FINAL REPORT

ON

HARMONISATION OF SHORT CODES IN EUROPE

25 September 1998

This study has been prepared by ETO on behalf of ECTRA for the Commission of the European Union.

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Work order no. 48 380
Author: Jack Nuijten

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This report has been prepared by Jack Nuijten of ETO with the kind assistance of the experts of the ECTRA Project Team on Numbering, ECMA, ECTEL, INTUG Europe, EIIA, ETNO, ETSI and GSM MoU EIG. It is to be noted, however, that the report does not necessarily reflect the official opinions of the said organisations.

Executive summary

Introduction

This report contains the findings and proposals of a study on "Harmonisation of Short Codes in Europe", which has been prepared by ETO for the European Commission. It concerns harmonisation across European countries of short codes that are in the national telephone numbering and dialling plans. A study on the harmonisation of short codes is justified because of their considerable significance in telephone numbering and dialling plans.

Short codes consist of digits only, not more than five digits, in exceptional cases six digits. They can be divided into three different types:

- short numbers which are short telephone numbers
- prefixes, which are always followed by a telephone number
- access codes, which are always the first part of a telephone number or a prefix.

Review of present and planned use of short codes

Investigation of the existing and planned use of short codes reveals that the categories of networks/services for which short codes may be used are:

- information/assistance services (access by short numbers)
- public non-telephony networks (access by short numbers)
- public telephony networks (access by short numbers and prefixes, for example carrier selection)
- supplementary services (access by short numbers and prefixes)
- non-geographic services (access by access codes).

It should be noted that several harmonised European short codes (HESCs) are already being introduced. First of all, the international prefix 00 and the emergency number 112, which are both mandatory in the EU. Then the directory enquiry service access code 118 for which an ECTRA Recommendation has recently been adopted. Finally, the national prefix 0, which is recommended by ITU-T for countries with open numbering schemes, that is with local dialling.

In addition, most CEPT countries use short codes for the following networks/services:

- short numbers: operator assistance, fault reporting
- prefixes: carriers (mainly in EU)
- access codes: freephone, shared revenue, shared cost (mainly in EU), cellular, paging (mainly in EU) and personal numbers (mainly in EU).

The use of short codes in North America, Australia and Europe appears to differ considerably. North America uses very few short numbers. Australia uses many short numbers, mainly in the 1-range. The most important lesson to learn from the North American and Australian examples is to be aware of the extensive demand for carrier selection prefixes.

Qualification for national short codes

A tentative assessment is made of whether specific networks/services qualify for national short codes. First, the main criteria are established and considered regarding relevant developments over time. These criteria are then applied to all categories of networks/services for which short codes are used. Finally, the options are considered for assigning short codes to networks/services which qualify.

The use of harmonised European short codes (HESCs)

Potential networks/services are identified for the use of future HESCs. First, the main criterion is established and considered regarding relevant developments over time. The criterion is the social importance of Europe-wide harmonisation. This criterion is then applied to all categories of networks/services for which short codes are used. Finally, the options are considered for assigning HESCs to networks/services which qualify.

HESCs require a common dialling space in the national dialling plans. The common space should consist of one or more ranges. The criteria for choosing a HESC range are related to the social impact of creating the HESCs. The social impact is proportional to the number of subscribers involved. It is caused mainly by freeing a range for HESCs and, to a lesser extent, by changing short codes into HESCs.

Finally, the introduction of HESCs requires a number of steps which are identified.

The non-digit symbols ‘*’ and ‘#’

The use of ‘*’ and ‘#’ symbols will be restricted for a long time because of limited facililities in older terminals and switches. Existing uses suffer from severe lack of harmonisation. Deciding about new uses of ‘*’ and ‘#’ is a process that should be viewed in a long-term perspective and cannot be considered for use in HESCs at present.

Proposals regarding HESCs

The main recommendations of ETO are:

1. ETO emphasises that an important precondition for the harmonisation of short codes in a competitive environment is that NRAs are in control over all short codes used for public services which includes network-specific codes used for public services on mobile networks.

2. ETO recommends that the international prefix 00 and the emergency number 112, which are already being introduced in the EU countries and most other CEPT countries, are introduced in all CEPT countries.

3. ETO recommends that the national prefix 0 is introduced in all CEPT countries which have local dialling.

4. ETO concludes that introduction of new HESCs will require the following steps to be taken by CEPT countries:

   1 Choice of services/networks to which HESCs will be assigned
   ETO recommends consideration of the following networks/services:
   - general types of operator help-desk (short number)
   - special operator services for disabled people (short number)
   - special operator services for foreigners (short number)
   - transportation information/assistance (short number)
   - carrier networks operating in more than one CEPT country (prefixes)
   - shared cost services (access code).

   2 Choice of HESCs to be designated to those networks/services
   ETO recommends:
   - range '11' in particular for information/assistance services
   - a separate range, preferably either range '10' or range '19' but not excluding range '99', if required, for carrier selection prefixes to access carrier networks
   - one or several of the combinations '8xy' with $x \neq 0$, if required, for shared cost services.

   3 Choice of the specific HESCs to be assigned
   ETO recommends:
   - to assign three-digit HESCs for information/assistance services
   - five-digit HESCs with a possibility of future extension to six digits, if required, for carrier networks.

   4 Proposals regarding a European decision process for HESC assignment
   Depending on the assignments options chosen for information/assistance services, a European decision process for HESC assignment may be required. For carrier networks, a European decision process is the only option.

   5 Approval by ECTRA Plenary of all results from the previous steps

6 Choice by individual countries of options for information/assistance services
ETO concludes that six assignment options can be considered when choosing a HESC for a specific (type of) information/assistance service (from low to high level of harmonisation of both short code and service):
- a HESC as an access code of a range of short numbers for network-specific services
- a HESC as an access code of a range of short numbers for national services
- a HESC as an access code of a range of short numbers for pan-European services
- a HESC as a short number for one network-specific service per network
- a HESC as a short number for one national service per country
- a HESC as a short number for one pan-European service.

7 Free choice by each CEPT country of the moment to start its use of a HESC

8 Proposals by any CEPT country regarding the future creation of new HESCs.

5. ETO recommends the following regarding '*' and '#' symbols:

- a study should be initiated in Europe regarding the harmonised use of '*' and '#' and other non-decimal symbols in the long term, involving ETSI, GSM MoU and ECTRA and mandated by the European Commission

- the study should result in the formulation of ETSI standards valid for all types of networks

- the outcome of the study should be used for input into ITU-T to have the E.164 Recommendation amended to include the '*' and '#' and other non-decimal symbols in so far as appropriate.

1. Presentation of the Study

This study on "Harmonisation of Short Codes in Europe" has been prepared by ETO on behalf of ECTRA for the European Commission. It concerns harmonisation across European countries of short codes that are in the national telephone numbering and dialling plans. Short codes, as defined in this report, can be divided into three different types:

- short numbers, which are short telephone numbers
- prefixes, which are always followed by a telephone number
- access codes, which are always the first part of a telephone number or a prefix.

A separate study on the harmonisation of short codes is justified because of their considerable significance in telephone numbering and dialling plans:

- People are acquainted with short codes in their own countries. When travelling or temporarily living in foreign countries or when making international calls from their own country, they could use telephone services more easily if short codes in different countries had similar purposes (compare 112 for emergency and 00 for international access which are being harmonised already). The progress towards a single European market and the growing exchange of information, goods and people across borders may imply an increasing need for Europe-wide harmonisation of short codes. Liberalisation of the telecommunications market of the European Union by 1998 and its increasingly international dimension are likely to add further to this need (for example carrier selection prefixes).

- The introduction of a European Telephony Numbering Space (ETNS) and of universal numbering schemes for global services (Universal Personal Telecommunications (UPT), International Freephone service (IFS), and so on) in addition to the existing national schemes in the near future will not satisfy the demand for the harmonisation of short codes. The obligatory international dialling format of the numbers of these additional schemes is not suitable for the use of short codes, short numbers and prefixes in particular. Furthermore, services that do not qualify for numbers in an ETNS or a global scheme may nevertheless lend themselves to international harmonisation.

- Short codes represent a large capacity of ordinary telephone numbers and should therefore be considered as a scarce and sought-after resource. They need careful consideration in order to safeguard efficient use and non-discriminatory access regarding numbering resources. Therefore, it is important to assess the need for such codes and to identify essential criteria and conditions for their allocation.

The work requirement (see Annex A) addressed to ETO by the European Commission is as follows:

1. To review present and planned short numbers/codes within and outside Europe.

2. To identify service types that could possibly be allocated short codes, taking into account the competitive environment, available resources and the requirement of non-discriminatory, equal and fair allocation of numbers, in particular short codes.

3. To investigate the expected future need for pan-European short numbers/codes.

4. To investigate the possibilities of using * and # in short codes and to identify possible service categories for which the use of * and # should be avoided.

5. To propose a harmonised scheme (number ranges) for short number/code use in Europe, and an accompanying implementation schedule.

Throughout the report, a harmonised European short code will be indicated by the matching abbreviation HESC. Annex B contains a list of definitions of terms and abbreviations.

The study is carried out by ETO in close co-operation with the ECTRA Project Team on Numbering (ECTRA/PTN) and the parties represented in the European Numbering Forum (ENF).

An outline of the first interim report was distributed for comments to ECTRA/PTN and ENF members. It defined the short codes, their use and the scope of the study. It further presented criteria to assess subsequently the need for short codes on a national level, the need for harmonised European short codes (HESCs) and the availability of common number ranges for HESCs. It was presented and discussed in the ETO numbering workshop for ECTRA/PTN and ENF members in Copenhagen on 11-12 November 1997. At the workshop a provisional review of European countries was also presented.

The first interim report was also distributed for comments to ECTRA/PTN and ENF members. It contained a revised outline and, next to that, a review of present and planned short codes in European countries and their use. The report further contained:
- an identification of the services that could possibly be allocated short codes on a national level
- an investigation of the need for HESCs
- an identification of the number ranges that could most easily be freed for HESCs.

The report provided some preliminary proposals on HESCs.

The second interim report was again sent for comments to ECTRA/PTN and ENF. It contained a revised text of the first interim report and, in addition, a review of the use of short codes in North America and in Australia, further considerations for introduction of HESCs and related proposals.

The draft final report was sent for comments to ECTRA, the Commission, ECTRA/PTN and ENF.
Comments made by ENF members during the final phase of the consultation process have been annexed to the report. The final report will also have annexed any comments submitted by individual CEPT/ECTRA members on these issues with regard to their respective national regimes. The final report will be delivered to the Commission after approval by the ECTRA Plenary.

2. Definition and types of short codes

There is no generally agreed definition of the term 'short code' and the term is used in different ways. Neither ITU-T nor ETSI have defined the term. This chapter is intended to clarify the meaning of this term for the purpose of this study. The different types of short codes are described.

2.1 Definition of short codes

A short code is broadly defined in this study. It is a string of digits with the following properties:

- It can be used as a complete dialling sequence or as one of the first parts of a complete dialling sequence on public telephony networks. Its length does not exceed five digits, in exceptional cases six digits. There is no restriction regarding the dialling format (local, national or international).

- It should provide access to a specific network/service or specific type of network/service. 'Network' is a telecommunications network, 'service' is a telecommunications service or its subscriber application.

This broad definition is in line with the use of the term short code in the EU Interconnection Directive[1] and previous ETO reports, although the term has not been defined in these documents. It reflects the scope of the study according to the work requirement. The benefit of having this broad definition is that the term 'short codes' then covers all relevant elements of national numbering and dialling plans which may be considered for international harmonisation.

The length of a short code is restricted to a maximum. This restriction reflects virtually all present use of short codes and is in line with assumptions made in previous ETO reports. It also reflects the advantages of short codes, such as the ease with which they can be memorised and handled by networks. Short codes with more than five digits are, in general, not clearly distinguishable anymore as such. Although normal local subscriber numbers exist which have five or even less than five digits, those numbers are considered exceptional. They stem from the need for small numbering areas in the older electromechanical switches. In modern systems, large numbering areas can be handled, which allows more efficient use of numbering resources.

The definition of a short code does not exclude digit strings (such as a country code or a local area code) which provide access to a specific geographic area,. Such codes, however, have no significance regarding the harmonisation considered in this study.
Short codes not intended for use by the public are not considered. Examples of these codes are found among network-internal numbers, such as for testing and routeing.

[1] Directive 97/33/EC of the European Parliament and of the Council of 30 June 1997 on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP).

The definition does not exclude short codes that are network-specific. It can be assumed, however, that network-specific short codes are relevant for Europe-wide harmonisation only in so far as they are national short codes. A national short code is defined in this study as a short code that is used or planned nation-wide for the same (type of) network/service.
A harmonised European short code (HESC) is defined in this study as a short code which is used or planned for the same (type of) network/service in a significant part of Europe according to a formal agreement.

Short strings with '*' or '#' are not included in the definition. However, the possibility of using '*' and '#' for telephony purposes requiring short codes is investigated in this study (see chapter 8).

ETO defines a short code, within the context of this study, as a string of digits which can be used as a complete dialling sequence or as one of the first parts of a dialling sequence on public telephony networks to access a specific network/service or specific type of network/service. Its length does not exceed five digits, in exceptional cases six digits.

ETO defines harmonised short codes on two levels for the purpose of this study:

- A national short code is a short code that is used or planned nationwide for the same (type of) network/service.

- A harmonised European short code (HESC) is a short code which is used or planned for the same (type of) network/service in a significant part of Europe according to a formal agreement.

2.2 Types of short codes

According to the definition of short codes in the previous section, three different types of short codes can be distinguished: short numbers, prefixes and access codes. These three types are defined below[2]:

- A short number is a short telephone number. A telephone number is either an E.164 number or a non-E.164 number which is used for the same purposes as an E.164 number. Examples of the use of short numbers are: information/assistance services that are in the public interest, access to carrier networks/services, access to non-telephony networks or supplementary services.

- A prefix is a short code that may be dialled before a telephone number in a single dialling sequence on a public network. The prefix provides some extra information to the network, such as the (national or international) format of the dialled telephone number, the carrier to be selected for the call or the status of certain supplementary services required for the call.

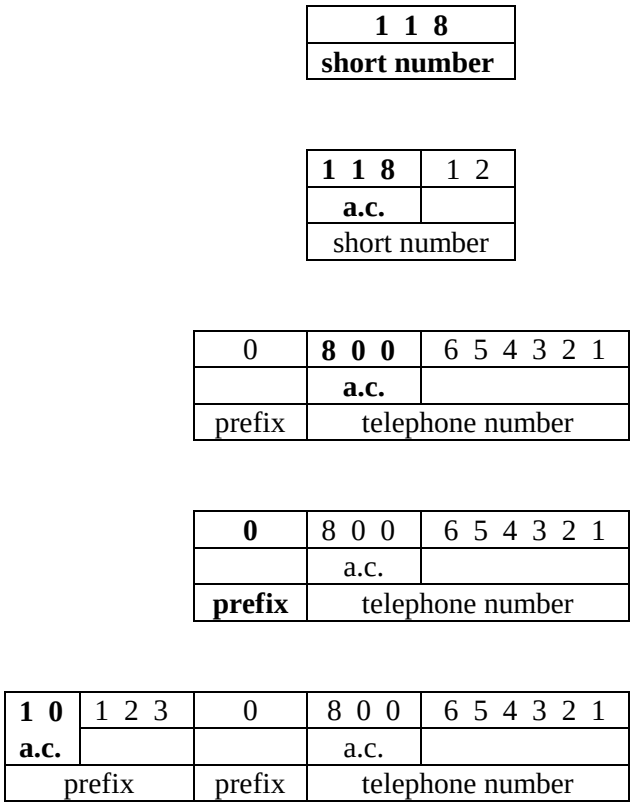
[2] The terms 'number' and 'prefix' are used her in line with ITU-T definitions, in particular ITU-T Recommendation E.164. The term 'access code' is not defined by ITU-T. Access codes which are the first part of a telephone number may or may not coincide with National Destination Codes (NDCs) as defined in E.164.

- An access code is a short code which consists of the first part of a prefix or a telephone number. The access code provides information to the network on the type of network/service required, such as a particular non-geographic telephony service, a particular national public telephony network, a particular type of information/assistance service or a carrier selection service.

Annex C provides a list on the possible use of short codes in which the examples of use for each of the three types are further explained.

It will be clear that these definitions apply to national dialling plans rather than to national numbering plans. National dialling plans cover both numbers and prefixes while national numbering plans do not cover prefixes.
For further clarification, each type of short code is depicted in examples of typical dialling sequences in figure 1 below. The examples concern local and national calls in countries with an open numbering plan.

Figure 1. The location of short codes in typical dialling sequences for local and national calls in countries with an open numbering plan. (a.c. = access code)



Each of the five rows represents a complete dialling sequence. Each dialling sequence is provided with a numeric example. Prefixes are located left from the centre and telephone numbers right from the centre. Access codes are always the first part of a prefix or a telephone number. The boxes with characters in bold indicate the typical locations of the different types of short codes in a dialling sequence.
The two examples of short numbers shown here are complete dialling sequences in themselves. Another possibility is that a short number is preceded by a prefix, such as the national prefix 0. The second example is a short number consisting of an access code

followed by a few digits. In the case of access code 118 for directory enquiry services, the additional digits identify competing or different types of directory enquiry services.
The third dialling sequence has access code 800 as the first part of a freephone telephone number as an example. Access code 800 is followed by the subscriber number.
If a prefix is used, it always precedes a telephone number. Some dialling sequences start with two prefixes, as in the last example where a carrier selection prefix precedes the national prefix 0. The carrier selection prefix consists of a carrier access code (CAC) followed by a carrier identification code (CIC).

It should be realised that the broad definition of short codes used here unites different types of short codes which nevertheless require a different approach from a harmonisation point of view. In particular, access codes in telephone numbers of normal length need to be approached differently from short numbers and prefixes in this respect.

ETO distinguishes and defines three different types of short codes within the context of this study: short numbers, prefixes and access codes.

3. Review of present and planned use of short codes

This chapter provides a review of the present and planned use of short codes, as defined in chapter 2, in European and some non-European countries. Information is provided on 36 CEPT countries (including all 15 EU countries), the USA and Australia. This information will be used in two ways:

- to assess the present level of Europe-wide harmonisation of short codes
- to identify networks/services which may qualify for Europe-wide harmonisation of their short codes.

3.1 The possible use of short codes

For the purpose of completeness of the review, a list of possible use has been developed for each type of short code, that is short numbers, prefixes and access codes as defined in chapter 2. See Annex D. This list is based on the existing and planned use of short codes in different countries. It can be considered as an exhaustive list within the scope of this study. The list provides a framework for the review of short codes and their use.

ETO concludes that networks/services for which short codes may be used are:

- information/assistance services (access by short numbers)
- public non-telephony networks (access by short numbers)
- public telephony networks (access by short numbers or prefixes, for example carrier selection)
- supplementary services (access by short numbers or prefixes)
- non-geographic services (access by access codes).

3.2 The present use of harmonised European short codes (HESCs)

European harmonisation is already taking place for some short codes, namely:

- national prefix 0 (ITU-T Recommendation E.164)
- international prefix 00 (ITU-T Recommendation E.164; European Council Decision of 1992)

- emergency number 112 (CEPT Recommendation of 1972-1990[3]; European Council Decision of 1991)

- directory enquiry service access code 118 (CEPT Recommendation of 1972-1990; ECTRA Recommendation of 1997).

For each of these four short codes, harmonisation is actually taking place based upon a Recommendation and/or a European Council decision, which made it mandatory in EU countries. According to the definition in this study, these short codes are HESCs.
The table in Annex D shows which of 37 European countries use or will use these HESCs. All CEPT countries are included except six countries from which no information is available at all. Complete information is available from the 15 EU countries. The number of non-EU countries from which information on a particular HESC is available varies between 20 and 22. Table 1 below provides a summary by showing the number of countries which use or will use the HESCs, compared with the number of countries from which information is available (see 'out of' in the table).

Table 1. The number of European countries which use or will use HESCs[4].

HESC	number of EU countries	number of CEPT countries outside EU
national prefix 0 (only applicable to open plans)	10 out of 15 (5 have closed plans)	14 out of 20 (3 have closed plans)
international prefix 00	15 out of 15	21 out of 22
emergency number 112	15 out of 15	15 out of 22
DQ access code 118	8 out of 15	7 out of 22

These codes need no further investigation. It is evident that the national prefix 0, the international prefix 00 and the emergency number 112 should be recommended for all CEPT countries.

ETO concludes that existing HESCs are national prefix 0, international prefix 00, emergency number 112 and directory enquiry service access code 118.

ETO recommends that the international prefix 00 and the emergency number 112, which are already being introduced in at least the EU, are introduced in all CEPT countries.

ETO recommends that the national prefix 0 is introduced in all CEPT countries which have local dialling.

[3] CEPT Recommendation T/SF 1 (The Hague 1972, revised at Puerto de la Cruz 1974, at Malaga-Torremolinos 1975, at Stockholm 1976 and by correspondence 1990) Long Term Standardisation of National Numbering Plans.
[4] The number of countries for which information is available differs amongst the HESCs as the information has been collected from different sources which cover different sets of countries.

3.3 The use of national short codes (non-HESCs)

An overview of the present and future use of national short codes in 37 European countries is provided in five tables in Annex E. A summary is provided in table 2 below by showing the number of countries continuing to use or planning to use short codes for different networks/services.

Table 2. The number of European countries with continued or planned use of short codes for different networks/services[5].

Networks/services	number of EU countries	number of CEPT countries outside EU
1. Operator services		
unspecified operator services	5 out of 14	3 out of 6
operator assistance	11 out of 15	19 out of 20
fault reporting	9 out of 15	14 out of 16
customer care	3 out of 14	2 out of 5
calling card	4 out of 14	1 out of 6
telegram, telex, fax	1 out of 14	4 out of 7
2. Other information/assistance		
speaking clock	6 out of 14	5 out of 8
weather report	2 out of 14	3 out of 8
medical/social care	3 out of 14	3 out of 8
wake-up call	3 out of 14	5 out of 8
transportation services	2 out of 14	4 out of 8
public utilities	0 out of 14	4 out of 9
3. Non-geographic services		
freephone	14 out of 15	18 out of 19
shared revenue	15 out of 15	14 out of 18
shared cost	11 out of 14	6 out of 12
cellular	15 out of 15	19 out of 19
paging	14 out of 15	10 out of 12
personal numbers	10 out of 14	8 out of 14
4. Mixed networks/services		
carriers	12 out of 14	4 out of 10
network-specific	5 out of 14	2 out of 8
CLIP/CLIR	5 out of 14	0 out of 8
Voice mail	3 out of 14	2 out of 8
VPNs	7 out of 14	1 out of 10
5. Non-telephony networks		
data networks	5 out of 14	3 out of 8
Internet	4 out of 14	3 out of 8
videotex	4 out of 14	0 out of 8

[5] The number of countries for which information is available differs amongst the networks/services as the information has been collected from different sources which cover different sets of countries.

All CEPT countries are included except eight countries from which no information is available at all. The number of EU countries from which information on a particular HESC is available varies between 14 and 15; the corresponding number of non-EU countries varies between 5 and 20. These data are reflected in the table by indicating the number of countries from which information is available (see 'out of' in the table).
Networks/services for which HESCs already exist are excluded. Networks/services are included if they are accessed by short codes in at least two European countries according to the information available.

ETO concludes that most CEPT countries use short codes for the following networks/services:

- short numbers: operator assistance, fault reporting
- prefixes: carriers (mainly in EU)
- access codes: freephone, shared revenue, shared cost (mainly in EU), cellular, paging (mainly in EU) and personal numbers (mainly in EU).

3.4 Non-European countries

Information on the present and future use of short codes in North America and in Australia is provided in Annex F. These countries are more advanced in the development of competition in the telecommunications market than most European countries, including the EU.

In summary, the use of short codes in North America, Australia and Europe appears to differ considerably. The most notable features of both the North American and the Australian use of short codes are described below. It should be noted that North America has an integrated numbering plan which covers 23 countries: the USA, Canada and Caribbean countries. The North American short codes are not all harmonised across these countries. The short codes mentioned below are at least harmonised across the USA.

North America:

- uses '0' and '00' not as prefixes but mainly as short numbers for operator services
- uses very few short numbers compared with most European countries
- uses an eight-digit prefix with a four-digit access code and four-digit carrier identifiers.

The carrier selection prefix originally had a length of five digits with the format 10xxx. Later, the CIC had to be extended by one digit because of the unexpectedly heavy demand which is also due to the relaxed definition of carrier networks in North America.

Australia:

- uses a range of prefixes for special enhanced international services with prefixes which combine the functions of international prefix and identification of the service/network concerned

- uses many short numbers, mainly in the 1-range.

ETO concludes that the most important lesson to learn from the North American and Australian examples is to be aware of the extensive demand for carrier selection prefixes.

4. Qualification for national short codes

This chapter provides a tentative assessment of whether specific networks/services qualify for national short codes. First, the main criteria are established and considered regarding relevant developments. These criteria are then applied to all categories of networks/services for which short codes are used. Finally, the options are considered for assigning short codes to networks/services which qualify.

ETO emphasises that an important precondition for the harmonisation of short codes in a competitive environment is that NRAs are in control of all short codes used for public services, including network-specific codes used for public services on mobile networks. This is also what is required by EU regulation.[6]

4.1 Criteria for assessment

Assessment for qualification of specific networks/services for access by a short code is made by what ETO considers to be the three main criteria common to all networks/services:

1. *The social importance of a short code*
   A good example of a short code with social importance is a short number for emergency services. In case of an emergency, it is important to react quickly, to have the emergency number immediately available and to dial without making mistakes. For this purpose, a short number is certainly advantageous compared with an ordinary telephone number.

2. *Call frequency*
   Frequently-dialled numbers occupy networks and users (or user terminals) more than numbers with average dialling frequency. Therefore, shorter lengths of more frequently-dialled numbers generally result in a more efficient use of resources. This is less true for modern systems.

3. *Network limitations*
   Although network limitations do not play an important role in modern systems, in some cases they should still be taken into account. An example is the limitation of the length of a dialling sequence. This limitation may become apparent in particular when a carrier selection prefix is used. Another example is the need to route explosive traffic through dedicated transmission paths in order to prevent congestion. An access code for telephone numbers concerned would support easy routeing.

Social importance and call frequency do not necessarily coincide. Fulfilment of only one of the two criteria may justify a short code.

The need for short codes is changing. The most important developments which affect the need are:

[6] See Article 12 of the Directive 97/33/EC of the European Parliament and of the Council.

- *Development of intelligence in networks and in terminal equipment*
  Modern networks are less dependent on short numbers for easy routeing of calls. Similarly, terminal equipment can more simply replace the need for short numbers or short prefixes by provisions for automatic dialling or abbreviated dialling. Alphanumeric dialling can also be mentioned in this context. Its use is expected to increase and to reduce the need for short numbers.

- *Development of non-geographic services*
  Long numbers for non-geographic services like freephone, shared revenue and shared cost services provide an alternative for some short numbers. The advantages of an access code for an IN (intelligent network) service may outweigh the advantages of a short number. The access code may inform the caller about the type of service and/or the tariff, which a short number does not.

- *Development of feasible alternatives for telephony networks/services*
  Some information/assistance services lose their social importance because of the development of feasible alternatives. For example, speaking clocks have become less important as clocks and watches have become generally available; weather reports on teletex or on Internet may substitute telephony equivalents.
  On the other hand, access to non-telephony networks is gaining significance.

- *Development of competition*
  Information/assistance services which were initially provided in a monopoly environment may more often be provided in a competitive environment now. This may increase the demand for short numbers. The scarcity of short numbers may prohibit their continued use, assuming that one competitor should not have an advantage over another competitor because of a shorter number. An alternative is to allow network-specific short numbers. Network operators show a need to use network-specific short numbers which are not harmonised and which provide them with possibilities for branding their services and making these services easily accessible. This is an effect of competition which runs counter to the use of short numbers and their harmonisation.
  On the other hand, competition creates the need for carrier selection prefixes.

The overall effect of these developments seems to be that the use of short numbers is decreasing, while the use of prefixes and access codes is increasing. Some confirmation of the assumed decrease in short numbers can be found in the decision in Germany to delete almost all short numbers and the plans in Denmark to bring the quantity of short numbers down considerably. The increase in the use of prefixes and access codes is obvious, for example when comparing EU countries and Central and Eastern European countries. See Annex E.

ETO concludes that the three main criteria for qualification of specific networks/services for access by a short code are:

- social importance of a short code

- call frequency for the networks/services

- network limitations.

ETO concludes that the need for short codes is affected by the following developments:

- development of intelligence in networks and terminal equipment
- development of non-geographic services
- development of feasible alternatives for telephony networks/services
- development of competition.

ETO concludes that, overall, the use of short numbers seems to be decreasing and the use of prefixes and access codes seems to be increasing.

4.2 Application of criteria

In this section, the criteria mentioned above are applied to national short codes for the networks/services of table 2, taking developments into account. It is noted that the outcome may differ from country to country, but a common minimum set of networks/services qualifying for national short codes can be identified.

1. *Operator services*
   The need for short numbers for operator services is decreasing. This is due to the developments mentioned in the previous section regarding intelligence in networks and terminal equipment, non-geographic services and feasible alternatives. Feasible alternatives are becoming available in particular for operator services, such as operator assistance and telegram/telex/fax services. The introduction of competition may then be a reason to change to long telephone numbers rather than to increase the number of short numbers. An alternative is to allow the use of network-specific short codes that are not harmonised. Maintaining national short codes is, possibly, worthwhile for general types of help-desk service (apart from directory enquiry services).
   On the other hand, some operator services may possibly gain significance, such as special services for disabled people (people with impaired hearing and/or speech) and for foreigners (foreign travellers or foreign residents).
   ETO concludes that general types of operator help-desk and special operator services for disabled people and for foreigners *possibly* qualify for short numbers.

2. *Other information/assistance services*
   For reasons similar to those applying in the case of operator services, the need for short numbers for other information/assistance services is decreasing. Speaking clocks and weather reports are examples of services for which feasible alternatives have become available. On the other hand, some information/assistance services, like medical/social care and transportation services, may possibly gain significance.
   ETO concludes that social/medical and transportation information/assistance *possibly* qualify for short numbers.

3. *Non-geographic services*
   Non-geographic services are increasing in importance. They use service access codes that have social importance because of the information they bear. They enable service branding, so as to provide the calling party with advance information on the characteristics of the type of service concerned. An important characteristic is the tariff structure for charging the caller. Other characteristics may be whether the

service provides one- or two-way communication, whether the calling party has to identify itself or not, whether the call is answered by a human being or by an automated system, whether the applications are adult services or not, and so on. Service access codes may also be of interest to the networks, for example to route calls to dedicated networks providing the services concerned, to route explosive mass traffic through dedicated transmission paths in order to prevent congestion, to block international calls to shared revenue services or to block calls from certain subscribers to adult services.

The assessment to be made regarding non-geographic services is whether certain types of non-geographic services may qualify for a separate access code of their own. For example, shared cost services may not have an access code of their own but share the access code used for shared revenue services.

ETO concludes that the following non-geographic services qualify for access codes: freephone, shared revenue, cellular, paging and, *possibly*, shared cost and personal numbers.

4. *Mixed networks/services*

The group of mixed networks/services here consists of carrier networks/services, network-specific purposes, the supplementary services calling line identification presentation and calling line identification presentation restriction (CLIP/CLIR), voice mail and virtual private networks (VPNs).

In a competitive environment, carrier selection is an important issue. It is assumed that only national carrier selection prefixes are considered, in line with the previous ETO report on carrier selection[7].When a carrier is selected on a call-by-call basis, a short prefix plays an important role because of the ease of dialling and because of network limitations to the total length of the dialling sequence.

Network-specific purposes for using short codes (short numbers, prefixes and access codes) may be worthwhile to have within a certain range which is nationally defined. This would facilitate the recognition of short codes which may have different purposes on different networks. The range could be identified by the first digits which can be seen as an access code.

CLIP and CLIR are examples of supplementary services for which some short codes (short numbers or prefixes) have a high social importance. Subscribers should always be able to activate CLIR in order to protect their privacy by preventing the presentation of their telephone number to the called party that is using CLIP. Although ETSI has defined short strings with '*' or '#' for such purposes, conditions for using these symbols are not always fulfilled. Traditional telephone terminals or exchanges may not have '*' and '#' facilities. This may be a reason to use short codes instead of or in parallel with '*' and '#' strings. When the short code is a prefix, the shortness of the prefix is important because of network limitations.

Voice mail and VPNs may be provided as non-geographic services with access codes. For VPNs, the length of the access code may be critical because of the possibility that some VPNs may require many digits after the access code in order to embed the internal numbering plan of the company concerned in the public number range behind the access code.

ETO concludes that carrier networks/services, CLIP/CLIR and, *possibly*, the range of network-specific purposes, voice mail and VPNs qualify for short codes.

5. *Non-telephony networks*

Access to non-telephony networks is normally achieved by intelligent terminal equipment, such as a PC, which has automatic dialling facilities. Therefore, there is little social importance in having a short number for such access.

[7] Final report on carrier selection, ETO, 24 July 1997.

ETO concludes that probably none of the non-telephony networks qualify for short numbers.

It should be born in mind that, apart from national short codes, network-specific short codes which are not harmonised could be used to provide access to networks/services .

ETO concludes that the following networks/services qualify for national short codes:

- certain non-geographic services: freephone, shared revenue, cellular and paging (access codes)
- carrier networks/services (prefixes)
- CLIP/CLIR (short numbers or prefixes).

ETO concludes, in addition, that the following networks/services *possibly* qualify for national short codes:

- general types of operator help-desk (short number)
- special operator services for disabled people and for foreigners (short number)
- social/medical and transportation information/assistance (short number)
- certain non-geographic services: shared cost, personal numbering, voice mail and VPNs (access codes)
- the range of network-specific purposes (access code).

4.3 Options for assignment

If a type of network/service, such as a transportation service, qualifies for a short code, the actual assignment of a short code depends on at least the following conditions:
- scarcity of short codes
- the degree of demand for short codes from other networks/services of the same type
- the national definition of the (type of) network/service, if the short code is national.

Assignment of short codes to some market parties and of long strings to others for the same type of network/service would create unfairness in competition. The problem of scarcity in situations of demand from competing market parties should be solved in a non-discriminatory way. The conditions regarding scarcity and demand are detailed below for networks/services using short numbers or prefixes. Those considerations do not apply to access codes for non-geographic services.

Short numbers

If the available capacity of short numbers does not meet the demand, then assignment may not be justifiable. Two approaches can be chosen regarding the choice of a national short code for a specific (type of) service for which short numbers are used:

- One approach is to have a range of short numbers with one national access code. A familiar example is access code 118 followed by a few digits to identify different directory enquiry services either offered by different service providers or by the same service provider. In this case, harmonisation is limited to a national access code and many short numbers of extra length are required. The short numbers could be either national or network-specific. There is a drawback either way. National use requires more and, possibly, longer short numbers. Network-specific use implies the possibility of diversity between services with the same short number.

- The other approach is to have just one national short number available for the specific (type of) service. The known example is emergency number 112. In this case, only one national short number is needed which could be very short indeed. However, co-operation between market parties may be required to a certain extent. The short number should be assigned on condition that certain market parties are not discriminated against. This could be achieved by demanding non-discriminatory co-operation between the market parties. One possibility is for the network-specific use of the short number to be made subject to co-operation between service providers on the same network. Another possibility is to have only national use of the short number which implies co-operation of service providers on a national level. For both possibilities, co-operation could be limited to providing a common access point or could be extended to providing one joint service.

Table 3. The options for assigning a national short code to a specific (type of) service and the associated conditions. (harmonis. = harmonisation)

Assignment options for national short codes	Length of short numbers	Level of short code harmonis.	Level of service harmon.	Level of co-operation
one access code + extra digits for one type of network-specific services	long	low	high	none
one access code + extra digits for one type of national services	very long	low	very high	none
one short number for one network-specific service per network	short	high	high	network-specific
one short number for one national service	short	high	very high	national

In table 3 above, the different options for assigning a national short code to a specific (type of) service and the conditions are shown. The conditions, apart from the common service definition, are the number of short numbers, the level of harmonisation of both the short codes and the services and the level of co-operation between providers of networks/services.

Prefixes

It is assumed that the only feasible option for using prefixes for carrier networks/services is to assign national carrier selection prefixes. Assigning such prefixes requires an adequate supply of carrier selection prefixes which fits the national carrier network/service definition. In some countries, only one prefix may be assigned to a particular carrier for access to its network, while in some other countries, additional prefixes may be assigned to one specific carrier for different carrier services.

ETO concludes the following regarding the actual assignment of short codes:

- assignment depends on scarcity and demand and should not create unfair competition
- assignment requires a national definition of the networks/services concerned, if the short code is national.

ETO concludes that four options can be considered when choosing a national short code for a specific (type of) information/assistance service (from low to high level of harmonisation of both short code and service):

- a national access code of a range of short numbers for network-specific services
- a national access code of a range of short numbers for national services
- a national short number for one network-specific service per network
- a national short number for one national service.

ETO concludes the following regarding the use of prefixes for carrier networks/services:

- the only feasible option is to assign national carrier selection prefixes
- assigning national carrier selection prefixes requires an adequate prefix supply which fits the national carrier network/service definition.

5. The need for harmonised European short codes (HESCs)

In this chapter, potential networks/services for which HESCs may be used in future are identified.

First, the main criterion for the use of HESCs is established and considered regarding relevant developments over time. This criterion is then applied to all categories of networks/services for which short codes are used. Finally, the options are considered for assigning HESCs to networks/services which qualify.

5.1 Criteria for assessment

The main criterion for qualification of networks/services for HESCs is considered by ETO to be the social importance of Europe-wide harmonisation. This social importance is related to the use of the short codes both by people making national calls while travelling or living abroad and by people making international calls from their home country within Europe.

The need for HESCs changes. The developments affecting the need for national short codes affect the need for HESCs in the same way. (See section 4.1 regarding the developments of intelligence in networks and terminal equipment, non-geographic services, feasible alternatives and competition.) Taking these developments into account is even more important for HESCs than for national short codes, because the creation of HESCs is a long-term process. It should be noted that competition may run counter to harmonisation. Competing network operators and service providers are well aware of the commercial value of short numbers and prefixes. They have a need to use short numbers which are not harmonised in order to brand their services.

Some other developments are important in the context of HESCs:

- *The growing exchange of information, goods and people across borders*
  The growing exchange of information, goods and people across borders makes both the volume of international telephone calls by native residents and the volume of national calls by foreigners grow. This development suggests that there will be an increasing need for HESCs.

- *The lowering of tariffs for international calls*
  Lower tariffs stimulate both international calling by native residents from their home countries and international calling by foreigners to their home countries. An increase in international calls *from* home countries implies a greater need for HESCs. On the other hand, more international calls *to* home countries would imply less need for HESCs. Because of the latter case, accessibility from abroad may become more important than international harmonisation of short codes.

- *The creation of international numbering schemes*
  International numbering schemes like the ETNS and universal schemes for global services (UPT, international freephone, and so on) are being created in addition to national schemes. They may provide alternatives to Europe-wide harmonisation of national access codes for non-geographic services. International numbering schemes

are intended for non-geographic services which are provided internationally and/or for which the applications are internationally accessible. They will attract part of the international calls to non-geographic services. They will co-exist with non-geographic services using national numbering resources which may still require international harmonisation.

Overall, these developments do not clearly point towards either an increasing or an decreasing need for HESCs.

ETO concludes that qualification of specific networks/services for a HESC mainly depends on the social importance of Europe-wide harmonisation.

ETO concludes that the need for HESCs is affected by the following developments:

- those affecting the need for national short codes (see section 4.1) and, in addition,
- growing crossborder exchange of information, goods and persons
- decreasing tariffs for international telephony calls
- creation of international numbering schemes.

ETO concludes that, overall, these developments do not clearly point towards either an increasing or an decreasing need for HESCs.

5.2 Application of the criterion

The outcome of chapter 4 on the tentative qualification of networks/services for national short codes is the starting point for identifying the networks/services for HESCs. The above-mentioned criterion is applied, taking into account the developments described. The same five groups of networks/services are distinguished:

1. *Operator services*
   Access to operator services may be achieved by short numbers. Consideration regarding HESCs can be given to general types of help-desk service as well as to special services for disabled people and for foreigners. Both groups of disabled people and of foreigners are growing. The three types of operator services would require more precise definitions.
   The special services for disabled people do not have a sound national base. On the other hand, one of the COST projects, subsidised by the European Commission, investigates the requirements for physically disabled people to access telephone networks. In one of their studies Europe-wide harmonised short codes for access to text and videophones and relay services have been proposed. The study points out that an increasing percentage of the EU population is physically impaired; there are for example 2.5 million hearing-impaired people at present.
   'Operator assistance' is becoming less important with the telephone networks being further automated and may be combined with directory enquiry services. The original CEPT proposal to have short number 115 as a HESC for 'operator assistance' is therefore no longer important.
   ETO concludes that general types of operator help-desk and special operator services for disabled people and for foreigners *possibly* qualify for HESCs.

2. *Other information/assistance services*
   Access to other information/assistance services may also be achieved by short numbers. The use of HESCs for transportation services, which are particularly important for foreigners, can be considered. Transportation services cover a wide range of services such as information on traffic, public transport, taxis, flights and cars for rent, booking for transport and road assistance.
   A second type of information/assistance service important for foreigners is tourist information, such as information on hotels and tourist attractions and booking for hotels and attractions. However, this type of service is not considered here, because countries are generally not using short numbers for this purpose.
   ETO concludes that transportation information/assistance *possibly* qualifies for HESCs.

3. *Non-geographic services*
   Access codes for non-geographic services require a different approach compared with short numbers and prefixes. Changing access codes inherently involves changing many telephone numbers of subscribers, which is not the case when changing short codes or prefixes. Access code changes should preferably be made in the context of fundamental numbering plan changes which are made for other reasons than harmonisation alone.
   ETO provides guidelines for fundamental changes of national numbering plans in its report on national numbering schemes[8]. According to these guidelines, the access codes for mobile and personal communications services should preferably start with digits 6 and 7. Access codes starting with two digits of which the second one is 0, should preferably be reserved for future services. Access code 800 should preferably be used for freephone services and range 80X should be reserved for future use by those services. Similarly, access code 900 should preferably be used for shared revenue services and range 90X should be reserved for future use by those services.
   The non-geographic services for which harmonisation seems to be most beneficial are freephone and shared revenue services, as the tariffs for calling parties could differ distinctively from those of other types of non-geographic services. As can be concluded from table 3 in Annex E, harmonisation of the access codes 800 and 900 for these services is already taking place. Shared cost services are expected to become more important, in particular as an alternative to freephone services. ITU-T Study Group 2 has approved a recommendation for an international shared cost service and has reserved country code 808 for the service in March 1998.
   ETO concludes that, in addition to the guidelines in its report on national numbering schemes, a HESC should be considered for shared cost services.

4. *Mixed networks/services (carrier networks/services and supplementary services)*
   Of the group of mixed networks/services, only carrier networks/services and supplementary services like CLIP/CLIR can be considered.
   For carrier networks/services, two cases should be distinguished:
   - carriers operating in one CEPT country only for national and/or international calls
   - carriers operating in more than one CEPT country for national and/or international calls.

   Only the latter case can be considered for a HESC. ETO recommends in its report on carrier selection[9] that ECTRA should determine a Europe-wide harmonised carrier access code (CAC) which is followed by carrier identification codes (CICs) for carriers operating in more than one CEPT country. A carrier network will then be accessible by the same carrier selection prefix in different countries.

[8] Final report on the Review of National Numbering Schemes on their Openness to Competition, ETO, 15 October 1997.
[9] Final report on carrier selection, ETO, 24 July 1997.

Further considerations of a HESC range for carrier selection reveal both benefits and drawbacks. The benefit from a subscriber point of view is that the same prefix can be used in different countries for selecting a specific carrier network. This is true in particular for subscribers using their own mobile telephones. In most other cases, when travelling abroad, calls are made on subscriptions of third parties and using one's own carrier does not seem relevant. The benefit for subscribers will decrease as tariffs for international calls are going down and the tariff differences between carriers disappear. The benefit from a carrier point of view is the effectiveness of marketing a single prefix in different countries. An important drawback is that a HESC range will require a larger number of CICs compared with a non-HESC range. For, if a particular CIC is assigned then this CIC can not be used anymore for other purposes, not even in CEPT countries where the carrier concerned is not operating. To allow a larger number of CICs, either a larger part of the national numbering space has to be reserved (say ten times as large) or longer prefixes have to be used (say one digit extra). The number of CICs should be limited by applying a strict definition of eligibility of applicants for these CICs and allowing not more than one CIC per carrier. Another drawback is that carriers may originally use a non-HESC prefix which has to be changed when migrating to a HESC prefix.
Access to supplementary services by using '*' and '#' codes should be made according to the ETSI standard. The use of short numbers or prefixes for such access should be seen as exceptional and temporary. This is therefore considered a national matter which does not require Europe-wide harmonisation. This was already proposed for CLIR by ETO in its report on user-friendly numbering.[10]
ETO concludes that carrier networks operating in more than one country *possibly* qualify for HESCs.

5. *Non-telephony networks*
As there is little social importance in having a short number for access to non-telephony networks, HESCs are not considered in this context either.
ETO concludes that none of the non-telephony networks qualifies for HESCs.

ETO recommends that the following networks/services are considered by the CEPT countries regarding their qualification for HESCs:

- general types of operator help-desk
- special operator services for disabled people
- special operator services for foreigners
- transportation information/assistance
- carrier networks operating in more than one CEPT country
- shared cost services.

[10] Final report on Numbering Related to the Topic of User-friendliness, ETO, 3 October 1996.

5.3 Options for assignment

When the assignment of a HESC is under consideration, it is obvious that, as a minimum, conditions regarding scarcity of HESCs and demand for HESCs should be taken into account. In addition, a common definition of the (type of) network/service concerned should be agreed upon by the CEPT countries.
Conditions regarding scarcity and demand are detailed below for short numbers (for operator services and other information/assistance services) and prefixes (for carrier networks). Those considerations do not apply to access codes for non-geographic services.

Short numbers

When a HESC is assigned to a specific type of information/assistance service, such as a help-desk service, the same two possible approaches as for assignment of short numbers on a national level should be considered:

- The HESC is an access code followed by a few digits and comprising a range of short numbers. In this case, harmonisation is limited to 'service branding'. The short numbers themselves are not fully harmonised. Extra number length is required.

  Three options for use can be distinguished:

  - for network-specific services

  - for national services

  - for pan-European services, which would require a European decision process for the assignment.

- The HESC is a single short number. In this case, the short number is fully harmonised and could indeed be short, but some co-operation between market parties may be required.

  Three similar options for use can be distinguished again:

  - for one network-specific service per network

  - for one national service per country

  - for one pan-European service, which would require a European decision process for the assignment.

The six different options are shown in table 4 below.
For a particular HESC, the chosen options can differ from country to country. Migration can be envisaged from one option to another.
Compared with table 3 regarding the assignment of national short codes, table 4 has the two additional cases for pan-European services which require co-operation between countries in a European decision process. A European level of co-operation between market parties or between countries may take some time but should not be excluded.

Table 4. The options for assigning a HESC to a specific (type of) service and the associated conditions. (harmonis. = harmonisation)

Assignment options for HESCs	Length of short numbers	Level of short code harmonis.	Level of service harmon.	Level of co-operation
one access code + extra digits for one type of network-specific services	long	low	average	none
one access code + extra digits for one type of national services	very long	low	high	none
one access code + extra digits for one type of pan-European services	longest	low	very high	none
one short number for one network-specific service per network	short	high	average	network-specific
one short number for one national service per country	short	high	high	national
one short number for one pan-European service	short	high	very high	pan-European

Prefixes

The only feasible option for European harmonisation of prefixes for carrier networks is to use HESCs from a range with one common carrier access code. Assigning such HESCs requires a strict carrier network definition to limit the use of HESCs as discussed in the previous section 5.2. In addition, a European decision process should be established.

ETO concludes that the assignment of HESCs requires a common definition of the networks/services concerned.

ETO concludes that six options can be considered when choosing a HESC for a specific (type of) information/assistance service (from low to high level of harmonisation of both short code and service):

- a HESC as an access code of a range of short numbers for network-specific services
- a HESC as an access code of a range of short numbers for national services
- a HESC as an access code of a range of short numbers for pan-European services
- a HESC as a short number for one network-specific service per network
- a HESC as a short number for one national service per country
- a HESC as a short number for one pan-European service.

ETO concludes the following regarding the use of HESCs for carrier selection:

- the only feasible option for European harmonisation of prefixes for carrier networks is to use HESCs from a range with one common access code

- assigning such HESCs requires a strict definition of eligibility of applicants to limit the use of HESCs

- assigning such HESCs requires a European decision process.

6. The potential dialling space for HESCs

In chapter 5 the networks/services that may qualify for HESCs were identified. In this chapter 6, potential dialling space for those networks/services is identified by making a qualitative assessment of the social costs (impact) of freeing such space for HESCs. Assessment of this type is appropriate for short numbers and prefixes. For access codes, the potential ranges are mainly determined by existing harmonisation tendencies. Shared cost services are close to freephone services where tariffs are concerned. This suggests that choosing an access code for shared revenue services close to '80x' would be preferable. At present, the existing national access codes for those services in Europe are diverse although there seems to be a slight preference for the range '8'. A number of European countries have no separate access code for shared cost services at all. The country code chosen for the ITU-T defined international shared cost service is 808.

ETO recommends use of one or several of the combinations '8xy' with $x \neq 0$ as HESCs , if required, for shared cost services.

6.1 Previous recommendations

ETNO conducted a study on HESCs (short numbers and prefixes) focussing on the identification of a potential dialling space for HESCs. ETNO investigated the present use of range 1, that is the dialling sequences starting with digit 1. This range is considered to be the most promising one. ETNO examined in particular the ranges '11' and '19' and provisionally concluded that range '11' would be the most appropriate for HESCs. For details regarding the study, reference is made to Annex I with the ETNO common position on HESCs of January 1997.
ETO based its recommendations in previous reports mainly on the ETNO study. ETO stated in its report on the review of national numbering schemes[11] that short codes starting with digit 1 would facilitate an easy recognition of these codes throughout Europe in the long run. In the same report, ETO recommended investigation in particular of the number ranges '10', '11' and '19' as a potential resource for HESCs.

ETO concludes that particularly the number ranges '10', '11' and '19' should be included in the investigation of potential dialling space for HESCs (short number and prefixes).

6.2 Criteria for the identification of potential HESC space

It is assumed that the HESC space for short numbers and prefixes should consist of at least one and probably a few more ranges identified by the first two digits, such as '11'. A range identified by the first three digits, such as '111', is considered to be unacceptable because the HESCs would then become longer than is normally required for national short codes.

[11] Final report on the Review of National Numbering Schemes on their Openness to Competition, ETO, 15 October 1997

The criteria for identification of potential HESC ranges for short numbers and prefixes are related to the social impact of creating the HESCs. The social impact consists mainly of the effect on subscribers and to a lesser degree also of the technical implications for the networks and of the communication of the changes to the parties involved. The social impact is assumed to be proportional to the number of subscribers involved. It is caused by two types of changes:

1. *Freeing a range for HESCs*
   The impact is presumably the largest when the range is used for ordinary geographic and non-geographic numbers. In that case, many subscribers are directly affected. The impact is assumed to be less large when the range is used for short codes. Of course, the impact fluctuates between the different types of networks/services using short numbers or prefixes. The impact is even smaller when it only concerns network-internal use. The impact is considered negligible when the range concerned is not in use, irrespective of the use for which the range may be reserved.

2. *Changing short codes into HESCs*
   This impact is probably minor compared with the first type.

The impact may be very high, even for the harmonisation of one short code. Emergency number 112 is a well-known example of this. For freeing a range for HESCs, a suitable moment in the future should be chosen when the impact is minimal. This moment differs from country to country and should be chosen, wherever applicable, to coincide with a period when the range concerned is not in use.
If the creation of a HESC range is combined with a major numbering scheme change, the impact that could be attributed to the harmonisation of the short codes may be much lower. Once a major numbering scheme change has taken place, involved subscribers should not be upset again by initiating another change for at least some years.

ETO concludes the following regarding the criteria for identifying potential HESC space:

- The HESC space for short numbers and prefixes should consist of at least one and probably a few more ranges identified by the first two digits.

- The criteria for identifying a potential HESC range for short numbers and prefixes are related to the social impact of creating the HESCs. The social impact is assumed to be proportional to the number of subscribers involved. It is assumed that the social impact is mainly caused by freeing a range for HESCs, in particular when the range is used for ordinary geographic and non-geographic numbers.

- For freeing a range for HESCs, a suitable moment in the future should be chosen when the impact is minimal. This moment differs from country to country.

6.3 Application of the criteria

When identifying a HESC range for short numbers and prefixes, two different types of dialling sequences should be distinguished:

1. *Dialling sequences not starting with digit '0'*
   Dialling sequences starting with digit '1' are the best-known candidates. CEPT played an important role in designating short numbers starting with digit '1' to HESCs. The CEPT role was at the basis of the creation of the present HESCs 112 and 118. In many European countries (at least 13), the 1-range is now designated or going to be designated for short numbers and carrier selection prefixes. In addition, in some European countries (at least seven), the 11-range is designated or going to be designated for HESCs.
   The other sequences, starting with digits 2 to 9, are normally used for ordinary (local) telephone numbers.

2. *Dialling sequences starting with digit '0'*
   Dialling sequences starting with digit '0' have two in-built drawbacks: they have not been associated with HESCs until now and their position in closed numbering plans and in open numbering plans is different. Most European countries have open numbering plans, that is with local dialling, using '0' as a national prefix in virtually all cases. In these cases, dialling sequences starting with '0' would consist of the national prefix followed by the first digit of the national telephone number. Assuming a 2-digit range, each range would occupy 10% of the national numbering and dialling space. Such a heavy claim on capacity and the equally heavy social impact it would imply rules out the possibility of these ranges being used for HESCs.

ETO's investigation of the dialling sequences not starting with digit '0' yielded four ranges with relatively low social impact if these ranges were freed in CEPT countries. All CEPT countries are included except nine countries from which no information is available at all. The resulting ranges are '10', '11', '19' and '99'.

The social impact for each of these ranges has been calculated by using the tables of Annex G. The most relevant indication of the social impact of freeing these ranges is the weighted total number of subscribers of countries where subscribers have to change their ordinary geographic or non-geographic telephone numbers. The weighted totals are summarised in table 5 below. The number of countries where subscribers have to change their telephone numbers is also shown.

Table 5. The social impact of freeing ranges of dialling sequences in Europe, for the ranges with the lowest impact.

Social impact	Range '10'	Range '11'	Range '19'	Range '99'
Total number of countries where subscribers have to change their telephone numbers	6 out of 32	6 out of 32	10 out of 32	13 out of 30
Weighted total number of subscribers of countries where subscribers have to change their telephone numbers	46 million	9 million	66 million	114 million or less

The total number of countries with complete information about the use of the ranges is 32, except for range '99'. The information on range '99' is not fully comparable with the information on the other three ranges in particular because it is less detailed. Therefore, the total number of 114 million subscribers is a maximum. It might have been considerably lower if the calculation had been based on more detailed information.

Range '11' clearly would have the lowest impact, followed by '10', '19' and '99'. ETO recommends the choice of range '11' for HESCs in particular for information-/assistance services. Another range may be needed, depending on the networks/services requiring HESCs. ETO recommends the choice of a separate range for carrier networks out of the ranges '10', '19' and '99'. Range '99' has the drawback that it conflicts with the prevailing use of range '1' for short numbers and carrier selection prefixes.

ETO concludes that there are four ranges of dialling sequences which would have relatively low social impact if they were freed in CEPT countries. These ranges are '10', '11', '19' and '99'. Range '11' would clearly have the lowest impact.

ETO recommends the following regarding the choice of HESC ranges for short numbers and prefixes:

- range '11' in particular for information/ assistance services

- a separate range, preferably either range '10' or range '19' but not excluding range '99', if required, for carrier networks.

7. Steps towards introduction of new HESCs

This chapter shows the required steps and conditions to be made by CEPT countries for introduction of new HESCs. Conclusions from the previous chapters 5 and 6 are taken into account.

Introduction of new HESCs requires the following steps and conditions:

1. Countries which are prepared to plan a HESC for any of the services/networks recommended by ETO should come to an agreement on:

   - which countries would assign HESCs to which networks/services

   - a rough description of the networks/services concerned.

2. The countries should agree on the choice of HESCs to be designated to the types of networks/services concerned (see chapter 6). The negative effect of the choice of a particular HESC on the right use of similar short codes in non-participating countries should be taken into account.

3. The countries should agree on a specific three-digit HESC for each (type) of information/assistance service.
   For carrier selection, if required, the length of the HESCs should be determined. The carrier selection prefix should consist of a carrier access code (CAC) of two digits (10, 19 or 99), followed by a carrier identification code (CIC) of three digits with a possibility of future extension to four digits.
   For shared cost services, if required, the countries should agree on a specific three-digit HESC.

4. The countries should consider the different assignment options for short numbers and prefixes (see section 5.3). The possibility of an evolutionary approach for short numbers should be seriously considered. Such an approach implies that a country chooses an initial option with limited harmonisation of both short code and service. For a later phase, a second or even third option could then be chosen, which provides a higher level of harmonisation. Migration from one option to another is not considered to be a problem.
   The options may differ per country. If more then one country plans to choose an option requiring a European decision process for HESC assignment, proposals regarding such a European decision process should be made. This may be the case for information/assistance services and it will always be the case for carrier networks. In these cases, assignment procedures and conditions should be agreed upon by the participating countries. A strict definition of eligibility of applicants for HESCs for carrier networks should be laid down to limit the use of these HESCs.

5. All results from steps 1 to 4 should be approved by the ECTRA Plenary before coming into effect.

6. Countries should choose assignment options for short numbers on a national level (see section 5.3), in so far as required. A country may choose different options for different types of services, mainly depending on the level of competition.

7. Each country can choose the moment to start its use of a HESC independently of other countries. It should notify the ECTRA Plenary of its participation. Countries which do not participate initially should be allowed to join later.

8. Any country can make proposals to the ECTRA Plenary regarding future creation of new HESCs.

ETO concludes that introduction of new HESCs will require the following steps to be taken by CEPT countries:

1. Choice of services/networks to which HESCs will be assigned.

2. Choice of the HESCs to be designated to these networks/services.

3. Choice of the specific HESCs to be assigned:
   - three-digit HESCs for information/assistance services
   - if required, five-digit HESCs, with a possibility of future extension to six digits, for carrier networks
   - a three-digit HESC for shared cost services.

4. Proposals regarding a European decision process, if required, for HESC assignment.

5. Approval by ECTRA Plenary of all results from the previous steps.

6. Choice by individual countries of assignment options for information/assistance services on a national level, in so far as required.

7. Free choice by each CEPT country of the moment to start its use of a HESC.

8. Proposals by any CEPT country regarding the future creation of new HESCs.

8. The non-digit symbols '*' and '#'

Modern terminals and switches are equipped with the handling symbols '*' and '#' next to digits. These symbols, however, have not been included in telephone numbering plans until now. Their use has been standardised to control supplementary services only. Unless their use is also standardised for other telephony services, there is no reason to consider it for short codes.

At present, the more general use of '*' and '#' would be a problem in most countries because it requires dual tone multi-frequency (DTMF) signalling. A considerable percentage of telephone terminals do not have these facilities. Some older types of telephone exchanges do not have them either.
From the table in Annex H the following can be seen:

- about half of the CEPT countries have at least 50% of their switches equipped with DMTF facilities

- less than half of the CEPT countries have at least 50% of their terminals equipped with DTMF facilities.

The non-DTMF terminals in particular may take many years to replace.

The restricted use of DTMF is one of the reasons why '*' and '#' have not, up until now, been included in telephone numbering plans. The only purpose for which the use of '*' and '#' has been standardised is a set of subscriber procedures to control supplementary services within public telephony networks.

According to the ETSI-standard concerned[12], the command dialogue format used to gain access to and control of a supplementary service has one or more of four forms. Two of those forms contain the '*' and/or the '#' symbol.
One form is the service code command which starts with a service prefix '**', '*', '*#' (or alternatively '#*'), '#' or '##'. The service prefix is followed by a service code consisting of two or three digits. In principle, there is no limit to the choice of these digits. The service code is followed by '#' (service suffix) or else by '*' (separator) if supplementary information follows.
The other form is the abbreviated dialling command which starts with an abbreviated number followed by a service suffix '#'. The abbreviated number may consist of one, two or more digits.

If the use of '*' and '#' is limited to what has been defined in the ETSI standard, a free space, consisting of short strings of digits, '*' and '#', is still left available. The following strings are not used:

- all strings, starting with three characters '*' and/or '#' (for example '**#', '#*#4' or '###3*')

- all strings, starting with one or more digits and '*' (for example '8*#', '567*' or '2#1*0').

[12] See Human Factors (HF); Minimum man-machine interface (MMI) to public network based supplementary services, Draft prETS 300 738, ETSI, June 1996.

At present, however, the '*' and '#' symbols are used by different countries all over the world in different and uncontrolled ways. Their use differs between public and private telephony networks, between fixed and mobile networks and between countries. Standardisation took place within the GSM Memorandum of Understanding (MoU). ETSI had planned a further study in 1997 on the use of the '*' and '#' symbols and other non-decimal characters. It cancelled the study because of the apparently diverse and non-standardised use of '*' and '#'. ITU-T still has the use of '*' and '#' on its agenda. But no contributions on this topic are expected. Participants in standardisation seem to have given up the objective of harmonising the existing use of '*' and '#'. ETSI has, however, collected information on the use of '*' and '#' in order to designate unused codes for new purposes regarding supplementary services.

ETO concludes the following regarding the use of the symbols '*' and '#':

- The use of these symbols will be limited for a long time because of lacking facilities in older terminals and switches.

- The existing uses severely lack harmonisation.

- Deciding about new use of '*' and '#' is a process that should be viewed in a long-term perspective and cannot be considered for use in HESCs at present.

ETO recommends the following regarding a study on the symbols '*' and '#':

- A study should be initiated in Europe regarding the harmonised use of '*' and '#' and other non-decimal symbols in the long term, involving ETSI, GSM MoU and ECTRA and mandated by the European Commission

- The study should result in the formulation of ETSI standards valid for all types of networks.

- The outcome of the study should be used for input into ITU-T to have the E.164 Recommendation amended to include the '*' and '#' and other non-decimal symbols in so far as appropriate.

9. Proposals regarding HESCs

Precondition for harmonisation of short codes

1. ETO emphasises that an important precondition for the harmonisation of short codes in a competitive environment is that NRAs are in control over all short codes used for public services which includes network-specific codes used for public services on mobile networks.

Networks/services for which HESCs exist

2. ETO recommends that the international prefix 00 and the emergency number 112, which are already being introduced in the EU countries and most other CEPT countries, are introduced in all CEPT countries.

3. ETO recommends that the national prefix 0 is introduced in all CEPT countries which have local dialling.

Networks/services which may qualify for new HESCs

4. ETO recommends that the following types of networks/services are considered by the CEPT countries regarding their qualification for HESCs:

   - general types of operator help-desk (short number)
   - special operator services for disabled people (short number)
   - special operator services for foreigners (short number)
   - transportation information/assistance (short number)
   - carrier networks operating in more than one CEPT country (prefixes)
   - shared cost services (access code).

Options for assignment of HESCs

5. ETO concludes that the assignment of HESCs requires a common definition of the networks/services concerned.

6. ETO concludes that six options can be considered when choosing a HESC for a specific (type of) information/assistance service (from low to high level of harmonisation of both short code and service):

   - a HESC as an access code of a range of short numbers for network-specific services
   - a HESC as an access code of a range of short numbers for national services
   - a HESC as an access code of a range of short numbers for pan-European services
   - a HESC as a short number for one network-specific service per network
   - a HESC as a short number for one national service per country
   - a HESC as a short number for one pan-European service.

7. ETO concludes the following regarding the use of HESCs for carrier selection:

   - the only feasible option for European harmonisation of prefixes for carrier networks is to use HESCs from a range with one common access code
   - assigning such HESCs requires a strict definition of eligibility of applicants for these HESCs to limit the use of these HESCs.
   - assigning such HESCs requires a European decision process.

The choice of new HESCs

8. ETO recommends the following regarding the choice of HESCs:

   - range '11' in particular for information/assistance services
   - a separate range, preferably either range '10' or range '19' but not excluding range '99', if required, for carrier networks
   - one or several of the combinations '8xy' with $x \neq 0$, if required, for shared cost services.

Introduction of new HESCs

9. ETO concludes that introduction of new HESCs will require the following steps to be taken by CEPT countries:

   1 Choice of services/networks to which HESCs will be assigned.

   2 Choice of the complete HESC ranges to be designated to these networks/services.

   3 Choice of the specific HESCs to be assigned, three-digit HESCs for information/assistance services and five-digit HESCs with a possibility of future extension to six digits, if required, for carrier networks.

   4 Proposals regarding a European decision process, if required, for HESC assignment.

   5 Approval by ECTRA Plenary of all results from the previous steps.

   6 Choice by individual countries of assignment options for information/assistance services on a national level, in so far as required.

   7 Free choice by each CEPT country of the moment to start its use of a HESC.

   8 Proposals by any CEPT country regarding the future creation of new HESCs.

The symbols '*' and '#'

10. ETO recommends the following regarding the symbols '*' and '#':

   - a study should be initiated in Europe regarding the harmonised use of '*' and '#' and other non-decimal symbols in the long term, involving ETSI, GSM MoU and ECTRA and mandated by the European Commission

   - the study should result in the formulation of ETSI standards valid for all types of networks

   - the outcome of the study should be used for input into ITU-T to have the E.164 Recommendation amended to include the '*' and '#' and other non-decimal symbols in so far as appropriate.

Annexes

Annex A Work Requirement No. 48380

1. Subject: Harmonisation of short codes in Europe

2. Purpose

This work requirement covers the work that the European Telecommunications Office (ETO) will conduct on behalf of ECTRA for the European Commission in the area of numbering of telecommunication services. This Annex defines the terms of reference for a study on the need for harmonisation for short codes in Europe.

3. Justification

The introduction of a European Telephony Numbering space in the near future will facilitate the development of telecommunications services in Europe. However, due to the structure and dialling arrangements and the international format of the number, the utilisation of short codes within an ETNS is not possible.

The need for pan-European short codes may arise due to different reasons: short codes are used on a national level. People are acquainted with short codes in their own countries. When travelling from country to country, the use of the same short number or code for the same purpose is user-friendly and makes telecommunication easier. The single European emergency number (112) and the standard international access code (00) are good examples of user-friendly numbering procedures.

The liberalisation of the European market by 1998 and its increasingly international dimension is likely to stoke the demand, not only for codes for carrier selection, codes to be used with virtual private networks and codes for ERMES and TETRA services, but also for common access codes for providers of all sorts of services.

A study on the harmonisation of short numbers and access codes is necessary in order to assess whether there is a real need for such codes, whether the limited amount of such codes sets certain a-priori conditions on their use (e.g. secure fair competition), and to define possible criteria for the allocation of short codes.

4. Work requirement

(1) To review present and planned short numbers/codes within and outside Europe;

(2) To identify service types that could possibly be allocated short codes, taking into account the competitive environment, available resources and the requirement of non-discriminatory, equal and fair allocation of numbers, in particular short codes.

(3) To investigate the expected future need for pan-European short numbers/codes

(4) To investigate the possibilities of using * and # in short codes and to identify possible service categories for which the use of * and # should be avoided

(5) To propose a harmonised scheme (number ranges) for short number/code use in Europe, and an accompanying implementation schedule

5. Execution

Work will be carried out in close co-operation with the CEC, the ECTRA PT on Numbering and the European Numbering Forum.

The final report of the study shall be delivered to the CEC not later than 31 December 1997.

6. Deliverables

Two interim reports and one final report shall be delivered.

The first interim report shall be delivered during the course of the work, containing (1) a review of present and planned short numbers/codes both inside and outside Europe, 2) an identification of the services that could possibly be allocated short codes, and 3) an investigation of the need for pan-European short numbers/codes

The first interim report shall be delivered by the end of 1996.

The second interim report shall contain the draft findings and proposals as they will be submitted to CEPT/ECTRA for approval. The second interim report will be delivered by August 1997.

The final report shall contain the findings and proposals, as approved by CEPT/ECTRA and will include any comments individual CEPT/ECTRA members have on implementation in their respective national regimes.

All reports shall be made available in draft form one month before a liaison meeting at which results will be discussed and approval can be given for their release.

The Commission shall receive three copies of the interim reports, while the approved final report shall be made available in 15 bound copies, one unbound copy and one copy on floppy disk in Word for Windows V2.0 format. *G*raphics shall be made available on separate hard copies.

7. Manpower

It is expected that this task can be accomplished in 4 man-months at expert level including possible subcontracting.

8. Subcontracting

Subcontracts - totalling 1 man-month - may be given to external experts for the execution of parts of this contract.

Annex B List of definitions of terms and abbreviations

Terms

Access code	An access code is a short code which consists of the first part of a prefix or a telephone number. The access code provides information to the network on the type of network/service required, such as a particular non-geographic telephony service, a particular national public telephony network, a particular type of information/assistance service or a carrier selection service.
Harmonised European short code (HESC)	A HESC is defined in this study as a short code which is used or planned for the same (type of) network/service in a significant part of Europe according to a formal agreement.
National short code	A national short code is defined in this study as a short code that is used or planned nation-wide for the same (type of) network/service.
Network-specific short code	A network-specific short code is a short code which has a network-specific purpose. Network-specific codes may or may not be national codes.
Prefix	A prefix is a short code that may be dialled before a telephone number in a single dialling sequence on a public network. The prefix provides some extra information to the network, for example the (national or international) format of the dialled telephone number, the carrier to be selected for the call or the status of certain supplementary services required for the call.
Service	Telecommunications service or its subscriber application.
Short code	A short code is defined in this study as a string of digits with the following properties: - It can be used as a complete dialling sequence or as one of the first parts of a complete dialling sequence on public telephony networks. Its length does not exceed five digits, in exceptional cases six digits. There is no restriction regarding the dialling format (local, national or international). - It should provide access to a specific network/service or specific type of network/service. 'Network' is a telecommunications network, 'service' is a telecommunications service or its subscriber application. The three different types of short codes as defined in this report are: short numbers, prefixes and access codes.
Short number	A short number is a short telephone number. Examples of the use of short numbers are information/assistance services that are in the public interest, access to carrier networks/services, access to non-telephony networks or supplementary services.
Telephone number	A telephone number is either an E.164 number or a non-E.164 number which is used for the same purposes as an E.164 number.

Abbreviations

CAC	Carrier access code
CEPT	European Conference of Postal and telecommunications Administrations
CIC	Carrier identification code
CLI	Calling line identification
CLIP	Calling line identification presentation
CLIR	Calling line identification presentation restriction
ECTRA	European Committee on Telecommunications Regulatory Affairs
ECTRA/PTN	ECTRA Project Team on Numbering
ENF	European Numbering Forum
ETO	European Telecommunications Office
ETSI	European Telecommunication Standardisation Institute
EU	European Union
HESC	Harmonised European Short Code
IFS	International Freephone Service
IN	Intelligent Network
ITU	International Telecommunication Union
MoU	Memorandum of Understanding
ITU-T	ITU Standardisation Sector
UPT	Universal Personal Telecommunications
VPN	Virtual private network

Annex C List of possible use of short codes

A list of possible use has been developed for each type of short code, that is short numbers, prefixes and access codes. This list is based on the existing and planned use of short codes in different countries. It can be considered as an exhaustive list within the scope of this study.

Short numbers

A short number may be used for access to different types of telecommunications services and their applications:

- *Information/assistance services*
  Information and assistance services are applications of telecommunications services. Examples are certain operator services and other information/assistance services that are in the public interest such as emergency services, 'speaking clock' and weather reports.

- *Public telephony carrier networks/services*
  National and international public telephony carrier networks/services (long-distance carriers) may be accessed by dialling a short number. To access a subscriber, a second dialling sequence has to follow (two-stage dialling).

- *Public non-telephony networks*
  Examples of public non-telephony networks are data networks and Internet[13].

- *Supplementary services*
  Supplementary services are normally accessed by using '*' and '#' symbols. Short numbers may be used instead where '*' and '#' facilities are lacking. Examples of a supplementary service are Calling Line Identification Presentation (CLIP) and Calling Line Identification Presentation Restriction (CLIR). These services may be activated/deactivated by using a short number. Another example is abbreviated dialling where short numbers may be used for abbreviated numbers. In the latter case, the meaning of the short numbers may differ amongst subscribers but at least the range of short numbers would be harmonised.

Prefixes

A prefix may be used for access to different types of networks/services:

- *National public telephony networks*
  A prefix to access national networks is required in national numbering schemes that are open. In that case, access to national networks is achieved from local access networks by dialling the national prefix (generally '0').

[13] Internet is traditionally considered to be a non-telephony network not using numbering according to ITU-T Recommendation E.164 and requiring two-stage dialling for accessing from a telephony network. Nowadays, Internet is increasingly used for telephony and access from a telephony network may be accomplished by one-stage dialling using an E.164 number.

- *International public telephony networks*
  A prefix to access international networks is normally achieved from local access networks by dialling the international prefix (generally '00').

- *Public telephony carrier networks/services*
  National and international public telephony carrier networks/services may be accessed by one-stage dialling using a carrier selection prefix (which may or may not contain a carrier access code).

- *Supplementary services*
  An example of accessing a supplementary service by using a prefix is activating/deactivating of CLIR on a call-by-call basis. The prefix indicates the required status of CLIP/CLIR. Another example is activating call forwarding. The prefix to activate call forwarding is directly followed by the telephone number of the party to which the incoming calls are to be forwarded.

Access codes

An access code may be used for access to different networks/services. For the use of access codes contained within short numbers or prefixes, reference is made to the paragraphs above. Other possible networks/services are:

- *Non-geographic telephony services*
  Non-geographic telephony services are public services which use non-geographic numbers. Well known examples are freephone, shared revenue, cellular, paging and corporate network access (including virtual private networks (VPNs)). Using the first digits of the telephone number for access to these services is, from a caller point of view, a way of service branding.

- *National public telephony networks*
  Some national public telephony networks may have their own identification in the first digits of the telephone number. Such identification facilitates operator branding. It is the national equivalent of identification codes for international networks. It may be used for different, competitive, national telephone networks which are used to provide different types of services.

Annex D Present harmonised European short codes (HESCs)

The table in this annex provides an overview of the present use of short codes which are formally harmonised in European countries. From all CEPT countries some or all relevant information has been included, except from Andorra, Bosnia and Herzegovina, Macedonia, Monaco, San-Marino and Vatican city.

The harmonised European short codes (HESCs) are:

- national prefix 0 (ITU-T Recommendation E.164)
- international prefix 00 (ITU-T Recommendation E-164; mandatory in EU countries)
- emergency number 112 (old CEPT recommendation; mandatory in EU countries)
- directory enquiry access code 118 (old CEPT Recommendation; draft ECTRA Recommendation).

The national prefix is only needed in an open numbering plan, that is a plan which allows local dialling. Closed numbering plans only allow national dialling and, therefore, do not require a national prefix to distinguish national dialling from local dialling.
The access code 118 may be followed by one or more digits to differentiate between competitive or different types of enquiry services. The use of additional digits is a national matter.

The table shows the HESCs only. Where no HESCs but other short codes are used, the indication 'no' is given. A blank indicates that no information on the short code is available. A question mark indicates that the country has not made a definite choice for the HESC yet.
Where there are plans to change short codes, the symbol '>' is used to distinguish between the old code and the new code (old code > new code).

Table 1. The present use of harmonised European short codes (HESCs).[14]

↓Countries	Harmonised European short codes (HESCs)			
Services →	Nat. prefix 0	Int. prefix 00	Emergency 112	DQ 118
EU				
Austria	0	00	112	>118
Belgium	0	00	112	no
Denmark	closed plan	00	112	118
Finland	0	00	112	118
France	closed plan	00	112	no
Germany	0	00	112	118
Greece	0	00	>112	no
Ireland	0	00	112	no
Italy	0>closed plan	00	112	no
Luxembourg	closed plan	00	112	no
Netherlands	0	00	112	>118
Portugal	0	00	112	118
Spain	>closed plan	>00	112	no
Sweden	0	>00	112	>118
United Kingdom	0	00	112	>118
NON-EU				
Albania	0	00	>112	no
Bulgaria		00	no	no
Croatia	0	00	112	118
Cyprus	0	00	112	no
Czech Republic	0	00	112	>118
Estonia	no	00	112	118
Hungary	>0	00	>112	>118
Iceland	closed plan	00	112	118
Latvia	no	00	112	118
Lithuania	0	00	no	no
Malta	closed plan	00	no	no
Moldova		00	no	no
Norway	closed plan	00	112	no
Poland	0	00	112	no
Romania	0	00	no>?	no>?
Russian Federation	no	no	no	no
Slovak Republic	0	00	>112	no
Slovenia	0	00	112	no
Switzerland and Liechtenstein	0	00	112	no
Turkey	0	00	112	118
Ukraine	>0	>00	no	no

[14] Information on the use of HESCs has been updated as of 1 June 1998.

Annex E The use of short codes in Europe (non-HESCs)

The five tables in this annex provide an overview of the use of national short codes in European countries. For all CEPT countries some or all relevant information has been included, except from Andorra, Bosnia and Herzegovina, Macedonia, Monaco, San-Marino and Vatican city.
The networks/services for which HESCs already exist are excluded. Networks/services are included in the tables in so far as they are accessed by short codes in at least two European countries according to the information available.

The tables may have some inconsistencies of two types:

- Different countries may use the same names for different types of services or different names for the same type of services, in particular regarding information/assistance services. The tables are based on the names used, not on the actual service descriptions.

- The tables should reflect the use of national short codes and not of network-specific short codes that are not nationally harmonised. The distinction between the two categories of short codes is not always clear from the available information.

These possible inconsistencies are considered to be unavoidable from a practical point of view but they are not thought to be significant for the purpose of a study on HESCs.

The five tables subsequently present the use of short codes for the following networks/services:

1. *Operator services*
   'Operator services' is the generic term for customer services provided by telecommunications network operators or telecommunications service providers.
   Table 1 includes unspecified operator services and the specified operator services:
   - operator assistance (for which an old CEPT recommendation exists to use short code 115, which is not really harmonised)
   - fault reporting (including repair service)
   - customer care (such as for billing information)
   - calling card services
   - services to request the sending of a telegram, telex or fax by telephone.

   Directory enquiry services are excluded from the 'operator services' as they are covered by the set of services/networks for which HESCs already exist.

2. *Other information/assistance services*
   Apart from operator services, other information/assistance services (subscriber applications) are provided. Table 2 includes speaking clock, weather report, medical/social care, wake-up (calls), transportation services (road assistance, traffic and transport information, transport booking) and public utilities (fault reporting to public utilities, such as for gas, electricity and water).

3. *Non-geographic services*
   Table 5 shows the use of short codes for the non-geographic services freephone, shared revenue, shared cost, cellular (mobile services), paging and personal numbers.

4. *Mixed networks/services*
   Table 3 presents mixed networks/services: carrier networks/services (carrier selection), network-specific (access codes for network-specific purposes which may be nationally harmonised or not), calling line identification presentation/restriction (CLIP/CLIR), voice mail and virtual private networks (VPNs).

5. *Non-telephony networks*
   Table 4 includes the following non-telephony networks: data networks (such as X.25 packet switched networks), Internet and videotex networks.

The figures in the tables indicate the short code ranges or the short codes themselves. The short codes are not fully shown in all cases for the sake of simplicity of presentation. Because of simplicity, ranges of short codes are presented instead in some places. These ranges may not always be used fully for short codes.

Where no short codes are used, this is indicated by 'no'. A blank means that no information on the short code is available. A question mark indicates that the country has not made a definite decision yet on the code concerned.
Where changes to short codes are being planned, the symbol '>' is used to distinguish between the old code and the new code (old code > new code). For example, '>long' means that the short code will be changed into a long telephone number.
The use of a national prefix in front of a short code is normally not shown in the tables, for example in front of access codes for non-geographic services. It is only where it is not clear whether a national prefix is used that the prefix is shown between brackets, usually (0). The brackets are used to distinguish a national prefix from the first digit, usually 0, of a telephone number.

Table 1. The use of short codes for operator services in Europe.[15]

↓Countries	(Ranges of) short codes for operator services[16]					
Services →	Unspecified operator svs	Operator assistance	Fault reporting	Custm. care	Call. card	Telegrm., telex, fax
EU						
Austria	111	1616	111	no	no	no
Belgium	12,13,14	12,13,14	12,13,14	12,13,14	no	12
Denmark	185 (for blind) >long?	11,13,14 >long?	14>long?	no	170 >long?	12>long?
Finland	no	no	10019	no	no	no
France	10,3030,3210, 36	3650	no	13>,14>	36	no
Germany	no	no	no	no	no	no
Greece	no	1161,126, 13,15,16,18	1166,12, 1730,6119	no	no	no
Ireland	no	10,114	190?	no	no	no
Italy	no	119,18,19	no	17,18	143,17	no
Luxembourg		010	17			
Netherlands	no	no	no	no	no	no
Portugal	no	12,146	188	no	(0)882	183>long
Spain	100	1004	026,1002	no	08	no
Sweden	no	115	no	no	no	no
United Kingd.	195 (for disabled)	100,155	15	no	no	no
NON-EU						
Albania		10,12	13			
Bulgaria		(0)123,121	137			
Croatia		90	97			
Cyprus		190,198				
Czech Republic	no	(0)10,(0)13	129	no	no	no
Estonia		007,07,08	no			
Hungary		190,191	14		(0)12	192
Iceland		115,119	145			
Latvia		115,116	114			
Lithuania	8194,8195	(0)7	(0)8			(0)6
Malta		190	133			
Moldova		971,973				
Norway		115,117	145			
Poland	90	90	>9224,969	no	no	905
Romania						
Russian Federat.		81				
Slovak Republic	(0)103,(0)139, 122,128	(0)102, (0)13	129	no	no	127
Slovenia		900,901				
Switzerland and Liechtenstein	no	114	175	113	no	110>long
Turkey		115,131	121			
Ukraine						

[15] Information on the use of short codes has been updated as of 1 June 1998.

[16] For simplicity of presentation, some short codes are only shown by the range to which they belong.

Table 2. The use of short codes for information/assistance in Europe.[17]

↓Countries	(Ranges of) short codes for information/assistance[18]					
Services →	**Speaking clock**	**Weather report**	**Medical/ social care**	**Wake-up**	**Transport services**	**Public utilits.**
EU						
Austria	1503>	>15	no	12,13,14	12>,15>,17>	no
Belgium	1200>	no	no	no	no	no
Denmark	155> long?	15,185> long?	185>long?	no	no	no
Finland	no	no	no	no	no	no
France	3699	no	115,119,15	no	no	no
Germany	no	no	no	no	no	no
Greece	141	14	10	no	104,11,14, 15,17,19	no
Ireland	no	no	no	no	no	no
Italy	no	no	196	114	no	no
Luxembourg						
Netherlands	no	no	no	no	no	no
Portugal	151>long	150>long	no	161>long	no	no
Spain	093	no	no	096	no	no
Sweden	no	no	no	no	no	no
United Kingd.	123	no	no	no	no	no
NON-EU						
Albania						
Bulgaria						
Croatia						
Cyprus						
Czech Republic	no	no	no	no	no	159
Estonia						
Hungary	180	no	no	193	no	14
Iceland						
Latvia						
Lithuania						(0)4
Malta						
Moldova						
Norway	no	no	no	no	no	no
Poland	926>9226	921>9221	911	917	919,94,96	99
Romania						
Russian Federat.	no	no	no	no	no	no
Slovak Republic	110	no	no	125	(0)123,123,154	no
Slovenia						
Switzerland and Liechtenstein	161	162,187	141,143, 144,147	150	140,163	no
Turkey						
Ukraine						

[17] Information on the use of short codes has been updated as of 1 June 1998.

[18] For simplicity of presentation, some short codes are only shown by the range to which they belong.

Table 3. The use of short codes for non-geographic services in Europe.[19]

↓Countries	(Ranges of) short codes for non-geogr. services[20]					
Services →	Free-phone	Shared revenue	Shared cost	Cellular	Paging	Pers. nrs.
EU						
Austria	660	45	67,7,9	66,676	666,68	no
Belgium	7811,800	77,90	7815	17,75,95	18,49,72,73	70
Denmark	80	90	no	2,30,40	50	70?
Finland	800	600,700	no	4,50	48	78
France	800	836	80	60,66	6	804,7
Germany	130,800	190,900	180	161,17	16	700
Greece	no	90	no	93,94	921	no
Ireland	1800	1550,1559	18	8	82	81
Italy	167	144,166	147	33,34,36	168	no
Luxembourg	0800	0898		02	no	
Netherlands	800	90	90	62,65,66	65,66	87
Portugal	500,800	60,64	808	93,676	94	no
Spain	800,900	903,906	901,902, 905	60,90,91,92, 93,97,98>6	940>6	904>70
Sweden	20,800	71,72,900, 939,944	77	10,70,73	74	75
United Kingdom	500,800	90	345,645, 990,8	various>7	various>7	70
NON-EU						
Albania				38,39	37	
Bulgaria	800	900		799,88		
Croatia	800	60	60	6?		
Cyprus	80	90	no	95,96	97	
Czech Republic	800	609	no	60	600	no
Estonia	800	900		5		no
Hungary	80	90	40,41	20,30,60	50	70
Iceland	800	900		8		7?
Latvia	800	900	700	92,93,94		91
Lithuania						
Malta						
Moldova	>800	no	no	2259	no	no
Norway	800	82	810	9	96	880
Poland	800	no	no	50,60,90	98,99>64	no
Romania	800					
Russian Federat.	no	no	no	901, 902	no	no
Slovak Republic	820>800	97,98>900	no	90	9090	>700
Slovenia	80	90		60	610	
Switzerland and Liechtenstein	155>800	156,157, 900,901,906	84	76,77,78,79	40>74	878
Turkey	800	900		5		no
Ukraine	800	900		03,04,05,06		500

[19] Information on the use of short codes has been updated as of 1 June 1998.

[20] For simplicity of presentation, some short codes are only shown by the range to which they belong.

Table 4. The use of short codes for mixed networks/services in Europe.[21]

↓Countries	(Ranges of) short codes for networks/services[22]				
Svs/netw. →	Carriers	Network-specific	CLIP/ CLIR	Voice mail	VPNs
EU					
Austria	10	no	no	no	no
Belgium	15,16	19	no	no	(0)88,(0)98
Denmark	10	no	1831	no	no
Finland	10,99	no	no	no	(0)10,(0)20,(0)30
France	2,4,5,6,7,8,9	no	3651	36	no
Germany	(0)10	no	no	no	(0)18
Greece	no	(0)9	no	no	no
Ireland	13?	17	no	no	172,173,18082
Italy	10	1400,177>0?	no	15	1482
Luxembourg					
Netherlands	16	no	131/132	(0)84	(0)82
Portugal	10,19	no	no	no	(0)700,(0)705
Spain	050>105, 107,0xy?	no	>067	no	no
Sweden	119,95	(0)78	no	no	no
United Kingd.	no	no	141/147	no	no
NON-EU					
Albania					
Bulgaria					
Croatia					
Cyprus	no				
Czech Republic	no	no	no	no	no
Estonia					
Hungary	13	17	no	no	no
Iceland					
Latvia					
Lithuania					
Malta					
Moldova	no				no
Norway	15	19	no	no	no
Poland	no	no	no	no	no
Romania					
Russian Federat.	no	no	no	no	no
Slovak Republic	no	no	no	no	no
Slovenia					
Switzerland and Liechtenstein	107	no	no	(0)860	(0)50>long
Turkey					
Ukraine					

[21] Information on the use of short codes has been updated as of 1 June 1998.

[22] For simplicity of presentation, some short codes are only shown by the range to which they belong.

Table 5. The use of short codes for non-telephony networks in Europe.[23]

↓Countries	(Ranges of) short codes for non-telephony[24]		
Servs/netw. →	**Data networks**	**Internet**	**Videotex**
EU			
Austria	19	no	no
Belgium	17	17	12>,13>,14>
Denmark	17>long?	no	no
Finland	no	no	no
France	no	no	36
Germany	no	no	no
Greece	(0)96	(0)965	no
Ireland	no	no	no
Italy	no	no	no
Luxembourg			
Netherlands	(0)67	(0)67	(0)67
Portugal	no	no	no
Spain	04>,051>,090>	055>	03>
Sweden	no	no	no
United Kingdom	no	no	no
NON-EU			
Albania			
Bulgaria			
Croatia			
Cyprus			
Czech Republic	no	no	no
Estonia			
Hungary	(0)41	(0)51	no
Iceland			
Latvia			
Lithuania			
Malta			
Moldova			
Norway	no	no	no
Poland	(0)20	(0)20	no
Romania			
Russian Federation	no	no	no
Slovak Republic	(0)19	(0)19	no
Slovenia			
Switzerland and Liechtenstein	no	no	no
Turkey			
Ukraine			

[23] Information on the use of short codes has been updated as of 1 June 1998.

[24] For simplicity of presentation, some short codes are only shown by the range to which they belong.

Annex F The use of short codes in N. America and Australia

The use of short codes in North America, Australia and Europe is quite different in each of those three regions. The similarity between European countries is considerably larger than between Europe, North America and Australia. It should be noted that the North American Numbering Plan is an integrated plan for 28 countries: the USA, Canada and Caribbean countries. The types of short codes of both North America and Australia are briefly described before the actual use of short codes is presented in table 1.

In North America, the following types of short codes can be distinguished:

- The international prefix is 011. There is no national prefix. Local dialling is made possible by using different first digits in the national number and in the local number.

- Eight-digit carrier selection prefixes with the format 1010xxxx have been harmonised between the USA and Canada.

- Operator services such as billing information can be accessed by dialling the harmonised network-specific short numbers '0' or '00' (which are not used for national or international prefixes). A prefix '0' indicates a credit card call.

- So-called N11 codes are 3-digit short numbers for information/assistance services such as governmental services, directory enquiry services and emergency services. The N11 codes are assigned nation-wide but not all codes have been harmonised across North American nations.

- So-called vertical service codes are short numbers used to provide access to features and services provided by local access network operators, inter exchange carriers, mobile radio service, and so on. These features and services include supplementary services such as call forwarding, automatic call back and customer originated trace. The formats of the vertical service codes are 11xx and 112xx (or *xx or *2xx). Largely, these codes have been harmonised across North America but there are some inconsistencies.

- Three-digit service access codes have been harmonised throughout North America. Known examples are the codes with the X00 format.

In Australia, many services using short codes have moved from the 0-range and 00-range to other ranges. Many of the old codes are still used but their use will be terminated within a few years. The old codes are therefore not considered here.

The following types of Australian short codes can be distinguished:

- The international prefix is 0011, the national prefix is 0. Special enhanced international services are accessed by prefixes in the format 001x(x) and 009x(x).

- The carrier selection prefixes have the format 14xx. In the latter case, the carrier selection function is combined with the international prefix function.

- The short numbers in the 1-range used for information/assistance services such as governmental services, public interest services, operator services, directory enquiry services and emergency services. They are also used for supplementary services and VPN access. Their number length varies from 3 digits upwards.

- A few short numbers in the (0)19x-range, starting with the national prefix 0, are used to access data networks.

- Two- and three-digit service access codes are used in the (0)1-range. The ranges (0)4 and (0)5 are used for digital mobile and personal number services respectively. Some four- and five-digit access codes are in the 1-range (without national prefix 0).

Details on the use of the short codes are provided in table 1 below.
'No' indicates that no short code is used for the service/network concerned.

Table 1. The continued and planned use of short codes in North America and Australia.[25]

↓Services	(Ranges of) short codes	
Countries →	N. America[26]	Australia
National prefix	no	0
International prefix	011	0011
International prefix for special enhanced international services	no	001x(x), 009x(x)
Credit card call	0	no
Carriers	1010xxxx	14xx, 001x
Operator services such as billing information	0, 00, 811	1222, 1234, 124xx(x(x)), 25xx(x(x))
Customer care	see operator services	1221
Emergency number	911	000, 112 (for GSM)
Directory enquiries	411	1222, 1225
Fault reporting	611	see operator services
Calling card	no	189xx
Government services	311	113xxx>long?
Hearing/speech impaired	711, 800855	100 (for emergency calls)
Public interest services such as weather report, speaking clock, medical/social care	no	110x(xx), 119x>long?
Special fax services	no	197x
Mass calling	no	114x(x), 115xx, 116xx, 118x>long?
VPNs	no	188xx
Data networks	no	(0)192, (0)195, (0)198
Supplementary services	11xx, 112xx	183x
Pre-selection verification	no	12711
UPT profile access	no	185xx
Free phone	800, 877, 888	180
Freephone from abroad	880, 881	180
Shared revenue	900	190x
Shared cost	no	13
Analogue mobile	not national	(0)14x, (0)15, (0)17x, (0)18, (0)19x
Digital mobile	not national	(0)4
Paging	not national	(0)16, 1906
Personal numbers	500	(0)5
Satellite	no	(0)14x
Network-specific	700	no

[25] Information on the use of short codes has been updated as of 1 June 1998.

[26] All codes are valid for at least the USA but not all of them have been harmonised across North America.

Annex G Ranges of dialling sequences for HESCs

The four tables in this annex concern the ranges '10', '11', '19' and '99' of dialling sequences respectively. These ranges have been identified as causing the lowest social impact if they were freed in CEPT countries for HESCs. From all CEPT countries some or all relevant information has been included, except from Andorra, Bosnia and Herzegovina, Lithuania, Macedonia, Monaco, Russian Federation, San-Marino and Vatican city.
The tables provide an indication of the social impact of freeing these ranges at a suitable moment in the future. This moment differs from country to country and is chosen, wherever applicable, to coincide with a period when the range concerned is not in use.

For that purpose, the tables are future oriented. The tables do not show the present situation but the present or a future planned situation, whichever causes the relatively lower social impact when the range is freed.

The social impact per country is reflected by codes:

- '-' means that the impact is negligible because the range is not in use at present or at a moment in the foreseeable future
- 'I' (internal) means that the impact is minimal because the range is used or will be used for network-internal purposes
- 'SC' (short codes) or any other two-letter code means that the impact is larger because the range is used or will be used for short numbers or prefixes. The other two-letter codes are CS (carrier selection), DQ (directory enquiry), EM (emergency services), FB (forbidden; only '111' in France), FR (fault reporting), NS (network-specific), OA (operator assistance), OS (operator service), VM (voice mail) and WU (wake-up).
  'SUB' (subscribers) means that the impact is the largest because the range is used for subscribers at present and in the foreseeable future.

  The social impact in a specific country is assumed to be proportional to the number of telephony subscribers of that country. The overall social impact in Europe is the sum of the social impacts in each country. So, the overall impact in Europe is proportional to the total number of telephony subscribers of all affected countries.

  In the tables, the number of telephony subscribers is indicated in millions behind the name of each country in the first column. Complete information on the ranges '10', '11' and '19' is available for 31 countries. Complete, but less detailed, information on the '99' range is available for 29 countries.
  In order to indicate the social impact for range '10', '11' or '19', all countries with 'SUB' in the cells of its row in the table concerned should be taken into account. For countries that do not have 'SUB' in all ten cells over the whole range the impact should count as having proportionately less weight. For example, a country with 5 million subscribers and ten 'SUB' cells counts for 5 million subscribers, while a country with 10 million subscribers and only two 'SUB' cells counts for 10 x 0,2 = 2 million subscribers only.
  The table for range '99' has no subdivision of the range in ten ranges. Each country has only one cell, with or without 'SUB'. One cell with 'SUB' represents ten subdivision cells or less with 'SUB'. Therefore, the subscribers of all countries with 'SUB' should be summarised without using weighting factors. The resulting indication of the social impact is, however, a maximum. If the same information for range '99' had been available as for the other three ranges, the result might have been considerably lower. On the other hand, the result might have turned out slightly higher if complete information had been available for 31 countries instead of 29.

For each range an indication of the social impact has been calculated by summarising the weighted number of subscribers of affected countries. The weighted total number of subscribers is not the actual number of affected subscribers but an indication of it.
The calculations yield the following indications of the social impact in Europe for freeing a specific range for HESCs:

- freeing range '10' would affect subscribers in 6 countries (out of 32) with a weighted total number of 46 million subscribers
- freeing range '11' would affect subscribers in 6 countries (out of 32) with a weighted total number of 9 million subscribers
- freeing range '19' would affect subscribers in 10 countries (out of 32) with a weighted total number of 66 million subscribers
- freeing range '99' would affect subscribers in 14 countries (out of 30) with a weighted total number of 114 million or less subscribers.

Table 1. The social impact of freeing range '10x' in Europe[27].

↓Countries	Social impact of freeing range '10x' in Europe[28]									
x of '10x' →	0	1	2	3	4	5	6	7	8	9
EU										
Austria	-	-	-	-	-	-	-	-	-	-
Belgium 5	EM	EM	SC	SC	SC	SC	SC	SC	SC	SC
Denmark 4	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS
Finland 3	SUB	CS	-	-	CS	CS	SUB	SUB	CS	CS
France 34	NS	NS	-	-	-	-	-	NS	-	-
Germany 38	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Greece 6	EM	SC	SC	SC	SC	SC	SC	SC	EM	EM
Ireland 1	OA	OA	OA	OA	OA	OA	OA	OA	OA	OA
Italy 25	-	-	-	-	-	-	-	-	-	-
Luxembourg 0										
Netherlands 8	-	-	-	-	-	-	-	-	-	-
Portugal 4	-	-	-	-	-	-	-	-	-	-
Spain 18	-	-	-	-	-	-	-	-	-	-
Sweden 6	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
United Kingd. 30	OA	-	-	I	-	-	-	-	-	-
NON-EU										
Albania	OA									
Bulgaria	-	-	-	-	-	-	-	-	-	-
Croatia 1	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Cyprus 1	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Czech Republic 3	-	-	-	-	-	-	-	-	-	-
Estonia 0	-	-	-	-	-	-	-	-	-	-
Hungary 4	-	-	-	-	EM	EM	-	EM	-	-
Iceland										
Latvia 1	-	-	-	-	-	-	-	-	-	-
Malta 0	-	-	-	-	-	-	-	-	-	-
Moldova 1	-	-	-	-	-	-	-	-	-	-
Norway 4	SC	-	-	-	-	SC	SC	-	-	-
Poland 8	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
Romania 3	-	-	-	-	-	-	-	-	-	SUB
Slovak Republ. 1	-	-	-	-	-	-	-	-	-	-
Slovenia 6	-	-	-	-	-	-	-	-	-	-
Switzerland and Liechtenstein 5	CS	CS	CS	CS	CS	CS	CS	-	-	CS
Turkey 13	-	-	-	-	-	-	-	-	-	-
Ukraine 9	-	-	-	-	-	-	-	-	-	-

[27] The information in the table has been updated as of 1 June 1998.
'-' means that the range is not in use at present or at a moment in the foreseeable future;
'I' (internal) means that the range is used or will be used for network-internal purposes;
'SC' (short codes) means that the range is used or will be used for short numbers or prefixes. The other two-letter codes are CS (carrier selection), DQ (directory enquiry), EM (emergency services), FB (forbidden), FR (fault reporting), NS (network-specific), OA (operator assistance), OS (operator service), VM (voice mail) and WU (wake-up);
'SUB' (subscribers) means that the range is used for subscribers at present and in the foreseeable future.

[28] The present or a future situation is shown, whichever has the lowest social impact.

Table 2. The social impact of freeing range '11x' in Europe[29].

↓Countries	Social impact of freeing range '11x' in Europe[30]									
x of '11x' →	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
EU										
Austria	SC	OS	EM	FR?	SC?	SC	SC	SC	DQ	SC
Belgium 5	-	-	EM	-	-	-	-	-	-	-
Denmark 4	-?	-	EM	DQ	-	-?	SC	-	DQ	-?
Finland 3	-	-	EM	-	-	NS	-	-	DQ	-
France 34	-	FB	EM	-	-	SC	-	-	-	SC
Germany 38	EM	I	EM	I	I	I	I	I	DQ	I
Greece 6	SC	SC	EM	SC	SC	SC	SC	SC	SC	SC
Ireland 1	-	-	EM	-	OA	-	-	-	-	SC
Italy 25	VM	-	EM	EM	WU	EM	-	SC	EM	SC
Luxembourg 0			EM	EM						
Netherlands 8	-	-	EM	-	-	-	-	-	DQ	-
Portugal 4	-	-	EM	-	-	-	-	-	DQ	-
Spain 18	-	-	EM	-	-	-	-	-	-	-
Sweden 6	-	-	EM	-	-	-	-	-	DQ	-
United Kingd. 30	-	-	EM	-	-	-	-	-	DQ	-
NON-EU										
Albania										
Bulgaria	-	-	-	-	-	-	-	-	-	-
Croatia 1	SUB	SUB	EM	SUB	SUB	OA	SUB	SUB	DQ	SUB
Cyprus 1	-	-	EM	SUB	SUB	-	SUB	-	-	-
Czech Republic 3	-	-	EM	-	-	-	-	-	DQ	-
Estonia 0	-	-	EM	-	-	-	-	-	DQ	-
Hungary 4	-	-	EM	-	-	-	-	-	DQ	-
Iceland			EM		DQ	OA			DQ	OA
Latvia 1	-	-	EM	-	FR	OA	OA	-	DQ	-
Malta 0	-	-	-	-	-	-	-	-	-	-
Moldova 1	-	-	-	-	-	-	-	-	-	-
Norway 4	EM	-	EM	EM	-	OA	-	OA	-	SC
Poland 8	-	-	EM	-	SUB	-	SUB	-	-	-
Romania 3	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Slovak Republ. 1	-	-	EM	-	-	-	-	-	-	-
Slovenia 6	-	-	EM	EM	-	-	-	-	-	-
Switzerland and Liechtenstein 5	SUB	DQ	EM	SUB	OA	DQ	SUB	EM	EM	SUB
Turkey 13	EM	-	EM	-	-	OA	-	-	DQ	SUB
Ukraine 9	-	-	-	-	-	-	-	-	-	-

[29] The information in the table has been updated as of 1 June 1998.
'-' means that the range is not in use at present or at a moment in the foreseeable future;
'I' (internal) means that the range is used or will be used for network-internal purposes;
'SC' (short codes) means that the range is used or will be used for short numbers or prefixes. The other two-letter codes are CS (carrier selection), DQ (directory enquiry), EM (emergency services), FB (forbidden), FR (fault reporting), NS (network-specific), OA (operator assistance), OS (operator service), VM (voice mail) and WU (wake-up);
'SUB' (subscribers) means that the range is used for subscribers at present and in the foreseeable future.

[30] The present or a future situation is shown, whichever has the lowest social impact.

Table 3. The social impact of freeing range '19x' in Europe[31].

↓Countries	Social impact of freeing range '19x' in Europe[32]									
x of '19x' →	0	1	2	3	4	5	6	7	8	9
EU										
Austria	-	-	-	-	DA	-	-	-	-	-
Belgium 5	NS	-	-	-	-	-	-	-	-	-
Denmark 4	-	-	-	-	-	-	-	-	-	-
Finland 3	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
France 34	-	-	-	-	-	-	-	-	-	-
Germany 38	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Greece 6	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	EM
Ireland 1	SC	-	-	-	-	-	-	-	-	-
Italy 25	SUB	SUB	SUB	-	-	-	SC	-	-	-
Luxembourg 0										
Netherlands 8	-	-	-	-	-	-	-	-	-	-
Portugal 4	-	-	-	-	-	-	-	-	-	-
Spain 18	-	-	-	-	-	-	-	-	-	-
Sweden 6	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
United Kingd. 30	NS	NS	DQ	NS	NS	NS	NS	NS	NS	I
NON-EU										
Albania	EM	EM	EM	EM	EM	EM	EM	EM	EM	EM
Bulgaria										
Croatia 1	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Cyprus 1	OA	DQ	DQ	SUB	DQ	SUB	SUB	SUB	OA	EM
Czech Republic 3	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
Estonia 0	-	-	-	-	-	-	-	-	-	-
Hungary 4	OA	OA	SC	WU	-	-	-	SC	DQ	DQ
Iceland										
Latvia 1	-	-	-	-	-	-	-	-	-	-
Malta 0	OQ	EM	-	-	OQ	SUB	EM	-	-	-
Moldova 1	-	-	-	-	-	-	-	-	-	-
Norway 4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Poland 8	-	-	-	-	-	SUB	-	-	SUB	-
Romania 3	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB	SUB
Slovak Republ. 1	-	-	-	-	-	-	-	-	-	-
Slovenia 6	-	-	-	-	-	-	-	-	-	-
Switzerland and Liechtenstein 5	-	DQ	DQ	DQ	-	-	-	-	-	-
Turkey 13	-	-	-	-	-	-	-	-	-	-
Ukraine 9	-	-	-	-	-	-	-	-	-	-

[31] The information in the table has been updated as of 1 June 1998.
'-' means that the range is not in use at present or at a moment in the foreseeable future;
'I' (internal) means that the range is used or will be used for network-internal purposes;
'SC' (short codes) means that the range is used or will be used for short numbers or prefixes. The other two-letter codes are CS (carrier selection), DQ (directory enquiry), EM (emergency services), FB (forbidden), FR (fault reporting), NS (network-specific), OA (operator assistance), OS (operator service), VM (voice mail) and WU (wake-up);
'SUB' (subscribers) means that the range is used for subscribers at present and in the foreseeable future.

[32] The present or a future situation is shown, whichever has the lowest social impact.

Table 4. The social impact of freeing range '99' in Europe[33].

↓Countries	Social impact of freeing range '99' in Europe[34]
'99' →	(the impact may be less for some ranges '99x')
EU	
Austria	
Belgium 5	-
Denmark 4	SUB
Finland 3	CS
France 34	-
Germany 38	SUB
Greece 6	SUB
Ireland 1	-
Italy 25	SUB
Luxembourg 0	
Netherlands 8	SUB
Portugal 4	SUB
Spain 18	-
Sweden 6	SUB
United Kingd. 30	EM
NON-EU	
Albania	
Bulgaria	
Croatia 1	-
Cyprus 1	SUB
Czech Republic 3	SUB
Estonia 0	SUB
Hungary 4	-
Iceland	
Latvia 1	-
Malta 0	-
Moldova 1	-
Norway 4	SUB
Poland 8	EM
Romania 3	OA
Slovak Republ. 1	SUB
Slovenia 6	-
Switzerland and Liechtenstein 5	SUB
Turkey 13	-
Ukraine 9	SUB

[33] The information in the table has been updated as of 1 June 1998.
'-' means that the range is not in use at present or at a moment in the foreseeable future;
'I' (internal) means that the range is used or will be used for network-internal purposes;
'SC' (short codes) means that the range is used or will be used for short numbers or prefixes. The other two-letter codes are CS (carrier selection), DQ (directory enquiry), EM (emergency services), FB (forbidden), FR (fault reporting), NS (network-specific), OA (operator assistance), OS (operator service), VM (voice mail) and WU (wake-up);
'SUB' (subscribers) means that the range is used for subscribers at present and in the foreseeable future.

[34] The present or a future situation is shown, whichever has the lowest social impact.

Annex H The use of DTMF capable terminals and switches

The table in this annex provides an overview of the use terminals and switches that can handle dual tone multi-frequency (DTMF) signalling. This capability is required to process '*' and '#' symbols. From all CEPT countries some or all relevant information has been included, except from Albania, Andorra, Austria, Bosnia and Herzegovina, Bulgaria, Estonia, Hungary, Iceland, Liechtenstein, Lithuania, Luxembourg, Macedonia, Monaco, Russian Federation, San-Marino, Spain, United Kingdom and Vatican city.

Table 1. The use of DTMF capable terminals and switches.[35]

↓Countries	Percentage use of DTMF capable equipment	
Equipment→	DTMF capable terminals	DTMF capable switches
EU		
Belgium	more than 85%	more than 80%
Denmark	more than 80%	100%
Finland	90%	100%
France	80%	100%
Germany	more than 50%	more than 80%
Greece		45%
Ireland	97%	more than 90%
Italy		97%
Netherlands	more than 50%	100%
Portugal	more than 10%	70%
Sweden		96%
NON-EU		
Croatia	0%	about 50%
Cyprus	70%	more than 80%
Czech Republic	30%	30%
Latvia	between 10 and 15%	14%
Malta	80%	100%
Moldova	less than 5%	3%
Norway	more than 75%	more than 80%
Poland	30%	50%
Romania	5%	20%
Slovak Republic	48%	52%
Slovenia		more than 55%
Switzerland	90%	90%
Turkey	85%	78%
Ukraine	1%	5%

[35] The information in the table has been updated as of 1 June 1998.

Annex I Comments from ENF members

The only comments from ENF members on the draft final ETO report on Harmonisation of Short Codes in Europe were comments from ETNO. The following fundamental ETNO comments have not been taken into account in the main text of the final report:

> ETNO appreciates the possibility to comment on ETO's draft final report on Harmonisation of Short Codes in Europe.
>
> This version maintains conclusions on the harmonisation of access codes and even introduces an additional proposal on shared cost services.
>
> ETNO has already commented on various occasions on such proposals and recalls that the harmonisation of short codes is only a small portion of the whole national numbering scheme. ETNO believes that decisions on the harmonisation of short codes cannot be done as a single action. The proposals made in the ETO report shall be considered together with other activities on harmonising national numbering schemes. ETNO would be pleased to contribute to this work.
>
> ETNO proposes to transfer the results of ETO's report as an input to any possible Europe-wide discussion about the harmonisation of national numbering schemes before any uncoordinated decisions are made.

Annex J ETNO Common Position

It should be noted that the information on short code use in this annex is from January 1997. ETO can not guarantee the accuracy of this information.