



# **Study for WIK-Consult Regulatory Analysis of VoIP in ten EU Member States**

Cullen International

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**Table 1 - Notification requirements for VoIP services**

Article 3 of the Authorisation Directive (2002/20/EC) establishes a general authorisation regime for the provision of electronic communications networks and/or services (ECN/ECS). Member States may require undertakings to notify their intention to commence provision of ECN/ECS and to submit information required to allow the NRA to keep a register or list of providers.

The table below shows whether:

- provision of ECN/ECS under the general authorisation regime requires submission of a notification to the NRA or the ministry?
- there are notification requirements specific to VoIP services?
- there is any time limit within which changes to the services in the original notification must be notified? (e.g. where an already notified provider of traditional PSTN voice telephony services starts to provide VoIP services)

	Notification requirement?	Specific requirements for VoIP services?	Any time limit within which have to notify changes to the services in original notification?
<b>AT</b>	Yes – to RTR According to § 15 <a href="#">TKG 2003</a> , providers of public electronic communications networks and services have to notify beginning, changing and ceasing their services (prior to the beginning, changing or ceasing) to RTR. RTR offers a <a href="#">web interface</a> for notification.	No. All providers must include a description of their networks or services as a part of the notification. The notification form supports this description by providing different categories, including VoIP technology, but in the <a href="#">published list</a> of notifications RTR does not differentiate by technology.	Operators must notify changes prior to the change (but a notification one day before would be sufficient).
<b>DK</b>	No Neither licensing nor registration of operators has been required in Denmark since 1996. Any service provider that starts operations is subject to the rules and obligations set out in the <a href="#">Act on Competitive Conditions and Consumer Interests in the Telecommunications Market</a> and <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services. Individual authorisations (licences) from NITA are only required for the use of scarce resources.	No	Not applicable
<b>EE</b>	Yes – to ENCB According to the art. 4(1) of the <a href="#">Electronic Communications Act of Dec. 8, 2004</a> , an operator must submit a notification to ENCB (Estonian National Communications Board) when it intends to provide ECN/ECS.	There are no specific notification requirements for VoIP providers. However, the operator must always describe the technology it will use.	An operator is obliged to notify ENCB within 5 working days in case of any changes in the information submitted earlier, including when the operator changes the underlying technology (e.g. shifting from PSTN to VoIP).
<b>FR</b>	Yes – to ARCEP <a href="#">Decree on authorisations</a> was published in Official Journal on July 29, 2005. It covers the declaration procedure and the obligations imposed on providers of public ECN/ECS and operators of networks for closed user groups. The declaration includes a short description of the nature and characteristics of the network and services and of their geographical coverage. Click <a href="#">here</a> for declaration form	No	Art. D.98 para III of the <a href="#">code on postal services and electronic communications</a> states that the operator must declare to ARCEP, within one month, by the same procedure, any modification of one of the elements listed the original declaration.
<b>DE</b>	Yes – to BNetzA According to the Telecommunication Act ( <a href="#">§ 6 TKG 2004</a> ), providers have to notify beginning, changing and ceasing their services without delay to <a href="#">BNetzA</a> .	The <a href="#">notification form</a> requires operators to classify the offered services. There is no special category for VoIP services. Category 8.1 covers voice services based on the operator's own network and category 8.2 covers voice services without own network.	Operators are obliged to notify "without delay".

	Notification requirement?	Specific requirements for VoIP services?	Any time limit within which have to notify changes to the services in original notification?
IT	Yes – to the Ministry of Communications Art. 25 and annex 9 of the <a href="#">Electronic Communications Code of Aug. 1, 2003</a>	In the notification form ( <a href="#">annex 9</a> to the Electronic Communications Code of Aug. 1, 2003) the applicant must specify the type of network/service provided, and the network systems used and their location. If the provider seeks to be assigned numbers from the: <ul style="list-style-type: none"> <li>• 0X geographic number range, it needs a general authorisation for the provision of PATS (autorizzazione generale per la fornitura del servizio telefonico accessibile al pubblico)</li> <li>• 5X non-geographic number range, it needs a general authorisation for the provision of nomadic voice communications services (autorizzazione generale per la fornitura di un servizio di comunicazione vocale nomadico).</li> </ul> For further details on numbering, see <a href="#">Table 4</a> .	Any change in the information provided in the notification form must be “promptly communicated” to the ministry. <a href="#">Annex 9</a> to the Electronic Communications Code of Aug. 1, 2003.
NL	Yes – to OPTA <a href="#">Telecommunication Act</a> , Chapter 2	In the <a href="#">notification form</a> , the operators must classify the offered services. Among the services listed, there is a category on VoIP-in and another one on VoIP-out services. Any modification must be transmitted to OPTA using the ‘modification or termination of the provision of public electronic communications activities’ <a href="#">form</a> .	No time limit set to notify the changes to the services.
PL	Yes – to UKE <a href="#">Telecommunications Law</a> , art. 10, pt. 1. Act on the freedom of the business activity, art. 64. Ordinance of the Minister of Infrastructure of March 9, 2007	No (see blank <a href="#">notification form</a> )	For any changes in the service, operators must immediately submit a written application to the President of UKE. President has to modify the <a href="#">register</a> within 7 days of the notification. And within 7 days of the modification in the <a href="#">register</a> , President will deliver an ‘ex-officio’ certificate.
ES	Yes – to CMT Art.6 § 2 of Law 32/2003 of Nov. 3, 2003 ( <a href="#">General Telecommunications Law</a> ) Art. 5 of <a href="#">Royal Decree 424/2005</a> of April 15, 2005 on the conditions for the provision of electronic communication services, universal service and protection of end-users	In the notification form, the operator must specify if it intends to provide nomadic VoIP services (servicios vocales nómadas). See list of <a href="#">information requirements</a> . If the operator is seeking to be assigned numbers, it has to comply with a <a href="#">resolution</a> of June 30, 2005 of the Ministry of Industry, Tourism and Trade allocating new number ranges for ‘nomadic voice services’ (VoIP) to ECS operators who have notified CMT of their intention of providing VoIP.	According to art. 12 of <a href="#">Royal Decree 424/2005</a> changes in the ECN/ECS to be provided must be notified within one month.
UK	No There is no advance notification requirement to Ofcom before starting to provide an ECN/ECS.	Not applicable	Not applicable

## Table 2 - Classification of VoIP services

Different rights and obligations may apply to VoIP services depending on which category they belong to: 'electronic communications services' (ECS) or 'publicly available telecommunications services' (PATS).

ECS are defined in the Framework Directive (2002/21/EC) as services *normally provided for remuneration which consist wholly or mainly in the conveyance of signals on electronic communications networks*.

PATS are a subset of ECS defined in the Universal Service Directive (2002/22/EC) as services:

- *available to the public*
- *for originating and receiving national and international calls*
- *and access to emergency services*
- *through a number or numbers in a national or international telephone numbering plan.*

PATS providers have additional rights and obligations compared to publicly available ECS providers: number portability, calls to emergency services, carrier selection and pre-selection, right to have an entry in the publicly available directory (see annexes A, B and C to the [Commission staff working paper](#) on the treatment of VoIP under the EU 2003 regulatory framework).

The table below shows:

- the classification of VoIP services by NRAs based on ECS/PATS
- whether NRA has given any interpretation of the term 'available to the public'?

See, for example, discussion on 'public availability' in [Ofcom VoIP statement](#) of March 2007 (Paras A5.39 to A5.45)

	Classification of VoIP based on ECS/PATS	Any interpretation of 'public availability' by NRA?
AT	<p>In April 2005 RTR publicly <a href="#">consulted</a> "Guidelines for VoIP service providers". In these guidelines, RTR defined two types of publicly offered VoIP services (chapter 2):</p> <ul style="list-style-type: none"> <li>• Class A VoIP services: VoIP services that provide access to and/or from the PSTN and that classify as PATS (and therefore as ECS, as well); and</li> <li>• Class B VoIP services: VoIP services that only provide voice communication between Internet subscribers without provision of access to the PSTN and that classify neither as ECS nor as PATS.</li> </ul> <p>On Oct. 10, 2005 RTR <a href="#">published</a> version 1.0 of the <a href="#">guidelines</a>, including this classification. This document is only available in German language, whereas the very similar consultation <a href="#">document</a> was published in English.</p> <p>This classification is still valid, but with focus on market analyses, RTR and TKK focus on those services that provide access to/from the PSTN (the "Class A" type) and take for granted that these services are PATS and ECS. In particular, in the second round analysis of M 1–6, RTR's <a href="#">re-evaluation</a> of the market definition ordinance (Feb. 6, 2006) and TKK's <a href="#">final decisions</a> (April 4, 2007) they use the following classification:</p> <ul style="list-style-type: none"> <li>• Voice over Internet (VoI): a VoIP service that is not (only) sold as a bundle with Internet connectivity. RTR says, that some of such services do provide access to the PSTN and some do not, but that no VoI service currently is a substitute of PSTN and therefore VoI is excluded from the market definition.</li> <li>• Voice over Broadband (VoB): a VoIP service that is sold as a bundle with Internet connectivity, either with DSL, or with CATV. RTR and TKK argue that these services offer full connectivity with the PSTN on the basis of the provider's managed IP infrastructure and are therefore included in the market definition. RTR and TKK do not explicitly say so, but take for granted that VoB services providing access to/from PSTN are ECS/PATS.</li> </ul>	No official interpretation
DK	<p>In March 2005 NITA finalised a comprehensive <a href="#">analysis</a> of barriers for development of IP-telephony in Denmark following two rounds of public consultations. NITA has considered five scenarios of IP-telephony, based on the underlying technology, network and service aspects, use of numbering resources and access to public telephone network:</p> <ul style="list-style-type: none"> <li>• Scenario 1: IP-telephony as an application on the open Internet (peer-to-peer communication with the use of special software), no possibility to make or receive calls on public telephone networks (i.e. PSTN/mobile networks).</li> <li>• Scenario 2: IP-telephony as an application on the open Internet with IP-address forwarding service (e.g. an earlier version of SKYPE), no possibility to make or receive calls on public telephone networks.</li> <li>• Scenario 3: Private IP-telephony network with the possibility to make and receive calls on public telephone networks through a gateway.</li> <li>• Scenario 4: IP-telephony as an application on the open Internet with the use of an IP-telephony server and a gateway, with the possibility to make and receive calls on public telephone networks.</li> </ul>	Under Section 6 (2) of the <a href="#">Act on Competitive Conditions and Consumer Interests in the Telecommunications Market</a> , public electronic communications networks and services are defined as a subset of electronic communications networks and services <i>that are made available to a number of end-users who have</i>

	Classification of VoIP based on ECS/PATS	Any interpretation of 'public availability' by NRA?
	<ul style="list-style-type: none"> <li>Scenario 5: IP-telephony over a QoS-secure IP-network with access to public telephone network.</li> </ul> <p>NITA concluded that only VoIP services provided under scenarios 3 – 5 fall within the scope of the electronic communications legislation and should be classified as ECS.</p> <p>PATS category has not been defined in the Danish legislation. Rights and obligations of different categories of ECS providers are set out in the Act on Competitive Conditions and Consumer Interests in the Telecommunications Market and the Executive Order on the Provision of Communications Networks and Services. Initially, the concept closest to PATS used in this legislation was the category of 'voice telephony' subject to obligations equivalent to PATS (including access to 112 emergency services). Some further obligations were set in connection to 'telephony' services. NITA analysis concluded that both categories, 'voice telephony' and 'telephony' were to be understood as technology neutral and applied to VoIP in the same way as to fixed PSTN/ISDN and mobile services. NITA stated that both concepts could be misinterpreted and potentially result in discriminatory treatment of VoIP providers.</p> <p>NB NITA also observed that the distinction between PATS and ECS with voice was not entirely clear in the Universal Service Directive, and there had been no clear guidelines from the European Commission on this matter (See Section 2 in NITA's conclusions to the second round consultation).</p> <p>Following NITA's assessment, the definitions used in the Executive Order on the Provision of Communications Networks and Services have been revised with an emphasis on the technology neutrality principle. The amended <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services sets out the rights and obligations of different categories of ECS providers based on the following classification:</p> <ul style="list-style-type: none"> <li>public electronic communications networks and services;</li> <li>non-public electronic communications networks and services; and</li> <li>electronic communications networks and services that enable users to make calls to numbers in the Danish national numbering plan. This is a subset of ECS replacing the previously used 'voice telephony' category that is subject to the obligation to provide access to emergency services, calls to the national directive enquiry service and access to a call-based charge advice facility.</li> </ul>	<p><i>not been specified in advance.</i></p> <p>According to NITA, these are services that can be offered to any user, in contrast to the services that are only offered to narrowly defined categories of users (e.g. banks, insurance companies, educational institutions or virtual private networks and services) (See NITA's notes to the Executive Order on the Provision of Communications Networks and Services, Dec. 2003).</p>
EE	<p>A fixed 'telephony service provided' on the basis of VoIP is classified as PATS in Estonia.</p> <p>Under art. 2(58) of the <a href="#">Electronic Communications Act of Dec. 8, 2004</a>, a "telephone service" is defined as "a publicly available electronic communications service for originating and receiving national and international calls at a determined location and for access to emergency services through a number or a short access code connected with the number in the Estonian or international telephone numbering plan".</p> <p>However, there are several VoIP providers (e.g. wireless access operators) in Estonia that do not have their own switching platform, points of interconnection (PoI) or numbers granted from the national numbering plan. Such VoIP providers have access to a fixed PSTN operator (switching and interconnection). ENCB treats these type of VoIP providers as resellers of fixed telephony services of that other operator (to which PATS obligations apply).</p>	<p>Yes</p> <p>'Publicly available' ECS is defined in art. 2 68) of the <a href="#">Electronic Communications Act of Dec. 8, 2004</a> as follows:</p> <p><i>"publicly available electronic communications service" (hereinafter communications service) is a service provided by a communications undertaking on the corresponding communications services market pursuant to the general procedure to all persons, and the persons need not meet any conditions differentiating them from other similar persons. A service is publicly available particularly if provision of the service is continuous and consistent and it is provided essentially under the same conditions".</i></p>

	<b>Classification of VoIP based on ECS/PATS</b>	<b>Any interpretation of 'public availability' by NRA?</b>
<b>FR</b>	ARCEP strongly recommends VoIP operators to register as PATS. From a numbering point of view, geographic numbers may only be used by PATS providers. Non-geographic numbers, such as 09XX numbers, however, are dedicated to 'services de communications interpersonnelles' and can be used also by non-PATS, so ECS.	No
<b>DE</b>	ECS and PATS (if the VoIP service is a substitute for PSTN) <ul style="list-style-type: none"> <li>When BNetzA published its "Key elements of the regulatory treatment of Voice over IP" in Sep. 2005, it stated clearly that VoIP services which provide access to PSTN are 'telecommunications services' as defined in § 3 Nr. 24 TKG (see Key element 2). This term is the German equivalent of ECS.</li> <li>In this document BNetzA avoided a clear statement whether VoIP is PATS. In Germany the obligation to provide access to emergency services is postponed until 2009 (see Table 3). Furthermore the rule about number portability is not linked with PATS. Therefore until now it has not been necessary to decide whether VoIP is PATS or not. However, BNetzA attributes VoIP calls to national and international fixed networks to the markets 3 to 6 and treats VoIP services equal to PSTN in the context of geographic numbers (see Table 4).</li> </ul>	In the context of the obligation to notify (see Table 1) BNetzA interprets the term 'publicly available' as: "any non-defined group of persons".
<b>IT</b>	VoIP may be PATS if it fulfils the criteria laid down by the Universal Service Directive, as transposed by the Italian legislation. For 'nomadic services' there is a separate category, a general authorisation for the provision of nomadic voice communications services (autorizzazione generale per la fornitura di un servizio di comunicazione vocale nomadico). The authorisation in this category implies the same rights and obligations as those applicable to PATS, save some exceptions to the conditions that may be attached to general authorisations (points 1, 6, 12 and 15 of Annex 1, part A of the Electronic Communications Code of July 1, 2003 relating to, e.g. USO funding, network integrity and ensuring communications between the emergency services and authorities in case of a natural disaster). AGCOM Decision 11/06/CIR however specifies that providers must adequately inform end-users, before the signing of a retail contract, of any limitations in conforming with the obligations normally applying to PATS.	No
<b>NL</b>	OPTA only regulates VoIP services providing incoming and outgoing telephony to PSTN using E.164 numbers. If the service is subject to regulation, some differences apply according whether the service can be defined as a PATS or ECS (e.g. access to emergency services is only mandatory for PATS providers).	No
<b>PL</b>	On Dec. 14, 2006 UKE issued a <a href="#">guide on VoIP</a> . In this guide, UKE concluded that providers of VoIP services are not classified as PATS. The provision of VoIP is subject to the same rules as the provision of telecommunications services, defined as provision of services by means of own network, other operator's network or reselling a telecommunications service performed by another service provider. ECS is not defined in the Telecommunications Law. Telecommunications Law defines PATS as telecommunications services available to the whole of users, for the originating and receiving of national and international calls and for the access to emergency services through a number or numbers in a national or international numbering plan.	No
<b>ES</b>	Following a public consultation, CMT concluded on Feb. 3, 2005 that VoIP services should be regulated as ECS and not as PATS (minimum regulatory approach). However, a VoIP service can be considered as PATS if it complies with all PATS requirements in the Spanish legislation, including if it: <ul style="list-style-type: none"> <li>offers access to emergency services</li> <li>offers interconnection and interoperability</li> <li>is provided at a fixed location (non-nomadic)</li> <li>ensures number portability.</li> </ul> Currently, number portability is only defined and implemented for PATS and mobile telephony, not for VoIP (that are not considered as PATS). The Resolution of June 30, 2005 of the Ministry of Industry, Tourism and Trade defines a specific category for VoIP, called "nomadic vocal services". It assigns specific geographic number ranges for non-nomadic usage (8XY) and a special prefix for nomadic usage (51). It also establishes the obligation to provide access to emergency services. Annex II § 30 of Law 32/2003 of Nov. 3, 2003 and Royal Decree 2296/2004 of Dec. 10, 2004 on electronic markets, access to networks and numbering (Annex 1 § 3). Royal Decree 424/2005, of April 15, 2005 on electronic communication services, USO and protection of end-users Relevant CMT decisions: CMT Decision of Oct. 5, 2006 on an opinion requested by Tiscali and CMT Decision of Nov. 27, 2003 on the use of conventional geographic numbers for VoIP (request from BT).	No

	Classification of VoIP based on ECS/PATS	Any interpretation of 'public availability' by NRA?
UK	<p>Ofcom <a href="#">Statement on 'Regulation of VoIP services: Access to the Emergency Services'</a> of Dec. 5, 2007. In this document, Ofcom identifies four main types of VoIP voice call service:</p> <ul style="list-style-type: none"> <li>• Type 1 – Peer-to-peer</li> <li>• Type 2 – VoIP Out allowing calls over the Internet to the PSTN</li> <li>• Type 3 – VoIP In allowing to receive calls over the Internet from the PSTN. Customers can be allocated an ordinary geographic number or a non-geographic VoIP number (056)</li> <li>• Type 4 – VoIP In and Out (Type 2 plus Type 3).</li> </ul> <p>Ofcom says:</p> <ul style="list-style-type: none"> <li>• Often, Type 1 VoIP services are marketed as PC-to-PC services because they allow calls from one PC to another, e.g. Skype and Google Talk; Types 2 and 3 are marketed as providing a secondary phone line, e.g. Skype In/ Skype Out and Tesco; Type 4 is also marketed as providing a secondary phone line, e.g. BT Broadband Talk, or as a replacement for making calls over the PSTN, e.g. Vonage.</li> <li>• To date, no single combination of business model, functions or equipment has emerged to lead the market. Ofcom expects this diversity to remain for some time, although recent UK and international trends indicate that providers that seek to serve the mass market in the future are likely to offer Type 4 phone-based PSTN replacement services.</li> <li>• Depending on their individual characteristics, Ofcom considers Type 1 VoIP services are unlikely to constitute an ECS. Type 2 and 3 VoIP services are likely to be regarded as PECS. Type 4 VoIP services are likely to be PECS or, if they meet the four PATS gating criteria, PATS.</li> <li>• Under the general authorisation regime, VoIP providers must comply with certain general conditions of entitlement (GCs) set by Ofcom. See Ofcom <a href="#">guidelines on GCs</a> that apply to ECS/ECN, PECS/PECN and PATS/PTN.</li> </ul>	<p>Yes, see discussion on public availability in Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007 (Annex 5, Paragraph A5.39 to A5.45).</p>

### Table 3 - Calls to emergency services

Article 26 of the Universal Service Directive (2002/22/EC) requires that:

- all end-users of publicly available telephone services (PATS) are able to call the emergency services free of charge by using the single European emergency number 112 or any other national emergency call numbers
- calls to 112 are appropriately answered and handled in a manner best suited to the national organisation of emergency systems and within the technological possibilities of the originating network
- undertakings which operate public telephone networks (PTN) make caller location information available to authorities handling emergencies, to the extent technically feasible, for all calls to 112.

The table below shows whether VoIP providers are required to:

- ensure access to emergency services (based on PATS, ECS or some other classification)
- transmit Calling Line Identification (CLI) and caller location information to emergency services
- route emergency calls to a particular local emergency call centre
- inform their subscribers about the risks linked to the use of the VoIP service (e.g. that the voice service will fail if the broadband connection fails or if there is a power cut, any limitations on access to emergency services or provision of caller location information to emergency services)
- provide their subscribers with safety power supply solutions (e.g. battery back-up).

PSAP = Public Safety Answering Point

Country	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
AT	Yes (PATS) All PATS providers must provide access to emergency services (§ 20 TKG 2003).	Yes (PATS) All PATS providers must transmit the CLI (§ 20 TKG 2003 and § 5 KEM-V) and must provide caller location information on request (§ 98 TKG 2003). Without regard to the technology, location information is only provided on request. When the PSAP needs location information, it calls the operator and		Yes (PATS) <ul style="list-style-type: none"> <li>• PSAP must define location dependent routing and must make this information available in electronic format (§ 19 KEM-V)</li> </ul>	No	No

Country	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
		<p>the operator must provide location data of the caller and/or the name and address of the subscriber to the extent that this information is available.</p> <p>If a subscriber has a geographic and a nomadic number, non-nomadic calls to PSAP should present the geographic number as CLI, and nomadic calls should present the non-geographic number, as far as possible. A CLI beginning with 0720 or 0780 therefore flags to PSAP, that the call might be nomadic. It is being tolerated that VoIP providers cannot always provide correct caller location information.</p> <p>A working group of operators and RTR has regular meetings on emergency call issues and develops best practices.</p>		<ul style="list-style-type: none"> <li>Operators of ECN/ECS must route according to these definitions, but only within the technical capabilities of their network (§ 19a KEM-V)</li> </ul> <p>In practice, location dependent routing of calls from geographic numbers works well. It is being tolerated, that some VoIP providers route all nomadic emergency calls to Vienna.</p>		
DK	<p>Yes</p> <p>Only ECS providers that enable their users to make calls to the numbers in the Danish <i>national</i> numbering plan are required to provide access to the public emergency services (112 emergency number) (§3 of <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services).</p>	<p>Yes</p> <p>(§5 of <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services).</p>	<p>Yes</p> <p>Caller location information must be provided to the extent technically feasible. Where it is not technically possible to establish the caller location, service providers are required to provide to PSAP information about any service usage characteristics that</p>	<p>Designated universal service (US) provider (currently TDC) must ensure correct routing of emergency calls to the relevant local emergency call centres.</p> <p>Public ECS providers must ensure that emergency calls are without delay terminated on the US provider network.</p> <p>Non-public ECS providers must ensure that emergency calls are</p>	<p>Providers of electronic communications services that only offer access to international calls or do not enable making calls to the numbers in the Danish national numbering plan are not required to provide access to the public emergency services. These service providers are required to inform end users about unavailability of access to emergency services at latest at the time of entering into the service provision agreement.</p> <p>If it is not technically possible to ensure transmission of caller location information to emergency services, the service provider must inform end users about any service limitations in connection to the</p>	<p>No</p> <p>NITA discussed power supply solutions in its <a href="#">analysis</a> of barriers for development of IP-telephony in Denmark but did not propose any specific requirements for VoIP providers that could potentially present another barrier for development of VoIP (see Section</p>

EE	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
			can be relevant in this context (§5 of <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services).	without delay terminated on a public electronic communications network from where the calls must be without delay terminated on the US provider network. Public ECS providers are required to ensure through a detailed agreement with the US provider that the information necessary for correct routing of emergency calls is made available to the US provider. (§4 of <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services).	correct routing of emergency calls at latest at the time of entering into the service provision agreement. (§7 and §10 of <a href="#">Executive Order No. 1031 of Oct. 13, 2006</a> on the Provision of Communications Networks and Services).	2.7.4 and 11.6 in the final report published in March 2005).
<b>EE</b>	Telephone service providers (i.e. PATS, see <a href="#">Table 2</a> ). Art. 88 of Electronic Communications Act of Dec. 8, 2004. In practice, ENCB realises that it cannot enforce this requirement on 'VoIP resellers'.	CLI: Yes Caller location information: Yes, " <i>where possible</i> ". Art. 88 of Electronic Communications Act of Dec. 8, 2004. There is no classification of nomadic or non-nomadic VoIP providers in Estonia. In practice, ENCB realises that it cannot enforce this requirement on 'VoIP resellers'.		No, there are no specific requirements on any telephone service providers, but in practice all fixed and mobile telephone service providers route calls to a local emergency call centre.	No	No

	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
<b>FR</b>	<p>Yes, both PATS and ECS</p> <p>The French legislation (Art. D.98-3 and D.98-8 of the <a href="#">code on postal services and electronic communications</a>) states that both public network operators and providers of electronic communications to the public have to carry emergency calls i.e. 112 (EU emergency number)</p> <p>15 (ambulance) 17 (police) 18 (fire) 115 (SAMU Social) 119 (abused children) 11600 (missing children)</p>	<p><b>CLI</b></p> <p>No explicit requirement (assumed to be implicit)</p> <p><b>Caller location information</b></p> <p>Obligation for the operator to provide location data of the caller to the emergency centre “where the network equipment at its disposal makes it possible”.</p> <p>(Art. D.98-8 of the <a href="#">code on postal services and electronic communications</a>)</p>		<p>Yes</p> <p>To the relevant emergency centre corresponding to the location of the caller.</p> <p>Information on which emergency centre to use are communicated to operators by the <i>Départements</i>.</p> <p>(Art. D.98-8 of the <a href="#">code on postal services and electronic communications</a>)</p>	<p>VoIP providers include an article in their terms and conditions. For example, Alice’s <a href="#">general conditions</a> (4.1) states that “in case of non-functioning of the network, no call is carried, including emergency calls”.</p>	No
<b>DE</b>	<p>Yes, but not before Jan. 1, 2009 (see transitional provision mentioned below).</p> <p>§ 108 TKG obliges all PATS providers to provide access to 112 (EU emergency number, fire and ambulance). Other numbers shall be regulated in an ordinance. This ordinance will probably only refer to 110 (police).</p> <p>The last amendment of TKG inserted a new transitional provision (§ 150 (9a) TKG), which exempts providers of PATS based on new technologies from the access obligations before Jan. 1, 2009.</p>	<p>Yes, but not before Jan. 1, 2009</p>	<p>Yes, but not before Jan. 1, 2009</p> <p>Research under way</p>	<p>Yes</p> <p>According to § 108 <a href="#">TKG</a> providers of PATS must route calls to the locally responsible emergency call centre. Details shall be regulated in an ordinance and a technical guideline, but neither of these documents yet exists. DT maintains and distributes to interconnect partners a list that maps geographic number areas to the respective target numbers.</p>	No	<p>No</p> <p>This was one of BNetzA’s questions in the VoIP <a href="#">consultation</a> in April 2004, but has not been an issue afterwards.</p>

ID	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
	See also the “ <a href="#">Key elements</a> of the regulatory treatment of Voice over IP”, Sep. 2005 (Key element 5)					
IT	<p>Yes</p> <p>Undertakings authorised for the provision of:</p> <ul style="list-style-type: none"> <li>• PATS</li> <li>• nomadic voice communications services.</li> </ul> <p>(see <a href="#">Table 2</a>)</p> <p>Art. 76(1) of the <a href="#">Electronic Communications Code of Aug. 1, 2003</a>; AGCOM <a href="#">Decision 11/06/CIR</a>.</p>	<p><b>CLI</b></p> <p>Yes – CLI is general obligation for PATS under art. 3 of AGCOM decision n. 11/06/CIR</p> <p><b>Caller location information</b></p> <p>Yes – authorised providers of PATS, to the extent technically feasible</p>	<p><b>CLI</b></p> <p>Yes – CLI is general obligation for providers of nomadic voice communications services under art. 6 of AGCOM decision n. 11/06/CIR</p> <p><b>Caller location information</b></p> <p>Yes – authorised providers of nomadic voice communications services, to the extent technically feasible.</p>	No	<p>Under art. 8(4) of AGCOM <a href="#">decision 11/06/CIR</a>, before the signing of a retail contract, undertakings authorised for the provision of PATS and nomadic voice communications services must provide the end-user with accurate information of any limitations in the caller location information for emergency calls, and the end-user must give his explicit approval for such limitations.</p> <p>Under art. 11 of the decision, on June 19, 2006 AGCOM <a href="#">launched</a> a procedure in order to address the implementation of caller location information for emergency VoIP calls. No follow-up published so far.</p> <p>No specific provisions on risks related to power cuts and other such failures in the broadband connection.</p>	No

Country	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
		<b>Caller location information</b> The European Commission's 12 <sup>th</sup> Implementation Report of March 29, 2007. <a href="#">Annex 1</a> , p. 161, notes that "there seemed to be a lack of technical regulation that would enable operators to fulfil the requirement of caller location for emergency services imposed on nomadic VoIP". On March 22, 2007 the Commission <a href="#">referred</a> Italy to the European Court of Justice as there are still problems in the provision of caller location information for calls to 112.				
NL	Yes VoIP providers considered as PATS providers must ensure access to emergency services. ( <a href="#">Telecom Act</a> , Art. 7.7)	Yes, if operator provides CLI	Yes, if operator provides CLI	All calls must be routed to the USO provider (KPN) who will terminate the call to the appropriate local emergency centre.	No	No
PL	No VoIP operators must clearly inform its users about any limitation to access emergency services.	No	No	No	Yes VoIP operators must clearly inform its users about any limitation to access emergency services.	No
ES	Yes VoIP providers (both PATS and "nomadic vocal services") must route calls to the single European emergency call number 112. VoIP are considered as ECS (and not PATS). The <a href="#">Resolution</a> of June 30, 2005 of the Ministry of Industry, Tourism and Trade defines a specific category for VoIP, called "nomadic vocal services". It establishes the	<b>CLI</b> No (only PATS need to transmit CLI) <b>Caller location information</b> No, only PATS	<b>CLI</b> No (only PATS need to transmit CLI) <b>Caller location information</b> No, only PATS	In both cases (non-nomadic and nomadic VoIP services), calls are routed to the emergency centre that corresponds to the area of the address determined by the subscriber in the contract for subscription to the VoIP service.	The contracts with subscribers should include information on features of the service, in particular as regards emergency calls. It should clearly indicate that it is a service different from PATS and about its limitations. <a href="#">Resolution</a> of June 30, 2005 of the Ministry of Industry, Tourism and Trade	No Only obligation established for the USO provider. Article 28 § 2 of <a href="#">Royal Decree 424/2005, of April 15, 2005</a> - the USO provider must have the necessary technical resources

	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
	obligation to provide access to emergency services, due to the use of public numbering resources.					to ensure the continuity of the fixed telephony service in situations of electricity power failure for at least four hours.
<b>UK</b>	<p><b>Current</b> – PATS only</p> <p>At present VoIP providers can choose whether to offer 999/112 access on a voluntary basis.</p> <p>'Type 4' VoIP providers that offer 999 access and meet the other PATS gating criteria become PATS and have to comply with the PATS General Conditions (GCs).</p> <p>As part of Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007 Ofcom published Guidelines for VoIP providers on complying with GC 3 (network integrity and service reliability) and GC 4 (access to emergency services and provision of caller location information). Under the Guidelines, all VoIP providers that provide 999/112 access (not only PATS) are required to conduct a formal risk assessment of network integrity and implement a risk mitigation strategy.</p> <p><b>From Sep. 8, 2008</b> – All PECS that allow users to make outgoing calls to national telephone numbers (Type 2</p>	<p>CLI: as below, where technically feasible</p> <p>Caller location information:</p> <p><b>Current</b> – PATS only, to the extent technically feasible</p> <p><b>From Sep. 8, 2008</b> – All PECS that allow users to make outgoing calls to national telephone numbers (Type 2 and 4 VoIP services), to the extent technically feasible (GC 4)</p> <p>Ofcom <a href="#">Statement on 'Regulation of VoIP services: Access to the Emergency Services'</a> of Dec. 5, 2007 (see from para 5.39). "At present Ofcom considers the technically feasible solution is for VoIP providers to provide the registered address of their VoIP customers to the emergency services database (ESDB), accompanied by a VoIP flag to alert the emergency call handling operator to ask the caller to confirm their location.</p> <p>Where a VoIP service is mainly used in a nomadic way or is mobile and it would be unhelpful for the emergency services call handler to have the registered address</p>	<p>BT, Cable &amp; Wireless (CW) and Kingston Communications provide emergency answering services.</p> <p>VoIP provider would have to interconnect directly with one of these operators or via a third party.</p> <p>Approx. 80% of emergency calls are answered by BT and 20% by CW.</p> <p>See <a href="#">description of BT Emergency Service</a> for fixed, VoIP and mobile originated calls. Section 9 covers VoIP originated emergency calls.</p> <p>For pricing, see <a href="#">BT Carrier Price List Section B3, Part 3.08 (Emergency Service)</a></p>	<p>Yes</p> <p>Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007 adopted a mandatory Code of Practice on the provision of consumer information by all providers of PECS offering VoIP services to residential and small business customers, at both fixed and nomadic locations.</p> <p>The deadline for compliance with the Code was May 29, 2007 (GC 14).</p> <p>PECS providers must ensure customers are provided with information about the features of their service. In particular, during the sales process, at the point of signature, in terms and conditions and in any user guide. Type 2, 3 and 4 VoIP providers must provide clear and readily accessible information on whether their service offers 999/112 access and whether it may cease to function if the power or broadband connection fail. The Code requires providers to:</p> <ul style="list-style-type: none"> <li>secure the customer's positive acknowledgement at point of sale that there is no 999/112 access or that</li> </ul>	<p>No</p> <p>See Paragraphs A5.72 to A5.74 of Guidelines on the application of PATS obligations to VoIP service providers published as Annex 5 to Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007.</p>	

Q1	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
	<p>and 4 VoIP services – see <a href="#">Table 2</a>) Ofcom <a href="#">Statement on 'Regulation of VoIP services: Access to the Emergency Services'</a> of Dec. 5, 2007. The requirement will apply to services that allow calls to national numbers or to national and international numbers, but not to "Click to Call" and international-only services. The modification to GC 4 will enter into force on Sep. 8, 2008 (i.e. 9-month implementation period).</p>	<p>because the caller is unlikely to be there, the test of "to the extent technically feasible" may be met by providing a VoIP flag only. We expect the meaning of "technically feasible" to change as technology progresses and will monitor that. We strongly encourage and expect industry to strive to agree and implement a standardised solution for providing automatic caller location information and CLI for Type 2 and Type 4 VoIP services. We expect to conduct a formal review in early 2009 with a view to identifying new "technically feasible" standards and setting a deadline for meeting them. "Technically feasible" may include costs to the extent that the caller location information solution must be feasible, or reasonable. In considering what is reasonable, we will place particular weight on the importance of providing 999/112 access for public safety." The UK interconnection standards committee NICC is actively developing solutions to provide caller location information for nomadic VoIP services. See also requirements below on user registration of location data.</p>			<p>999/112 access will fail if the power or broadband connection fails</p> <ul style="list-style-type: none"> <li>offer to provide a physical label for equipment and provide on-screen or printed information stating there is no 999/112 access, or</li> <li>offer to provide physical label for equipment or an on-screen message stating that 999/112 access will fail if the power or broadband connection fails</li> <li>if there is no 999/112 access, play a network announcement each time a 999/112 call is attempted reminding the caller that it's unavailable and, for example, recommending they hang up and call from a traditional fixed line or mobile. Intersperse the announcement with the Number Unavailable tone for the benefit of hearing-impaired users.</li> </ul>	

	VoIP providers required to provide access to emergency calls? PATS/ECS	Transmission of CLI and caller location information to emergency services		Requirements for routing call to local emergency call centre? If yes, does Member State provide guidance on which PSAP is responsible for answering emergency calls from particular regions?	Information to subscribers about risks of VoIP service	Requirements for provision of safety power supply solution (e.g. battery back-up)
		Non-nomadic VoIP	Nomadic VoIP Requirement for VoIP provider to flag nomadic users to PSAP? (i.e. user might be at a different location to registered location)			
	<p><b>User registration of location data</b></p> <p>For all VoIP services which provide access to emergency calls (PECS, not only PATS), the mandatory Code of Practice adopted as part of Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007, sets the following obligations regarding registration of caller location information:</p> <ul style="list-style-type: none"> <li>• VoIP service used principally at a single fixed location: the VoIP provider shall require the customer to register the location where the service is going to be used before activation of the service.</li> <li>• VoIP service accessed from several locations: the VoIP provider shall recommend (but not require) that the customer register and update the location information with it, whenever accessing the service from a new location.</li> <li>• The VoIP provider shall advise the customer, during the sales process, at the point of signature, in the Terms and Conditions and in any user guide, about any limitations on the location information that will be provided to the emergency services if the location they have provided is not up to date.</li> </ul>					

**Table 4 - Numbering and number portability**

The table below shows if VoIP providers are allowed to:

- use E.164 numbers (geographic and non-geographic) from the national numbering plan to provide customers with the possibility to make/receive calls to/from the PSTN
- port-in/out E.164 geographic and non-geographic numbers from/to another network operator.

The term 'nomadic services' refers to services where the user can connect their VoIP phone to any network termination point and make/receive calls using the same number. Nomadic VoIP services are therefore provided independently of the physical location of the user. The user may, however, be required to specify a particular physical location and corresponding network termination point as their 'home' location when signing the contract with the provider of the nomadic VoIP service in order to enable the provision of caller location information to the emergency services.

In countries where number portability is implemented based on direct routing/centralised database solution, the table also shows how the database is financed by the operators using it.

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS	Where number portability is based on direct routing/centralised database, how is database financed by operators?	
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)		VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)
<b>AT</b>	Yes (see details below)	No (see below)	Yes (0720: national numbers, and 0780: ENUM numbers)	Yes (0720: national numbers, and 0780: ENUM numbers)	Yes	Not applicable (all geo. numbers are portable, but nomadic use is forbidden)	Yes	Yes	PATS	PATS	Number portability in the fixed network uses onward-routing, no centralised database.

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS	Where number portability is based on direct routing/centralised database, how is database financed by operators?	
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)		VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)
	<p>RTR does not allow the nomadic usage of geographic numbers, but describes a possible <i>"pseudo-nomadic"</i> usage in its VoIP guidelines (p. 10). It is possible that a subscriber has both a geographic and a non-geographic number. The geographic number addresses a fixed-location network termination point and the non-geographic number addresses the nomadic network termination point. In such a scenario, it is allowed to use the geographic number for incoming calls (in the form of call-forwarding to the nomadic number) and also as the CLI of outgoing calls.</p> <p>However, this pseudo-nomadic usage of geographic numbers is only possible for VoIP providers who provide a VoIP service at a fixed-location. VoIP providers are only entitled to use geographic numbers, if they either provide the physical access by themselves (in particular, if DSL operator and VoIP provider are identical) or if they have at least some kind of agreement with the subscriber's IP access provider which (technically) guarantees that the geographic number is assigned to an existing geographically fixed network termination point. The use of virtual network termination points is not allowed. In particular, the VoIP provider cannot argue that the gateway between PSTN and IP network would be a network termination point.</p>										
<b>DK</b>	Not applicable (see comment)	Not applicable (see comment)	Yes	Yes	Not applicable (see comment)	Not applicable (see comment)	Yes	Yes	ECS	ECS	<p>Direct routing (all calls query - ACQ). The centralised database, <a href="#">Operators Clearing House (OCH)</a> is jointly owned by TDC, Telenor (Sonofon) and TeliaSonera. Its operations are financed from the fees paid by connected operators and service providers: connection fees, monthly fees, and transaction and services support charges.</p> <p>The fees vary depending on the type of connection to the OCH database:</p> <ul style="list-style-type: none"> <li>• direct (possibility to import and export numbers to the system and to resell indirect access to third parties),</li> <li>• indirect (access resold through another directly connected operator);</li> </ul>

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS	Where number portability is based on direct routing/centralised database, how is database financed by operators?
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic			
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)	
										<ul style="list-style-type: none"> <li>passive (only possibility to receive updated information from the system).</li> </ul>
<p>The Danish national numbering plan is a closed non-geographic plan. All subscriber numbers consist of eight digits and contain no information about the geographic location of the subscriber. Special allocation rules apply only to short codes and numbers from 80- (free phone) and 90- (PRS) number ranges (<a href="#">Executive order No. 685 of June 20, 2007</a> on the Danish national numbering plan and <a href="#">NITA's guidelines to the national numbering plan</a>, Aug. 2007). VoIP providers have the right to use numbers assigned by NITA on the same conditions as any other providers of electronic communications networks and services. In its <a href="#">analysis</a> of barriers for development of IP-telephony in Denmark NITA concluded that reserving a special number range for VoIP would contradict the principles of technology neutrality and non-discriminatory treatment of services regardless of the underlying technology (see Section 10 in the final report published in March 2005).</p> <p>In practice, when allocating numbers, NITA still maintains the distinction between the number ranges for fixed telephony and mobile services. VoIP providers, both non-nomadic and nomadic, are assigned numbers from the same ranges as PSTN/ISDN fixed telephony services.</p>										
<b>EE</b>	Not applicable All numbers in Estonia are non-geographic	Not applicable All numbers in Estonia are non-geographic	Yes No dedicated ranges for VoIP	Yes No dedicated ranges for VoIP	Not applicable	Not applicable	Yes	Yes	Number portability is a general obligation for all telephone service providers (i.e. PATS, see <a href="#">Table 2</a> ). In practice, ENCB realises that it cannot enforce this requirement on 'VoIP resellers'. Art. 89 of the <a href="#">Electronic Communications Act of Dec. 8, 2004</a>	Number Portability (centralised database) is operated and financed by ENCB.
<b>FR</b>	Yes	Yes, but limited to use in same local area (Zone de Numérotation Elémentaire "ZNE")	Yes (087 migrating to 09 numbers)	Yes (087 migrating to 09 numbers)	Yes	Yes	Yes	Yes	PATS (providers/subscribers) for all numbers and ECS but for non-geographic numbers only. The reason is as follows, each numbering assignment decision by ARCEP specifies the services that may be provided. For example, a block of geographic numbers can only	Indirect routing. Negotiation underway between operators for the establishment of a centralised database to allow for the direct routing of calls.

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS		Where number portability is based on direct routing/centralised database, how is database financed by operators?
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)	VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)	
									be assigned to a PATS provider. So, an ECS provider is not entitled to portability of geographic numbers.		
<b>DE</b>	Yes See notes below: provider must verify the user's location or address	Yes	Yes (0)32	Yes (0)32	Yes	Yes	Yes	Yes	ECS	ECS	Number portability uses onward routing (both in fixed and mobile network). No centralised database.
<p>According to BNetzA's rules there are two steps:</p> <ul style="list-style-type: none"> <li>• allocation of a number block from BNetzA to a provider; and</li> <li>• sub-allocation of a number from the provider to its subscriber, based on a contract between the provider and the subscriber.</li> </ul> <p>The rules do not foresee that number blocks are delegated from one provider to another. Therefore, generally the provider that has the contract with the subscriber should apply for allocation of numbers.</p> <p>For geographic numbers see the <a href="#">procedure for allocation</a> and the <a href="#">structure of the number range</a> (in particular pages 3 and 4). The provider has to verify the subscriber's location or address against an official document before he sub-allocates a number of the respective area.</p> <p>The numbering range <a href="#">(0)32 national numbers</a> is often used by VoIP providers, because it is not required to verify the subscriber's address and the same number block can be used for subscribers all over the country.</p>											
<b>IT</b>	Yes	Yes, as long as nomadic use limited to geographic area indicated by the number (see below)	Yes	Yes 5X UUUU U=0-9	Yes (within same 0X number range)	Yes (within same 0X number range)	Yes (within same 5X number range)	Yes (within same 5X number range)	Subscribers to/providers of: <ul style="list-style-type: none"> <li>• PATS</li> <li>• nomadic voice communications services</li> </ul> Art. 3 – 7 of AGCOM <a href="#">Decision 11/06/CiR</a> ; art. 80 of the <a href="#">Electronic Communications Code of Aug. 1, 2003</a>	No direct routing/centralised database.  Onward routing used.	

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS	Where number portability is based on direct routing/centralised database, how is database financed by operators?	
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)		VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)
	<p>Under art. 4 and 7 of AGCOM <a href="#">Decision 11/06/CIR</a> of March 31, 2006, the Ministry of Communications assigns numbers from the:</p> <ul style="list-style-type: none"> <li>'0X' geographic number range only to undertakings in the possession of a general authorisation for the provision of PATS (servizi telefonici accessibili al pubblico), the definition of which is technology neutral and covers all services (including non-nomadic VoIP) available to the public for originating and receiving national and international calls at a fixed location and access to emergency services through a number or numbers in a national or international telephone numbering plan. The service may be nomadic only within the geographic area indicated by the number.</li> <li>'5X' non-geographic number range only to undertakings in the possession of a general authorisation for the provision of nomadic voice communications services (servizio di comunicazione vocale nomadico), which enable an end-user to originate and receive voice communications at any network termination point, using a single non-geographic number. Numbers from the 55 number range will be assigned first, while the rest of the 5X numbers are reserved for future use.</li> </ul> <p>(AGCOM consulted from July 6 until Sep. 19, 2007 on the review of the <a href="#">national numbering plan (decision n. 44/07/CIR)</a>. It did not, however, propose to make any amendments in order to remove the current distinction between numbering ranges for fixed (geographic and non-geographic), mobile and nomadic services).</p>										
NL	Yes	Yes, as long as VoIP provider checks that subscriber has home address or company address in the area corresponding to the area code	No dedicated range. Several non-geographic ranges are open for VoIP services: 085, 091 (general electronic communications) 088 (company numbers), 084/087 (personal assistant numbers), 090x (information numbers (VoIP-in only)).	See comment in previous column	Yes	Yes	Yes	Yes	ECS	ECS	All network operators in the Netherlands are members of the association that manages the database (coin.nl). They all pay an annual fee. The fee contains a number of 'free' number portings included in the annual fee. For all ported numbers exceeding this free quota, they pay a tariff based on the annual costs of the association (so members that port more numbers pay more extra).  Telecom parties who only need to access the database for routing purposes (no porting) are not members of the association. They simply pay an annual fee for the use of the service.

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS	Where number portability is based on direct routing/centralised database, how is database financed by operators?	
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)		VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)
	According to OPTA, no dedicated non-geographic number range for VoIP, but 085 and 088 are probably best suited. OPTA <a href="#">guidelines</a> on the use and assignment of numbers for VoIP services - July 2006										
<b>PL</b>	Yes	Yes	Yes (039)	Yes (039)	Yes	Yes	Yes	Yes	Yes	No	Distributed databases with query on release. UKE is planning to implement a central database in the future (with direct routing based on all calls query).
<b>ES</b>	Yes, if the VoIP service is PATS.	Yes, specific range (8XY) but limited to the telephone district to which the number belongs	No	Yes (51)	Currently, number portability is only defined and implemented for PATS and mobile telephony, not for "nomadic vocal services" (51 and 8XY numbers). See next column				PATS + mobile telephony	PATS + mobile telephony CMT stated in its <a href="#">conclusions</a> of Feb. 2005 following a public consultation on VoIP that it would amend current rules on number portability to allow portability between VoIP providers (between 51, 8XY and between PSTN and 8XY). There	Direct routing (ACQ or QoR). In 2004 CMT <a href="#">established</a> the portability principles, including the financing criteria that the costs relating to the database should be shared by the operators, who agreed on the following sharing scheme. The centralised database ("Reference Entity" or ER) allows the portability of fixed and non-geographic numbers and also includes the updated database of all mobile ported numbers. From Jan. 2006, the ER management has been outsourced and the outsourcing company receives €800K per year. 40% of those costs are shared equally by each operator, the remaining 60% are shared proportionally to volume of ported numbers by each

	Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS		Where number portability is based on direct routing/centralised database, how is database financed by operators?
	Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic				
	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)	VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)	
										has been no follow up so far.	operator. No entrance fee or set-up costs since Jan. 2006.
<b>UK</b>	Yes	Yes	Yes (056)	Yes (056)	Yes	Yes	Yes	Yes	Type 4 VoIP providers that fulfil the four PATS gating criteria AND Type 3 VoIP providers (PECS) for receiving national and international calls through a standard telephone number (no outgoing calls) Modified <a href="#">General Condition 18</a> as a result of Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007	All ECS providers required to provide number portability, on request and on reasonable terms, to subscribers of PATS or to subscribers of receive-only PECS. GC 18	Number portability in both the fixed and mobile network uses onward routing, no centralised database solution at present. Change to direct routing planned – see below.

Access to numbers for VoIP				Number portability				Who entitled to benefit from / obliged to offer number portability? PATS only or ECS		Where number portability is based on direct routing/centralised database, how is database financed by operators?
Geographic		Non-geographic Dedicated ranges for VoIP?		Geographic		Non-geographic		VoIP provider entitled to Port IN (i.e. user wants to keep number when moving to VoIP provider)	VoIP provider required to Port OUT (i.e. user wants to keep number when moving AWAY from VoIP provider)	
Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP	Non-nomadic VoIP	Nomadic VoIP			
<p><b>Number portability – Change to direct routing</b></p> <p>On July 17, 2007 Ofcom published for <a href="#">consultation 'Arrangements for porting phone numbers when customers switch supplier'</a>. Ofcom proposed that:</p> <ul style="list-style-type: none"> <li>• Industry should establish a Central Database (CDB) in order to allow for direct routing of calls to fixed and mobile ported numbers; and</li> <li>• Mobile porting lead times should be reduced to a maximum period of two working days from March 31, 2008.</li> </ul> <p>Following on from the July consultation, on Nov. 29, 2007 Ofcom published a <a href="#">Statement on 'Telephone number portability for consumers switching suppliers'</a> concluding that:</p> <ul style="list-style-type: none"> <li>• UK industry must co-operate to develop a shared CDB which will hold details of all ported numbers and enable calls to ported numbers to be routed directly, without reliance on the customer's previous supplier. The CDB will hold both fixed and mobile numbers. Ofcom has powers to make directions about the nature of the CDB to ensure there's no deadlock in negotiations about establishing the CDB.</li> <li>• Communications providers must use all reasonable endeavours to establish a CDB ready to be populated with data, as soon as reasonably practicable and, in any event, no later than Dec. 31, 2008.</li> <li>• The CDB must be populated with all ported mobile numbers as soon as reasonably practicable and, in any event, no later than Sep. 1, 2009, and with all ported fixed numbers as soon as reasonably practicable and, in any event, no later than Dec. 31, 2012.</li> <li>• All mobile providers are required to directly route all calls to ported mobile numbers as soon as reasonably practicable and, in any event, no later than Sep. 1, 2009.</li> <li>• All other calls to ported numbers (fixed and mobile) must be directly routed as soon as reasonably practicable and, in any event, no later than Dec. 31, 2012.</li> <li>• All mobile providers must implement a recipient-led, near-instant (no more than 2 hours) process for porting mobile numbers by Sep. 1, 2009.</li> </ul>										

**Table 5 - Interconnection**

The table shows:

- Whether incumbent operators at present offer the possibility for IP-IP interconnection for VoIP calls or whether VoIP traffic must be converted via a gateway for traditional PSTN interconnection?
- Where IP interconnection is offered by incumbent operator, is it part of the regulated Reference Interconnection Offer, or has it been regulated in any other way?  
The European Regulators Group (ERG) [report on IP Interconnection \(ERG \(07\) 09\)](#) says that it is still early days and no cases yet where IP-IP interconnection for VoIP. However, the report gives information on future arrangements planned in some countries. For example, the Netherlands (page 17)  
“In NL, IP data interconnection will be available respectively in 4 / 200 / 1000 nodes, while voice interconnection between PSTN and VoIP (SS7 interconnection on Media Gateway) will only be provided at the 4 core nodes”
- Are there any requirements for a VoIP provider to have a switch in-country to offer VoIP services or to have a minimum number of Pols?
- How call termination rates for incoming calls on Alternative Network Operators' (ANOs) fixed networks are regulated, and whether regulated termination rates for ANOs differ depending on the number ranges (geographic or non-geographic) used?

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
AT	No	No VoIP providers who neither have a network in Austria nor offer a service in Austria do not have operator status and therefore cannot enforce interconnection with the incumbent. The minimum number of Pols is one. Annex 2 of the <a href="#">RIO</a> does not explicitly require that the Pol is in Austria, but if the distance between the Pol and TA's switch is larger than 10 km, the ANO must pay the joining link according to TA's wholesale leased lines <a href="#">offer</a> .	Yes The retail tariffs of some operators (in particular some mobile operators) have significantly higher prices for mobile calls to 0780 (sometimes also to 0720) than for calls to geographic numbers.	Yes Some operators charge cross-border calls to Austrian 0720 and 0780 number ranges with a higher retail charge, as if these numbers would be in mobile networks.	Yes, by dispute settlement decisions of TKK. Since the first interconnection decision in 1998, the termination rate of ANOs has always been set equal to Telekom Austria's single tandem termination rate (V3 regional).	Yes There are some exceptions (e.g. for calls to value added services or free phone services), but not for calls to the non-geographic number ranges 0720 and 0780, which are often used for VoIP services.

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
DK	No	No specific requirements for VoIP providers. TDC's RIO (Annex B) contains a minimum requirement of having at least one Pol in Denmark as a prerequisite for interconnection with the incumbent operator.	Yes The Danish national numbering plan is a closed non-geographic plan. All subscriber numbers consist of eight digits and contain no information about the geographic location of the subscriber.	Yes A requirement to ensure interoperability of publicly available electronic communications services throughout the EU and EEA is set out in Section 41 (2) of the <a href="#">Act on Competitive Conditions and Consumer Interests in the Telecommunications Market</a>	In its <a href="#">final decision</a> on M 9 adopted on Jan. 18, 2006 NITA designated TDC and five ANOs as having SMP. NITA concluded that the market power of the ANOs is considerably limited due to the countervailing buyer power of TDC (holding 90% of the cumulative fixed termination market). For this reason, NITA imposed asymmetrical SMP obligations: <ul style="list-style-type: none"> <li>TDC is subject to an extensive set of regulatory obligations, including cost orientation and price control based on (LRAIC)</li> <li>the five ANOs are only required to meet all reasonable requests for interconnection.</li> </ul> On July 28, 2005, when closing its investigation into NITA's notification of M 9 with <a href="#">comments</a> , the Commission expressed its concerns about asymmetrical application of remedies such as not imposing non-discrimination obligations on ANOs with SMP.	Yes (all numbers in Denmark non-geographic)

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
EE	<p>No</p> <p>The wording of ENCB's interconnection decisions (including the SMP obligations in M 9) do not address the type of interconnection.</p> <p>In practice, RIO of Elion (approved by ENCB) includes only PSTN-based interconnection.</p> <p>All VoIP traffic is always converted into PSTN (i.e. SS7).</p>	<p>Yes, through the definition of a fixed telephone service (i.e. PATS, see <a href="#">Table 2</a>) which requires switching and interconnection.</p>	Yes	Yes	<p>Yes, but no difference between VoIP and PSTN. ANOs are subject to the following regulatory obligations:</p> <ul style="list-style-type: none"> <li>• Non-discrimination</li> <li>• Transparency (at the request of either ENCB or interconnect operator, publication of information on network features, terms and prices)</li> <li>• Price regulation based on benchmarking: Average EU termination rate at single transit level according to the European Commission yearly implementation report</li> <li>• ANO may ask ENCB to authorise higher charges, if this can be justified with costs (based on fully distributed historic costs)</li> </ul> <p>ENCB <a href="#">Decision</a> of June 28, 2007 concluding the analysis of M 9.</p>	<p>Yes (all numbers in Estonia non-geographic).</p>

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
FR	No	<p>No direct legal requirement</p> <p>But having at least one Pol in France is a condition for being granted E.164 numbers by ARCEP. See for instance <a href="#">Decision 06-0509</a> defining the numbering categories in the national numbering plan.</p> <p>Further, call origination is not offered by FT at double transit level, but call termination is.</p>	<p>Yes France Telecom provides transit + termination of calls to non-geographic numbers used for VoIP (087, migrating to 09) terminating on ANOs' networks. See FT RIO 2007 <a href="#">Annex 3</a></p>	<p>Yes France Telecom provides transit + termination of calls to non-geographic numbers used for VoIP (087, migrating to 09) terminating on ANOs' networks. See FT RIO 2007 <a href="#">Annex 3</a></p>	<p>For the market analyses, ARCEP took the view that voice over broadband (VoB) also called managed voice, where the QoS is controlled by the provider of the broadband access, and which has a similar quality to traditional telephony is treated as voice telephony (so falls under market 1-6 and 8-10).</p> <p>On Sep. 28, 2005 ARCEP <a href="#">adopted</a> final decision on its analysis of M 9 for ANOs. ARCEP did not impose cost-orientation but imposed a prohibition on excessive termination charges.</p> <p>In May 2006 ARCEP <a href="#">ruled</a> on a dispute between FT/Neuf Télécom and set Neuf Telecom's termination charges for the period Jan. 2006 to Sep. 2008 based on FT's transit level termination charges with a three year lag (so for 2006 the basis is FT's 2003 charges) plus 10%</p> <p>Neuf Telecom's termination rate (for geographic numbers) is set from:</p> <ul style="list-style-type: none"> <li>Jan. 1 to Dec. 31, 2006: 1.110 eurocents/min</li> <li>Jan. 1 2007 to Sep. 1, 2008: 1.088 eurocents/min</li> </ul>	<p>No</p> <p>ANOs' termination rates for VoIP traffic to non-geographic numbers are lower than for voice calls to geographic numbers</p> <p>Annexe 17: Offre de transit commuté de France Télécom aux opérateurs (page 12) – not public – available from Cullen International.</p> <p>In practice, most VoIP services are associated with a ported geographic number usually from FT. Since France has implemented an onward routing solution rather than a centralised database for fixed number portability, the calling party network operator still pays the termination rate of the donor operator, which will be FT in most cases.</p>

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pops?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates													
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)												
					In practice, most other ANOs have set their termination rates following the rates set for Neuf in the FT/Neuf Télécom dispute with the exception of cable TV operators.													
DE	<p>No</p> <p>On Dec. 20, 2006 BNetzA published a report on IP interconnection.</p> <p>BNetzA set up a project group of high-ranking telecommunications experts in Aug. 2005 and asked it to develop a new interconnection regime for voice telephony in IP-based networks (NGN). BNetzA gave the group an advisory <a href="#">mandate</a> containing 12 rather detailed questions. On Dec. 20, 2006 BNetzA <a href="#">published</a> the group's <a href="#">final report</a> on 'framework conditions for interconnection of IP-based networks' for public consultation (see <a href="#">press release</a>).</p> <p>BNetzA also commissioned three <a href="#">studies</a> to support the work of the project group: A <a href="#">study</a> by Ingo Vogelsang, Boston University, on economic aspects of accounting systems and interconnection regimes; a <a href="#">study</a> by Scott Marcus, WIK-Consult, on a comparison of</p>	<p><b>Switch in country</b></p> <p>Although the <a href="#">RIO</a> does not explicitly exclude the possibility to interconnect if the switch is not located in Germany, several contact persons at DT and at one ANO said that they do not know an example where the switch would be outside the country. The Pop must be in Germany.</p> <p>DT offers two types of interconnection links, collocation and customer sited. Customer sited links have a maximum distance of 221 km.</p> <p><b>Minimum number of Pops</b></p> <p>See <a href="#">DT wholesale website</a> (select English &gt; Interconnection &gt; Interconnection Access &gt; Service network concept):</p> <ul style="list-style-type: none"> <li>“There is no prescribed minimum number of interconnection points (Pops), even if an interconnection partner intends to establish itself nationwide as an alternative network</li> </ul>	<p>Yes, from most networks</p> <p>Some operators charge significantly higher retail tariff to (0)32 numbers as they charge to geographic numbers, or do not include them in flat rate packages. See e.g. this <a href="#">table</a> in a VoIP user forum (last update in July 2007).</p> <p>Vodafone, the second largest MNO, did not offer calls to (0)32 before Oct. 2007 (Source: <a href="#">teltarif</a>).</p>	<p>Yes</p> <p>Reports from previous years show significant problems to call (0)32 numbers from abroad, but it seems that the numbers are now accessible from most countries.</p>	<p>Termination rates in Germany are not reciprocal. Termination charges of ANOs are 0.17 eurocents/min higher than corresponding charges into DT's network.</p> <p>BNetzA's last set of <a href="#">decisions</a> on ANOs' termination rates (May 31, 2006, valid from June 1, 2006 to Nov. 30, 2008, eurocents/min excl. VAT):</p> <table border="1"> <thead> <tr> <th></th> <th>peak</th> <th>off-peak</th> </tr> </thead> <tbody> <tr> <td>Tariff I</td> <td>0.69</td> <td>0.53</td> </tr> <tr> <td>Tariff II</td> <td>1.05</td> <td>0.76</td> </tr> <tr> <td>Tariff III</td> <td>1.53</td> <td>1.06</td> </tr> </tbody> </table> <p>Tariff I applies for local interconnection, tariff II for single tandem, and tariff III for double tandem. Note, that the detailed rules on routing, in the interconnection agreement contain some exceptions, e.g. DT only has to pay tariff I if it requested local interconnection for that area but ANO did not</p>		peak	off-peak	Tariff I	0.69	0.53	Tariff II	1.05	0.76	Tariff III	1.53	1.06	<p>Yes</p> <p>For ANOs there is no difference between termination rates for geographic numbers and (0)32 numbers.</p> <p>In DT's network, there is a differentiation between geographic and (0)32 numbers for each kind of traffic (origination, transit, termination).</p>
	peak	off-peak																
Tariff I	0.69	0.53																
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	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
	accounting systems and interconnection regimes in the US and the UK; and a <a href="#">study</a> by Klaus Hackbarth, Universidad de Cantabria, and Gabriele Kulenkampff, WIK-Consult, on technical aspects of interconnection in IP-based networks (extended <a href="#">executive summary</a> in English).	operator.” <ul style="list-style-type: none"> <li>“There is, however, an obligation to migrate to up to 23 Pols if the traffic out of one of the basic catchment areas assigned to these 23 interconnection areas and into one of these 23 basic catchment areas exceeds 48.8 Erlang.”</li> </ul>			interconnect.	
<b>IT</b>	No <i>AGCOM March 2006 decision on VoIP</i> Art. 8(6) of AGCOM <a href="#">Decision 11/06/CIR</a> of March 31, 2006 required that authorised providers of PATS (servizi telefonici accessibili al pubblico) and nomadic voice communications services (servizio di comunicazione vocale nomadico) must: <ul style="list-style-type: none"> <li>negotiate interconnection that is most efficient from the technology and economic points of view (para. 76 of <a href="#">annex A</a> clarified that this means direct IP interconnection between two VoIP providers)</li> <li>provide access to technical interfaces, protocols and other</li> </ul>	No explicit obligations in AGCOM decisions or Telecom Italia current reference offer.	Yes – nomadic voice communications services (servizio di comunicazione vocale nomadico) in 5X' non-geographic number range Art. 7(2)(c) of AGCOM <a href="#">Decision 11/06/CIR</a> .	Yes – nomadic voice communications services (servizio di comunicazione vocale nomadico) in 5X' non-geographic number range Art. 7(2)(c) of AGCOM <a href="#">Decision 11/06/CIR</a> .	In addition to TI, ANOs' termination rates regulated on the basis of 'delayed reciprocity'. <a href="#">AGCOM Decision 417/07/CONS</a> of June 28, 2006 concluding the analysis of M 8-10 included VoIP (that allows originating and receiving national and international calls using E.164 numbers from the national numbering plan, and which interconnects with PSTN (SS7)) in the definition of the interconnection markets. In M 9 (call termination): <ul style="list-style-type: none"> <li>in addition to Telecom Italia (TI), 11 ANOs were designated as having SMP</li> <li>AGCOM decided that ANOs should be allowed "fair and reasonable" ("equo e ragionevole")</li> </ul>	Yes AGCOM <a href="#">Decision 11/06/CIR</a> does not differentiate between the number ranges and the same termination rate applies, as stated in <a href="#">AGCOM Decision 417/07/CONS</a> .

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
	<p>technologies necessary for the interoperability of VoIP services</p> <ul style="list-style-type: none"> <li>where possible, use standard protocols as set out in art. 20 of the <a href="#">Electronic Communications Code</a>.</li> </ul> <p>Under art. 11 of the decision, on June 19, 2006 AGCOM <a href="#">launched</a> a fact-finding procedure in order to define the technical details implementing the above requirements. No follow-up published so far.</p> <p><i>AGCOM June 2006 decision concluding analysis of M 8-10</i></p> <p>Art. 14(3) of AGCOM <a href="#">Decision 417/06/CONS</a> of June 28, 2006 concluding the analysis of M 8-10 required TI to include in its reference offer IP interconnection with the nodes of its NGN backbone network. Pending an AGCOM decision on the implementation details (see above), such interconnection must be offered on same technical terms as used internally.</p> <p>Art. 14(4) adds that until an appropriate AGCOM decision defining the cost accounting principles, TI must offer packet switched origination and termination</p>				<p>termination charges. It set the maximum call termination charge of ANOs with a view to apply symmetrical charges between TI and ANOs within five years, as shown below. Taking into account the network topology of ANOs, the maximum call termination charge of 1.54 eurocents/min until June 30, 2007 was based on TI's single transit charge in its first RIO in 1998 when the market was liberalised. This charge was based on TI's costs and international benchmarking. AGCOM therefore noted that this charge entails notable economies of scale of TI, but that these can be compensated by lower running costs of ANOs (annex A, para. 624-625). ANOs' max. termination charges are:</p> <ul style="list-style-type: none"> <li>Until June 30, 2007: 1.54 eurocents/min</li> <li>July 1, 2007-June 30, 2008: 1.32 eurocents/min</li> <li>July 1, 2008-June</li> </ul>	

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
	services on same prices and at same interconnection levels as for PSTN.				<p>30, 2009: 1.11 eurocents/min</p> <ul style="list-style-type: none"> <li>July 1, 2009-June 30, 2010: 0.88 eurocents/min</li> <li>July 1, 2010-June 30, 2011: 0.69 eurocents/min</li> <li>July 1, 2011-June 30, 2012: 0.55 eurocents/min (same as TI, calculated based on the current price control on TI's call termination charges.)</li> </ul> <ul style="list-style-type: none"> <li>ANOs may ask AGCOM to authorise higher charges, if this can be justified with costs</li> <li>By Dec. 31, 2006 AGCOM would define the cost accounting model for the evaluation of the glide path (not yet published)</li> <li>By March 30, 2007 AGCOM would re-examine the proportionality of the imposed price caps (not yet published).</li> </ul>	

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
NL	No KPN's ' <a href="#">All-IP project</a> ', due to be completed by 2010, foresees IP data interconnection possible in 1000 nodes. Interconnection between voice on PSTN and VoIP will be available in four main core network nodes.	No	Yes	Yes	OPTA includes managed VoB (where QoS provided is similar to traditional fixed telephony) in M 9. ANOs are subject to a price control obligation: they cannot charge a higher termination tariff than KPN charged three years ago ('delayed reciprocity' based on KPN's single transit tariffs). OPTA's <a href="#">final decision</a> on M 9 of Dec. 21, 2005.	Yes Delayed reciprocity for both geographic and non-geographic numbers. Numbering ranges 085 and 091 were not yet introduced in the Dutch numbering plan at the time of the analysis.
PL	No	No	Yes	Yes	No Following analysis of M 9, UKE did not impose price control obligations on ANOs. The European Commission commented on the non imposition of price control obligation on alternative operators and asked UKE to monitor the evolution of ANOs' termination rates. See Commission's comments on <a href="#">Oct. 18, 2006</a> and <a href="#">June 11, 2007</a> .	Not applicable
ES	No	No	Yes Requirement to ensure interoperability and interconnection with PSTN telephony in order to get numbers for VoIP. <a href="#">CMT Decision of Dec. 21, 2005</a>	Yes	Only normal fixed geographic numbers are regulated (VoIP geographic (8XY) and VoIP non-geographic numbers (51) are not regulated). When analysing M 9 ( <a href="#">final decision</a> of March 8, 2006), CMT concluded that VoIP is not part of the product market due to lack of	Not applicable

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
					<p>substitutability with PSTN. CMT imposed on ANOs the obligation to provide 'reasonable' call termination charges, maximum 30% above Telefónica's rates for termination of calls to geographic numbers (PSTN only) at local interconnection level (for time-based interconnection).</p> <p>In a <a href="#">consultation document</a> on Next Generation Access networks of May 2007, CMT asks whether VoIP (with geographic numbers - 8XY) should be included in M 9.</p>	
<b>UK</b>	<p>No</p> <p>BT is in the <a href="#">process</a> of rolling out its 21st Century Network <a href="#">21CN</a>. This network will replace BT's current network <a href="#">architecture</a> by a simplified, IP based architecture, which will consist of approx. 5,500 <a href="#">multiservice access nodes</a> (MSANs, where the copper or fibre access lines will end) and approx. 100 <a href="#">metro nodes</a> which will provide IP routing. The future points of interconnection will be at the metro nodes (see <a href="#">FAQ NGN Interconnect</a>).</p> <p>BT's <a href="#">undertakings</a> contain provisions where BT committed to be transparent and to cooperate with the Network Interoperability</p>	No	<p>Yes</p> <p>Most non-geographic numbers available from most networks, though there are concerns that some network operators are slow to open new ranges and that some premium rate and other non-geographic numbers are not available from some networks (generally mobile networks). 056 numbers are accessible in practice.</p>	<p>Yes</p> <p>056 numbers are accessible in practice.</p> <p>All ECS/ECN providers required, "<i>where technically and economically feasible</i>", to ensure end users in any part of the EC outside of the UK are able to access non-geographic numbers, unless where subscriber has chosen for commercial reasons to limit such access. GC 20 implementing requirements of article 27 of the USD.</p> <p>Limited access to 08 and 09 numbers (both premium rate services) from abroad due to problems with scams and money-laundering.</p>	<p>Yes - Strict reciprocity with BT.</p> <p>Two reference charges, depending on whether the ANO is classified as "single-switched operator" or "multi-switched operator" (see below):</p> <ul style="list-style-type: none"> <li>• Single-switched operators can charge a weighted average of BT's local exchange rate and BT's single-tandem rate.</li> <li>• Multi-switched operators can charge a weighted average of BT's double tandem (short) rate and the rate of single-switched operators.</li> </ul>	<p>In principle, yes. The formulas do not refer to geographic or non-geographic numbers. However, it seems to be unclear if an ANO could gain "multi-switch operator" status, if a high percentage of calls to the ANO are addressed to non-geographic numbers. BT's <a href="#">Reciprocity Offer</a> expects that a multi-switched operator provides numbering information to BT, in order to enable BT handover at the switch next to the called party.</p> <p>NB. These arrangements don't apply to 08 and 09 numbers where BT is subject to an SMP obligation to originate calls on</p>

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
	<p>Consultative Committee (NICC) in the transition phase (see section 11), but the undertakings mostly cover access products (see sections 3.1.2, 5.7) and only partly interconnection. BT has published a transitional interconnection offer using a PSTN emulation charging model.</p> <p>Ofcom's <a href="#">market analysis</a> of M 8–10 covers all existing wholesale products, regardless whether they are provided over the old network or the 21CN, but do not cover new wholesale products like IP interconnection at the metro node.</p>					<p>regulated terms. Terminating operators purchase origination on regulated terms so there are no termination charges.</p>
<p><b>Market analysis</b></p> <p>As a result of finding each fixed operator to have SMP in M 9, Ofcom on Nov. 28, 2003 required all operators to provide network access on fair and reasonable terms. In addition, BT's call termination services are subject to an annual RPI - 5% charge control from Oct. 1, 2005 - Sep. 30, 2009 (Ofcom <a href="#">revised</a> the previous cap RPI - 10% on Aug. 18, 2005), and they must be cost oriented on the basis of forward looking LRIC. Ofcom considers that the reciprocal charging arrangement, where ANOs' fixed call termination charges are based on BT's equivalent regulated charges, addresses the potential harmful effects of their SMP in fixed call termination markets. See Ofcom's final <a href="#">decision</a> on M 9, section 4.14.</p> <p><b>Dispute settlement decision</b></p> <p>On June 16, 2006 Ofcom published a <a href="#">decision</a> resolving a dispute between cable operator Telewest (now Virgin Media) and BT regarding charges payable by BT to Telewest for fixed geographic call termination. Telewest had disputed the formula for calculating single-switched traffic rates. Ofcom rejected Telewest's proposal for charges and accepted BT's.</p> <p><b>Background</b></p> <p>ANOs must make an agreement with BT to set their charges for fixed geographic call termination services based on BT's charges. Under BT's <a href="#">Reciprocity Offer</a> of Oct. 1, 2005, BT pays ANOs a charge based on call termination on its own network, taking into account differences between BT's and the ANO's networks. The Reciprocity Offer distinguishes between:</p> <ul style="list-style-type: none"> <li>• single-switched calls = calls handed over from BT to the ANO's local exchange switch and thereafter terminated by the ANO to on an end-user's network termination point connected directly to this switch; and</li> <li>• multi-switched calls = calls handed over from BT to the ANO and thereafter switched by one or more ANO's tandem switches, before being switched by the ANO's local exchange switch and terminated to an end-user's network termination point.</li> </ul> <p>ANOs with more than a 10% proportion of multi-switched calls can apply to BT for "multi-switch-operator" status. The ANO's termination charge is in all cases a weighted average of BT's termination charges, but the exact calculation depends on ANO's status:</p>						

	Regulated IP-IP interconnection offer for VoIP calls from incumbent?	Requirements for VoIP provider to have switch in-country or minimum number of Pols?	Non-geographic numbers accessible when calling from:		ANOs' fixed call termination rates	
			Different network operator within same Member State	Another Member State (cross-border call)	Regulated?	If regulated, does same termination rate apply for all number ranges? (geographic and non-geographic numbers)
	<ul style="list-style-type: none"> <li>Single-switched operators receive termination payments for all calls received based on the single-switched call charge ("Rate A"). The single-switched call charge is a weighted average of BT's single tandem call termination and local exchange call termination charges, where the weights reflect the mix of geographic call termination traffic sent from the ANO to the relevant BT tandem and local exchange switches and also take account of any relevant local exchange Carrier Pre-Select (CPS) traffic the ANO receives from BT.</li> <li>Multi-switched operators receive the higher multi-switched call charge ("Rate B"), which is a weighted average of the single-switched call charge and the BT double tandem (short) rate, where the weights reflect the proportion of traffic sent from BT to the ANO's network that is multi-switched or single-switched.</li> </ul> <p>Both the single-switched call charge and the multi-switched call charge are calculated separately for peak, evening and weekend tariffs.</p>					

**Table 6 - Codes of practice and future legislation**

The table below shows if there are any:

- codes of practice or guidelines related to marketing VoIP services in force? Are they focussed specifically on residential and SME customers, or applicable also to large business customers?
- If no codes of practice or guidelines specific to VoIP, are there any codes of practice or guidelines related to marketing of voice telephony services in general that would be relevant?
- pending or future national legislation or regulation specific to VoIP services planned?

	<b>Codes of practice on marketing VoIP services?</b>	<b>Codes of practice on marketing voice telephony services in general?</b>	<b>Future legislation or regulation on VoIP?</b>
<b>AT</b>	No	No	<p>No published plans for future legislation.</p> <p>On June 18, 2007 RTR published for public consultation <a href="#">four documents</a> on the future of regulation.</p> <p>On Oct. 16, 2007 RTR <a href="#">presented</a> the results of the consultation and a tentative work programme for 2008. These documents have a strong focus on NGN, but more on the issues of next generation access and investments than on the issue of IP interconnection. Bill &amp; Keep will be subject of discussion within the next months, but primarily in the context of mobile termination and not yet in the context of NGN.</p> <p>In 2008, RTR will publicly discuss the usage conditions for geographic numbers. Depending on the results of this discussion, the conditions could be changed.</p>
<b>DK</b>	<p>No</p> <p>NITA published on its website guidelines for VoIP users in connection with access to public emergency services (112). In particular, NITA addressed:</p> <ul style="list-style-type: none"> <li>• access to 112 emergency services and the fact that not all IP-telephony providers are subject to this obligation</li> <li>• limitations to availability of end user location information in case of nomadic VoIP services and that the end users need to inform the emergency services about their location.</li> </ul>	No	<p>No published plans for future legislation on VoIP.</p> <p>Between Oct. 9 and Nov. 7, 2007 NITA <a href="#">consulted</a> on legislative proposals for amendments to the <a href="#">Act on Competitive Conditions and Consumer Interests in the Telecommunications Market</a> and a new draft Executive order on requirements for providers of electronic communications networks and services in connection with the planning and the necessary measures to safeguard vital electronic communications in emergency situations and other extraordinary situations.</p> <p>The new legislation is expected to enter in force on June 1, 2008.</p>
<b>EE</b>	No	No	No
<b>FR</b>	No	No	No published plans for future legislation.
<b>DE</b>	No	No	<p>No published plans for future legislation.</p> <p>Future regulation: On Dec. 20, 2006 the project group "Framework Conditions for the Interconnection of IP-Based Networks" published its <a href="#">final report</a>. See also the additional information on BNetzA's <a href="#">website</a> (in particular the studies commissioned by BNetzA). See <a href="#">Table 5</a>.</p>

	Codes of practice on marketing VoIP services?	Codes of practice on marketing voice telephony services in general?	Future legislation or regulation on VoIP?
<b>IT</b>	No	No But several AGCOM decisions on tariff and billing transparency: <a href="#">Decision 96/07/CONS</a> of Feb. 22, 2007 <a href="#">Decision 126/07/CONS</a> of March 22, 2007. See also <a href="#">AGCOM website</a> that provides links to operators' offers.	No published plans for future legislation.
<b>NL</b>	No	No	Possible future regulation will be decided on in the next market analysis.
<b>PL</b>	No	No	On 3 July 2007, the Council of Ministers adopted a draft act amending Telecommunications Law and some other acts. The amendments aim at, among others, introducing new pro-consumer regulations. This could have an impact on VoIP providers. The regulator, UKE, is in the process of revising its national numbering plan. The President of UKE considers that the definition of geographic numbers should be modified. The revision of the numbering plan should enter into force in the second half of 2008.
<b>ES</b>	No	No	CMT to amend number portability rules to allow NP between VoIP providers. Timing not known.
<b>UK</b>	Yes Ofcom <a href="#">Statement on 'Regulation of VoIP services'</a> of March 29, 2007 adopted a mandatory Code of Practice on the provision of consumer information by all PECS offering VoIP services to residential and small business customers, at both fixed and nomadic locations. The deadline for compliance with the Code was May 29, 2007. See <a href="#">Table 3</a> (fourth column).	Specific Code of Practice for VoIP, see left column	Yes Ofcom <a href="#">Statement on 'Regulation of VoIP services: Access to the Emergency Services'</a> of Dec. 5, 2007 introduces a modification to General Condition 4 that will enter into force on Sep. 8, 2008. From that date, all PECS that allow users to make outgoing calls to normal national telephone numbers (Type 2 and 4 VoIP services), excluding "Click to Call" and international-only services, will be required to allow users to access 999/112 emergency services free of charge, and to provide caller location information to the emergency organisations handling those calls to the extent technically feasible.