 2, there was a clear split of opinion between incumbent operators and new market players with regard to the need for rapid progress on Options 3 and 4²¹.

II.3 But key regulatory decisions are increasingly urgent

Whilst progress has been made, further action is required at a European level to respond to new market developments resulting from the ongoing liberalisation process whilst ensuring an adequate protection of the customer interests.

Responding to user and market needs

Numbering schemes must be *opened for competition*, if users are to have a real choice as to who provides them with service. Even the efforts to ensure independent allocation and management of numbering will be of limited benefit, if the regulator is working with a numbering scheme designed for a monopoly environment. New entrants must be able to obtain equal quality numbers for example through dialling parity²². Carrier selection and number portability are considered essential to allow customers to choose their long-distance carrier or retain their number if they wish to change operator and make the best choice in

¹⁹ Strategic options for numbering of telecommunications services in Europe, ECTRA PT N, 27 July 1994

²⁰ Report on the consultation on strategic options for numbering of telecommunications services in Europe, by ECTRA PT N, 10 July 1995

²¹ This split of opinion was confirmed by the contributions received on the consultation on the Green Paper on the liberalisation of telecommunications infrastructure and cable TV networks, COM(94) 682, 25.01.95

²² dialling parity exist when the same number of digits have to be dialled for access to services of competing operators

service, service quality and price. Besides the direct benefits of price savings, this is expected to bring large indirect benefits to society and economy.

Numbering will be a key facilitator for *the completion of the internal market* for telecommunications networks and services, and, in particular, for take off of new pan-European services²³ (such as Europe-wide freephone services, tele-shopping, easy access to road-side emergency, transport or tourism information), based on single Europe-wide numbers. It will give European business better opportunities to take advantage of the Information Society, and strengthen Europe's telecommunications industry as it competes in a more open World market.

In a multi-operator environment and in a Europe, where more and more people are travelling, working and living in different parts of the Union, expectations are raised that use of the telephone should be simple and user-friendly. Furthermore, users expect the numbers they dial to give some indication of price (e.g. international, long-distance, mobile or premium-rate tariffs are today readily identifiable from the numbers, even if there is a confusing variation from country to country). A new approach to numbering at a European level may present an opportunity to meet these concerns through the *harmonisation of dialling arrangements* across Europe, providing this can be justified on the basis of demand, the level of network developments and the costs involved.

If Europe wishes to reap the full benefits of the liberalised internal market, it will need a numbering environment that can fully accommodate present and future requirements. This may involve major restructuring of national numbering plans, but such changes are proceeding today at national level in any event and they are not always part of a clear long-term strategy reflecting the reality of a Europe-wide market.

Users and the telecommunications industry demand a clear picture of the future numbering landscape. This involves not only the numbers and technical facilities linked to those numbers, but who will be taking the decisions on numbering and, in the context of promoting pan-European services based on Europe-wide numbers, how the tasks of operating and managing a European Telephony Numbering Space can be split.

Finally, the changes which this Paper envisages, if not adequately managed, could be costly, disruptive and unpopular²⁴. This means that the Paper must focus not only on the decisions to be taken, but the way in which the implementation of numbering decisions will be managed and the timescale within which the targets set out in this Paper can be reached. The long lead times involved in restructuring the number format (e.g. for carrier selection) means that the need for decisions is seen by operators, service providers and equipment manufacturers as urgent.

²³ The introduction in the Union of carrier selection for international and long-distance trunk traffic would put some 40 - 50 billion ECU per year of telecommunications revenues at stake; the opening of a freephone market would lead to incremental revenues as high as 4 to 5 billion ECU per year; see *The harmonised European telephone services market: the economic stakes and the need for numbering solutions*, Sagatel, Paris, March 1996.

²⁴ One example, is that the cost of changing switchboards and other customer equipment related to a major numberplan change in Germany has been estimated at around 3000 man-years of effort. See *Private Network Perspective on the Cost of Number Changes*, ECMA, 4 March 1996

At the same time, numbering changes have already been undertaken at a national level and those changes may themselves need to be adapted to decisions taken at a European or global level. Only a co-ordinated approach to numbering reform can minimise this disruption. This means that Member States should avoid unnecessary changes pending the emergence of a long-term European strategy for numbering.

Furthermore, users must be closely involved in the formulation of a long-term numbering strategy for Europe, and, where changes are necessary, a proper assessment must be made of both the costs involved and the benefits which will follow for both business and consumers.

Responding to the political mandate for change

The issues of user and market need identified above, find a parallel in the political framework for the changes which this Paper proposes. In three specific areas, work remains to be done to fulfil the political objectives identified by Council and the European Parliament over the last three years in the numbering area. These can be summarised as

- *Completing the telecoms regulatory framework for full liberalisation in 1998²⁵ and consulting on the future regulatory framework required to ensure an efficient management of numbers (i.e. to ensure fair competition and equitable treatment for the various market players²⁶),*

This goes beyond the framework introduced by the ONP Voice Telephony Directive²⁷, the proposed Interconnection Directive²⁸, the proposed Licensing Directive²⁹ and the Full Competition Directive³⁰, whose provisions on

²⁵ Council Resolution 93/C213/01 on the review of the situation of the telecommunications sector and the need for further development in that market, OJ C 213, 6.8.1993, p.1

²⁶ Council Resolution on the implementation of the future regulatory framework for telecommunications, OJ 95/C 258/01, 18.09.95

²⁷ Directive 95/62/EC of the European Parliament and of the Council of 13 December 1995 on the application of open network provision (ONP) to voice telephony, OJ L321, 31.12.95 and; Proposal for a European Parliament and Council Directive on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment (replacing 95/62/EC), COM(96) 419, 11 September 1996, OJ ... to be published

²⁸ Common Position (EC) No 34/96 adopted by the Council on 18 June 1996 with a view to adopting a European Parliament and Council Directive on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP), in particular Articles 6, 9 and 12, OJ 96/C 220/13, 29.7.96

²⁹ Common Position adopted by the Council of 27 September 1996 with a view to adopting a European Parliament and Council Directive on a common framework for general authorizations and individual licenses in the field of telecommunications services, to be published shortly, proposal ref: COM(95) 545 final, Brussels, 14.11.1995. Within the current framework, the granting of numbers can be implemented through general authorisations or individual licenses, conditions and procedures must be transparent and non-discriminatory, time limits are imposed on Member States and fees can be charged. The reasons for limiting the number of individual licenses (only to the use of radio frequencies was a limitation in the Commission's initial proposal) have been extended to numbering, but only on a temporary basis and subject to compliance with applicable Community law, which *inter alia* refers to Commission Directive 96/19/EC (OJ L 74/13, 22.3.96)

³⁰ Commission Directive 96/19/EC of 13 March 1996 amending Directive 90/388/EEC with regard to the implementation of full competition in telecommunications markets, OJ 22.3.96

numbering were outlined above, but to look beyond 1998 to the numbering challenges in a multi-operator environment.

- *Facilitating the rapid introduction of pan-European services based on the European Telephony Numbering Space (ETNS)*³¹,

This proposal was linked to the completion of additional studies. These studies have shown an identified demand for pan-European services. Technical studies on the implementation are underway and will be concluded in the mid of 1997. In the light of that work, this Paper makes proposals in relation to both the numbers themselves and the framework for their future management and control.

- *Establishing clear schedules for numbering for mobile and personal communications,*

Following the consultation on the Mobile Green Paper³², the political discussions in the Council³³ and the European Parliament³⁴ resulted in a call for action in this field.

³¹ Council Resolution of 19 November 1992 on the promotion of Europe-wide cooperation on numbering of telecommunications services (OJ 92/C 318/02)

³² Towards the Personal Communications Environment: Green Paper on a common approach in the field of mobile and personal communications in the European Union, COM(94)145 final, 27.04.1994

³³ Council Resolution of 29 June 1995 on the further development of mobile and personal communications in the European Union (OJ 95/C 188/02)

³⁴ European Parliament Resolution on the further development of mobile and personal communications in the European Union, A4-0097/95; OJ C 151/473, 19.06.95

III THE KEY TASKS FOR A EUROPEAN NUMBERING POLICY

In responding to the future needs of the market and the European customers, the following key tasks can be identified for a European numbering policy:

KEY ISSUES FOR A NUMBERING POLICY WITHIN THE EUROPEAN UNION

I The role of numbering in ensuring effective competition, and in particular:

- Carrier selection.
- Number portability.
- Restructuring of national numbering plans to foster competition and the role of national regulatory authorities in ensuring adequate numbers are available.

II Facilitating the single market and, in particular:

- The creation of a European Telephony Numbering Space,
and within that the need for common access codes for pan-European services (such as freephone, shared cost, premium rate or mobile network services).
- The need for European numbering to be administered by an appropriate administrative structure at a European level

III Adapting Europe's numbering environment to the needs of the Information Society, and, in particular:

- The creation of a long term numbering plan for Europe
- Naming and addressing in the Internet and other emerging multi-media and on line services.

III.1 Regulatory evolution: "making competition effective"

For competition to be effective, users must be able to choose easily between the services of competing carriers. This principle of open access is likely to impact all current numbering arrangements. In practice, it is likely to mean, for example :

- the use of specific short codes for access to directory enquiries or to different long-distance carriers;
- the need for operators and service providers to have "fully open" access to numbering ranges for services such as freephone; or
- the ability for subscribers to take their existing numbers with them when they change operators or service provider (portability of numbers between operators).

Competing service providers, both those providing telecommunications services and those providing services employing telecommunications for access, will be concerned not only with the quantity of numbers they are allocated, but also with their "quality". This may, for example, involve numbers that are easy to learn,

remember or subjectively pleasing or the user recognition of the meanings of certain codes e.g. for appropriate access branding (identification). These service providers must therefore also be given equal access to numbers. This concept must pervade the development of numbering schemes and the allocation of numbers.

Under the framework contract between the Commission and ETO, ETO has carried out two numbering studies in this area³⁵. Under a new work order from the Commission, ETO will turn the outcome of these studies into Numbering Conventions which establish an important policy baseline for Numbering Administrations and provide common rules, for example, on the rights associated with numbers and the procedures for allocating them.

III.2 Economic evolution: creating an internal market for special services

A recent study for the Commission³⁶ and the work by ECTRA outlined above show that there is a strong demand for the development of a range of special Europe-wide services, such as freephone services, shared revenue or premium rate services, calling card/country direct services and, emerging service areas such as shared cost services. This would allow goods and services to be offered Europe-wide on the basis of a single number, offering the businesses using such numbers significant cost savings in their marketing and advertising costs, whilst stimulating further the growth in cross-border provision of goods and services and stimulating employment in these sectors, often in the Unions less favoured regions³⁷. It would lead to a significant increase in European telephone traffic offering potentially significant cost-reductions for the telecommunications industry.

The study for Commission also concluded that common Europe-wide access codes within a European numbering space would provide Europe with the vital flexibility to meet future service requirements while responding to a clear demand from today's market. Moreover, that it would provide nascent market sectors with the opportunity to develop regional services with a truly European identity.

Thus, the establishment of a European numbering space would provide the flexibility to meet the future demands of the internal market for special telecommunications services , offering both business and consumers greater

³⁵ Under a study on non-discriminatory access to numbering resources, ETO investigated issues such as the allocation and rights of use of numbers, number ownership, tradability of numbers, non-discriminatory access to directory services and the allocation of data network identification codes (DNICs/PNICs). Another study on numbering related to the topic of user-friendliness aimed at defining structured and logical dialling arrangements for future service access codes across Europe. It also involved the harmonised alpha-numeric keypad in Europe to allow for re-introduction of alpha-numeric dialling in the future. The final reports will be delivered to the Commission in the course of 1996 and will contain the ECTRA approved findings and proposals as well as any comments individual ECTRA members may have on these issues.

³⁶ *Potential Opportunities Afforded by a New European Telephony Numbering Space*, Final Report, Mary Ann O'Loughlin and Stuart Sharrock marketing consultants, 20 April 1994. Comments were invited from network operators, managed service bureaux and information service providers throughout Europe.

³⁷ One example, is that of Call Centres located in one Member State, handling tele-sales from all over Europe or offering 'help desk' services within the computer and software industries. More than 6000 companies in a wide range of industries now have service "call centres" to provide information to customers (many on a pan-European basis). These employ around 130,000 Europeans and are expected to generate another 100,000 jobs by 2000. The development of these facilities has been strongest in Ireland. Source KPMG 1996.

choice and reduced costs³⁸. European service providers would benefit from economies of scope and scale, which should in turn be passed on to customers in terms of lower prices and greater innovation. Moreover, it would put European service providers in a better position to prepare themselves for global services competition and create a more outward-looking focus on emerging markets.

III.3 Technological evolution: promoting innovation

Numbering must *facilitate* the combination of different types of telecommunications services based on a mixture of technologies and standards, (such as a single subscription offering the user mobile and fixed network services) instead of requiring a different telephone number to be associated with each of the systems. At present, users are allocated numbers which are country, network and operator specific. In the future however, users may wish to have numbers which are independent of network or service provider, service type, location and terminal equipment. In other words, users should have *personal numbers* which are allocated to the user rather than to the network.

Such personal numbers would allow a user to be contacted in his or her office, home, car or whilst "roaming" anywhere in Europe or beyond. The customer would rarely know or care whether the communication was being passed via a mobile, satellite or fixed network (i.e. the PSTN/ISDN), but would benefit from the ability to stay in touch, whilst being receiving service and being billed from a single point of contact.

New combined technology concepts have already been introduced such as the "follow me" functionality or are on the horizon such as the concept of *personal communications* which is being build on the massive growth of mobile and personal communications. Given the ability of such new concepts to combine numbering borders, both in terms of different numbers associated with different technologies and in terms of geographical boundaries set by national numbering plans into single combinations solutions, they require a unique numbering solution at a regional and global level.

III.4 Evolution of numbering from the customer's perspective: need for harmonisation

In the emerging liberalised environment, users have a right to expect that more choice does not simply mean longer and more complex numbers. Here regulatory intervention may be justifiable in order to overcome the risk that commercial pressures lead to users facing a diverse set of new access codes and different number structures for identical services, fragmented on the basis of national borders or any particular group of countries or even individual operators³⁹.

³⁸ In principle, pan-European services could also be numbered from within global numbering resources where available (e.g. global freephone or 800). In question here are the perceived threat of US dominance with a global approach, the speed of implementation of different solutions, the flexibility to respond to as yet unknown future requirements and the possibility to accommodate special numbers unique to Europe. Further, regional and global numbering solutions may live alongside each other with the possibilities for a graceful migration from one to the other.

³⁹ In this respect, commercial operators have recently called in ITU-T Study Group-2 for the allocation of special country codes to network/network operators to open up access possibilities and allow for "Telco branding" of their services on a global level. Apart from the fact that this would conflict with the aim of portability and could result in an inefficient utilisation of numbering resources as

Beyond action to harmonise certain access codes for specific services, as well as number structures, both consumers and business should be able to benefit from so-called "alpha-numeric" dialling. This facility, which was once common in Europe, and which has taken on a significant role in the US freephone market, allows users to make calls on the basis of more easily remembered names or words, rather than numbers.

For alpha-numeric dialling to take off once again in Europe, the keypads on telephone handsets must be harmonised, so that the same letters are assigned to the same numbers on every telephone. At present different assignments are in use within Europe, therefore agreement on just one format for the alpha-numeric keypad would form a first important step⁴⁰.

III.5 European numbering: a continuum between national and global numbering

global versus European numbering solutions

Preparations are underway in the ITU-T to open global service codes for the Universal International Freephone Service (UIFS or global freephone) and for Universal Personal Telecommunications (UPT). There is a tendency to assume that business and users will prefer these global solutions and that consequently the demand for European-wide numbers will be of a much lower order. The Commission considers that that view is incorrect.

Firstly, ITU-T Recommendations offer a relatively weak enforcement mechanism which, when the competitive impact of a UIFS becomes fully clear, may be insufficient to ensure that a true pan-European freephone market emerges. As such, the UIFS will provide merely a framework for commercial agreement where the best we can hope for are fragmented service offerings negotiated between individual operators on a bilateral basis.

Secondly, the extent to which specific Europe-wide numbers may be required should not be underestimated. The internal market presents opportunities for services providers that do not exist at the national level. European service providers have tended to identify specific European, rather than global, market opportunities⁴¹, in terms of information and entertainment services through to product marketing and promotion to direct response and teleshopping services⁴². Although many products are available world-wide, their sales, marketing and

network/network operator codes would start to compete with general service codes, Telco branding seems contradictory to basic customer needs such as an understandable numbering scheme that allows them to get a broad indication of service and charge before they make a call. The growing power of commercial forces in ITU-T raises also fundamental questions about objectivity, transparency and a possible bypass of national regulations.

⁴⁰ The harmonisation of keypads is currently under discussion in ECTRA. In parallel, ACTE is looking into this matter. It is thought to be unlikely that a harmonised keypad could be considered to be covered by the Terminal Directive 91/263 (OJ L128/1, 23.05.91). However, ACTE believes that harmonisation is desirable and the matter is due to be discussed further.

⁴¹ See, *Potential Opportunities Afforded by a New European Telephony Numbering Space, Final Report*, Mary Ann O'Loughlin and Stuart Sharrock marketing consultants, 20 April 1994.

⁴² Teleshopping in this context means all new forms of teleshopping in the broad sense including those meant by the Council Common Position of 8 July 1996 with a view to adopting a Directive amending Directive 89/552/EEC of 3 October 1989 "Television without Frontiers" as well as other new forms of teleshopping through interactive tele-services

customer support activities are usually organised on a regional basis for cultural, linguistic and logistical reasons, so there are not necessarily significant cost benefits to be associated with a global rather than a regional freephone number. In the end, multi-nationals may well make their decision based on an assessment of whichever numbers are made available in a timely and consistent manner within the region within which they operate.

Thirdly, global developments do not address latent demands for Europe-wide services such as a premium rate and shared cost services.

Fourthly and perhaps most importantly, the pace of the liberalisation in the Europe Union is progressing more rapidly than in many other parts of the World. Current work in the ITU must inevitably take account of both the more rapid progress towards liberalisation in certain countries and the slower progress in others. It is doubtful whether the ITU will be able to produce the type of open numbering environment that Europe requires to fully accommodate the needs of the liberalised sector⁴³. Indeed, such an environment would pose significant competitive threats to national operators in those countries where liberalisation is not so advanced. The European Union cannot wait for ITU developments, but must take its own initiatives in this field.

a European dimension to national numbering

As Member States prepare for a competitive environment and also respond to the tremendous growth in the telecommunications lines and traffic, they are preparing (or in some cases have already undertaken) extensive changes to their national numbering schemes to cope with future demands. Urgent agreement on the policy objectives and direction for European numbering is of critical importance if these national decisions are to take into account the needs of the internal market and the framework provided by the Community's regulatory policy. The risk for businesses and users is that national numbering schemes will need change again, if reform is planned in isolation, leading to additional costs and dissatisfaction.

some control over numbering at the European level is imperative

Although the Commission is supportive of global numbering efforts and recognises that these global numbering efforts may provide numbering solutions for global businesses such as Internet, it takes the position that in order to accommodate the requirements of both a liberalised market and the development of pan-European services, not only must a common strategy for numbering in Europe be developed, but the administration and management of certain aspects of that strategy must be co-ordinated at a European level.

Here, the current discussions in ITU-T are not encouraging. Discussions on Recommendation E.190 (governing the criteria for allocation of country codes) and Recommendation E.164 (procedures and criteria for country code allocation) have so far not resulted in an "open" mechanism which would allow the set up of regional (read European) numbering entities.

⁴³ Note, for instance, that ITU-T is not yet close to agreeing on the introduction of carrier selection mechanisms

The Commission believes that European Administrations and market players should recognise the value of a regional numbering scheme and ensure that new ITU-T proposals do not exclude such a development possibility.

Further, with the rapidly growing importance of computer network services such as Internet and other innovative multi-media and on-line services, any long term European approach to numbering and addressing should be extended into that domain as well.

IV PROPOSALS FOR ACTION

A clear policy on numbering at a European Union level will need to respond to the future needs of the citizens and businesses in the Union. Moreover, it will need to create the *legal certainty needed for investment and innovation, whilst providing safeguards for a fair and open competitive environment* and will need to ensure that the *internal market for special telecommunications services* such as Europe-wide freephone can and does emerge on the basis of easy, user-friendly access across Europe.

The Commission does not believe that, in the absence of a clear and predictable regulatory framework, market forces on their own are enough to guarantee the emergence of an open numbering environment. At the same time, the sufficiency of the current ECTRA⁴⁴ and ITU-T mechanisms to create an open numbering environment, capable of accommodating the needs of the post-1998 liberalised market within the necessary timescale is in question.

The Commission seeks the views of the sector on this. Comments are invited on both the general approach and on the specific elements detailed hereafter.

IV.1 Ensuring effective competition

Carrier selection

The implementation of full competition will lead to the replacement of current traffic handling arrangements based on correspondent relationships between national network operators by new relationships between specialised regional and global long-distance operators, with lower costs due to higher traffic volumes and strategic partnerships. Such operators will be entitled to sufficient access numbers in each Member State from 1 January 1998 on. This should result in cost-savings which can be passed on to customers in the form of lower tariffs. Simple dialling codes to access those long-distance carriers are essential if users are to benefit from these lower prices.

Moreover, by encouraging users to choose between long-distance carriers, the development of regional operators within Europe will be encouraged, potentially offering further improvements in price and quality of service, and at the same time, promoting services with a global reach.

⁴⁴ Whilst ECTRA and the ETO has provided a vital forum for pan-European discussion of numbering issues, as well as an increasing centre of numbering expertise, ECTRA has no mechanism with which to enforce the implementation of the decisions which its members take, nor a judicial body which can interpret the resulting commitments taken in the case of disputes as to their scope of application. Moreover, the majority of ECTRA members are in a very premature stage of their liberalisation programmes and have indicated that they are not yet ready to open their markets, and hence, unlikely to need or welcome the type of reform which the internal market and the goal of full liberalisation now requires.

The introduction of long-distance carrier selection potentially offers large direct and indirect benefits to consumers, business and the telecommunications industry. The cost of introducing carrier selection is relatively small if compared with the benefits that can be derived. Carrier selection can be introduced through a gradual staged approach. Annex II sets out three main options:

- The default long-distance carriers is determined by the local access provider (often the same company), with the possibility of the user over-riding that choice on a call by call basis.
- Carrier pre-selection by the user with the possibility of a call by call over-ride.
- Assignment of carrier selection codes for all calls (including to access the long-distance network of the local carrier). *This last option would actually make dialling more complex for users and therefore does not seem desirable.*

Estimates suggest that the introduction of carrier selection could substantially assist users to benefit from annual savings of between 20 and 25 Billion ECU on long-distance call charges in the Community which competition is bringing about⁴⁵. Estimates of the cost of these changes to the telecoms industry vary, but the Commission believes that a figure of around 2 Billion ECU over a ten year period may be a reasonable estimate.

Carrier selection is essential, if fair and non-discriminatory competitive conditions are to be created, in line with the Community's regulatory framework. Technical and organisational measures will be required to ensure equal access is implemented in exchanges, whilst the assignment and management of carrier identifications codes must be carried out at a European level and will require *inter alia* a European management body.

Member States should introduce carrier selection, starting in 1998 with a solution where the local operator sets the default long-distance carrier with a carrier selection override by the customer and moving towards a pre-selection by the user with override by the year 2000.

A range of regulatory issues stand out, for instance, on how to implement pre-selection and who has a right to or qualifies for pre-selection, given that short codes are a scarce resource. Another issue is whether an obligation to provide pre-selection should apply to all operators or only to those with "market power"; and for international traffic only or for all long-distance traffic. Billing is another equally significant issue with significant customer implications. **The Commission seeks views and opinions on these and any other issues related to the introduction of carrier selection in the Union.**

Number portability

Subscribers attach a high value to their number. Polls have indicated that some 80 - 90 percent of business customers would not consider switching operators if they can not take their number with them.

⁴⁵ Such estimates are based on decreases of between 40 and 50% in current tariff rates, whilst resulting traffic growth - judging by experience in markets such as the USA or Finland - could substantially offset the potential loss of revenue to operators.

Number portability allows subscribers to retain their number when they decide to switch operators. Number portability thus is an important pre-requisite, if users are to be able to choose from whom they obtain telecommunications services and if competition is to become genuinely effective. As identified in Annex III below, number portability can in fact relate to three issues :

- *Location portability* : the ability of the user to keep a number, when changing location either in same exchange area or anywhere in a Member State ;
- *Service portability* : the ability to keep a number when changing to a different service in the same service area, (e.g. the user keeps his or her PSTN number when taking a subscription to an ISDN service, though it is actually provided via a different exchange in the same areas), and
- *Service provider portability* : the ability for a user to keep a number when changing operators at the same location, or within the same exchange area.

Within the European Union a first priority must be to promote service provider portability within the local calling area. As indicated in Annex III, the economic and customer benefits derived from the introduction of number portability in the local loop far outweigh the costs.

Member States should ensure that, where technical restrictions would still prohibit local loop operator portability, all necessary measures are taken to remove these as soon as possible, and at the latest that number portability is available in major centres of population by 1 January 2000⁴⁶.

Analysis also shows that number portability for mobile services and for non-geographical services such as freephone (e.g. to allow customers to take their golden numbers) should be considered as a matter of urgency and is critical for creating equal conditions for access and opportunity for new entrants.

Member States should ensure that any technical restrictions that still prohibit number portability for mobile and personal communications services as well as non-geographic services are removed as quickly as possible, and at the latest that number portability is available by 1 January 2000.

The Commission invites comments on the importance of number portability and the desired timing for its introduction for the different categories of services, as well as on the impact that such a requirement might have on entry into a competitive market. The Commission also invites comments on the allocation of costs involved (administrative, set up and additional conveyance costs). Further, comments are sought on the long term solution and any migration strategies that could be followed.

Restructuring national numbering schemes

⁴⁶ The proposed Directive on interconnection (Common Position EC No 34/96, OJ 96/C 220/03, 29.7.96) requires this measure to be realised before 1 January 2003. In the view of the accelerating liberalisation process and the recognition of number portability as a key factor for opening up local markets to competition, the need of anticipating that date must be seriously considered. This Green Paper requests comments from the sector.

Today, national numbering schemes which were conceived in a monopoly environment often limit the possibilities for new market entrants, both on the local or retail level and on the carrier/service provider level. Competition in local operation or service retailing requires fair and equal access to end-user numbers which may already have a high level of consumer recognition. Services with well-known "branding", notably national freephone, shared cost and premium rate services but also mobile services should be made available to all competing operators and service providers. This principle of open access is in addition to the issue of equal access outlined above.

In view of the 1998 date for full liberalisation of telecommunications services and the pivotal role that national numbering schemes play in enabling competition, there is an urgent need to open up national numbering schemes to competition. It is expected that this will require adaptation of most if not all national numbering schemes.

The Commission's approach to numbering encompasses a phased approach. In the first stage, and before 1 July 1997, except as regards those Member States which were granted additional implementation periods under Directive 96/19/EC, adequate numbers must be made available to allow in particular new entrants to provide voice telephony to the public⁴⁷. In a second stage, the national schemes should be reviewed towards further integration of the national numbering plans.

Independently from the adoption of the national numbering schemes in order to ensure that adequate numbers are available by 1 July 1997, the Commission will produce common guidelines, on the basis of work done by ETO, for use by national regulatory authorities with a view to ensure the further development of the national numbering schemes in a balanced manner across the EU and to build-in a convergence aim towards a more unified numbering environment⁴⁸.

After the completion of the technical work by ETO, Member States should start adapting their national numbering schemes according to the agreed common guidelines and complete this process by the year 2000. In the meantime and in order not to jeopardise a future European approach, Member States should not allocate numbers beyond the length of 13 digits⁴⁹.

The Commission invites comments on the characteristics desirable for the national numbering schemes (e.g. dialling parity, flexibility to meet future demand, facilitate market development and innovation, user-friendliness, options for branding and supply of "golden numbers", perceived relationship between number and geographic location, number structure and need for consistency of number length, local dialling and tariffing information), and on the relative importance of the various characteristics.

⁴⁷ Commission Directive 96/19/EC (OJ L 74/13, 22.3.96) requires that Member States ensure the availability of *adequate* numbers for all telecommunications services by 1 July 1997

⁴⁸ Convergence is required for example for short codes e.g. carrier selection codes at the European level. Moreover, consideration should be given to the need for harmonising the access codes to special services such as freephone (e.g. 800), premium rate (e.g. 900) and personal communications services and UPT (e.g. 500 or 700).

⁴⁹ the number length includes the country code but excludes the international prefix or carrier selection prefix

IV.2 Facilitating a single market

Establishment of a European Telephony Numbering Space (ETNS)

A Universal International Freephone Service (UIFS)⁵⁰ has been agreed in the ITU-T and will be introduced in 1997⁵¹. However, the Commission does not believe that the UIFS can be considered the platform that will create a seamless Europe-wide blanket for special services. Firstly, under ITU rules, service offerings under the UIFS will be subject to commercial negotiation between individual operators and are likely to result in fragmented service offerings. Secondly, the UIFS does not address any other needs of the internal market than freephone.

The establishment of an ETNS, as was recently decided upon by ECTRA, would allow for the implementation of special pan-European services such as freephone, shared cost and shared revenue services numbered from a Europe-wide numbering space. Moreover, the emergence of Personal Communications Services (PCS) could be facilitated by the availability of a European numbering solution⁵² to support the combination of different services and technologies via a single service platform (see Annex IV).

A well developed internal market for special services would create new business opportunities within telecommunications, develop the internal market for goods and services and stimulate employment. As indicated in Annex I strong net-benefits can be derived from the introduction of a pan-European numbering environment. Estimates prepared for the European Commission⁵³ suggest on the basis of experience in the USA that the market for freephone and shared revenue services could be as much as 4.6 Billion ECU by 2003 (compared with a freephone market today of around half a Billion ECU) where introduction cost is believed to be small⁵⁴. The Commission also believes that a vibrant home market will allow European

⁵⁰ Freephone allows the freephone operator to establish a direct relationship between himself and the customer. Within a global scheme such as a UIFS, the customer may be anywhere in the World. The freephone operator collects the charges from the organisation using the freephone number. This control over the revenue stream gives the freephone operator a strong bargaining position in relation to local network operators in the countries where the calls originated.

⁵¹ The freephone market has developed much further in North America than in Europe. In the US, freephone is a US\$ 10 billion market, the European market is only a few percent of that. Estimates suggest that around 40% of peak rate long-distance traffic in the United States is attributable to 'toll-free' calls, in comparison with 20% in Canada and less than 1% in Europe. One reason for the success of freephone in the United States has been the requirement for freephone numbers to be fully portable since 1993. It is commonly believed that this global freephone platform offers great commercial opportunities to operators in markets where competition is well developed and scale-economies exist such as in the US.

⁵² The recently created UMTS Forum will address the numbering of PCS. The issue is further supported by an ETO study that has been contracted under the framework contract with the Commission. It is proposed that, in line with the current agenda of the UMTS Forum and after completion of the ETO study on the numbering of PCS, the Commission will come by the end of 1997 with proposals for a regulatory framework for UMTS which will, besides important licensing and frequency matters, have to include proposals for the numbering of PCS in Europe.

⁵³ *The harmonised European telephone services market: the economic stakes and the need for numbering solutions*, Sagatel, Paris, March 1996; and *Potential Opportunities Afforded by a New European Telephony Numbering Space*, Mary Ann O'Loughlin and Stuart Sharrock marketing consultants, 20 April 1994.

⁵⁴ see for instance ETNO common position on the ECTRA exercise of consultation regarding European numbering, ETNO, 18 March 1995

businesses to increase their share of the emerging global market for telecommunications services.

Member States should take the necessary steps to ensure that a European Telephony Numbering Space (ETNS) is implemented following the completion of current ECTRA and ETSI work and at the latest by 1 January 1998.

Rapid creation of an ETNS could require adoption of a Resolution by the Council and the European Parliament inviting the Member States to support, *inter alia*, a request to the ITU for the allocation a regional code number.

The Commission invites comments on the necessity and desired characteristics of the European Telephony Numbering Space and on the timetable of its introduction.

Private and corporate networks

The development of the market will lead increasingly to so-called network-network attachment scenario's, where private networks (e.g. Corporate Networks, VPNs, LANs, Campus networks, CityInformationHighways) are connected to the public network base with new service features introduced such as Direct-Dialling-In (DDI).

These networks also serve an important economic function. A recent study for the Commission⁵⁵ argued that it is critical to develop corporate networks as efficient telecommunications solutions for the Small and Medium size Enterprises (SMEs) as they are the lifeblood of the European economy with a total of 12.9 million businesses and about 60 million people employed⁵⁶. SMEs should be able to easily establish corporate networks and closed user groups with pan-European or even global reach to meet their evolving business requirements.

The handling of calls to and from private or corporate networks may be facilitated by special service codes to indicate to the public network that the call needs special treatment and routing. Under the framework contract with the Commission, ETO will, with the technical support of ETSI and taking into account the requirements of global corporate networks, carry out a study on the numbering requirements of private and corporate networks and -if a need is found- propose harmonised procedures for the Europe-wide access to private networks.

The Commission seeks comments on the importance of private and corporate networks and the need to develop European solutions.

Need for a new structure for regulation and administration of numbers

⁵⁵ The harmonised European telephone services market: the economic stakes and the need for numbering solutions, Sagatel, Paris, March 1996

⁵⁶ Compare this with the 13,000 large European businesses (>500 people) employing in total 15 million people. These businesses do often have efficient corporate networks provided by the dominant and global telecommunications operators.

Control of the numbering environment at the European level involves the development of an appropriate administrative structure⁵⁷ with at least the following functions being carried out at a European level :

- policy making,
- dispute resolution,
- maintenance of number data bases, and
- processing applications for pan-European numbers.

Bearing in mind the character of numbers as a scarce national or regional resource, any approach should accept the possibility of a commercial value being placed on particular numbering resources, as a means of encouraging their efficient use.

Several administrative models can be envisaged such as a single regulatory authority handling all functions or a model based around either a co-ordinating role assigned to a Numbering Committee, made up of national regulatory authorities or industry representatives (determining policy and resolving disputes with a pan-European dimension) while a separate administrator would maintain administrative number data bases and process applications for numbers.

With the growing importance of European numbering solutions, Europe must urgently address the administrative model it wants to put in place to guide policy and tackle basic regulatory issues. In view of the important role of numbering, Europe must also ensure that European interests are adequately promoted in ITU-T.

The European Union, in conjunction with ECTRA, should urgently develop and propose a new structure for regulation and administration of numbers in Europe by 1 January 1998 at the latest.

The Commission invites comments to the proposal for the development of such a new structure for the regulation and administration of number and its proposed timetable.

IV.3 Adapting to the Information Society

Long term European numbering plan

The long-term development of European numbering has been the subject of a study for the Commission⁵⁸. The study looked at ways for progressing towards a more unified numbering environment for Europe. On the basis of this study and on-going

⁵⁷ A study carried out for the Commission showed a general consensus amongst service providers and network operators that the administration of numbers in a European numbering environment should be the responsibility of an independent structure which must be located in Europe. Many players consulted emphasised that European concerns and commercial requirements differ from those of the USA and some expressed openly their fears that an inappropriate and under resourced administrative structure could give their US competitors an unfair advantage.

⁵⁸ Securing a stable and long term approach to European numbering, Coopers & Lybrand, April 1995

work in ECTRA/ETO⁵⁹, the Commission has prepared a reference scenario for progression towards an open and unified numbering environment (see Annex V).

When implemented, this new numbering environment would provide the necessary numbering capacity for new services and expected future demand. It would provide for harmonised access to pan-European services such as freephone, premium rate and shared cost services and personal communications services. It would provide harmonised prefixes and short codes for services such as carrier selection, VPN services and directory enquiry services. It would also provide a clear European identity when calling from outside Europe, for example:

European code	country code	national destination or service code and subscriber number (maximum)
3	49	XXX.XXX.XXX.XXX

European players, through co-ordination in the ENF, should line up their contributions to ITU-T with the European strategic plan and work towards the necessary degree of control of the numbering environment at the European level.

A long-term strategic plan for numbering in Europe should be developed by 1 January 1998; this should include the creation of a European country code ("3-XX) with transfer of responsibility of administration and management of the last two digits to Europe and a unified numbering environment by the year 2000.

The Commission invites comments on the necessity and desired characteristics of such a strategic plan and the proposed timetable for its development.

Naming in the Internet

The rapid growth of the Internet has produced strains in the system for allocation of Internet names and addresses. The Internet IP address (usually expressed in the form 158.169.50.11) has a domain name which refers to it, and which is intended to be more meaningful to users (in the form "europe.eu.int").

These names and addresses were originally allocated by a university or academic institution, normally one in each country. In some countries, these activities have now been transferred to private companies charging fees for their services. Although many "top level" domain names are national such as ".fr" for France, ".de" for Germany or ".uk" for the United Kingdom⁶⁰, some domain names, of which the most important is the ".com" domain, have become global in practice⁶¹ and are administered by the US system.

⁵⁹ ETO has recently been given study contracts under the framework contract with the Commission to assist in the definition and elaboration of a long term European numbering plan (European numbering strategy and transition plan, potential for harmonisation of short codes and for what services).

⁶⁰ domain names refer either to the country from which the service is originated (following the ISO 3166 standard) or to the specific nature of the service

⁶¹ ".com" is a *non-geographic international top level domain* that can be used by anyone in the world. As of June 1996, non-US entities account for about 75,000 of the 250,000 international top level domain registrations - and their relative percentage is rising. What is going to happen when more non-US companies want in and start waving their national trademarks too?

With the growth of the commercial use of the Internet, value has become attached to the domain name, because of its memorability, and disputes have arisen between businesses claiming the same name.

A series of issues have therefore been raised:

- managerial issues where some disquiet has been expressed at the fact that some of the most significant global domains are administered by a private company in the US;
- principles of allocation are regarded as lacking transparency and the mechanism for resolving conflicts is unsatisfactory⁶²;
- on the need to introduce further geographical or territorial components to domain name space such as “.eu”.

The use of trade-marks, which are geographical and limited to a particular trade, in the naming system and the fact that domain names may be global and are not inherently linked to a particular commercial activity, means that a simple application of the principles of trade-mark law may not resolve all the issues⁶³.

The Commission invites comments on the scope for regulatory involvement in issues of Internet naming and addressing, and if so what should be done at the level of the European Union.

Consideration should be given to the situation with regard to Internet naming and addressing in the Member States and, if necessary, measures proposed to safeguard their fair and non-discriminatory allocation.

Europe's numbering environment must also be able to cope with the growth of new and innovative multi-media and on-line services which are emerging as a key factor in the Information Society. In general, the framework set out above is likely to be adequate with regard to ensuring the availability of numbers, but consideration is being given in some Member States to the possible allocation of specific access codes to identify particular groups of services. This may be an important means of providing consumer and pricing information. Developments at a national level and the views of interested parties will be noted, in reviewing the need for further action.

For the long-term development of numbering and addressing, the interdependency with E.164 based telephone numbers and naming and addressing schemes based on X.400 or Internet should be considered and transition mechanisms towards a more integrated advanced telephone-network-addressing scenario be studied. **The Commission invites views on how numbering and addressing policy should evolve to prepare for the Information Society.**

⁶² Internet Domain Names: Whose Domain Is This?, Robert Shaw, ITU, Geneva, Switzerland, see <http://www.itu.ch/intreg/dns.html>

⁶³ DG XV recently launched a questionnaire on “Industrial Property in the Information Society”. The responses are awaited for the end of November 1996. Proper follow up actions will be decided upon depending on the outcome of the questionnaire.

SUMMARY OF PROPOSALS FOR ACTION

In order to achieve these objectives the Commission proposes the following targets:

From 1 January 1998

1. The implementation of **carrier selection** (i.e. users are offered a simple, non-discriminatory mechanism enabling them to select the carrier of their choice on a call by call basis).
2. The implementation as soon as possible of **number portability for the local loop** and, at the latest by 1 January 2000 (i.e. allowing users in all major centres of population to keep their telephone number at a particular location when changing to another operator or service provider).
3. The promotion of action at a national level to open up and to ensure the convergence of **national number plans** including the harmonisation of specific access codes and the adoption of a common standard for keypads supporting alpha-numeric dialling (i.e. allowing users to 'dial' names instead of numbers, e.g. 'FLOWERS' for a florist).
4. The implementation of a **European Telephony Numbering Space** (i.e. the implementation of a common numbering scheme and common access codes for special pan-European services : freephone, premium rate and shared cost calls, and, if needed, for personal communications services).
5. The establishment of a **common framework for the regulation and administration** of a common European numbering scheme (including the allocation of European service access codes and carrier selection codes, as well as the promotion of the Community's interest in international numbering fora).
6. The review of the issues associated with **naming and addressing in the context of the Internet** to consider the need, if any, of regulatory action.

From 1 January 2000

7. The implementation of **carrier pre-selection** (i.e. allowing users a simple, non-discriminatory mechanism enabling them to pre-select the carrier of their choice on a permanent or default basis).
8. The extension of **number portability for users of mobile and personal communications networks as well as for users of special services** (e.g. allowing users to retain valuable numbers for freephone or personal communications services), taking into account the state of network development and the level of demand.

From 2000 onwards

9. The implementation of a **long-term numbering plan**, involving the creation of a European country code ("3-XX) with the administration and management of the code transferred to the European level.

Comments are invited on each of these proposed measures, as well as the proposed timetable.

V CONCLUSIONS

The objectives of competition and the development of pan-European services and trans-European networks impact directly on the telecommunications numbering policy.

Present numbering schemes have essentially developed in isolation and inherently lack the flexibility to accommodate the liberalisation of the market by 1998. The fragmentation along national numbering schemes also poses significant hindrances to the further development of personal communications and continues to be a psychological barrier for the creation of a single market for telecommunications services.

A convergent European approach towards a unified numbering scheme will benefit users, allowing them to taste the real fruits of the Community's liberalisation programme and can become an important symbol of our common European identity.

Further, single Europe-wide numbers will benefit European enterprises by creating new pan-European telecommunication services, stimulating the growth in cross-border provision of goods and services and employment in these sectors, and giving European enterprises better opportunities to take advantage of the Information Society.

Policy makers today have an exceptional chance to prepare Europe's numbering environment for the future, but they can only be successful if they take on a long-term view in the broad political context: This requires them to start the process of moving towards an open and unified numbering environment that *enables* competition, *promotes* the emergence of a single dynamic and innovative telecommunications market and *responds* to the need for harmonisation of future dialling arrangements in an increasingly complex telecommunications environment.

This Green Paper is intended to launch an active discussion involving the Council of the European Union and the European Parliament; the Economic and Social Committee and the Committee of the Regions; the *ad-hoc* high level Committee of National Regulatory Authorities; consumers and business users; fixed and mobile network operators, and service providers; manufacturers of equipment; together with the trade unions and other organisations representing the social interests in the sector. **Comments and opinions are invited on all the positions set out in this Green Paper and, in particular, on the proposed targets established in the table above.**

On the basis of the Consultation political positions will be developed. The Commission will forward those to the Council and the European Parliament.

Comments should be sent to the European Commission, DG XIII A/1, Rue de la Loi 200, B-1049 Brussels to the attention of Mr. de Cockborne (fax +32 2 2968391) at the latest by Friday 21 February 1997. Comments may also be sent by e-mail to: numbering@bxl.dg13.cec.be with reference to "Numbering Green Paper" (in format Word for Windows or Wordperfect).

ANNEX I: COMMENTS ON THE ECTRA STRATEGIC OPTIONS FOR NUMBERING AND ANALYSIS OF THE COST-BENEFITS

ECTRA defined strategic options

As indicated above, ECTRA defined four options for a European strategy to numbering⁶⁴, which could constitute steps in an evolutionary approach towards a long-term numbering strategy in Europe.

Option 1 comprises a continuation of the present situation and only be reactive to market forces or ITU developments.

Option 2 implements a European Telephony Numbering Space (ETNS) for special pan-European services such as freephone, premium rate or shared cost services without making changes to country codes. (Its implementation was initially foreseen via the allocation of a virtual country code by ITU⁶⁵).

Option 3 establishes a consistent set of three-digit country codes for European countries (e.g. 332 for Belgium) and can be realised in 1997 when the new international standard that controls the maximum length of telephone numbers comes into effect. Option 3 could:

- provide the medium-term ability to manage country code resources at the European level (independently from ITU),
- give Europe a clear numbering identity ("3"), comparable with the "1" found in the North American Numbering Plan, and
- create significant empty space for Europe, while freeing 50 country codes to be used as extra geographical codes for certain countries with high demand, as well as for additional non-geographic service codes

Under Option 3 country codes starting with "4" would be relinquished. This would release "4XX" to meet demand elsewhere in the World.

Option 4 would establish a single digit country code for Europe linked to an open and unified European numbering scheme with which national schemes would gradually be fully integrated. Option 4 would again act as symbol of Europe's unique identity, whilst facilitating competition through short dialling for carrier services and the take off of personal communications services

analysis of the strategic options

As indicated above, the consultation on these four Options⁶⁶ showed that Option 1 was widely rejected and there was support for rapid progress on Option 2 via a number of parallel actions (i.e. through requesting ITU for a virtual country code and exploring further the possibilities of using national numbering ranges and/or numbering resources made available for global service applications such as global 800). This view was put

⁶⁴ Strategic options for numbering of telecommunications services in Europe, ECTRA PT N, 27 July 1994

⁶⁵ Country code 388 has been set aside and marked unavailable until mid-1997 pending further studies in Europe on the set up of an ETNS.

⁶⁶ Report on the consultation on strategic options for numbering of telecommunications services in Europe, by ECTRA PT N, draft 10 July 1995

forward, in particular, by ETNO and supported by ETSI. Incumbent operators further suggested that further opening of any pan-European services should be a matter for commercial agreement between operators involved.

At the same time, there was a clear split of opinion between incumbent operators and new market players with regard to the need for rapid progress on Options 3 and 4. Incumbents tended to take a more conservative view, favouring only Option 2, whilst new entrants, service providers, users and manufacturers generally stressed the strong desirability for opening up the numbering environment in Europe in the short term, and stressed the urgent need for clear political decisions on this.

This split of opinion was largely confirmed by the contributions received on the consultation on the Infrastructure Green Paper, where the competitive and consumer impact of numbering policy was also stressed.

On this basis, ECTRA adopted a decision in its October 1995 meeting which calls for: support by member states of a submission to ITU to secure country code 388; further study on the use of national resources for pan-European needs; and the preservation of the CEPT interests in ITU. It was further decided to review the decision by June 1996 which date has now been further postponed.

cost/benefits of special pan-European services under Option 2

In making policy choices an assessment must, of course, be made of the resulting costs and of the financial benefits which the change should facilitate. Both ECTRA and the Commission have carried out such studies. At the same time, the potential costs identified are only those attributable to the telecommunications industry and not the often significant costs which must be borne by business and users. Data on those costs are not currently available, but comments addressing those issues are specifically invited.

Studies have suggested that there is strong latent demand for special Europe-wide services, such as freephone, premium rate or shared-cost services, even though their development until now has been held back by the absence of a common numbering approach, as well as by cultural and linguistic factors. This contrasts with the phenomenal success of freephone services in the USA⁶⁷, where portability of freephone numbers both between different locations and between different operators has been required. 40% of US long-distance call traffic is to freephone numbers against 20% in Canada and only 1% in Europe. **US freephone revenue represents \$10 Billion** annually against **\$500 Million in Europe**. In 1993, **\$435 billion** of goods were sold via freephone calls. The average telecommunications cost to the seller was 2 - 9 % of the amount of sale. At the same time, a study⁶⁸ suggests a potential in Europe for additional revenues of up to **4.6 Billion ECU** by the year 2003 Europe-wide freephone services (including calling card services) and shared revenue services.

The cost of introducing advanced service platforms for freephone, shared cost and shared revenue services requires interconnection and interoperability of national Intelligent Networks (i.e. interconnection of Signalling System 7 networks across

⁶⁷ The harmonised European telephone services market: the economic stakes and the need for numbering solutions, Sagatel, Paris, March 1996

⁶⁸ Potential Opportunities Afforded by a New European Telephony Numbering Space, Final Report, Mary Ann O'Loughlin and Stuart Sharrock marketing consultants, 20 April 1994

Europe and the creation of a pan-European number database and service management system to support portability) have been estimated as extremely small⁶⁹.

overall cost benefit assessment of progression towards an open and unified numbering plan under Options 3 and 4

In addition to the additional revenues generated by special pan-European services, an open and unified European numbering plan should improve the efficiency of European operators and service providers and offer certain scale economies. At the same time, the costs involved in adapting national numbering schemes for the telecommunications industry would be significant, though relatively small in relation to the potential benefits to the customer.

ECTRA⁷⁰ has estimated the direct costs per subscriber for numbering changes to be within the following ranges: the cost of a **subscriber number change** is estimated at **10 - 50 ECU**, the cost of a change in **national destination code** at **1 - 10 ECU** and the cost of a **country code change** (Option 3) at less than **0.5 ECU**. On this basis, the **total cost for Option 3 is estimated to be lower than 1 Billion ECU**. The **total cost for Option 4**, which would involve some revamping of national numbering plans, was difficult to estimate because it involves medium to long term planning with very different starting situations in the Member States. A reasonable estimate of the **direct** costs would amount to some **2 billion ECU**⁷¹. Further indirect costs may occur but there is little data available to give reliable indications as to the amount of such costs. Further analysis may be required in order to derive a reliable overall cost/benefit ratio.

⁶⁹ Report on costs of number changes, ECTRA Project Team on Numbering, 10 July 1995

⁷⁰ Report on costs of number changes, ECTRA Project Team on Numbering, 10 July 1995

⁷¹ With about 200 million subscriber lines and a cost of 10 ECU per line, the direct cost would amount of 2 billion ECU only. The Council Decision on the introduction of the common emergency number "112" and the consequential review of a number of national numbering schemes has significantly facilitated the introduction of other short codes starting with "1".

ANNEX II: CARRIER SELECTION

options for carrier selection

One possibility for carrier selection is through the use of prefixes (short codes) to be dialled in front of the subscriber number in a single stage dialling procedure. Identification of the calling party is done through the Calling Line Identification (CLI). Another possibility is by calling a special service access codes to carrier services after which the dialled number is entered together with a special code for authentication of the subscriber. This latter possibility is a two stage dialling procedure which is more prone to fraud and resembles calling card services in use today. For the remainder of this analysis, we will concentrate on the first option.

The main options for carrier selection in a single stage dialling procedure are:

- A: *default carrier determined by access network operator* (local operator) with possibility of override by user on call by call basis. This options is sometimes referred to as *easy access*;
- B: *pre-selection of carrier by the customer* plus possibility of override on call by call basis. There are some variants on this method e.g. change default carrier through instant DTMF dialling (change pre-selected carrier on-line) or pre-selected carrier determined by regulator on the basis of market share. This option is referred to as *equal access*;
- C: *the use of carrier selection codes for all calls*. Clearly, this option is in contradiction with the Council Decision on the introduction of a standard telephone access code⁷².

The Commission believes that the requirement for a harmonised access code should prevail as, with the implementation of Option B, it does not form a barrier to the development of effective competition. Option C is therefore not considered further.

With the implementation of easy access (Option A), operators will not loose market share in long-distance and international traffic as quickly and substantially as with the implementation of equal access (Option B) because they will normally elect to route their long-distance and international traffic via their own channels. Option A could therefore be an intermediate step in a phased approach with Option B as the medium to long-term goal and cause a more gradual transition towards an open competitive market then with the implementation of Option B right from the start.

cost/benefit of carrier selection

Studies carried out for the Commission⁷³ and ETO⁷⁴ concluded that carrier selection mechanisms are mandatory to foster competition in main telecommunications markets. Users must be able to easily select a carrier wherever they are in Europe for their national and international long-distance telephony services.

⁷² Council Decision of 11 May 1992 on the introduction of a standard telephone access code in the Community, 92/264/EEC, OJ L137/21, 20.05.92)

⁷³ The harmonised European telephone services market: the economic stakes and the need for numbering solutions, Sagatel, Paris, March 1996

⁷⁴ Carrier selection study for ETO, OVUM, June 1996

The experience with carrier selection is strongest in the US where, after the divestiture of AT&T and the introduction of inter-exchange long-distance competition, the long-distance rates have been slashed by approximately 40 %. Another example is Finland. Since the introduction of long-distance competition between Telecom Finland and the long-distance carrier of the independent local operators in 1993, long distance tariffs fell by more than 50 %. Remarkably, the total revenue did fall but not as substantial because of increased telephone usage.

The total revenues of the telecommunications market in the European Union in 2000 is estimated at 110 - 120 Billion ECU. Some 50 % of the traffic is business traffic with some 20 % international traffic. By introducing carrier selection throughout the EU, it works out that between 40 - 50 Billion ECU of revenues is at stake. Extrapolating the effects on long-distance tariffs which were seen in the US and Finland to the European Union, the introduction of carrier selection could save the European customer as much as 20-25 Billion ECU per year. Obviously, the reductions of tariffs would change telephone calling patterns and thus offset somewhat the loss of revenues for operators.

The lower prices of telephone traffic would make the diffusion of information cheaper and thus form an immediate stimulus to the European economy. These direct effects are difficult to quantify in financial terms but are believed to be huge⁷⁵. Besides that, the introduction of carrier selection would assist in the migration of users from one operator to the other. It would make customers more aware of competitive alternatives, customers would not have to invest so much time and money (including any necessary CPE alterations) in changing to a new operator, customers could try out new operators on a call-by-call basis with no long term commitment, and customers would avoid having to dial additional digits in order to access an other operator's network.

The cost of introducing carrier selection cover local network implementation cost for the incumbent operator and any other local operator required to provide equal access; costs for long distance operators; any extra costs of network capacity or operations that result from increased customer churn; and end user equipment costs.

An analysis of the cost of implementation of equal access to long-distance carrier was carried out in the UK⁷⁶. The total direct cost to BT over the period 1995 - 2004 was estimated between 136.6 and 261.2 £M⁷⁷. This included cost for network changes, cost for information system changes, and cost for data build maintenance and staff, training and organisation. The cost for other operators for the same period was estimated at 68.6 £M.

Extrapolating this to the European Union market and assuming similar degrees of network digitisation and efficiency, the introduction of carrier selection at the European level would cost about 2 Billion ECU over the ten year period considered.

It is obvious from this very rudimentary analysis that the benefits of introducing carrier selection by far outweigh its costs. Even if the drop in long-distance tariffs would be much less than assumed, benefits of equal access to carriers will exceed costs.

⁷⁵ see for example the Bangemann report on Europe and the Global Information Society, Recommendations to the European Council, 26.05.1994

⁷⁶ Cost Benefit Analysis of Equal Access, a consultation paper issued by OFTEL, July 1995

⁷⁷ In sharp contrast is the cost of carrier selection in Sweden. The cost of implementing a new carrier code in the network of Telia (incumbent in Sweden) is only 60 kECU. The numbers poroduced by the OFTEL report are disputed and are said to be excessively high.

Pre-selection equal access was introduced in the US and Australia using slightly different methods.

move to equal access in the US

Pre-selection was introduced in the US from September 1984 as local exchanges were given equal access capabilities in rolling conversion programmes. To begin with, once an exchange had been converted to equal access, there was no immediate requirement for all customers to be balloted on their preferred long-distance carrier. By early 1985, it became apparent that only around 30 % of customers connected to equal access exchanges were pre-selecting a long-distance carrier (either AT&T or one of the other long-distance carriers) whilst the remaining 70 % were staying with AT&T by default.

In May 1985 the FCC released an Order specifying a balloting and allocation plan to be used by local exchange carriers (LECs) on the introduction of equal access into their exchanges and a retroactive balloting process in cases where equal access had already been introduced. This process required a re-ballot of customers who failed to respond to the first ballot, after which customers who did not respond to either ballot had to be assigned a long-distance carrier in proportion to those who did respond in the first ballot. Under this system, LECs found that between 60 % and 75 % of their customers now pre-selected a long-distance carrier, whilst the remaining 24 % to 40 % were assigned a carrier. This increase in pre-selection has been argued to have been a major factor behind AT&T's loss of market during the late 1980s. In particular, its share of inter-state switched traffic fell from 82 % in 1985 (when it had already faced eight years of competition from MCI without equal access), to 63 % in 1991 when equal access had been rolled out to over 90 % of access lines in the US⁷⁸.

move to equal access in Australia

Australia licensed a second carrier, Optus, in December 1991. The new carrier's network was operational in major cities by November 1992, and was available to 65 % of the population by the end of 1993. Within 18 months of launch it had captured about 15 % of national and international traffic. Originally access to the Optus network was through a simple dialling code prefix - "1". If this prefix was omitted calls would be routed over the Telstra (incumbent) network. However, it was always intended to move to an equal access system of pre-selection with call-by-call override.

Pre-selection balloting began in Australia in July 1993, and will continue on a sequential city-by-city basis until 1997. The process takes the form of a first ballot, with the option for Optus to call for a second ballot in cities where the response rate is less than 60 %. Non-respondents remain with the existing carrier (in contrast to the US system where they were assigned). It is likely that the share of traffic captured by Optus exceeds its share of lines since it will have tended to have captured customers with higher than average calling rates.

On the basis of the experience of the US and Australia, it appears that effective pre-selection would require the balloting of all customers; and an option of a second ballot if response rates are low. There are however other possibilities than ballots to let users make their pre-selection for instance through marketing campaigns. Unlike the ballot, this latter method allows a better control quality and quantity of customers by the new entrant and allows new entrants with less marketing resources to compete fairly.

⁷⁸ Cost Benefit Analysis of Equal Access, a consultative paper issued by OFTEL, July 1995

ANNEX III: NUMBER PORTABILITY

Number portability is a generic term which comprises three basic types: service provider portability, service portability, and location portability (geographic portability).

1) location portability

Location portability refers to the ability of end-users to retain the same telephone numbers when moving from one location to another, either within the area served by the same telephone switch or between areas served by different telephone switches.

Today location portability is normally possible when relocating office or home within the local area or district but customers must change their telephone numbers when they move outside the local or area served by their current switch. Clearly, with full location portability of numbers, information in the number such as tariff indications to the user, would be lost.

Businesses and increasingly residential customers may get full location portability by using non-geographic service access codes with national and -in the future- European or even global scope. Personal numbered services, even those on the fixed network, may offer full portability in the same way.

It must however be mentioned that the main drive for these developments today does not emanate from a demand for freedom to move around with numbers but a demand for easy customer access to services, even beyond national borders. The Commission seeks views on the relative importance of location portability.

2) service portability

The need for service portability arises when a particular service is available only through a particular switch. For example, if operators deploy ISDN by installing new ISDN switches within existing service areas of switches that provide POTS, customers that wish to receive ISDN services must change their telephone number.

Clearly, service portability can only apply to a selected set of services while for some services porting numbers would imply that the unique meaning of certain access codes like 800 (for freephone services) and 900 (for premium rate services) would be entirely lost. The Commission seeks comments on the relative importance of service portability.

3) service provider portability (transferability between operators)

The issue of service provider portability spans a broad spectrum from portability at the national level between local operators all the way through to portability at the global level for global services. And, that any new application for service can obtain the service from any company at a local, national, European or even global level. Customers can then enjoy the best value in terms of features, services, reliability, quality and cost. Hence, service provider portability is considered a major instrument to boost competition in the market.

The competitive importance of service provider number portability depends primarily on the value that customers assign to their current telephone numbers. When users attach a significant value to retaining their telephone numbers while changing service providers, a lack of number portability would likely deter entry by competitive providers of local services. A survey in the US indicates that 40 - 50 % of residential customers and 70 - 80 % of business customers who otherwise were willing to consider

changing their local telephone operator would be unlikely to consider such a change if they had to change their telephone numbers⁷⁹. Business customers, in particular, may be reluctant to incur the administrative, marketing and goodwill costs of changing telephone numbers.

Four areas are considered important for Europe at the short to medium term: number portability in the local loop, number portability of non-geographic services such as 800 services, number portability of mobile services and number portability of pan-European services.

Number portability in the local loop

With the full liberalisation of the telecommunications sector, alternative methods for local access (e.g. through cable TV networks and through new radio infrastructures such as those based on DECT and the GSM/DCS-1800 standards) are being introduced rapidly often by new entrants to the market. Number portability in the local loop is considered crucial by these new entrants to give them a fair chance compete with the incumbent and establish a market position.

Without number portability between local operators, new market entrants face a significant barrier to entering the market. Lack of portability may even become a disincentive to invest in alternative local loop networks with detrimental effects on the development of effective competition in Europe.

Number portability for non-geographic services

Number portability for non-geographic services such as nation-wide freephone and premium rate services is currently under study in several Member States. The argument for local number portability hold for the non-geographic services.

A recent brainstorm in the context of the ENF concluded that number portability for freephone services is key to allow customers to retain their valued freephone numbers if they want to change service provider and in fact becomes compulsory when applying the equal access principle on the freephone numbering space.

Number portability for mobile services

The market for mobile and personal communications is the fastest growing market in telecommunications today. Europe now counts over 20 million mobile subscribers with an average penetration of about 5 %. The expectations for the future are enormous with personal communications entering the mass consumer market with highly innovative products and services and with penetration levels exceeding 50 % of the population.

But in most countries, competition in this market has not fully developed where in some countries the second mobile operator is still rolling out his network and a third operator has not even been appointed. In order to stimulate competition in this volatile and innovative market, number portability between mobile service providers should be considered to stimulate growth and innovation.

A recent study carried out for the administration of the Netherlands shows that the net benefits to be gained by introducing number portability for mobile services accrue to as much as 500 million ECU per year for the Dutch market only⁸⁰. Indeed, there seems to

⁷⁹ Notice of proposed rulemaking in the matter of telephone number portability, US FCC, July 13, 1995

⁸⁰ Number portability in the Netherlands, Final report for HDTP, OVUM, 14 March 1996

be a very strong case for number portability among mobile service providers and operators.

Number portability for pan-European services

The market for pan-European services is developing quickly with service codes for accessing pan-European services likely to become available in the near future.

For the unconstrained development of a competitive market, it is important that customers are not locked into an early service provider but can freely take their number with them if they wish to change pan-European service provider. This requires number portability in the European numbering space⁸¹.

Besides freedom to the customer, the introduction of number portability in a European numbering space would also create more balanced market conditions with the US where number portability for country wide freephone services was introduced in the early 1990s with a highly competitive freephone market as a result.

cost/benefit of number portability

A study carried out recently by the UK Office of Telecommunications (OFTEL) indicates that number portability in the local loop delivers considerable benefits - estimated at some 1.8 B£ over 10 years⁸². Such benefits far outweigh the costs. BT, which will incur the majority of the costs, estimates them at £ 220 million over the next five years, and falling steeply thereafter. The other operators cost was estimated at less than £ 3 million each⁸³. This is in sharp contrast with the conclusions of a study carried out in the Netherlands where the initial set up cost was estimated at £ 12 million with an additional £ 7 per porting line⁸⁴.

The UK's Monopolies and Mergers Commission has produced an agreed allocation of the costs of portability, in which BT and other operators bear 70 % of its own administrative costs and recover the remainder from the operators to whom portability is being provided. The cost for technical changes to the own network is borne by each operator himself.

Besides number portability in the local loop, other forms of portability such as portability of mobile and freephone numbers should be considered. A recent study carried out for the Ministry of Post and Telecommunications in the Netherlands⁸⁵ indicates that the economic benefits outweigh the costs for these latter services. The detailed issues will have to be worked out further and are best tackled from a European level.

⁸¹ The introduction of number portability within a European numbering space is not an issue which stands entirely by itself. In fact, in the more mature situation an intelligent system is required to support the routing of calls placed within a European numbering space. Such an intelligent system would greatly facilitate the portability of certain pan-European numbers.

⁸² This figure includes £ 550 million of direct benefits in saving cost on telecoms and £ 1.2 billion of indirect benefits flowing to all customers as a result of increasing genuine competition for all categories of customers.

⁸³ Number portability: a paper by the Office of telecommunications of the United Kingdom, March 1996

⁸⁴ Study on number portability by OVUM for the Dutch Ministry of Post and Telecommunications, 1996

⁸⁵ Study on number portability by OVUM for the Dutch Ministry of Post and Telecommunications, 1996

portability in the US

In order to further boost competition in freephone services, the US FCC, in a 1991 ruling, ordered number portability for freephone services to begin by 1993. Local and long-distance telephone companies have spend hundreds of millions of dollars for the necessary changes and additions to their networks. The new post-portability environment in the US calls for a centralised database and operational management system. This will enable all long-distance companies to reserve, activate and deactivate freephone numbers. When considering that over 40 % of all long-distance calls in the US (comparable with intra-European calls) are freephone calls, the impact of this measure on competition in the US market is clear. Moreover, it has prepared US players better than European players for global services competition.

Moreover, the recent Telecommunications Act⁸⁶ specifies that Regional Bell Operating Companies will be free to compete in the long-distance market, but only when they have opened their own networks by complying with a 14 point checklist which includes the obligation to provide full number portability. Local number portability trials have now started all over the US. Clearly the Act creates a lot of additional impetus to progress rapidly with the introduction of number portability.

⁸⁶ US Telecommunications Act of 1996, adopted February 8, 1996

ANNEX IV : PERSONAL COMMUNICATIONS

The views on Personal Communications Services (PCS) and on the related issue of Universal Personal Telecommunications (UPT) are very divergent⁸⁷. Conceptually however, UPT embraces much of the same thinking as PCS but was, unlike PCS which was driven by the competitive mobile sector, defined in ITU and driven by the wireline sector.

UPT requires an intelligent logical layer above existing networks. The implementation of UPT is a commercially sensitive issue, certainly on a European or global level, in particular where it concerns the need for IN facilities storing subscriber data (such as subscriber service profiles and data relating personal numbers with network termination points or physical network numbers). It would put mobile and cable operators that lack these IN facilities in a disadvantageous position vis-à-vis other (incumbent) operators since the latter would have to process the UPT calls including those calls originating in and destined for mobile and cable networks.

With the fast evolving mobile communications networks, the PCS concept is emerging, in Europe on the basis of the GSM/DCS environment. At the local level, it is likely that this PCS concept is further enhanced with micro-cellular networks and individual micro-cells interworking with the GSM/DCS environment. Through service roaming, this PCS concept could be readily turned into a global PCS concept including the GSM/DCS environment and other environments such as D-AMPS, PDC and satellite PCS⁸⁸.

The PCS concept has inherent advantages over the UPT concept. True mobility is inherently part of it. It has a large and fast growing user base. Since customer profiles reside with the individual operators, it does not seem to have the same commercial barriers to implementation as UPT. Further, the PCS concept is driven from the highly competitive mobile sector and thus seems to offer better guarantees for a level playing field for all players.

If we would add the possibility to port numbers between mobile operators and perhaps even the possibility to port numbers between mobile operators and fixed operators, an environment is created where the telephone numbers of today (the network termination points) become the de-facto personal numbers of the future.

The Commission solicits views on the further development of personal communications and personal numbering and on mechanisms to promote effective competition in converging markets.

Pan-European roamers represent a significant market with a high potential for increase who demand, besides operator-to-operator portability, geographical portability. New entrants argue that they need European number ranges, particularly service resellers. The Commission seeks views on the need for a European numbering solution for PCS⁸⁹.

⁸⁷ A generally accepted definition of PCS is: "PCS is used as a generic term for services which provide person-to-person calling, independent of location, terminal used, the means of transmission (wireline or wireless) and/or the choice of technology"; see for instance "ETO discussion paper for a workshop on numbering of Personal Communications Services (PCS) in Europe", 19 April 1996.

⁸⁸ Inter-system roaming between various mobile networks including the possibility of SIM card roaming is under discussion

⁸⁹ The recently established UMTS Forum has as one of its main task the elaboration of a mobile communications policy for Europe. This includes *inter alia* the issue of numbering.

**ANNEX V : A REFERENCE SCENARIO FOR MOVING TO AN OPEN AND UNIFIED
EUROPEAN NUMBERING ENVIRONMENT**

At the European level

STEP 1

(implements ETNS under Option 2)

By 1998, introduce pan-Europe services under virtual country code 388 (e.g. 3-888-) and under empty space behind national codes (e.g. 3-900-, 3-500-)

↓

STEP 2

(implements Option 3)

By late 1998, transition towards a 3-digit country code for European countries

↓

STEP 3

(implements Option 3+)

By 1999, transfer the responsibility of managing the last two digits of the 3-digit country codes to a European body. Europe is identified by "3", creates enormous space for competition, new services and market entrants

At the national level

STEP 1

By early 1997, define and agree on common guidelines for mandatory use by administrations when rewriting their national numbering schemes to ensure that these open up (for competition) in a balanced manner and converge (harmonisation)

↓

STEP 2

By 1997, start rewrite national numbering schemes to ensure that they can fully accommodate the needs of the post-1998 liberalised market

↓

STEP 3

By 1998-1999, start opening up national numbering schemes in a harmonious and balanced manner for example for carrier selection

↓

STEP 4

(implements Option 4)

By 2000, melt national numbering schemes and the ETNS together.

Replace international dialling for intra-European calls by regional dialling

e.g. replace "003XX" (access code) by "1XX" (prefix), leading digit "1+" represents European trunk call.

Facilitates dialling and removes psychological barriers,

opens range of common short codes for different applications e.g. carrier selection etc.

geographic numbers

local dialling: 2345678

national dialling: 02-2345678

intra-European dialling: 132-2-2345678

international dialling: +3-32-2-2345678

non-geographic numbers (pan-European service numbers)

carrier selection : 10XYZ or 10ABCDEF

emergency number, road side assistance, directory assistance: 11X

personal numbers: 1-500-

freephone service: 1-888-

premium rate and shared cost services: 1-900-

A REFERENCE SCENARIO FOR MOVING TO AN OPEN AND UNIFIED EUROPEAN NUMBERING ENVIRONMENT

country code now	STEP 1 - 1998 <u>Option 2</u>	STEP 2 - 1998 <u>Option 3</u>	STEP 3 - 1999 <u>Option 3+</u>	STEP 4- 2000 <u>Option 4</u> "003" -> "1" "1" is European prefix
			3 00	
			.	10XYZ prefix e.g. carrier selection
			3 09	
				112 common emergency
				11X European short service codes
				118 directory services
			3 20	
				12X empty space (national short codes)
			3 29	
.				.
31		331	3 31	131 area code Netherlands
32		332	3 32	132 area code Belgium
39	3900	339	3 39	139 area code Italy
.
49	.	349	3 49	149 area code Germany
.		.	.	.
350	3500	350	3 50	150 area code Gibraltar
352		352	3 52	152 area code Luxembourg
.		.	.	.
			3 XX	1XX further geographic area codes
			3 YY	1YY further European service codes
.		.	.	.
.		3500	3 500	1500 personal communications services
.	388	388	3 888	1888 European freephone
		3900	3 900	1900 European premium rate services
			Rest of the world to Europe:	+3 49 228 123456 +3 500 <personal number>

ANNEX VI: ETO/ECTRA STUDIES ON NUMBERING

Title	Work requirement	Target/end date
1 Non-discriminatory access to numbering resources	To examine issues of number ownership and number tradability , equal access to competitive services such as directory services and DNIC/DCC allocation procedures	May 1996
2 Numbering related to the topic of user-friendliness	To examine aspects of user-friendliness including the issue of alpha-numeric dialling and make proposals how to promote user-friendly dialling	September 1996
3 Preparation of request for virtual country code to ITU	To prepare a submission to ITU requesting for a virtual country code for the implementation of a European Telephony Numbering Space for special services of pan-European nature	September 1996
4 Numbering related to PCS in Europe	To analyze developments of telecoms services and networks related to UPT/PCS numbering issues and the effects on and requirements for personal numbering	December 1996
5 Carrier selection*	To investigate carrier selection mechanisms available or planned at the national level and alternatives for introducing carrier selection at the European level	August 1996
6 Management of a European Telephony Numbering Space (ETNS)*	To establish a management plan for a European Telephony Numbering Space including proposals for number structure, allocation principles, rights/obligations and administration	June 1997
7 Number portability for pan-European services*	To investigate technical alternatives for introducing number portability in an ETNS between European service providers including IN network implementations	June 1997
8 Routing aspects of pan-European service calls*	To define alternative strategies for handling and routing of pan-European service calls numbered from a European Telephony Numbering Space	June 1997
9 Numbering requirements of corporate telecommunications networks*	To review the current access mechanisms for VPNs, define the requirements of corporate networks on the numbering of public networks and propose harmonisation measures	June 1997
10 Review of national numbering schemes on their openness to competition	To study which criteria are important for opening up national numbering schemes, review current national numbering schemes and develop common guidelines for restructuring them	February 1997
11 European Numbering Conventions	To study current rules and principles of telephone number allocation and use in European countries and prepare proposals for detailed European Numbering Conventions	February 1997
12 Harmonisation of short codes	To review the present and planned short codes/numbers in Europe, investigate the expected need for pan-European short codes and propose a harmonised scheme for Europe	December 1997
13 Long term strategic plan for numbering and addressing of telecommunications services	To identify potential future requirements for numbering and addressing and develop a long term transition strategy for moving towards an integrated numbering plan for Europe	December 1997

* In conjunction with ETSI

ETO studies lead to recommendations for ECTRA approved policy positions.

ETSI will produce technical reports as input to the ETO work. ETSI reports may also form the basis for European Telecommunications Standards (ETS) for reference in future European Union legislation but no agreement exist today about the need for ETSs.

LIST OF ABBREVIATIONS

ACTE	Approvals Committee Terminal Equipment
AMT	Asian Mobile Telecommunications
AT&T	American Telephone & Telegraph
BT	British Telecom
CEPT	Conference Europeenne de Post et Telecommunications
CLI	Customer Line Identification
DDI	Direct Dial-In
DNS	Internet Domain Name System
DECT	Digital European Cordless Telecommunications
DNIC	Data Network Identification Codes
DTMF	Dual Tone Multiple Frequency
ECMA	European Computer Manufacturers Association
ECTEL	European Telecommunications Manufacturers Association
ECTRA	European Committee of Telecommunications Regulatory Affairs
EIG	European Interest Group
EIIA	European Information Industry Association
ENF	European Numbering Forum
ETNO	European Public Telecommunications Network Operators'
ETNS	European Telephony Numbering Spac
ETO	European Telecommunications Office
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission of USA
GSM	Global System for Mobile communications
GSM	Association of GSM operators
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunications Union - Telecommunications
LAN	Local Area Network
LECs	local exchange carriers
NAFTA	North American Free Trade Association
NANC	North American Numbering Council
NANP	North American Numbering Plan
NRA	National Regulatory Authority
OECD	Organisation for Economic Construction and Development
OFTEL	UK Office of Telecommunications
ONP	Open Network Provision
PCS	Personal Communications Services
POTS	Plain Old Telephone System
PSTN	Public Swiched Telephony Network
PTN	Private Telecommunication Network
SME	Small and Medium size Enterprise
VPN	Virtual Private Network
UIFS	Universal International Freephone Service
UMTS	Universal Mobile Telecommunications System
UPT	Universal Personal Telecommunications

GLOSSARY

ACTE (Approvals Committee for Terminal Equipment)	Created by Directive 91/263/EEC, and, <i>inter alia</i> responsible for the adoption of the Common Technical Regulations (CTRs) on which EU harmonised type approval procedures are based
Alpha-numeric dialling/keypad	Dialling a telephone number by using the alphanumeric tokens on the telephone's keypad that correspond to the name of the service or the called party e.g. 0-800-“FLOWERS”
Call centres	A place where incoming and outgoing telephone traffic is handled in a structured manner. Call centres are used for activities such as telemarketing and sales, teleservice and complaints handling
Calling card services	A telephone service where the customer calls an operator service (often free-of-charge), identifies himself with a unique card number and identification code, and is then connected to any destination(s) wanted. The customer is often billed afterwards directly by the card service provider.
Carrier selection	The possibility for customers to choose their (preferred) long-distance or international operator through telephony dialling or other means such as pre-selection.
Carrier selection override	The possibility to override the pre-selection of a long-distance or international carrier by adding a special carrier prefix to the dialled sequence.
Dialling parity	Exists when the same number of digits have to be dialled when accessing a service which is provided by different competing service providers
E.164/E.190	ITU-T Recommendations governing the procedures and criteria for the allocation of country codes.
Easy access	One option for the implementation of carrier selection where the default carrier is determined by the incumbent operator with the possibility of override through dialling by the user on a call by call basis
ECTRA	The European Committee for Telecommunications Regulatory Affairs (ECTRA), created as one of the three committees under the CEPT. It includes a number of project teams covering <i>inter alia</i> licensing, numbering, interconnection, mobile communications, testing and type-approval. Council Resolution 92/C318/EEC of 19 November 1992 on the promotion of co-operation on Europe-wide numbering, identified several tasks for ECTRA in numbering co-ordination, including the creation of a European numbering space and the preparation of European positions for discussion within ITU. ECTRA has set up the European Telecommunications Office (ETO).
ENF - European Numbering Forum	An industry Forum to discuss numbering and numbering related issues. The ENF is open to any organisation that has an interest in numbering or addressing and that is represented at the European level. The ENF was established in 1994 following the Council Resolution 92/C 318/EEC of 19 November 1992 that called for industry cooperation in the area of numbering.

Equal access	<p>Generic term for equal (non-discriminatory) access to numbering resources by competing operators and service providers e.g. equal quality, equal opportunity, equal length.</p> <p>In relation to carrier selection, equal access refers to the implementation where the long-distance carrier is pre-selected by the customer with the possibility of override through dialling on a call by call basis. This option is generally a second step following the implementation of “easy access”.</p>
ETNO	<p>Association of European Telecommunications Network Operators, currently comprising the incumbent operators in Europe but discussions are ongoing to open up to independent mobile operators.</p>
ETNS - European Telephony Numbering Space	<p>A numbering space that sits parallel to the national numbering spaces. Numbers from the ETNS will be available anywhere in the European Union (and later on Europe). When implemented, a services numbered from the ETNS can be accessed by a single pan-European number from any place in the Union (and later on Europe).</p>
ETO - European Telecommunications Office	<p>The European Telecommunications Office (ETO) is an office which has been established under the umbrella of ECTRA. With regard to numbering, ETO’s functions are to undertake studies, including studies for the Commission and to advice ECTRA on European numbering issues.</p>
ETS	<p>European Telecommunications Standard. Standards established according to the procedures of the European Telecommunications Standards Institute (ETSI).</p>
Europe-wide service/number	<p>A service that can be accessed by a single number from anywhere in Europe provided by a service provider that can be located anywhere else in Europe</p>
European area/country code	<p>A specific single digit code assigned to Europe under the ITU global country code scheme; like “1” for North America</p>
European Telecommunications Standards Institute (ETSI)	<p>The European standards organisation in the Telecommunications field, having the task of producing European Telecommunications Standards (ETS), having European-wide application and acceptance, in the area of telecommunications.</p>
Freephone service	<p>A service that is (can be accessed) free of charge to the customer. The access code “800” is generally associated with freephone. There is an ongoing debate in the Member States whether the customers when calling a freephone number need to get a free service or, alternatively, only the call to the service centre is free of charge.</p>
Golden numbers	<p>Golden numbers are telephone numbers that distinguish themselves from all other numbers in a given number range because they are attractive to have, are easy to learn or remember, subjectively pleasing or are in use and known by the general public or client base. Golden numbers may have a big commercial value. For instance, the digits that relate to “FLOWERS” on the standardised alphanumeric keyboard may have special value to a flower service.</p>

Green Paper(s)	Green Papers, in the European Union context, are European Commission consultative documents setting out basic policy goals for public debate. Key Green Papers issued in the telecommunications sector, are the 1987 Green Paper on the development of a common market for telecommunications services and equipment (COM (87) 290) and the 1994 Green Paper on the further development of mobile and personal communications in the European Union (COM (94) 145).
Information Society	A society that becomes more dependent on information and communication. In the report entitled "Europe and the global information society" (the Bangemann Group report) it is presented as a revolutionary challenge which will change the ways of living and working together.
Internet	Data communications network based on the Internet protocol TCP/IP. TCP/IP was developed as a US military computer based communications standard which has over recent years met great success in academic and later in commercial applications - particularly for internetworking among different LAN environments and servers.
ISDN	Integrated Services Digital Network. Standard defined by the ITU for the modern telecommunications bearer network. Is end-to-end digital and integrates different type of services e.g. circuit and packet switched services.
ITU - International Telecommunications Union	International Telecommunications Union (ITU), the United Nations specialised agency for telecommunications.
MoU - Memorandum of Understanding	MoUs in the telecommunications field in Europe have been entered into between operators and/or equipment manufacturers or other market participants for the roll out of new products and services. MoUs have been entered <i>inter alia</i> for GSM, ERMES and TETRA.
Non-geographic services	Telecommunications services that are numbered from (national) number ranges that are not identified with one specific geographic region, city area or local community. A country wide freephone service or a service numbered from the ETNS are examples of non-geographic services.
NRA - National Regulatory Authority	National Regulatory Authority. Directive 88/301 and 90/388 both require Member States to ensure the separation of regulatory activities from the operation and provision of services by Telecommunications Organisations.
Number portability	Can have different meanings (see Annex III). Is often referred to as the possibility to transfer a telephone number from one operator to the other. Number portability thus allows customers to retain their telephone number when they decide to change operator and removes an important barrier to competition.
Numbering Conventions	Conventions laying down rules about e.g. rights and obligations associated with numbers, the modification of numbering schemes, number pricing and number trading. Under the framework contract with the Commission, ETO has been tasked to define European Numbering Conventions which should create a common framework for European Administrations
Numbering plan/scheme	A plan/scheme that structures the number space available to a country, operator or other organisation.
Numbering space/environment	Generic term for the total set of numbers available behind a country code or service access code or the collection of them

ONP	The Open Network Provision concept defined in Council Directive 90/387/EEC.
Open numbering environment	A numbering environment that is open to competition e.g. that provides equal quality and equal opportunity numbers to competing operators and service providers.
PCS - Personal Communications Services	Personal Communications Services (PCS) is a generic term for services which provide person-to-person calling, independent of location, terminal used, the means of transmission (wired or wireless) and/or the choice of technology
Personal and portable numbers	Unique number assigned to the individual independent of network or location.
Pre-selection of carriers	Mechanism where the local operator/service provider will automatically route the long-distance and international calls of a customer to the long-distance carrier of his choice (pre-selected by the customer). The customer does not have to dial special carrier selection codes with every call.
PSTN	Public Switched Telephone Network. The basic telephone network as it exists today.
Service access code	The first part of a service number through which the service is accessed. Often, service access codes are uniquely identifiable codes e.g. "800" for freephone or "900" for premium rate services.
Service Providers	Service providers offer services to end users involving the use of mobile and fixed networks and services. The role of service providers may vary between that of airtime reseller to the provision of sophisticated value added services. Service providers may be independent or form part of a network operator.
Shared cost services	These services provide special tariff network access in which the cost are shared between the caller and the service provider. The caller pays the call at a tariff generally equivalent to a local call. The network provider charges the service provider for any additional transport to the service provider termination point.
Shared revenue of premium rate services	Services provided on a shared revenue infrastructure permitting the charging of calls to certain prefixes at a premium rate. The calls are billed to the subscriber by the operator and a "share" of this revenue is paid to the service provider, in general an independent company.
Special pan-European services	Generic term for service platforms for e.g. freephone, shared cost and shared revenue (premium rate) services that are Europe-wide available.
TEN - Trans-European Networks	Generic term for interconnected networks and services available on a pan-European basis.
Trans-European carriers	Long-distance and international carriers that carry trunk (volume) traffic between different European locations (or Points of Presence).
UIFS - Universal International Freephone Service	ITU-T Recommendation establishing a global freephone service behind the country code 800. The implementation is a matter of commercial negotiation between individual operators.
Unified numbering environment	A numbering environment created by melting together a set of national numbering schemes with a singular structure and e.g. single service access codes for general public services
UPT - Universal Personal Telecommunications	ITU-T Recommendation for establishing a personal communications environment where the individual can be reached through a single (personal) number independent of network or location.