



OFCOM-Industry Working Group on VoIP

VoIP Functional Standards

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Table of contents

1	Introduction	4
1.1	Abbreviations	5
2	Interoperability / interconnection.....	8
2.1	Transmission of speech in real time.....	8
2.2	Interconnection.....	11
2.3	Interoperability.....	13
2.4	Access to value-added services.....	14
3	User-related aspects of access to networks and services.....	16
3.1	Lawful Interception (LI).....	16
3.2	Emergency calls (112, 117, 118,...) incl. caller location.....	18
3.3	Services for hearing impaired and visually impaired	20
3.4	Outgoing call barring	21
3.5	Advice of charge	22
3.6	Calling-line identification	23
3.7	Publication of NTP	25
3.8	Extraterritoriality	26
4	Numbering	27
4.1	E.164 resources for VoIP based services	27
4.2	Carrier selection for VoIP TSP	29
4.3	"Global number portability" / use of national E.164 resources abroad	33
4.4	Obligations relating to the public telephone service directories	35
Annex A:	Final member's comments.....	37
Annex B:	Swiss law and OFCOM regulations.....	41
Annex C:	Main ETSI reference: ETSI SR 002 211.....	42

This document represents the result of the studies of the VoIP OFCOM-Industry working group and reflects the opinion of the group members. It is only an informative tool proposing solutions to quickly adapt the current legislation in order to integrate public telephony services based on the VoIP technology into existing telecommunications legislation. The document is neither constraining nor legally binding.

1 Introduction

After continuous development of the traditional telephone service for more than 100 years, it seems that the arrival of VoIP will determine a fundamental change on it. On the basis of the Internet Protocol (IP), new voice services are being established which apparently no longer obey the same rules as the old public telephone service, which is also part of the universal service according to telecommunications law.

These new IP voice services are not being provided via the traditional circuit-switched telecommunications networks (Time Division Multiplexing, TDM), but via packet-switched data networks. The voice service is, as it were, being split off from its characteristic network (the Public Switched Telephone Network, PSTN). This separation, which also brings into question some of the existing facilities and service characteristics in the PSTN, now calls for a more precise definition of the public telephone service.

The term public telephone service, as used in the Law on Telecommunications and the Decree on Telecommunications Services, is not a generally valid definition but concerns the specification and description of the service to be provided by the universal service licensee. This service is furthermore based on the telephony available on the analogue public fixed network at the time of the entry into force of the revised Telecommunications Act.

A generally valid definition of the public telephone service, however, cannot include all the user facilities and service characteristics to be provided by the universal service licensee under this heading. Otherwise, new voice services would incorrectly risk to no longer be included under the concept of the public telephone service. Thus, for example, fax transmission and narrowband data transmission over the voice channel fall within the services to be provided by the universal service licensee. In modern telecommunications networks, these services are fundamentally no longer associated with voice transmission. GSM, UMTS, WLL, VoIP or WLAN services generally no longer include either fax or narrowband data transmission services. New voice services would therefore no longer fall under the definition of the public telephone service (PTS) if the latter (PTS) had to include as an obligation the support to fax transmission and narrowband data transmission over the voice channel.

The result of this would be that important principles of voice transmission would no longer be guaranteed. Interoperability (as defined in art. 11 para. 2 LTC) would, in particular, raise questions. However, it was precisely the wish of the legislator that anyone can call everyone else, regardless of their choice of provider. This major policy objective of coverage would be severely restricted if providers of pure voice services without fax or data transmission were excluded from the interoperability obligation.

The definition of the public telephone service has therefore to be essentially restricted to its central element, i.e. real-time voice transmission via telecommunications structures. The complementary facilities and services included in the telecommunications legislation (fax, data link for internet access, physical connection, entry in directories free of charge, etc.) are not part

of this definition and, according to the current legislation, are of significance only for the universal service licensee.

A further key element of the public telephone service, in addition to voice transmission in real time, is freedom of connection between users identified by E.164 numbers. This numeric address space is an important achievement of the telephone service and allows worldwide uniform addressing for call set-up. The use of these E.164 numbers must be retained both in the traditional telephone service and in the case of VoIP.

From today's viewpoint, therefore, the goal of VoIP regulation must be to retain interoperability of real-time voice transmission using E.164 numbers in compliance with the basic conditions of telecommunications law, with a view to uniformity of the public telephone service. Such regulation must provide answers to the questions thrown up by the change in technology and avoid the erection of barriers which prevent dissemination and use of VoIP services by consumers.

This objective is to be achieved in two stages:

First stage: the current requirements in the public telephone service, which were established on the basis of traditional PSTN fixed network telephony, are examined for their applicability in a VoIP environment, using the present document drawn up by OFCOM in collaboration with interested parties and taking into account the corresponding European and international environment. If problems arise, indications are given as to how the corresponding regulations can be adapted in the coming year in such a way that the essential content of the public telephone service, i.e. interoperability of real-time voice transmission using E.164 numbers, is not questioned. In this context, OFCOM will be guided by the following principles:

1. The market launch of VoIP shall not be hindered because of the existing requirements of the public telephone service.
2. Conditions for the protection of consumers (e.g. barring outgoing calls), for maintaining the integrity of the public telephone service and for maintaining interoperability shall be maintained in accordance with their original aim.
3. VoIP providers which provide real-time voice transmission, use E.164 numbers and connect their services to the public telephone service are to be considered as providers of the public telephone service.
4. Requirements for the protection of the state and the community are maintained (e.g. legal interception).
5. Requirements to maintain the availability of emergency call services are in principle maintained and if necessary adapted to the technical possibilities of VoIP services (nomadic mobility).
6. The same requirements apply to VoIP providers who offer their services via broadband connections of other providers and those using other means.
7. The interconnection obligation in the case of market dominance and the obligation to ensure communications capability (interoperability) in the case of provision of a public telephone service (art. 11 para. 1 and 2 LTC) are also maintained in a VoIP environment.

Second stage: in the medium and long term the telecommunications legislation must be adapted to the paradigm shift in telecommunications expected as a result of the "IP revolution", making use of all the possibilities of legislation and decrees. One important milestone along this road will be the universal service licence(s) to be awarded on 1 January 2008.

See final comments from COLT Telecom AG in [Annex A](#).

1.1 Abbreviations

ADSL	Asymetrical Digital Subscriber Line
AEFV	AddressierungsElemente im Fernmeldebereich Verordnung
AGB	Algemein GeschäftsBedingungen (general business conditions)

AoC	Advice of Charge
BB	Broad Band
CATV	Common Antenna TeleVision installations
CbC	Call by Call
CEC	Commission of the European Communities
CH	Switzerland
CLI	Calling Line Identification, Caller Line Identification
CLIP	CLI Presentation
CLIR	CLI Restriction
CPS	Carrier Pre-Selection
CS	Carrier Selection
CSC	Carrier Selection Code
DTS	Data Transfer Service
ETSI	European Telecommunications Standards Institute
EU	European Union
FDV	FernmeldeDienst Verordnung
FMG	FernMeldedienst Gesetz (the same as LTC)
GSM	General System for Mobile communications
IC	InterConnection
ICT	Information and Communication Technologies
INA	Individual Number Allocation
INET	Internet Server
IoP	Interoperability
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISP	Internet SP
ISUP	ISDN Signalling User Part
LTC	Loi des TeleCommunications (the same as FMG)
MOS	Mean Opinion Score
NO	Network Operator
NP	Number Portability
NRA	National Regulating Authority
NTP	Network Termination Point
ONP	Operator Number Portability
OST	Ordonnance des Services de Telecommunication (the same as FDV)
PATS	Public Available Telephony Service
PBV	Price notification decree
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
QoS	Quality of Service
SIP	Service Independent Protocol / Session Initiated Protocol / Session Initiation Protocol
SP	Service provider
TAV	Technische und Administrative Vorschrift (technical and administrative requirements)
TDM	Time Division Multiplexing
TSP	Telephony SP
UMTS	Universal Mobil Telecommunications System

US	Universal Service
USO	US Obligation
VAS	Value-Added Services
VoIP	Voice over IP
WG	Working Group
WLAN	Wireless Local Area Network
WLL	Wireless Local Loop
WS	Work-Shop
xDSL	All (x) Digital Subscriber Line technologies

2 Interoperability / interconnection

2.1 Transmission of speech in real time

Obligation	Transmission of speech in real time
Legal reference	LTC art. 16, para. 1 a
VoIP Workshop results (23/06/04)	<p>WG1 : Quality of voice transmission should not be regulated (choice of customer).</p> <p>WG5: Real time or more recently Quality of Service (QoS) do not seem to be the most important criteria to define boundaries between PATS and 'non-PATS' services (this requires further study).</p>

Comments or problem description:

The WG VoIP, with the industry, has tried to define what the terms "**transmission of speech in real time**" meant. It has tried to associate this term with a specific end-to-end speech transmission quality without arriving at any definitive results.

The comments of the Working Document are published on the OFCOM website on the page http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite00977/index.html

Quality of service (QoS):

In fact, for services which form part of the universal service, the WG VoIP has studied the voice transmission criteria and contributed to drafting technical and administrative prescriptions entitled "Critères de qualité du service téléphonique public [Quality Criteria of the Public Telephone Service] (RS 784.101.113/1.8)". In these regulations, it is mentioned that they apply to providers of the public telephone service with directly connected subscribers. The target quality values are R values (ITU-T Recommendations G.107/G.108/G.109) of at least 70 for connections between two normal terminals directly connected to the network of a public telephone service provider. This value must be met in at least 95% of calls.

As far as TSPs which provide public telephony without directly connected subscribers are concerned, these regulations do not apply. Therefore, for these TSPs, the WG has tried to define quality criteria for end-to-end connections. Some work and reflections have been produced, but they have not resulted in publications.

The Working Document published on the OFCOM website is available on the following page: http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite00977/index.html :

The Quality of Service is the level of satisfaction the users of a service experience, having as reference their expectations.

The sections of the present chapter discuss relevant items for the QoS of the telephony service. It is assumed that the QoS planned is at the same level for the overall service and for each one of the relevant functionalities and components associated with that service.

This means that, e.g. in a case where the planned QoS for a PTS is 3.0 MOS, it is assumed that the overall voice transmission quality and all other components of that service are planned to fulfil individually a QoS of at least 3.0 MOS.

The obligation to respect a specific QoS level (MOS \geq 3.6 for 95 % of connections, see RS 784.101.113/1.2) is only applicable to the provision of the universal service (art. 25 OST).

Real time notion

Swiss law refers to the real time notion, but strictly speaking this is an old concept limited by the technology, which today is enhanced by evaluation of user satisfaction, i.e. QoS.

Delay is still a major issue for digital voice transmission, but other parameters need to be included in evaluation of QoS for voice transmission and, as referred to above, voice transmission performance is not the only component of the PTS to be evaluated.

For the other aspects or reflections on speech transmission, refer to the Working Document published on the OFCOM website

(http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite00977/index.html) including the following chapters:

- **QoS quantification, Mean Opinion Score (MOS)**
- **Aspects other than voice transmission**
- **Voice transmission**
- **Specific aspects of compression algorithms and delay**
- **Most common compression algorithms**
- **Building the delay budget**

One may ask if transmission quality needs to be regulated, especially considering the recent discussions emanating from the workshop on 23 June 2004. It would be possible to start from the principle that consumers themselves will sort out the wheat from the chaff. TSPs not offering reasonable transmission quality will not be able to survive. Starting from this idea, it would then be possible to abrogate the technical regulations on the "Quality criteria of the public telephone service" (RS 784.101.113/1.8)".

Later: define an equal quality requirement for the universal service licensee and for the other SP's offering parts of the universal service? This could be studied when the forthcoming new definition of the universal service in 2008 will be prepared.

The market is allowed to regulate itself. Excellent quality of transmission and of the service might be an advertising argument for TSPs (and not just price, as is often the case at present).

See final comments from COLT Telecom in [Annex A](#).

Solution	<p>In the case of telecommunication services providers offering voice services with VoIP technology, it is considered that speech transmission takes place in "real time". Moreover, if the service offered is communication of the "any to any" type, with users who can be reached universally, then it represents a public telephone service.</p> <p>Here are some examples of public telephony with VoIP (the list is not exhaustive) :</p> <ul style="list-style-type: none"> - Voice service independent of ISP and Access Provider, including PSTN Gateway, establishment of bi-directional communication - Voice service sold by ISP (e.g. Yahoo!BB), including PSTN Gateway, establishment of bi-directional communication - Voice service sold by the owner of the access, including PSTN Gateway (e.g. Cablecom with digital phone), establishment of bi-directional communication - Voice service sold by means of a CSC (access remains a PSTN access of another access provider, no broadband needed, IP protocol is used for the transmission), including establishment of
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	<p>bi-directional communication.</p> <p>Here are examples of non-public telephony (the list is not exhaustive) :</p> <ul style="list-style-type: none"> - VoIP inside a "peer to peer group", private numbering/addressing plan (not E.164), no PSTN gateway - Provision of VoIP by means of an application on a PC, private numbering/addressing plan (not E.164) no PSTN gateway - Provision of VoIP by any means, including PSTN gateway, but establishment of <u>unidirectional communication only</u>.
Advantages	Considering provision of VoIP as speech transmission in real time (i.e. telephony) means that there is no need to specify "speech transmission in real time". The subsequent stage is to determine if it is additionally a case of public telephony or not. TSPs providing public telephony offer services forming part of the universal service and have certain rights, but they also have corresponding obligations.
Disadvantages	The voice quality is not formally guaranteed, particularly if the voice service provider is different from the connectivity provider and if no agreement is concluded between them.
Regulatory impact	No impact on the regulatory domain, since it is clear that the interoperability rules apply to services based on (directly or indirectly) interconnected IP networks.

2.2 Interconnection

Obligation	Interconnection
Legal reference	LTC art. 11, para. 1 and 2
VoIP Workshop results (23/06/04)	<p>WG1: Interconnection interfaces and protocols are relevant topics. Interoperability is a relevant topic (in relation with interconnection).</p> <p>WG4: OFCOM should let the suppliers determine the interconnection interface, recommendations are however expected.</p> <p>The suppliers cannot require the provision of an IP interface. Only a TDM interface or a transit operator can guarantee that the IoP obligation is fulfilled.</p> <p>OFCOM should give the transition period for the migration from TDM to IP.</p> <p>Only the market dominant supplier must offer the interconnection, all other suppliers are obliged to IoP. Swisscom may be exempted through indirect interconnection (transit).</p> <p>IoP is an obligation only at national level. National IoP is also to be guaranteed when the service provider is located abroad.</p> <p>It remains a PATS even if one element of the network is not controlled by itself (network of other suppliers, CATV, ADSL).</p> <p>All suppliers considered as PATS must ensure access to value-added numbers.</p>
Standards and associated references	List of the recommended interfaces for interconnection: http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite13/index.html

Comments or problem description:

Interconnection is a key point within a multi-provider environment. From a technical viewpoint, interconnection is achieved by means of an interface which allows two independent networks to “communicate” using protocols. When one refers to an interface, it is also implied interoperability of telecommunications services via that interface. Without direct or indirect interconnection, no interoperability of services is possible.

During the WS organised on 23 June 2004, the WGs clearly mentioned that interconnection, interfaces and protocols were relevant and necessary items for the satisfactory operation of services within a multi-provider environment.

In terms of interconnection, the rules applicable today are also applicable in the context of VoIP services. Here is what the Working Document published on the OFCOM website says, on page http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite00977/index.html :

According to art. 11 para. 2 LTC, the provider of services forming part of the universal service must guarantee the capacity for communications between the users of these services and is therefore also obliged to offer interconnection, even if he does not hold a dominant position in the market or is not the universal service licensee. The aim of this rule was expressed in these terms at the time of the drafting of the LTC: *It ensures that all the customers of a provider can always communicate fully with all the customers of another*

provider. In other words, those wanting to offer their customers a public telephone service must also allow them to have access to all customers involved in the public telephone service, irrespective of the providers to which they are subscribers.

From the point of view of the customer, it is virtually only necessary to have a single network permitting each person to communicate with all others. Not only subscribers to fix and mobile services should be regarded as customers, but also service providers via value added services numbers (08XX/090X) or via short numbers (1XX), who are also allocated individual numbers directly by OFCOM.

To date, interconnection arrangements and standards have addressed circuit switched to circuit switched interconnection. With the introduction of IP technology it will be necessary to cover IP-IP interconnection in equivalent detail. An important issue will be how to extend the current peering arrangements to cover guaranteed QoS, new addressing schemes and to provide appropriate carrier-to-carrier billing. Where networks that need to interconnect use different technologies, one of these operators (circuit switched or IP) will need to provide the necessary interoperability functions. Interoperability functions also may be needed between IP-based networks if those networks use different protocols, e.g. one uses SIP and the other H.323.

Solution	<p>In principle, <u>nothing in the current interconnection rules</u> has to be changed. The only change would be to add one or more new interfaces to the list of interfaces recommended for interconnection available on the OFCOM website:</p> <p>http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite13/index.html</p> <p>The interface currently recommended by OFCOM is ISUP v3 international. The WG, with the industry, has started work on a new interface which could be recommended. A draft document exists at present but has not yet been published. The work performed in this area was carried out under the name of Q.3. The recommended interface should be at IP-IP level. For the time being no complete set of standards and specifications is available in the IP interconnection environment. As far as harmonized international interfaces are available, they should be privileged for interconnection (according to art. 46, al. 3 of OST).</p> <p>In the case of IP-TDM interconnection, the old interfaces should apply, as otherwise many adaptations would have to be made in the TDM environment for a transitional period. Adaptations would also have to be made in respect of services like CLI, AoC, etc., as this information is exchanged at the IC interface. It is difficult to estimate the expenditure, but in view of the successive migration to IP this would be pointless.</p> <p>After consulting the working group, it turns out that an interface recommendation is not urgent, or even desirable, at least in the short term.</p>
Advantages	If two TSPs wish to interconnect across a different, non-recommended interface, the possibility of doing so is offered to them, as long as interoperability of services is guaranteed.
Disadvantages	Not identified
Regulatory impact	No impact on the regulatory domain, since it is clear that the interconnection between two IP networks and/or services is subject to the interconnection rules.

2.3 Interoperability

Obligation	Interoperability
Legal reference	LTC art. 11, para. 2
Comments or problem description: This point is related to interconnection and also to the services analysed later (CLI, short numbers, value-added numbers, etc.). It is therefore not necessary to develop it in more detail in this section.	
Solution	Interoperability of services must be guaranteed (see solutions specific to the problems encountered) as far as E.164 numbers are assigned and used.
Advantages	Not identified
Disadvantages	Not identified
Regulatory impact	Not identified

2.4 Access to value-added services

Obligation	Access to value-added services 08xx and 09xx
Legal references	OST art. 43, para. 1 d
VoIP Workshop results (23/06/04)	WG1: Access to value-added services is a relevant topic and must be guaranteed.
Comments or problem description:	
<p>The Working Document published on the OFCOM website is available on: http://www.ofcom.ch/en/telekommunikation/interkonnection/ag_technik/unterseite00977/index.html :</p> <p>According to Article 43, para. 1 d, OST, access to 08xx and 09xx value-added services forms part of the universal service as regards interconnection and must therefore be guaranteed by all providers of services forming part of the universal service (Art. 48 a, OST).</p> <p>The main problem arising for this type of number is due to their special charging scale and the fact that the value-added service provider receives some of the charges. However, this must not be an obstacle to the principle of interoperability. It is up to the service providers to find solutions to this problem in their interconnection agreements. In the event of disputes regarding this subject, ComCom will arbitrate.</p>	
Solution	<p>Access to value-added services must be guaranteed by TSPs which offer services forming part of the universal service (public telephony). This access shall be "unbarred" by default and as far as the users did not request from the TSP(s) to bar them (the "opt out" principle).</p> <p>The emergence of TSPs providing VoIP access might have consequences in terms of the operation of the technical and administrative processes concerning INA (Individual Number Allocation) and ONP (Operator Number Portability) of the INET server. Furthermore, the fact that certain TSPs providing VoIP are located and based abroad might pose additional problems which have been unknown to date. Analysis of these consequences and of the satisfactory operation of INA and ONP processes of the INET server would then be the responsibility of the TSP Headgroup which is competent to take decisions in this area.</p> <p>With the introduction of individual number assignment in 2001, major problems arose, which have been preoccupying TSPs for some years in combating abuse. The new Decree on Price Notification has brought some improvements as has the obligation to obtain customer confirmation for prices in higher than CHF 10 set-up and CHF 5 per minute. It must be analysed how this confirmation is implemented in the IP environment so that the requirements of the decree are fulfilled. This topic needs essentially to be reviewed in greater detail in order not to repeat the same mistakes as were made during the introduction of INA. The feasibility of charging needs to be examined.</p>
Advantages	The integrity of the public network is maintained.
Disadvantages	Not identified

Regulatory impact	Not identified
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3 User-related aspects of access to networks and services

3.1 Lawful Interception (LI)

Obligation	Lawful Interception (LI)
Legal reference	<ol style="list-style-type: none"> 1. LTC art. 44 2. Federal Law of 6 October 2000 on the surveillance of postal and telecommunications services (SR 780.1; AS 2001 3096) (DBA)
Standards and associated references	<p>It is difficult to find very specific references from the authorities due to the sensitivity of the subject and the high risks for the citizens and States.</p> <p>The deliverables from ETSI TC LI (selectively), e.g. ETSI TR 101 944 (Issues on IP Interception), ETSI TS 101 671 (Handover interface for circuit switched technologies, the corresponding deliverable for IP is being developed, this document is often updated, please always consult the latest version).</p> <p>ETSI TR 101 331: Requirements of LI-Law Enforcement Agencies.</p> <p>ETSI TS 101 909-20-1 and ETSI TS 101 909-20-2 IPCablecom (for 'cable operators') LI standards to be published by the end of 2004.</p>
Comments or problem description:	
<p>The problem is under the DBA responsibility (Swiss Surveillance Authority), OFCOM can only offer support with relation to the communications arena.</p> <p>Internet and new technologies (including networking, coding, transmission and others) in general, together with the de-regulation policies for ending monopoly regimes, opened up the possibility of using different types of architecture and an increased number of operators and service providers.</p> <p>The traditional surveillance of voice services normally practiced in POTS/ ISDN / earlier PSTN systems is no longer sufficient. E-mail exchange, coded voice communications, remote controlled data systems and much higher rates of information exchange via the networks also need to be considered in the context of lawful interception.</p> <p>Summary: There is much more information to survey and it is much more difficult to access new systems</p>	
Solution	<p>The collaboration of network operators with the surveillance authorities (requested by the law) seems to be the only solution. To follow standardisation work in the area facilitates the understanding of the problems and suggests specific solutions.</p> <p>The adoption of the generic handover interface is being followed by the majority of the technologies and this facilitates the correct implementation of the principles in the law.</p> <p>For OFCOM: Wait for any DBA specific request.</p>
Advantages	Not identified
Disadvantages	Not identified

Regulatory impact	If no particular difficulty is identified by DBA, OFCOM will not produce specific regulatory documents or recommendations.
Proposal	Adopt the solution, recommend handover interface specification.

3.2 Emergency calls (112, 117, 118,...) incl. caller location

Obligation	Emergency calls (112, 117, 118,...), including the identification of the caller location
Legal reference	OST art. 28
Standards and associated references	<p>SR 784.101.113/1.3 Routing and identification of location of emergency calls</p> <p>The following ETSI Special Reports offer overviews of the problems under different aspects:</p> <p>ETSI SR 002 299: collection of EU regulating texts ETSI SR 002 180: emergency communication citizen – authority</p> <p>The following documents are in the development phase:</p> <p>ETSI SR 002 181: emergency communication among authorities ETSI SR 002 182: emergency communication authority - citizen ETSI SR 002 410: emergency communication among citizens http://www.emtel.etsi.org/ explains ETSI activity in the area</p> <p style="padding-left: 20px;">❖ specific for Identification of location of caller:</p> <p>CEC recommendation (2003/558/EC) of 25 July 2003 on the processing of caller location information in electronic communication networks for the purpose of location - enhanced emergency call services (main text can be found in ETSI SR 002 299)</p> <p>Clause 1.2 of the VoIP group OFCOM-Industry (Functionality analysis)</p> <p>This area is covered by ETSI SR 002 211 in the following annexes:</p> <ul style="list-style-type: none"> - A.4.10.2 Caller location - A.5.3 Location data for public telephone services
Comments or problem description:	

With 'nomadic' VoIP based services, the VoIP service provider has no knowledge of the physical location of the caller and is therefore not able to route an emergency call to the nearest emergency service centre.

According to VoIP group, Q2:

At home, routing works on the basis of the subscriber's location data which he has specified in the contract. The TSP must inform the subscriber that the correct routing works only at home (comparison AGB by Econophone).

If the subscriber makes a call away from home, routing does not always work properly and there are two possibilities:

- 1) The subscriber must be informed appropriately of this inaccessibility.
- 2) Technically it would be possible for the subscriber to temporarily change the data stored with the TSP concerning routing.

According to art. 28 para. 3 [FDV](#) identification of location must be guaranteed only in so far as the selected technology allows this. Accordingly, identification of location is also dispensed within the mobile telephony sector. In the case of VoIP, identification of location can still be

guaranteed for the “default location” specified in the contract.

See final comments from 3G Mobile AG Telefónica in [Annex A](#).

Solution	<p>Routing to the nearest emergency service centre must be guaranteed for the “default location” specified in the contract. In the case of nomadic use of the service, the obligation concerning correct routing is provisionally lifted – as long as no technical possibility exists.</p> <p>But users need to be explicitly warned that, when moving their terminals from an agreed fix location, correct connection to the emergency services cannot be guaranteed. This warning must be clearly stated in the subscriber contract and in a separate written notice to the subscriber. It must be stated explicitly that this exception is just temporary as long as the technology does not allow the correct routing to the appropriate emergency service centre. The VoIP service provider should be obliged to inform the emergency call centre that the user may, in some situations, use the nomadic functionality and, in that case, his default address does not correspond to the location where the communication was generated. The emergency database should be adapted accordingly based on proposals made by the emergency call centres.</p> <p>OFCOM will organise the implementation of the solutions as soon as possible to prevent multiple interventions at legislative and technical levels and minimal impairments during the launch of IP based services.</p> <p>The emergency call centre may find additional solutions, e.g. to ask the caller about his localisation.</p>
Advantages	<p>The following suggested adaptation of the technical and administrative regulations can be implemented more rapidly than an amendment to the Decree on Telecommunications Services (FDV). OFCOM can rely on art. 28 para. 5 FDV which gives the Federal Office the authority to issue regulations for routing and identification of location. Such regulations already exist for mobile telephony, where correct routing is not guaranteed in every case.</p> <p>If subscribers are expressly informed about the limitations on emergency calls in the case of VoIP providers, an attempt to regulate via technical and administrative regulations should be considered.</p>
Disadvantages	<p>In the case of a nomadic use, without the user re-announcement, the caller localisation is critical.</p>
Regulatory impact	<p>Additions to the technical and administrative regulations for routing and identification of location of emergency calls (SR 784.101.113/1.3).</p> <p>If the opinion is that the legal basis for exemption from the emergency call obligation at the level of technical and administrative regulations is not adequate, a revision of the Decree on Telecommunications Services (FDV) would have to be considered.</p>
Proposal	<p>Additions to the technical and administrative regulations for routing and identification of location of emergency calls (SR 784.101.113/1.3) (possibly to the FDV).</p> <p>OFCOM will try to include the emergency call organisations in the discussion as quickly as possible!</p>

3.3 Services for hearing impaired and visually impaired

Obligation	Services for hearing impaired and visually impaired
Legal reference	OST art. 30
Standards and associated references	Clause 1.2 of the VoIP group OFCOM-Industry (Functionality analysis). This area is covered by ETSI SR 002 211 Annex B: Human Factors. Further documents can be found on the work programme of the ETSI TC HF
Comments or problem description:	
<p><u>According to the results of Q2:</u></p> <p>a) With reference to hearing impaired: The service implies the support of 'Teletype' (110 Baud, V.21., V.22. or similar) which only work properly in an environment where compression is not applied.</p> <p>b) With reference to visually impaired: The service works as follows: 1145 is dialled and connected to an operator who - if the received CLI is found in a white list (CLI) - performs the manual through-connection to the desired destination.</p>	
Solution	According to the results of Q2: a) With reference to hearing impaired: non-compressing codec (e.g. G.711) is a must! b) Availability of the CLI of the calling impaired person!
Advantages	Not identified
Disadvantages	Restricts the technological liberty of the VoIP provider.
Regulatory impact	Not identified
Proposal	With reference to hearing impaired: Examine whether solutions such as "Telesip" (http://www.telesip.org) might be envisaged. They satisfy the requirements of hearing impaired much better and are conceived for an IP environment.

3.4 Outgoing call barring

Obligation	Outgoing call barring
Legal reference	OST art. 31
Standards and associated references	This area is covered by ETSI SR 002 211 in the following annex: - A.4.3.1 Outgoing call barring

Comments or problem description:

The user shall be able to communicate with any of the addresses of the E.164 numbering plan. This includes access to supplementary services (required by the law, see [§ 2.4](#)).

The calls addressed to the numbers 090X shall be blocked only in the case where the subscriber explicitly declares he decided to bar calls to these addresses. The default case is always for the user to be able to contact every public network E.164 address.

If the VoIP service provider has difficulties to offer access to a certain type of addresses, e.g. value-added services (VAS), due to difficulties within his own infrastructure, e.g. billing systems, he has to organise with other partners a way of offering the user the full service according the Swiss rules.

Generally barring requirements are applicable to VoIP based services like any other service independently from the network technology.

See final comments from COLT Telecom in [Annex A](#).

Solution	The voice service provider is in all cases responsible for the call barring.
Advantages	Easy to implement
Disadvantages	Not identified
Regulatory impact	Not identified
Proposal	Publish information on the solution on the OFCOM website

3.5 Advice of charge

Obligation	Advice of charge
Legal reference	OST art. 32
Standards and associated references	<p>SR 784.101.113/1.5 Advice of charge</p> <p>This area is covered by ETSI SR 002 211, annex:</p> <ul style="list-style-type: none"> - A.4.3.3, Advice of charge (AoC)
Comments or problem description:	
<p>The detailed information may be provided in different forms. The earlier listing of the calls made during the period in paper form is a possibility. A number of protocols exist but require the signalling systems to be understood by the user terminal.</p> <p>There is no particular problem identified in the application of SR 784.101.113/1.5 to traditional systems. The application to IP systems may nevertheless give rise to difficulties because the document is based on a traditional architecture and a specific protocol.</p> <p>The increasing usage of flat rates further simplifies any possible problem.</p> <p>Some SPs offering services in Switzerland may situate their facilities outside the country and may not be aware of their duties. They must however respect Swiss law.</p>	
Solution	Do not apply SR 784.101.113/1.5 to VoIP based services and therefore do not use the powers specified in FDV, art 32 in this case.
Advantages	Easy, no specific requirement regarding justification of charges.
Disadvantages	The user may not be well informed about the justification of the charges. Nevertheless, this is not a legal problem since the “price notification decree” (PBV, SR 942.211) must still be respected.
Regulatory impact	SR 784.101.113/1.5 should not be applied to VoIP based services.
Proposal	Implement solution and inform the market appropriately on the OFCOM website that SR 784.101.113/1.5 does not apply in this case.

3.6 Calling-line identification

Obligation	Calling-line identification
Legal reference	OST art. 43, para. 2
Standards and associated references	<p>SR 784.101.113/1.7 Calling line identification</p> <p>This area is covered by ETSI SR 002 211 in the following annexes:</p> <ul style="list-style-type: none"> - A.4.13.2 Calling-line identification presentation (CLIP) - A.4.13.3 Calling-line identification restriction (CLIR) - A.5.2 Presentation and restriction of calling and connected line identification
Comments or problem description:	
<p>The caller identification information may be provided in different forms: name, telephone number or IP address. The nomadic characteristics of IP systems allow the same user to be identified by his IP address independently of the physical/ geographical point where he is connected to the service. This identification of the caller's line needs to be appropriately transmitted over the network(s) to the called party.</p> <p>The interconnection agreements need to cover aspects ensuring that the calling line identification is appropriately transmitted over the networks and their interfaces.</p> <p>There is no particular problem identified in the application of SR 784.101.113/1.7 for traditional systems. The application to IP systems may nevertheless give rise to difficulties because the traditional user's line identification is based on the Calling Line Identification (not really the identification of the user and also not the place where he actually is in each case, but the identification of his E.164 communication address).</p> <p>In IP systems, the identification refers to the IP-address that the user adopts in each case and this implies that the user may have different identifications and may use communication services with the same IP-identification but from different places. Nevertheless, since this requirement applies only to E.164 (public telephony) initiated calls, the service provider associates to each number the identification of the caller's line.</p> <p>Some SPs offering services in Switzerland may situate their facilities outside the country and may not be aware of their duties. They must however respect Swiss law.</p>	
Solution	<p>Make VoIP SPs aware of their duty of collaborating with partners in the interconnection agreements in order to appropriately cover the transmission of calling line identification as required in the law.</p> <p>The caller's line (the line he is using) has to be correctly identified and shall not be corrupted.</p> <p>Revise the TAV to be more technology independent.</p>
Advantages	The identification of the user's line is maintained as for earlier systems.
Disadvantages	Not identified
Regulatory impact	Revise the TAV to be more technology independent.

Proposal	Implement the solution on the OFCOM website, i.e. provide information about the need to present the correct Calling Line Identification and revise SR 784.101.113/1.7.
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3.7 Publication of NTP

Obligation	Publication of NTP
Legal reference	<p>1. Decree of 31 October 2001 on Telecommunication Services (SR 784.101.1, FDV) Art. 5 para. 4</p> <p>2. SR 784.101.113/1.4 Telecommunication network interfaces</p>
Standards and associated references	<p>R&TTE Directive (1999/5/EG, R&TTE Directive) on radio and telecommunications terminal equipment, art. 4.2</p> <p>ETSI study (to be publish at the beginning of 2005) on R&TTE Directive, art 4.2 application: ETSI 'DEG/AT-010121-1'</p>
Comments or problem description:	
<p>All telecom network operators (NO) and service providers (SP) should specify their publicly offered interface in <i>sufficient detail to permit the design of telecommunications terminal equipment capable of utilizing all services.</i></p> <p>VoIP based services very often offer a virtual NTP. The specification of the NTP technical characteristics shall be made as perceived by the user at the physical NTP.</p> <p>The liberalization of the market with an increasing number of NO and SPs, the evolution and success of IP and the globalisation effects are resulting in an extremely complex situation where it is impossible to completely fulfil this requirement.</p> <p>On the other hand, the rule is valid in the European market and is therefore known by the most active players in the Swiss market.</p> <p>Some SPs offering services in Switzerland may situate their facilities outside Europe and may not be aware of their duties. They must however respect the Swiss (and European) law.</p> <p>The application of the formal requirements should not be perceived by the market for VoIP based services as more restrictive than for services based on other technologies (GSM, ISDN, POTS, xDSL, WLAN, cable communications, etc).</p>	
Solution	Apply the requirement and wait for complaints from terminal equipment manufacturers.
Advantages	<p>Easier to control, focus on issues actually causing problems on the market.</p> <p>The same solution as applied in Europe (again easier to control).</p>
Disadvantages	The application is unlikely to be complete.
Regulatory impact	No particular impact.
Proposal	Adopt solution.

3.8 Extraterritoriality

Obligation	Application of Swiss law to SPs active in Switzerland without domicile in the national territory
Standards and associated references	<p>Introduction of the obligation for the providers to indicate a correspondence address by a revision of the decree concerning Telecommunication Services (OST), which is planned to enter into force on 1st February 2005</p> <p>CEC report from 14 June 2004</p>

Comments or problem description:

The evolution and success of IP and the globalisation effects are resulting in an increased number of global ISP, many of them offering voice services.

Some SPs offering services in Switzerland may situate their facilities outside the country and may not be aware of their duties. They must however respect Swiss law.

From 1.2.2005 on all the TSP's (not only VoIP) have to have an address in Switzerland.

(Partial) copy of the CEC report from 14 June 2004:

5.6. Extra-territorial VoIP providers

VoIP - like any IP-based service - can be provided by accessing the internet, and the provider of the service does not necessarily have to be established in the country in which the service is being consumed.

To the extent that a VoIP-based service constitutes an electronic communications service, its supply to customers in the EU is subject to the Authorisation Directive and to the associated national law (i.e. general authorisations). In the case of a breach of the conditions of a general authorisation, an NRA could have difficulties imposing penalties on a supplier not established in the EU, but in practice most commercial VoIP providers of any size are expected to have some presence in the EU, in order to serve their European customers effectively.

The investigation, detection and prosecution of criminal offences is outside the scope of the regulatory framework for electronic communications.

Solution	Adopt a cautious approach so that Swiss solutions are equivalent to (at least) European solutions. This will reduce the risk of 'uncontrolled market players' or unknown rules of the Swiss market. Focus the interventions on totally unacceptable situations with major impact on the Swiss market or affecting national security or citizens' fundamental rights.
Advantages	Simple implementation.
Disadvantages	Some (minor) non-compliance with Swiss law may have to be accepted.
Regulatory impact	Where possible, align Swiss rules and interpretations thereof with (at least) European regulatory framework conditions.
Proposal	Implement the solution, coordinate with the EU Commission.

4 Numbering

4.1 E.164 resources for VoIP based services

Obligation	E.164 resources for VoIP based services
Legal reference	<ul style="list-style-type: none"> - AEFV - Numbering plan E.164 / 2002 - Allocation of E.164 numbers <p>Possibly:</p> <ul style="list-style-type: none"> - ComCom Decree
Standards and associated references	--
Comments or problem description:	
	<p>In several European countries, a number range has been opened specifically to meet the needs of IP telephony (VoIP). The problem is also posed in Switzerland, where some participants in the VoIP working group had expressed a wish to see a number range dedicated to this type of service.</p> <p><u>WG Meeting on 28 September 2004:</u> this issue has been rated “Low Priority”.</p> <p>See <i>final comments from COLT Telecom, Orange Communications SA, Swisscom Fixnet AG and Swisscom Mobile AG in Annex A.</i></p>
Solution (1)	<p>VoIP will not change the status of mobile/ fix services.</p> <p>If VoIP is associated to fixed access networks, traditional geographical numbers will have to be used.</p> <p>The definition of a new numbering range dedicated to VoIP can be considered at any time but the application must be clearly motivated and the issues related to interconnection must have been taken into consideration.</p>
Advantages	<ul style="list-style-type: none"> • Geographical portability authorised throughout Switzerland. • Closed numbering plan implying a single charge for the whole of Switzerland (no longer any distinction between local and national calls). • TSPs providing their services via VoIP access have the possibility of benefiting from number portability. In this way they can offer their new customers the option of keeping their number. • The current legal basis is adequate. No need for any amendments to the legislation.
Disadvantages	<ul style="list-style-type: none"> • VoIP users are not identifiable by other users on the basis of their number.
Regulatory	Not identified

impact	
Solution (2)	Definition of a range of numbers specific to VoIP
Advantages	<ul style="list-style-type: none"> • VoIP users are identifiable by other users on the basis of their number (this is interesting in the case where call charges to this type of user are high, e.g. a call to the mobile network). • Advantage of advanced charging by other countries to justify a new range.
Disadvantages	<ul style="list-style-type: none"> • Limited number portability (no portability between services). • The possible new ranges are not included in foreign TSPs' routing tables.
Regulatory impact	Amendment of the current legislation required (AEFV, numbering plan, possibly Annex 1 ComCom Decree).
Solution (3)	Use of INA numbers (0878, 084x)
Advantages	<ul style="list-style-type: none"> • These are “virtual” numbers. • Free choice of number by the holder (numbers assigned individually and directly to users). • NP ensured. • No amendment to the legislation necessary.
Disadvantages	<ul style="list-style-type: none"> • More expensive for users (fees related to number assignment in principle paid by the user). • Less advantageous for VoIP TSPs (IC terminating charges are lower with this type of number than with traditional numbers).
Regulatory impact	Not identified
Proposal	It is proposed to opt for solution (1).

4.2 Carrier selection for VoIP TSP

Obligation	Carrier selection for VoIP TSP
Legal reference	<ul style="list-style-type: none"> - LTC, Art. 28 - ComCom Decree, Art. 9 - Appendix 2 of the ComCom Decree
Standards and associated references	--
Comments or problem description:	
<p>According to the VoIP TSPs, the obligation to guarantee carrier selection is not justified for them as users have the possibility of choosing their service provider independently of the access structure.</p> <p>Originally, the purpose of the obligation to guarantee carrier selection was to open up the (fixed) telephony market which was at that time the <i>de facto</i> monopoly of the historic operator. The absence of an unbundled local loop made carrier selection the only opportunity for competing operators to quickly win market share in the fixed telephony sector and in this way to establish a competitive market.</p> <p>Today, the essential element of competition in the fixed telephony market revolves around carrier selection. The VoIP TSPs currently present on the market are still marginally represented and do not seem to suffer as a result of this obligation, since some of them even guarantee carrier selection (call-by-call at least) without, however, users actually having recourse to it.</p> <p>Carrier selection offers users a degree of flexibility which allows them sporadically to benefit from special offers from competing providers, notably in respect of international calls. It also serves to maintain a market for reselling services, through small resellers/providers.</p> <p>It is not possible to foresee the consequences which an exemption from the obligation to guarantee carrier selection for VoIP TSPs would have on the market. However, it is almost certain that such an exemption would result in limiting the flexibility which users currently enjoy in the free choice of their provider(s).</p> <p>It must also be noted that operators' or service providers' offerings – in the case of either pre-selection or VoIP access – are increasingly being tied to a minimum contract term, generally 12 months. This necessarily limits consumer choice.</p> <p>The obligation to guarantee carrier pre-selection "in a predetermined manner" may possibly represent a technical and administrative constraint for VoIP providers. However, IP technology does offer greater possibilities which allow users to configure their pre-selection themselves by means of online management of their profile.</p> <p>As for the possibility of choosing a provider on the basis of "call-by-call carrier selection", this obligation poses no particular problems as its implementation rests exclusively on call routing technology.</p>	
<p><u><i>WG Meeting on 28 September 2004:</i></u></p> <p>This issue has been rated "Medium Priority"</p> <p><u><i>Swisscom – 18.10.2004:</i></u></p> <p>Solution 1 should be chosen. It basically maintains the carrier selection obligation (pre-selection and</p>	

call-by-call), but technically implemented at the connectivity layer and no longer in the voice service (decoupling of connectivity and service with BB as enabler). The end user thus retains full freedom of choice.

The CPS obligation is logically tied to the "old TDM environment"; in the case of VoIP there is no longer any justification for it, for the above-mentioned reason – the customer has full freedom of choice even without CPS. A decision in favour of solution 3 would therefore be in contradiction with the interpretation outlined in the introduction, according to which the regulations drawn up for the state of the art in 1997/1998 and not suitable for VoIP should not be applied. It is irrelevant whether one of the justifications for adopting solution 3 is that it would not lead to any discrimination between the different technologies. If this argument were to prevail, the entire introduction would be incorrect. The latter is in fact based on the need to differentiate between old and new technologies. If no differences were permitted, the present document and the work of the working group would be substantially pointless: the regulations equally applicable to all would then simply result from the consistent application of the existing law.

Alcatel – 27.10.2004:

Carrier selection by dialling a prefix is obsolete in times of VoIP as the carrier is selected by connecting to the corresponding softswitch.

Carrier selection was invented as all subscribers were (are) physically connected to a Swisscom switch. In order to allow such a "Swisscom" customer to select its preferred carrier, a dialling prefix did the job. With VoIP this "physical" connection to a telephony server is replaced by a "logical" one making dialling prefixes obsolete.

WG Meeting on 2nd November 2004 (draft summary of the discussions):

Both contributions from Swisscom and Alcatel were discussed during the plenary. Some participants expressed themselves against the idea of exempting VoIP operators from their liability to provide carrier selection (call-by-call and pre-selection) to their customers. The main argument voiced is that VoIP is a new technology used for the provision of an existing service, namely the public telephony service. It should not have any impact on the customer's habits.

In fact, the key issue is not whether the obligation to provide carrier selection is essential or not but more a question of which level the obligation shall be considered.

In the TDM environment, users have the opportunity to choose their carrier at the highest level, i.e. the application level, by dialling a prefix before the called party's telephone number (call-by-call) or by opting for fixed programming of the said prefix generally in the access provider's local exchange (pre-selection). This model was chosen in 1998 in order to overcome the lack of competition in the local loop and to allow new entrants to offer services to customers.

VoIP offers more freedom to customers who can make their choice at various levels, in particular at the connectivity level (customers can choose their broadband access provider). Once broadband access is available, they can also choose their telephony service provider. Although the users have theoretically more choice, this freedom is quite subjective in practice because of the conditions imposed on the service offerings, e.g. bundled offer, installation fee, long term contract with a heavy exit fee, etc... In reality, users are usually tied with a 6 or 12-month minimum contract duration (that is the case for most of broadband access offerings and some telephony service offerings).

On the other hand, dialling a prefix could not be seen as the most appropriate manner to select one's preferred operator in a VoIP environment. In an IP network, selecting an operator could be done by selecting a proxy rather than by dialling a prefix. Various SIP softphones for example allow the user to pre-program a list of preferred proxies.

In conclusion, the participants do not primarily object to the fact that the obligation to provide carrier selection would also apply to VoIP service providers. The debate is really at which level the obligation must be considered and which implementation would fulfil the legal requirements.

The OFCOM position is that the ComCom decree gives the basic requirements for carrier selection, namely: "*The providers of fixed public telephony services must offer their subscribers the possibility of selecting a provider for national and international calls, i.e. both by pre-selection and call-by-call'*

These requirements must be fulfilled by any provider of the public fixed telephony service. In other words, VoIP users must be able to easily select their preferred operator on a call-by-call basis as well as on a pre-selection basis. Regarding the technical implementation, if programming in the user's terminal equipment (e.g. softswitch) is a simple matter for the user (e.g. programming of the

proxy server of the preferred service provider), then the requirements will be fulfilled. Otherwise, the users must be able to select their operators by means of the traditional prefixes. Therefore, the annex 2 to the ComCom Decree should be amended in order to take into account the possibilities offered by VoIP technology and thus become more technology neutral.

It should also be noted that the evolution of tariff models (e.g. introduction of flat rates) could make the obligation of providing carrier selection obsolete in the medium or long term. Such an evolution would be much more preferable to a regulatory intervention.

See final comments from 3G Mobile AG Telefónica, Netstream AG, Orange Communications SA, SOLPA AG, Swisscom Fixnet AG, Swisscom Mobile AG, Swisscom Solutions AG and TDC Switzerland AG in [Annex A](#).

Solution (1)	Provide for a specific exemption of VoIP TSPs from the obligation to guarantee carrier selection (call-by-call & pre-selection).
Advantages	<ul style="list-style-type: none"> • For VoIP TSPs: greater possibility of building customer loyalty. • No need for VoIP TSPs to put in place the necessary processes to guarantee carrier selection.
Disadvantages	<ul style="list-style-type: none"> • Discrimination in relation to the other fixed access technologies (obligations varying as a function of the access technology). • Need to specify precisely "VoIP" access and the criteria allowing a TSP to be exempt from the obligation to guarantee carrier selection. • For users: loss of flexibility in their choice of service provider (onerous minimum contract term – "customer lock-in" effects).
Regulatory impact	<ul style="list-style-type: none"> • Need for large-scale consultation of interested parties in the industry in Switzerland. • Need to provide for this exception at the level of the ComCom decree.
Solution (2)	Provide for a specific exemption of VoIP TSPs from the obligation to guarantee carrier pre-selection only. The obligation to guarantee call-by-call carrier selection is maintained.
Advantages	<ul style="list-style-type: none"> • For VoIP TSPs: greater possibility of building customer loyalty. • No need for VoIP TSPs to put in place the necessary technical and administrative processes associated with pre-selection.
Disadvantages	<ul style="list-style-type: none"> • Discrimination in relation to the other fixed access technologies (obligations varying as a function of the access technology). • Need to specify precisely "VoIP" access and the criteria allowing a TSP to be exempt from the obligation to guarantee carrier pre-selection. • For users: loss of flexibility in their choice of service provider.
Regulatory impact	<ul style="list-style-type: none"> • Need for large-scale consultation of interested parties in the industry in Switzerland. • Need to provide for this exception at the level of the ComCom decree.
Solution (3)	Maintain current requirements.

Advantages	<ul style="list-style-type: none"> • Freedom of choice and flexibility maintained for users. • No discrimination between the different access techniques (technology-neutral obligations). • No need to specify exemption criteria as "VoIP" access is considered as an access to the fixed public telephony service. • No impact on current regulation.
Disadvantages	<ul style="list-style-type: none"> • More difficult to build customer loyalty. • Need to implement the technical and administrative processes to guarantee carrier selection.
Regulatory impact	Not identified
Solution Sunrise	<p>Reformulation of art. 9 ComCom Decree for discussion: <i>Art. 9 ComCom Decree (Revision proposal from sunrise)</i></p> <ol style="list-style-type: none"> 1) <i>Providers of services forming part of the universal service according to art. 16 LTC shall offer their subscribers the possibility of selecting a provider for national and international calls for each call.</i> 2) <i>Providers of connections according to art. 20 DTS shall offer their subscribers the possibility of selecting a provider for national and international calls, both in a pre-determined manner and for each call.</i> 3) <i>Providers of public mobile radio services according to the GSM or UMTS/IMT-2000 standard shall offer their subscribers the possibility of selecting a provider for international calls, both in a pre-determined manner and for each call.</i>
Advantages	Not identified
Disadvantages	Not identified
Regulatory impact	<ul style="list-style-type: none"> • Need for large-scale consultation of interested parties in the industry in Switzerland. • Need to amend the ComCom decree.
Proposal	<p>No consensus was found within the Working Group on the solution and on possible technical difficulties in the provision of CS (cbc/cps).</p> <p>OFCOM suggests that ComCom launch a larger consultation of the interested parties on this issue. The evaluation of this consultation should enable ComCom to make a final decision.</p>

4.3 "Global number portability" / use of national E.164 resources abroad

Obligation	Allocation and use of national E.164 resources abroad
Legal reference	<ul style="list-style-type: none"> - AEFV - E.164 / 2002 numbering plan - Allocation of E.164 Numbers - ComCom Decree
Standards and associated references	ITU-T Rec. E164

Comments or problem description:

With VoIP, access to the public telephone service is made possible universally as soon as broadband internet access is available (a form of international roaming). This poses the problem of allocation by TSPs (subsequent allocation) of E.164 national addressing resources to users who are not resident in Switzerland or of the use of these resources abroad.

WG Meeting on 28 September 2004:

This issue has been rated "Low Priority".

Colt – 19.10.2004:

In section 3.3, with solution 2 the global use of Switzerland's E.164 numbers is permitted. However, the following points still need to be clarified in this context:

1. CH number with a foreign country code: overlapping with numbers in the country concerned cannot be excluded.
2. CH number with CH country code assigned abroad: the national reference is lost or is misleading.

CH number without country code worldwide: requires a specific number range which is assigned internationally (possibly with its own "global code") in order to avoid overlapping, but represents a long-term resource problem. It would have to lead to a personal number which is valid internationally, in which case without the existing structure with country code and national destination code, which in turn is not realistic.

Solution (1)	Restrict the allocation of E.164 resources mainly to Swiss residents (no "global number portability") and authorise their use abroad in the case of international "roaming" (similar to current practice in the mobile networks).
Advantages	<ul style="list-style-type: none"> • No impact on regulation.
Disadvantages	<ul style="list-style-type: none"> • Impossible for VoIP TSPs to promote their services abroad with Swiss E.164 numbers. • Impossible for subscribers to keep their telephone number if they settle abroad for a long period or permanently (global number portability).
Regulatory impact	Not identified

Solution (2)	Authorise the unrestricted allocation of E.164 addressing resources to user's resident abroad.
Advantages	<ul style="list-style-type: none"> • Subscribers can keep their number even if they settle abroad for a long period or permanently. • VoIP TSPs can offer their services beyond national borders with Swiss E.164 numbers.
Disadvantages	<ul style="list-style-type: none"> • Major impact on regulation. • Implications on supervision of telecommunications. • Risk of creating problems at international level (most of the European countries are against the allocation of E.164 national resources outside the borders of the country concerned).
Regulatory impact	Necessary to amend the Decree on Addressing Resources in the Telecommunications Sector.
Proposal	It is proposed to opt for solution (1).

4.4 Obligations relating to the public telephone service directories

Obligation	Obligation on TSPs to maintain a directory of their subscribers to the public telephone service and to guarantee access to these data by third parties.
Legal reference	<ul style="list-style-type: none"> - FMG, Art. 21 - FDV, Art. 29 - The directory of subscribers to the public telephone service
Standards and associated references	--

Comments or problem description:

The current obligations relating to maintaining a directory of the subscribers to the public telephone service and making these data available to third parties may constitute an additional administrative burden on VoIP TSPs.

Comments from WG2:

OFCOM assumes that VoIP providers can comply with this requirement. Nonetheless, OFCOM has established that E-fon still does not provide an entry in a telephone directory (cf. agreement dated 28 July 2004).

The VoIP service provider may or not be the Universal Service (US) licensed operator but he has to collaborate with the US provider in order to allow all clients participating in all forms of the public available telephony service (PATS) and wishing to have their telecom address on the public directories to have their wish fulfilled.

Due to the expansion of the internet, it became easier for smaller organisations to be service providers (SP) and this obligation may be overlooked by some, particularly those using automatic forms of client registration or operating at a global level and not understanding all the details of national regulations.

Some SPs offering services in Switzerland may situate their facilities outside the country and may not be aware of their duties. They must however respect Swiss law.

WG Meeting on 28 September 2004: This issue has been rated "Low Priority".

See final comments from AareNet AG in [Annex A](#).

Solution (1)	Status quo
Advantages	<ul style="list-style-type: none"> • Gives VoIP subscribers the possibility of having an entry in the directory. • No impact on regulation.
Disadvantages	<ul style="list-style-type: none"> • Administrative burden and additional costs for VoIP TSPs
Regulatory impact	Not identified
Solution (2)	Introduction of an exemption from the current obligations concerning the maintaining of a directory and making data available to third parties.

Advantages	<ul style="list-style-type: none">• No administrative burden or additional costs for VoIP TSPs.
Disadvantages	<ul style="list-style-type: none">• VoIP TSP subscribers lose the possibility of having a directory entry.• Major impact on regulation.
Regulatory impact	Need to amend the LTC and DTS.
Proposal	It is proposed to opt for solution (1).

Annex A: Final member's comments

3G Mobile AG Telefónica

- Chap. 3.2: We see the current wording as "side-stepping" this important issue and have considerable fears that this is "an accident waiting to happen" i.e. it is only a matter of time before the emergency services are unable to reach a VoIP emergency caller resulting in a serious incident or death(s). Notwithstanding the complexities of a technical solution (and we have no proposal to make), there should be no exclusion, temporary or otherwise, for VoIP TSPs.
- Chap. 4.2: Throughout Europe there is clear evidence that the former incumbent/monopoly operators are very much in favour of a minimal regulation, particularly in respect of carrier selection, of VoIP. We interpret at this as being an opportunity for them to reinforce their market dominant position.
- Telecoms liberalisation has not progressed very far in Switzerland and it took a long time to force through efficient processes for call-by-call and preselection carrier selection. These small opportunities for the "Alternative TSPs" cannot be jeopardized. Once again there should be no exclusion of carrier selection, which from a customer perspective relates to call-by-call or preselection whatever functionality is subsequently employed, temporary or otherwise, for VoIP TSPs.

AareNet AG

- Chap. 4.4: The proposal for a further consultation of ComCom is accepted, although solution (2) would have been preferred.
-

Aartesys AG

Aartesys AG ist als Lieferant von Telecom Carriern von den im Dokument definierten Standards nicht unmittelbar betroffen und verzichtet deshalb darauf, das Dokument formell zu akzeptieren oder abzulehnen.

Alcatel Switzerland Ltd

Alcatel Schweiz AG ist als Lieferant von Telecom Carriern von den im Dokument definierten Standards nicht unmittelbar betroffen und verzichtet deshalb darauf, das Dokument formell zu akzeptieren oder abzulehnen.

Der Vorschlag betrefts Carrier Selection (CPS ohne CSC, CBC mit CSC) wurde bereits als Diskussionsvorlage verschickt.

COLT Telecom AG

- Chap. 1: Introduction: it shall be explained e.g. in the clause of the objective, that the transposition of the legal and regulatory requirements is only valid for the Public Available Telephone Service (PATS) and not for the Electronic Communication Services (ECS) or at least which distinctions will be made between public and non-public telephony. It is not sufficient to mention this solely in point 7, it is a general aspect for all following chapters!
- Chap. 2.1: Transmission of speech in real time: the explanation of public and non-public telephony with the examples is not sufficient but it can be referred to chapter 1, if it is explained there.
- Chap. 3.4: Outgoing call barring: the requirements are applicable to VoIP based services is not correct because it is again a PATS issue.

Chap. 4.1: E.164 resources for VoIP based services: in solution (1) third clause it shall be mentioned that with a new numbering range the ONP is only possible within the same numbering range (equivalent to service category).

Lexsys AG

Lexsys ag ist als Regulierungs- und Rechtsberatungsunternehmen von den im Dokument definierten Standards nicht unmittelbar betroffen und verzichtet deshalb darauf, das Dokument formell zu akzeptieren oder abzulehnen.

Netstream AG

Chap. 4.2: Wir sind mit der Schlussversion des Dokumentes einverstanden und unterstützen auch die Meinung von Swisscom, vertreten durch Herr Kurt Lanz, in Bezug auf den Voice Pre-Selection / CBC Vorschlag.

Orange Communications SA

Chap. 4.1: Mobile services should be identifiable by their number range, independently of the access technology.

Chap. 4.2: The proposal for a further consultation of ComCom is accepted, although solution 2 (no obligation for CPS but CBC CS maintained) would have been preferred.

SOLPA AG

Chap. 4.2: The proposal for a further consultation procedure lead by ComCom concerning Art. 9 VComCom is accepted.

Swisscom Fixnet AG

Swisscom Fixnet ist mit der Schlussversion des Dokumentes "VoIP Functional Reporting" mit Ausnahme vom Kapitel zu Carrier Selection und unter Berücksichtigung eines kleinen redaktionellen Korrekturvorschlags zum Kapitel Numbering einverstanden.

Chap. 4.1: Im Kapitel Numbering (4.1.) wurde u.a. der Satz "If VoIP is associated to fixed access networks, traditional geographical numbers will have to be used" neu aufgenommen. Wir sind der Überzeugung, dass in den nächsten Jahren durch die VoIP-Technologie die Unterscheidung Fix / Mobile, sowie die Differenzierung zw. Voice und Data schrittweise verschwindet. BT entwickelt bspw. ein konvergentes Handy, das zu Hause wie ein Festnetzanschluss funktioniert. Die verwendete UMA-Technologie ermöglicht die Übertragung von Gesprächen als GSM over DSL, was letztlich einer spezifischen VoIP-Lösung entspricht, da die Übertragung auf dem IP-Protokoll basiert (= Mobile-Anruf mit Mobile-Nummer, welcher über das Festnetz abgewickelt wird, also "associated to fixed access networks" ist). Es ist wahrscheinlich, dass in Zukunft auch in der Schweiz solche oder vergleichbare konvergente Dienste aufkommen, bei denen die VoIP-Technologie auch im Mobilfunknetz eingesetzt wird oder bei denen eine Differenzierung Fix / Mobile und Voice / Data immer schwieriger wird. Damit sich der Nummerierungsplan nicht innovationshemmend auswirkt, sollte die Nummerierungssituation so ausgestaltet sein, dass solche Innovationen ohne zeitliche Verzögerungen möglich sind. Der neu eingefügte Satz ist vor diesem Hintergrund nur verwirrend, weshalb wir die ersatzlose Streichung dieses Satzes beantragen. Da gegenwärtig keine Anpassungen im Nummerierungsbereich vorgesehen sind, genügt der erste Satz ("VoIP will not change the status of mobile / fix services") - obwohl dieser auch nicht ganz zutrifft...

Chap. 4.2: Ansonsten können wir weiterhin das Kapitel zu Carrier Selection (4.2) nicht unterstützen, da u.E. klar die Lösung 1 gewählt werden müsste. Carrier Selection ist ein wettbewerbspolitisches Instrument, das seine Berechtigung nur dort hat, wo kein Markt besteht, oder eben nur durch Carrier Selection ein solcher existieren kann. Ist bereits ein

funktionierender Markt vorhanden, dürfen wettbewerbspolitische Instrumente nicht mehr zum Einsatz kommen.

Im Breitbandbereich herrscht insbesondere im Retailmarkt Wettbewerb, was aus den zahlreichen Angeboten ggü. den Konsumenten leicht ersichtlich ist (ca. 30 ADSL-Anbieter, verschiedene CATV-Anbieter und ATA Wahlmöglichkeiten). Gemäss Aussagen von Marc Furrer am Euroforum unterstützt BAKOM das "Primat des Marktes", was auch in diesem Fall umzusetzen ist. Konsumentenschutz entspricht keiner fernmelderechtlichen Zielsetzung und kann deshalb nicht als Argument dienen. Eine Verpflichtung zum Call by Call würde sich aber selbst bei Berücksichtigung des Aspekts des Konsumentenschutzes nicht als erforderlich erweisen. Wenn sich der Konsument - wie in dem vom BAKOM häufig erwähnten Fall - für ein Jahr an eine Anbieterin bindet, dann ist die vom BAKOM befürchtete grosse Preiserhöhung durch die Anbieterin bereits nach allgemeinen vertragsrechtlichen Grundsätzen nicht möglich. Wenn der Vertrag auf eine bestimmte Dauer geschlossen ist, dann gelten während dieser Zeit grundsätzlich die vereinbarten Bedingungen. Möchte die Anbieterin diese Bedingungen nach einer bestimmten Zeit während der Vertragsdauer ändern, so ist dies grundsätzlich nur dann möglich, wenn sie sich ein solches Recht zur einseitigen Vertragsänderung vorbehalten hat. Eine solche Klausel würde, wenn sie die vom BAKOM befürchteten Preisanpassungen umfassen würde, bereits einer AGB-rechtlichen Überprüfung kaum standhalten. Und selbst wenn die Klausel Vertragsbestandteil geworden wäre und die Anbieterin von ihr Gebrauch machen würde, würde die Preiserhöhung entweder ein Sonderkündigungsrecht des Kunden auslösen oder der Richter würde die Erhöhung zumindest auf das erlaubte Mass reduzieren. Im weiteren ist immer noch unklar, wie Carrier Selection für Voice/Data-konvergente Produkte zu verstehen ist. So können wir uns bspw. nicht vorstellen, wie bei paralleler Übertragung von Voice/Data für Voice eine Carrier Selection Pflicht möglich ist. Wir denken dabei z.B. an Video-Chat oder Gaming, wo nebst der Sprachübertragung Bilder über die Breitbandverbindung und über das IP-Protokoll übertragen werden. Müsste z.B. eine allfällige cbc-Pflicht auch bei einer Gaming-Anwendung auf der Playstation eingeräumt werden, wenn gleichzeitig eine Voice-Übertragung zwischen den Anwendern stattfindet? Solange keine regulierungsökonomische Grundlage für eine CS-Pflicht besteht und solange offensichtliche Konfliktpotentiale mit Voice-Data-Anwendungen bestehen, können wir dem geplanten Vorgehen nicht zustimmen.

Swisscom Mobile AG

- Chap. 4.1: The sentence in Solution (1) ...If VOIP is associated to fixed access networks, traditional geographical numbers will have to be used... should be deleted because it might not reflect the reality of some convergent fix and mobile offers. The first sentence is clear enough, that for basically fixed services geographical numbers should be used and for mobile services mobile numbers. It mustn't be that basically mobile services have to use geographical numbers if they use a broadband access point for example.
- Chap. 4.2: The proposal for a further consultation of ComCom is accepted, although solution (1) would have been preferred.
-

Swisscom Solutions AG

- Chap. 4.2: Die Zustimmung erfolgt unter Vorbehalt des Punktes CSC (4.2 des VoIP Functional Standards Dokuments). Hier spricht sich Swisscom Enterprise Solutions AG gegen eine so weit reichende CSC-Verpflichtung aus. Die Freie Wahl des Dienstanbieters sowohl auf dem Connectivity- wie auch auf dem Dienstelayer zu verlangen, kommt u.E. einer zu extensiven Interpretation von Art. 9 V ComCom gleich.
- Der Kunde soll gemäss dieser Norm die Möglichkeit haben, über seinen öffentlichen Fixnet-Anbieter einen Anbieter für nat./internat. Verbindungen zu wählen. Es ist dabei fraglich, warum nach der freien Wahl für einen Access-Provider (Connectivity-Ebene) dem Kunden dann, auf einer weiteren (Dienste-) Ebene noch die freie Wahl für einen x-beliebigen VoIP-Provider offen stehen muss. Dieses Wahlrecht hätte der Kunde gemäss Art. 9 Abs. 2 V ComCom (Mobile
-

Dienste) für nat. Verbindungen im Übrigen auch nicht. Würde man also VoIP auf einer Mobilfunk-Basis ausgestalten, käme es hier zu einem Widerspruch. Auch ist es möglich, dass noch ein Antrag gestellt wird, man führe für VoIP einen eigenen Nummernbereich ein, der dann den Rückschluss auf einen Fixnet-Dienst nicht mehr ohne weiteres zulässt.

Insofern spricht sich Swisscom Enterprise Solutions AG für Lösung 1 aus.

TDC Switzerland AG

Chap. 4.2: Nachdem das Dokument im Rahmen der Working Group ausführlich diskutiert wurde und wir unsere Position auch schriftlich eingebracht haben, beschränken sich unsere Bemerkungen auf einen Punkt betreffend Carrier Selection.

Unter Ziffer 4.2 werden die verschiedenen Lösungsideen aufgeführt, unter anderem auch der Vorschlag von sunrise für eine Revision von Art. 9 VComCom. Input von anderen FDA wurde generell umfassend im Dokument wiedergegeben, von der Eingabe von sunrise (datierend vom 22. November 2004, beim BAKOM eingereicht am 7. Dezember 2004) fand jedoch nur der Vorschlag für den Verordnungstext Eingang in das Papier, die Überlegungen, die zu diesem Vorschlag geführt haben, wurden aber bedauerlicherweise nicht wiedergegeben. In den beiden Rubriken "Advantages" und "Disadvantages" zu unserem Vorschlag wird zudem erwähnt, dass diese "not identified" seien. In unserer Stellungnahme wurden aber die Vorteile deutlich herausgehoben (vgl. vor allem auf Seite 4 die Bemerkungen zu den Abs. 1, 2 und 3). Wir ersuchen das BAKOM deshalb höflich, im Sinne der Gleichbehandlung aller FDA auch die Ausführungen von sunrise in das Dokument einzufügen, mindestens aber unter dem Titel "Advantages" die in den Absätzen 2-4 auf Seite 4 unserer Eingabe vom 22. November 2004 aufgezeigten Vorteile aufzunehmen.

Here is the argumentation from TDC Switzerland AG:

Grundsätzlich handelt es sich beim Alternativvorschlag sunrise bzw. Lösungsvorschlag 4 also um einen Lösungsvorschlag 2, welcher aber neu nicht einzelne Technologien bzw. Übertragungsprotokolle von den Verpflichtungen ausnimmt, sondern die bestehende Regulierung neu und zukunftstauglicher formuliert.

Mit dieser Formulierung wird in Abs. 1 sichergestellt, dass sämtliche Festnetztelefonie-Kunden von der Call-by-Call Carrier Selection profitieren können, und zwar unabhängig von der verwendeten Technologie und/oder dem verwendeten Übertragungsprotokoll. In einer ersten Phase wird diese Wahlmöglichkeit vermutlich noch vorwiegend über die Vorwahlcodes (CSC) sichergestellt werden. Parallel und in zunehmendem Masse die CSC ablösend wird es auch andere Möglichkeiten geben, z.B. die manuelle Wahl eines anderen Proxies für VoIP Kunden, etc. Entscheidend ist letztendlich lediglich, ob ein Kunde für einzelne Gespräche, mit einem der Wahl eines Präfixes (CSC) vergleichbaren Aufwand, eine andere als die vorbestimmte Anbieterin wählen kann.

Durch den neuen Abs. 2 wird die bisherige Carrier Preselection sichergestellt. Diese ist vor allem für jene Endkunden von wesentlicher Bedeutung, welche keinerlei Ausweichmöglichkeiten zum Anschluss von Swisscom haben. Es reicht somit aus, diese Verpflichtung auf die Grundversorgungskonzessionärin(nen) zu beschränken. Die Realität heute zeigt, dass ausserhalb der Anschlüsse der Grundversorgungskonzessionärin keinerlei Nachfrage nach CPS besteht, sodass die neue Einschränkung keinerlei Auswirkungen auf das Angebot im Markt haben wird.

In Abs. 3 wird die heutige Situation betr. Carrier Selection für Mobilfunkdienste klarer definiert, d.h. die hier gemeinten, bisher in Abs. 2 geregelten Mobilfunkdienste beschränken sich demnach explizit auf die GSM- und UMTS-Standards und schliessen somit etwa WiFi- oder WiMax-Telefonie aus. Der Vorbehalt bzw. Aufschub betreffend der Carrier Preselection für Mobilfunkdienste bleibt bestehen.

Annex B: Swiss law and OFCOM regulations

The Swiss Law on Telecommunications LTC (FMG in German, LTC in French) can be found at:

FMG: <http://www.bk.admin.ch/chp/sr.pl?SPRACHE=de&EX=0&ID=19970160&MODE=CV>

LTC: <http://www.bk.admin.ch/chp/sr.pl?SPRACHE=fr&EX=0&ID=19970160&MODE=CV>

The Swiss Decree on Telecommunications Services DTS (FDV in German, OST in French) can be found at:

FDV: <http://www.bk.admin.ch/chp/sr.pl?SPRACHE=de&EX=0&ID=20011326&MODE=CV>

OST: <http://www.bk.admin.ch/chp/sr.pl?SPRACHE=fr&EX=0&ID=20011326&MODE=CV>

OFCOM's technical and administrative regulations in this area can be found at:

- [**SR 784.101.112/1 Nummernportabilität zwischen Fernmeldediensteanbieterinnen**](#)
- [**SR 784.101.113/1.1 Die Verzeichnisse der Teilnehmerinnen und Teilnehmer des öffentlichen Telefondienstes**](#)
- [**SR 784.101.113/1.2 Dienstqualität der Grundversorgung**](#)
- [**SR 784.101.113/1.3 Leitweglenkung und Standortidentifikation der Notrufe**](#)
- [**SR 784.101.113/1.4 Schnittstellen von Fernmeldenetzten**](#)
- [**SR 784.101.113/1.5 Gebührennachweis \(Advice of charge\)**](#)
- [**SR 784.101.113/1.6 Eigenschaften von Schnittstellen der Grundversorgung**](#)
- [**SR 784.101.113/1.7 Identifikation des anrufenden Anschlusses**](#)
- [**SR 784.101.113/1.8 Qualitätskriterien des öffentlichen Telefondienstes**](#)
- [**SR 784.101.112/2 Die freie Wahl der Diensteanbieterinnen für nationale und internationale Verbindungen**](#)
- [**SR 784.101.113/2.1 Nummerierungsplan E.164 / 1998**](#)
- [**SR 784.101.113/2.2 Nummerierungsplan E.164 / 2002**](#)
- [**SR 784.101.113/2.3 Nummerierungsplan F.69**](#)
- [**SR 784.101.113/2.4 Nummerierungsplan X.121 für die Schweiz**](#)
- [**SR 784.101.113/2.5 Kennzahlen ohne formelle Zuteilung**](#)
- [**SR 784.101.113/2.6 Kurznummern ohne formelle Zuteilung**](#)
- [**SR 784.101.113/2.7 Vorschriften über die Verwaltung der Kommunikationsparameter**](#)
- [**SR 784.101.113/2.8 Aufteilung der E.164 Nummern**](#)
- [**SR 784.101.113/2.9 Verwendung von Rufnummern ohne formelle Zuteilung**](#)
- [**SR 784.101.113/2.10 Einzelnummerzuteilung**](#)
- [**SR 784.101.113/2.11 Migration der 01-Nummern nach 044**](#)
- [**SR 784.101.113/2.12 Die Kurznummern der Auskunftsdiene zu den Teilnehmerverzeichnissen**](#)
- [**SR 784.101.113/2.13 Die Zuteilung und Verwaltung der Domain-Namen der zweiten Ebene, die der Internet-Domain .ch untergeordnet sind.**](#)

Annex C: Main ETSI reference: ETSI SR 002 211

[ETSI SR 002 211](#) is the ETSI proposed list of standards for the EU e-communications directives application. It offers an extensive analysis of the European e-communications set of Directives and, in the annexes, a proposal for a list of relevant standards in this regulatory context. It therefore studies areas of central importance for the correct application of the Swiss law. The areas covered by [ETSI SR 002 211](#) annexes are:

Annex A:.....List of standards and/or specifications

A.1	Introduction
A.1.1.....	Internet specifications
A.1.2.....	Structure of tables
A.2	Authorisation Directive (2002/20/EC)
A.2.1.....	Lawful interception
A.3	Access Directive (2002/19/EC)
A.3.1.....	Application Program Interfaces (APIs)
A.3.2.....	Interconnection
A.3.3.....	Access to network facilities and services
A.3.4.....	Unbundled access to the local loop
A.3.5.....	Leased lines
A.3.5.1.....	Analogue leased lines
A.3.5.2.....	Digital leased lines
A.3.5.3.....	Bitstream access
A.4	Universal Service Directive (2002/22/EC)
A.4.1.....	Access to PATS at a fixed location and telephony tones
A.4.2.....	Special measures for disabled users
A.4.3.....	Control of expenditure
A.4.3.1.....	Outgoing call barring
A.4.3.2.....	Incoming call barring
A.4.3.3.....	Advice of charge (AoC)
A.4.4.....	Quality of service (QoS)
A.4.4.1.....	Quality of service (parameters)
A.4.4.2.....	Grade of service
A.4.5.....	Carrier selection and carrier pre-selection
A.4.6.....	Transparency of prices and tariffs
A.4.7.....	Integrity of the network
A.4.8.....	Interoperability of consumer television equipment
A.4.9.....	Directory enquiry services
A.4.10.....	Single European emergency call number
A.4.10.1.....	Access to emergency services
A.4.10.2.....	Caller location
A.4.11.....	European telephone access code ("3883")
A.4.12.....	Non-geographic numbers
A.4.13.....	Provision of additional facilities
A.4.13.1.....	DTMF
A.4.13.2.....	Calling-line identification presentation (CLIP)
A.4.13.3.....	Calling-line identification restriction (CLIR)
A.4.14.....	Number portability

A.5	Directive on privacy and electronic communications (2002/58/EC)
A.5.1	Security
A.5.1.1	Security analysis
A.5.1.2	Network information security (NIS)
A.5.2	Presentation and restriction of calling and connected line identification
A.5.2.1	Calling-line identification presentation (CLIP)
A.5.2.2	Calling-line identification restriction (CLIR)
A.5.3	Location data for public telephone services
A.5.4	Automatic call forwarding
A.5.5	Unsolicited communications
A.5.5.1	Anonymous call rejection
A.5.5.2	Consumer equipment - SIM card

Annex B:.....Human factors

B.1	General
B.2	Standards and guidelines for disabled access to ICT