



Regulation of VoIP Services: Access to the Emergency Services

Statement and publication of a statutory notification
under section 48(1) of the Communications Act 2003
modifying General Condition 4

Statement

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Contents

Section		Page
1	Executive Summary	1
2	Introduction	7
3	Background	8
4	Policy decision	18
5	Mandating access to the Emergency Services	47
6	Summary of the Impact Assessment	66
7	Modifying General Condition 4: Emergency Call Numbers	72
8	Next Steps	75
Annex		Page
1	Modification to General Condition 4	79
2	Modification to General Condition 4 of the General Conditions of Entitlement	80
3	Responses Received	82
4	Glossary	84

Section 1

Executive Summary

Introduction

- 1.1 Ofcom is the independent regulator of television, radio, telecommunications and wireless communications services in the UK. This Statement sets out our approach to regulating access to the emergency services from Voice over Internet Protocol services (VoIP services). It follows the July 2007 Consultation *Regulation of VoIP Services: Access to the Emergency Services*.
- 1.2 In that Consultation, Ofcom identified a high level of consumer and citizen confusion about access to the emergency services from VoIP services. That confusion means there is a risk of someone trying to make an emergency call from a service that does not provide access. Although most users can reach for another phone to make emergency calls, a delay of seconds can result in increased harm. Given this risk, and the recent rapid growth in the use of VoIP services, we consider it's time to act.
- 1.3 Ofcom has therefore decided to require certain categories of VoIP service to provide access to the emergency services, broadly in accordance with the proposals set out in the Consultation. Our decision aims to avoid the risk of delays in contacting the emergency services by regulating VoIP services that consumers and citizens may try to use to call the emergency services.
- 1.4 The new requirement will enter into force on **8 September 2008**.
- 1.5 This Statement sets out a summary of significant responses to the Consultation, Ofcom's view of those responses, and Ofcom's regulatory decision.
- 1.6 This Statement is primarily aimed at providers of VoIP services that allow users to call normal fixed or mobile phone numbers; consumers of VoIP services and other citizens; the emergency services and Government departments concerned with public safety, crime prevention and detection.
- 1.7 This Statement is also relevant to access to the emergency services over Next Generation Access (NGA) networks because they are likely to replace PSTN voice call services with VoIP. Ofcom published a consultation on *Future broadband - Policy approach to next generation access* on 26 October 2007 and proposed to carry out a specific consultation on NGA in new build developments around the end of 2007¹.

VoIP voice call services

- 1.8 Traditional phone services have existed for over 100 years. Voice services using VoIP are changing the way voice services are delivered. These services normally use VoIP technology to provide voice calls using fixed or wireless broadband connected to PC with a handset or headset, a Personal Digital Assistant (PDA, a handheld computer), a mobile phone handset or a fixed phone handset with an analogue telephone adapter (ATA) or router. VoIP services can benefit customers by reducing the cost of existing services, providing new services and increasing competition in telephony and broadband. Ofcom aims to ensure that, as voice call services evolve, consumers and citizens are protected.

¹ See <http://www.ofcom.org.uk/consult/condocs/nga/>

Calling the emergency services

- 1.9 One of the most important features of traditional phone services is that they enable users to call the emergency services. The UK's 999 emergency call service from fixed phones, the first of its kind in the world, was launched in 1937 and extended to all major towns and cities by 1948. The 999 service was introduced for mobile phone users in 1986. In 1991, the European Union established a single emergency call number, 112, which can be used anywhere in the European Union to call the emergency services (so in the UK the emergency services can be reached on 999 and 112)². BT currently handles around 30 million emergency calls a year from fixed and mobile phones.

The regulatory and policy background

- 1.10 General Condition 4 requires PATS³ providers to ensure that any end-user can access the emergency services by calling 999 and 112 at no charge and, to the extent technically feasible, make caller location information available to the emergency organisations handling those calls.
- 1.11 All fixed and mobile PSTN services allow users to access the emergency services. Some VoIP services allow users to do so but others do not. VoIP has introduced one-way services that allow users to make calls to traditional fixed or mobile phones but not to receive calls (called type 2 VoIP services); they aren't caught by the definition of PATS or General Condition 4. Regarding VoIP services that allow users to make calls to and receive calls from traditional fixed or mobile phones (called type 4 services), the Universal Service Directive 2002/22/EC provided a definition of PATS that included "access to the emergency services", creating circularity; PATS services must allow access to the emergency services, but allowing access to the emergency services is part of the PATS definition.
- 1.12 Ofcom is concerned that consumers and citizens are confused about whether they can call 999 / 112 from VoIP services. That could cause delays in contacting the emergency services, which could result in increased harm.
- 1.13 Ofcom has run three consultations on regulating VoIP services: *New Voice Services: a Consultation and Interim Guidance*, 6 October 2004⁴ (the 2004 Consultation); *Regulation of VoIP Services*, 22 February 2006⁵ (the 2006 Consultation), followed by a *Statement on the Regulation of VoIP Services*, 29 March 2007⁶ (the March 2007

² Council Decision of 29 July 1991 (91/396/EEC) and Directive 2002/22/EC (Universal Services Directive) of 7 March 2002. EU member states are required to ensure all end-users of publicly available telephony services (PATS, see footnote 11) and public pay phones are able to call the emergency services free of charge using 112, in addition to any national emergency call numbers.

³ In summary, PATS are defined as (i) a service available to the public (i.e. a PECS) (ii) for making and receiving national and international calls and (iii) accessing emergency services (iv) through a national or international phone number on a numbering plan. Those four points are known as the "gating criteria" for the PATS definition. For the full definition, see Article 2(c) of the Universal Services Directive (2002/20/EC) and Ofcom General Conditions (Schedule to the Notification under Section 48(1) of the Communications Act 2003) Part 1 para.1 and GC 18.

⁴ http://www.ofcom.org.uk/consult/condocs/new_voice/anew_voice/

⁵ <http://www.ofcom.org.uk/consult/condocs/voipregulation/>

⁶ *Statement on the Regulation of VoIP Services*, Ofcom, 29 March 2007

<http://www.ofcom.org.uk/consult/condocs/voipregulation/voipstatement/voipstatement.pdf>

Statement); and *Regulation of VoIP Services: Access to Emergency Services*, 26 July 2007 (the July 2007 Consultation)⁷, followed by this Statement.

- 1.14 Regarding the ability to call 999 / 112 from VoIP services, in the 2004 Consultation Ofcom set out the policy aim of ensuring consumers are properly informed and protected about 999 / 112 access. In the 2006 Consultation, Ofcom added the objective of ensuring the maximum availability of high quality 999 / 112 access as voice call services and technology change.
- 1.15 To meet those aims, Ofcom mandated compliance with a Code of Practice⁸ drafted by an industry-Ofcom working group requiring VoIP providers to give their domestic and small business customers information about differences between VoIP services and traditional fixed and mobile phone services. VoIP providers also had to provide labels on-screen or for equipment and an automated message indicating if users could not call 999 / 112.
- 1.16 Additionally, Ofcom provided Guidelines⁹ to help VoIP providers to comply with requirements about the reliability of calls to 999 / 112 and providing caller location information for use by the emergency services.
- 1.17 Finally, Ofcom clarified a requirement¹⁰ that defines the types of voice call provider that are entitled to number portability, which enables consumers to keep their phone number when they change provider. We noted the clarification might act as an incentive for providers to offer 999 / 112 access, in order to secure the benefits of number portability, but might not lead to all providers offering 999 / 112 access.

The policy challenge

- 1.18 In its March 2007 Statement, Ofcom decided to review its approach to ensuring maximum availability of 999 / 112 access. That was because:
 - since the 2006 consultation, there had been a rapid increase in the use of VoIP services: an estimated 10% of UK households used VoIP in the last quarter of 2006, compared to 5% in the last quarter of 2005¹¹;
 - significant developments in VoIP services and technology meant they were more likely to “look and feel” like traditional fixed and mobile phone services and to replace those services for the mass market in the future;
 - there was under provision of VoIP services that allowed 999 / 112 calls: in a survey of VoIP users conducted for Ofcom in October 2006 (the October 2006 research) 64% were with a provider that did not offer 999 or 112 access¹²;
 - a significant proportion of VoIP users were confused about whether they could call the emergency services from their service or not: in October 2006 research,

⁷ <http://www.ofcom.org.uk/consult/condocs/voip/voip.pdf>

⁸ *Code on the provision by Service Providers of consumer information to Domestic and Small Business Customers for the provision of Services*, which entered into force on 29 May 2007.

⁹ *Guidelines on the application of PATS obligations to VoIP service providers*, which entered into force on 29 March 2007.

¹⁰ General Condition 18.

¹¹ Source: *Ofcom communications tracking survey Q.4 2006*.

¹² More information about the results of the quarterly Ofcom communications tracking survey for Q.4 2006 and the October 2006 research are available in the *Ofcom Research Report: Voice over Internet Protocol (VoIP)*, www.ofcom.org.uk.

78% of UK households surveyed were not with a VoIP service that provided emergency services access but thought that they could access it or didn't know;

- responses to the 2006 Consultation from the emergency services, Government, the Royal National Institute of Blind People (RNIB) and the Royal National Institute for Deaf People (RNID) expressed similar concerns to Ofcom.

1.19 Therefore, Ofcom undertook to consult further in summer 2007 on 999 / 112 access over VoIP and in particular on whether, and if so how, certain VoIP services should be required to offer 999 / 112 access. The July 2007 Consultation met that commitment. In assessing the need to require 999 / 112 access, Ofcom said it would carefully consider the possible impact on competition and on market entry and innovation by VoIP providers.

The July 2007 Consultation: policy objectives and options

1.20 The key policy objective of the July 2007 Consultation was to ensure a high level of access to the 999 / 112 emergency call service. We considered two policy options:

- Option 1: do not require VoIP services to allow 999 / 112 calls; and
- Option 2: require all VoIP services that allow users to make calls to traditional fixed or mobile phones (type 2 VoIP services), or to make calls to and receive calls from traditional fixed or mobile phones (type 4 services), to allow users to call 999 / 112. Ofcom considered the users of those services were likely to expect to be able to call 999 / 112.

1.21 To implement Option 2, Ofcom proposed extending the scope of General Condition 4 from PATS to all PECS¹³ that allow users to make calls to traditional fixed and mobile phones using national and international numbers. That would cover type 2 and type 4 VoIP services.

1.22 In the Consultation, Ofcom recommended implementing Option 2. In addition to the reasons set out in the March 2007 Statement, research suggested that customer information was unlikely to be enough to tackle under provision or consumer and citizen confusion; Ofcom's Impact Assessment of the potential costs and benefits of Option 2 estimated there would be significant benefits for consumers and citizens, which would exceed the costs of compliance for the VoIP providers concerned and competition and innovation would not be significantly affected.

This Statement

1.23 In this Statement, Ofcom summarises significant responses to the July 2007 Consultation, provides its views on those responses and sets out its decision to adopt policy Option 2.

1.24 We have refined the drafting of the modification to General Condition 4 implementing Option 2 since the July 2007 Consultation to more accurately reflect the policy intention behind the requirement.

¹³ Public Electronic Communications Service: a service that uses a network and any associated apparatus, software or stored data to transmit signals, excluding content services, and that is available to the public. Section 32 Communications Act 2003 and Art. 2 Framework Directive 2002/21/EC.

- 1.25 Firstly, we have excluded “Click to Call” services. They are a form of VoIP service that may be selected on a web-site or other application by a user and connect the user only to a number or a limited set of numbers pre-selected by the provider or a user.
- 1.26 Secondly, the requirement now relates to services that allow calls to national numbers (and not national **and** international numbers). That means it covers services that allow calls to national or to national and international numbers, to ensure that services that allow calls to national numbers only are caught by the requirement and to exclude services that allow calls to international numbers only.
- 1.27 We have excluded “Click to Call” and international-only services because we consider consumers and citizens are not at material risk of confusion about whether they provide 999 / 112 access.
- 1.28 The modification to General Condition 4 will enter into force on **8 September 2008**, meaning that there is a 9-month period in which to comply.

Complying with the requirement to provide 999 / 112 access

- 1.29 Under the modification to GC 4, all type 2 and type 4 VoIP services, except “Click to Call” services, that allow users to make calls to national numbers, must provide 999 / 112 access at no charge¹⁴.
- 1.30 By 8 September 2008, affected providers that do not currently provide 999 / 112 access must do so and meet requirements on providing caller location information to the emergency organisations handling the calls.
- 1.31 Providers should take into account the Guidelines explaining how VoIP providers should provide caller location information and how they should take steps to maintain a reliable service. This Statement provides further information on following the Guidelines in Section 5.
- 1.32 Additionally, providers should comply with the Code of Practice on how VoIP providers should inform domestic and small business customers about their 999 / 112 service and any limitations. We will update the Code of Practice to coincide with the deadline for providing 999 / 112 access.
- 1.33 Type 4 providers are likely to meet the definition of PATS as a result of providing 999 / 112 access. They must also comply with other obligations on network integrity; emergency planning; operator access and directories; publishing prices, tariffs and terms and conditions; billing accuracy; itemised billing; non-payment of bills; special measures for end-users with disabilities.
- 1.34 Ofcom will enforce and review its policy to ensure VoIP providers are compliant and to see if its regulations need to be adapted.

Structure of this Statement

- 1.35 In this Statement, a summary of the significant responses to the July 2007 Consultation and Ofcom’s views on those are included within the relevant sections.

¹⁴ See Annex 1 for the full modification to GC 4.

- 1.36 Section 3 provides an overview of VoIP services and the growth of VoIP service provision and take-up. It also sets out the regulatory framework and policy background to this Statement. Section 4 summarises Ofcom's policy objectives, sets out the two policy options for meeting those objectives considered in the July 2007 Consultation and explains Ofcom's reasoning for refining and adopting one of those Options. Section 5 considers some of the practicalities for VoIP providers when complying with the new policy, including information on following the Guidelines and the Code of Practice. Section 6 provides a summary of Ofcom's Impact Assessment, which estimated the costs and benefits of Ofcom's policy proposals. Section 7 and Annex 1 describe the modification that Ofcom has made to its requirements in order to implement policy Option 2. Section 8 describes the next steps after this Statement, including the deadline for compliance and Ofcom's planned approach to monitoring, review and enforcement. There is a Glossary in Annex 3.

Section 2

Introduction

- 2.1 The 26 July 2007 Consultation *Regulation of VoIP Services: Access to the Emergency Services* (the July 2007 Consultation) identified a risk that citizens and consumers are confused about 999 / 112 access over VoIP, which may cause delays in contacting the emergency services and increased harm or loss of life. All traditional fixed and mobile services provide access to the emergency services. Some VoIP services do; others do not.
- 2.2 The July 2007 Consultation contained two proposals for regulating access to the emergency services over VoIP:
- Option 1: do not require VoIP services to allow 999 / 112¹⁵ calls; and
 - Option 2: require all VoIP services that allow users to make calls out to traditional fixed phones or mobile phones (called type 2 VoIP services), or to and from traditional fixed phones or mobile phones (called type 4 VoIP services), to allow users to call 999 / 112.
- 2.3 This Statement sets out a summary of significant responses to the July 2007 Consultation, Ofcom's view of those responses, and Ofcom's regulatory decision to implement Option 2, with modifications made in light of its evaluation of the responses.
- 2.4 Our decision to adopt a modified version of Option 2 is consistent with our principal duty¹⁶ to further the interests of citizens and consumers because it is likely to reduce the risk of confusion about 999 / 112 access over VoIP and delays in contacting the emergency services. The Impact Assessment in the July 2007 Consultation estimated that the benefits of Option 2 for citizens and consumers would significantly outweigh compliance costs for industry, and competition and innovation would not be significantly affected. The modification will enter into force on **8 September 2008**.
- 2.5 This Statement is primarily aimed at providers of VoIP services that allow users to call normal fixed or mobile phone numbers; consumers of VoIP services and other citizens; the emergency services and Government departments concerned with public safety, crime prevention and detection.
- 2.6 It is also relevant to access to the emergency services over Next Generation Access (NGA) networks because they are likely to replace PSTN voice call services with VoIP. Ofcom published a consultation on *Future broadband - Policy approach to next generation access* on 26 October 2007 and proposed to carry out a specific consultation on NGA in new build developments around the end of 2007¹⁷.

¹⁵ 112 is the single European emergency call number established by Council Decision of 29 July 1991 (91/396/EEC) and Directive 2002/22/EC (Universal Services Directive) of 7 March 2002. EU member states are required to ensure all end-users of PATS and public pay phones are able to call the emergency services free of charge using 112, in addition to any national emergency call numbers.

¹⁶ Communications Act 2003, Chapter 21, Part 1, Art. 3.

¹⁷ See <http://www.ofcom.org.uk/consult/condocs/nga/>

Section 3

Background

Introduction

- 3.1 This section provides an overview of VoIP services and the growth of VoIP service provision and take-up. It also sets out the regulatory framework and policy background to the consultation *Regulation of VoIP Services: Access to the Emergency Services*, 26 July 2007¹⁸, including *New Voice Services: a Consultation and Interim Guidance*, 6 October 2004¹⁹ (the 2004 Consultation) and *Regulation of VoIP Services*, 22 February 2006²⁰ (the 2006 Consultation) followed by a regulatory *Statement on the Regulation of VoIP Services*, 29 March 2007²¹ (the March 2007 Statement).
- 3.2 In line with Ofcom's policy objective of ensuring a high level of access to the emergency services (999 / 112 access²²), the March 2007 Statement included a commitment to consult in summer 2007 on whether we should require certain VoIP services to provide 999 / 112 access. In assessing the need for that requirement, we undertook to carefully consider the possible impact on competition and on market entry and innovation by VoIP providers. The July 2007 Consultation met that commitment.
- 3.3 This Statement summarises significant responses to the July 2007 Consultation, sets out Ofcom's view of those responses and explains its regulatory decision to implement Option 2, with modifications made in light of its evaluation of the responses.

What are VoIP Services?

- 3.4 VoIP services enable voice, data and multimedia services to be provided over a broadband Internet connection. The July 2007 Consultation and this Statement focus on the provision of voice call services, which is the feature common to all types of VoIP services.
- 3.5 The July 2007 Consultation referred to four main types of VoIP voice call service, as broadly defined by the European Regulators' Group (ERG):
- 3.5.1 Type 1: peer-to-peer services to make and receive voice calls over the Internet only, usually within the same application community;
 - 3.5.2 Type 2: VoIP Out services to make voice calls over the Internet to the PSTN (Public Switched Telephony Network, the standard public phone network), but not to receive calls from the PSTN;

¹⁸ <http://www.ofcom.org.uk/consult/condocs/voip/>

¹⁹ http://www.ofcom.org.uk/consult/condocs/new_voice/aneu_voice/

²⁰ <http://www.ofcom.org.uk/consult/condocs/voipregulation/>

²¹ *Statement on the Regulation of VoIP Services*, Ofcom, 29 March 2007

<http://www.ofcom.org.uk/consult/condocs/voipregulation/voipstatement/voipstatement.pdf>

²² See note 12.

- 3.5.3 Type 3: VoIP In services to receive voice calls over the Internet from the PSTN, but not to make calls to the PSTN. Customers can be allocated an ordinary geographic number or a VoIP number (056); and
- 3.5.4 Type 4: VoIP In and Out services to receive voice calls over the Internet from the PSTN and to make voice calls over the Internet to the PSTN. Customers can be allocated an ordinary geographic number or a VoIP number (056).
- 3.6 A VoIP service can be fixed, i.e. for use at a single fixed location like the home. Or it can be for use at different fixed locations, e.g. at home, at the office and at a hotel, which is known as a nomadic service. In these cases, the broadband is connected to a personal computer (PC) that has VoIP software and a headset or an IP phone handset or to an adapter or “VoIP router” and a traditional phone handset. For the purposes of illustration, Figure 1 shows how VoIP services work from a PC or a standard phone handset out to and/or in from the PSTN.

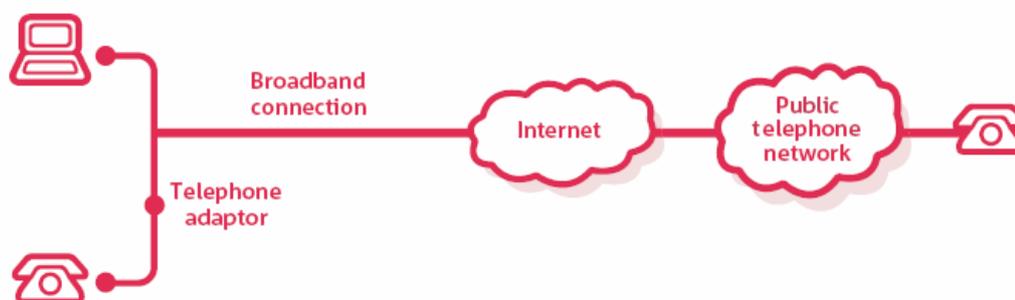


Figure 1: VoIP service from a PC or standard fixed phone out to and/or in from the PSTN.

Also, a VoIP service can be for use on the move using wireless broadband (WiMAX or Wi-Fi). VoIP can, therefore, be a mobile service, sometimes known as Voice over Wireless (VoWLAN). The broadband is connected to a wireless laptop PC, PDA, a 3G mobile phone or a dedicated VoWLAN phone, which has VoIP software.

- 3.7 Generally, where the broadband connection is connected to a PC (desktop, laptop or PDA) the service is known as PC-based VoIP. Where the broadband is connected to a phone handset (fixed or mobile) the service is known as phone-based VoIP.

Growth of VoIP service provision

- 3.8 Over the last five years, VoIP services have had an increasing impact on the UK communications market. They can deliver significant consumer benefits: offering new and innovative services like video calling, conference calling and computer file transfer, in addition to traditional services like call waiting, voice mail, call forwarding and call barring or fax; reducing network costs and user prices and introducing new pricing structures; enhancing competition in broadband and telephony.
- 3.9 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. VoIP is

marketed as a stand-alone service (Internet-based VoIP) or bundled with Internet access (on-net VoIP).

- 3.10 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.²³
- 3.11 As the type and number of VoIP providers and service or equipment propositions has grown so has consumer awareness and take-up.
- 3.12 According to Ofcom's quarterly communications tracking survey, in Q4 2006, 60% of UK adults were aware of VoIP services, up from 49% in the same period of the previous year. As would be expected, awareness of VoIP in Q4 2006 was significantly higher among those who had Internet (74%) or broadband (77%) at home.
- 3.13 In an Ofcom survey of VoIP users in October 2006 (the October 2006 research), respondents most commonly claimed they had a type 1 service to call users with the same provider (86%); 40% claimed they had type 4; 25% claimed they had type 2; 3% claimed they had type 3. Almost a quarter (23%) said they used more than one provider; the figures suggest consumers were using different types of VoIP in combination.
- 3.14 In the October 2006 research, seven out of ten users said they used VoIP at least once a week and 14% claimed to use it daily. According to the communications tracking survey, in Q4 2006 an estimated 10% of UK households (2.4 million) used VoIP products, a significant increase from 5% of UK households in Q4 2005.
- 3.15 More information about the results of the communications tracking survey for Q.4 2006 and the October 2006 research are available in the *Ofcom Research Report: Voice over Internet Protocol (VoIP)*²⁴.
- 3.16 Ofcom considers that, to benefit industry, consumers and citizens, regulation should not prevent VoIP service innovation or development and should enable competition with older services to occur on a level playing field and ensure that consumer protection measures keep pace with technology.

Regulatory Framework and Policy Background: Overview

- 3.17 In 1998, telecommunications were liberalised in principle in all Member States of the European Union (EU). In response to the convergence of telecommunications, information technology and the media and the growth of the Internet, in 2002 the European Parliament and the Council of Ministers adopted five Directives (the EC Communications Directives)²⁵, which set out a common regulatory framework for

²³ For example, see *US Broadband Telephony Forecast, 2007 to 2012: Cable MSOs assert their dominance in the VoIP market*, JupiterResearch, 2007.

²⁴ The report draws on three pieces of quantitative research among UK consumers commissioned by Ofcom: Ofcom's communications tracking survey of c.2,200 UK adults per quarter; a face-to-face survey of UK adults conducted in May 2006 to gain a better view of VoIP take-up; an online survey of 500 VoIP users in October 2006 to gain a better understanding of consumer usage. See www.ofcom.org.uk

²⁵ Directive on a common regulatory framework (2002/21/EC); Directive on access and interconnection (2002/19/EC); Directive on the authorisation of electronic communications networks

Electronic Communications Networks (ECN), Electronic Communications Services (ECS) and associated facilities in the EU. The common framework is intended to encourage competition, improve the functioning of the internal market and guarantee the availability of a basic set of ECS that might not be guaranteed by market forces (universal service). The Communications Act 2003 (the Act) implemented a significant proportion of the EC Communications Directives in the UK²⁶. The Directives entered into force on 24 April 2004.

- 3.18 In summary, the Directives and the Act define an ECN as a network used to transmit signals and any associated apparatus, software or stored data²⁷ and an ECS as a service that uses an ECN to send signals, excluding content services (e.g. the provision of information or entertainment)²⁸. They set out sub-categories of ECS: Public Electronic Communications Services (PECS), which are ECS that are available to members of the public²⁹ and, in turn, a sub-category of PECS: Publicly Available Telephone Services (PATS). PATS are defined as (i) a service available to the public (i.e. a PECS) (ii) for making and receiving national and international calls and (iii) accessing emergency services (iv) through a national or international phone number on a national or international numbering plan³⁰. Those four points are known as the “gating criteria” for the PATS definition.
- 3.19 Depending on their individual characteristics, Ofcom considers type 1 VoIP services are unlikely to constitute an ECS. Type 2 and type 3 VoIP services are likely to be regarded as PECS³¹. Type 4 VoIP services are likely to be PECS or, if they meet the PATS gating criteria, PATS.
- 3.20 The common regulatory framework abolished the requirement for those intending to provide an ECN, ECS or associated facilities to obtain permission or a licence from the National Regulatory Authority before entering the market. Today, persons are automatically entitled (or generally authorised) to provide them. As a result, in the UK the licensing regime under the Telecommunications Act 1984 was replaced with a General Authorisation Regime. Under general authorisation, VoIP and other telephony providers that enter the market must comply with certain regulatory conditions (known as conditions of entitlement or general conditions [GCs])³² set by Ofcom. Some GCs apply to all ECS providers; others apply to a sub-category only, e.g. PATS providers.
- 3.21 Importantly, it is the provider’s responsibility to determine if it must comply with a particular GC. Ofcom does not send individual notifications that certain conditions apply. Failure to comply is subject to enforcement by Ofcom under procedures established in the Act.

and services (2002/20/EC); Directive on universal service and users’ rights (2002/20/EC); Directive on Privacy and Electronic Communications (2002/58/EC).

²⁶ The remainder is implemented by secondary legislation or administrative action.

²⁷ See Section 32(1) of the Act and Article 2(a) of the Framework Directive (2002/21/EC).

²⁸ See Section 32(2) of the Act and Article 2(c) of the Framework Directive (2002/21/EC).

²⁹ See Section 151 of the Act.

³⁰ For the full definition, see Article 2(c) of the Universal Services Directive (2002/20/EC) and Ofcom General Conditions (Schedule to the Notification under Section 48(1) of the Communications Act 2003) Part 1 para.1 and GC 18.

³¹ Under section 32(4)(b) of the Act, a VoIP service is likely to be regarded as an ECS if it employs or engages a third party to provide an ECS (or ECN) and the provision of the ECS is under the VoIP provider’s “direction or control”.

³² Imposed on 25 July 2003 under Section 45 of the Act, and since revised. For more information, see http://www.ofcom.org.uk/telecoms/ioi/g_a_regime/gce/gcoe/

Regulatory Framework and Policy Background: VoIP and Access to the Emergency Services

- 3.22 General Condition 4 requires PATS³³ providers to ensure that any end-user can access the emergency services by calling 999 and 112 at no charge and, to the extent technically feasible, make caller location information available to the emergency organisations handling those calls.
- 3.23 All fixed and mobile PSTN services allow users to access the emergency services. Some VoIP services allow users to do so but others do not. VoIP has introduced one-way services that allow users to make calls the PSTN only (type 2); they aren't caught by the definition of PATS or General Condition 4. Regarding type 4 services, the Universal Service Directive 2002/22/EC provided a definition of PATS that included "access to the emergency services", creating circularity; PATS services must allow access to the emergency services, but allowing access to the emergency services is part of the PATS definition.
- 3.24 Ofcom has run three consultations on VoIP regulation.
- 3.25 The 2004 Consultation was launched in response to early developments in new voice services (NVS), including VoIP. Ofcom acknowledged the opportunities provided by NVS and the challenge of potentially lower consumer protection. We considered some services might "look and feel" like a traditional telephone service but might not be able to deliver, in the same way or to the same extent, the features consumers expect. In particular, some might not offer 999 / 112 access or might not offer 999 / 112 access to the same standard as traditional PSTN services. Unlike PSTN fixed phone services, except DECT phones, VoIP depends on the availability of a power supply. It also depends on a broadband connection and sometimes a software application. When on, a broadband connection can be less reliable than a PSTN fixed phone line, meaning that a voice call might be distorted or cut off.
- 3.26 In line with its principal statutory duty to promote the interests of citizens and consumers, Ofcom identified its aims as: (i) helping to create an environment in which new technologies can be developed and deployed successfully in the market so that consumers can benefit from a wider and more innovative range of services; (ii) ensuring consumers are properly informed and protected, e.g. regarding 999 / 112 access; and (iii) in doing so, being aware of the importance of technology neutrality and minimising distortions in the type of services offered to and used by consumers, without creating artificial incentives. Ofcom also asked some specific questions to inform its policy going forward, including what its policy on 999 / 112 access should be.
- 3.27 Ofcom favoured an approach that allowed new services to enter the market and enabled consumers to make informed choices when taking advantage of them. Ofcom also recognised that there was a clear public interest in ensuring that widespread, reliable 999 / 112 access was maintained in the UK as VoIP use grew.

³³ In summary, PATS are defined as (i) a service available to the public (i.e. a PECS) (ii) for making and receiving national and international calls and (iii) accessing emergency services (iv) through a national or international phone number on a numbering plan. Those four points are known as the "gating criteria" for the PATS definition. For the full definition, see Article 2(c) of the Universal Services Directive (2002/20/EC) and Ofcom General Conditions (Schedule to the Notification under Section 48(1) of the Communications Act 2003) Part 1 para.1 and GC 18.

- 3.28 At this stage, because they had strong expectations that all voice call services would offer 999 / 112 access and seemed to value that highly, Ofcom considered it was likely consumers would exercise a strong preference for VoIP services with 999 / 112 access, provided they were properly informed. Because the cost of providing 999 / 112 access was low, Ofcom also considered it likely that consumers would be prepared to pay the additional cost for a service with basic 999 / 112 access, and that they would retain at least one service in the home with high quality access. Moreover, existing and potential providers had indicated to Ofcom that most providers would choose to offer 999 / 112 access so that they could compete with other voice call providers and to avoid the possibility of a life being lost because a user was unable to access 999 / 112 from their service. Ofcom concluded, therefore, that it was not necessary or appropriate to require all voice call services to provide 999 / 112 access at that time, but undertook to keep that position under review as the voice call market developed. If it became apparent that the availability of 999 / 112 access was, or was likely to be, significantly reduced and that was likely to cause detriment to consumers and citizens, Ofcom would consider requiring certain VoIP services to offer 999 / 112 access, among other measures. An industry-Ofcom working group³⁴ was set up to draft a Code of Practice on consumer information, including about 999 / 112 access.
- 3.29 Ofcom understood that the European Commission considered a VoIP provider could choose if they were providing a PATS even if they met all of the PATS gating criteria³⁵. Ofcom sought clarification from the European Commission. In the interim, Ofcom adopted a policy to allow VoIP providers to enter the market and meet the PATS gating criteria, in particular offering 999 / 112 access, without becoming PATS and having to comply with all of the associated GCs like network integrity and reliability for 999 / 112 access under GC 3 (i.e. Ofcom would forbear from enforcing the PATS GCs). That allowed providers that could not provide the same level of 999 / 112 access as fixed PSTN providers to offer some (potentially less reliable) access, rather than none at all. That policy was known as the “interim forbearance policy”.
- 3.30 Under the interim forbearance policy, Ofcom provided that only subscribers to PATS services that met all of the associated GCs had a right to number portability³⁶. That meant that VoIP services that provided 999 / 112 access that did not meet the standard of reliability set by GC 3 did not have the right to offer new customers the possibility of retaining their previous telephone number. Ofcom hoped that would provide an incentive for services that met the PATS gating criteria to comply with the PATS-related GCs.
- 3.31 Ofcom also enabled VoIP providers to allocate their customers standard phone numbers (geographic number ranges) or a new 056 number range so that consumers could use familiar numbers with VoIP services.
- 3.32 In its 2006 Consultation, launched in response to market, technology and regulatory developments since 2004, Ofcom set out three main policy objectives, which built on its 2004 policy aims: (i) enabling innovation in a technologically neutral way; (ii) ensuring consumers are well-informed, particularly about 999 / 112 access; (iii)

³⁴ The New Voice Services (NVS) Working Group was convened at the end of 2004 and involved BT, Centrica, Communications Management Association, Easynet, Gossiptel, ISPA, ITSPA, Kingston Communications, Level 3, Magrathea, Ntl, Ofcom, Telewest, Thus, Vonage, Wanadoo and Xconnect.

³⁵ European Commission, *Information and consultation paper on the regulatory treatment of Voice over Internet Protocol (VoIP) under the EU regulatory framework*, 14 June 2004.

³⁶ “Number Portability” enables subscribers to take their standard telephone number with them when they change provider.

ensuring maximum availability of high quality 999 / 112 access as voice call services and technology change.

- 3.33 In light of clarification from the European Commission, Ofcom understood that, if the PATS gating criteria are met, a service automatically constitutes a PATS and must comply with the PATS obligations³⁷. Therefore Ofcom discontinued its interim forbearance policy. But that created the risk that VoIP providers would decide not to provide 999 / 112 access to avoid becoming a PATS and subject to the relevant PATS GCs.
- 3.34 As set out in its March 2007 Statement on the 2006 Consultation, Ofcom modified the drafting of GC 18 on number portability to make clear that number portability rights would only apply to services that provided 999 / 112 access (with an exception for receive-only services like type 3 VoIP services) (March 2007 Statement, from paragraph 5.8, and Annex 4). The modification to GC 18 entered into force on 29 March 2007. We noted the clarification might act as an incentive for providers to offer 999 / 112 access, in order to secure the benefits of number portability, but might not lead to all providers offering 999 / 112 access.
- 3.35 Also, Ofcom implemented the *Code on the provision by Service Providers of consumer information to Domestic and Small Business Customers for the provision of Services* (the Code of Practice) developed by the industry-Ofcom working group following the 2004 Consultation. It requires VoIP providers to provide information about any feature or limitation that differs from a standard phone service provided over the PSTN, in particular the availability or standard of 999 / 112 access (March 2007 Statement, Section 6 and Annex 1). The Code is included in GC 14 and entered into force on 29 May 2007.
- 3.36 Following the March 2007 Statement, the GCs that were directly relevant to 999 / 112 access over VoIP voice call services can be summarised as:
- PATS providers must take all reasonably practicable steps, to the greatest extent possible: to maintain the availability of PATS at fixed locations³⁸ in cases of catastrophic network breakdown or *force majeure*; to provide uninterrupted 999 / 112 access (GC 3 implementing USD Article 23);
 - PATS providers must provide all end-users with 999 / 112 access at no charge and must make caller location information for all 999 / 112 calls available to the emergency organisations handling those calls, to the extent technically feasible (GC 4 implementing USD Article 26);
 - PECS providers must ensure domestic and small business customers are provided with information about the features of their service. In particular, type 2, 3 and 4 VoIP providers must make clear whether their service offers 999 / 112 access and the extent to which it depends on the user's home power supply. If the customer chooses to take up a service that does not offer 999 / 112 access or that depends on an external power supply, the code requires providers to: secure the customer's positive acknowledgement of that at point of sale; provide a

³⁷ As confirmed by the European Commission's Expert Group on Emergency Access in a response dated 23 May 2006 to Ofcom's 2006 consultation *Regulation of VoIP Services*.

³⁸ For nomadic VoIP, "fixed locations" is understood as the contractually agreed fixed location. *New Voice Services: a Consultation and Interim Guidance*, Ofcom, 6 October 2004 and Statement on the Regulation of VoIP Services, Ofcom, 29 March 2007, Annex 5, *Guidelines on the application of PATS obligations to VoIP service providers*, from paragraph A5.53.

physical label for equipment on request or information on the computer screen stating there is no 999 / 112 access; play an announcement each time a 999 / 112 call is attempted reminding the caller that 999 / 112 access is unavailable (GC 14 implementing USD Article 34);

- ECS providers must provide, on request and on reasonable terms, number portability to subscribers of PECS that are for receiving national and international calls only through a standard national or international telephone number or to subscribers of PATS (GC 18 implementing USD Article 34).
- 3.37 PATS providers were also obliged to comply with: GC 5 on emergency planning; GC 8 on operator access, directory enquiries and directories; GC 10 on publishing prices, tariffs and terms and conditions; GC 11 on billing accuracy; GC 12 on itemised billing; GC 13 on non-payment of bills; GC 15 on special measures for end-users with disabilities.
- 3.38 On applying GC 3, Ofcom withdrew the *Essential Requirements Guidelines*³⁹ because they were suited to traditional PSTN providers only; they implied that the provider had ownership or direct control over the end-to-end network used to provide the call (March 2007 Statement, from paragraph 4.16).
- 3.39 Ofcom also issued *Guidelines on the application of PATS obligations to VoIP service providers* (the Guidelines), which explain how Ofcom would investigate potential contraventions of GCs 3 and 4 on network reliability and 999 / 112 calls to aid transparency and understanding of the requirements and increase the incentive for VoIP providers to offer 999 / 112 access (March 2007 Statement, Annex 5)⁴⁰. Ofcom specified that VoIP providers should take all possible steps to ensure network integrity and service reliability and should do so to the greatest extent possible, but only for the aspects of the network that they control.
- 3.40 Lastly, Ofcom undertook to encourage and enforce maximum compliance with relevant GCs by VoIP providers and to monitor market and technology developments to ensure regulation can be quickly adapted to meet consumer and citizen needs, especially the need to maintain the widespread availability of 999 / 112 access (March 2007 Statement, Section 5).
- 3.41 In that regard, in the 2006 Consultation and March 2007 Statement, Ofcom signalled that market forces combined with information provision might not lead to an optimum provision of 999 / 112 access for society: it may be inherently difficult for consumers to properly evaluate the potential costs and benefits of taking a service without 999 / 112 access; without any requirement to offer 999 / 112 access there was the risk that service operators and/or subscribers would be able to “free ride” by offering a low cost service with no or limited 999 / 112 access and rely on customers of other networks to allow them to make emergency calls, or to make emergency calls on their behalf.
- 3.42 Ofcom noted in the March 2007 Statement that a number of respondents to the 2006 Consultation considered the new measures were insufficient to combat the risk of consumer and citizen confusion about 999 / 112 access over VoIP. That could cause delays in accessing 999 or 112, possibly leading to increased harm.

³⁹ *Guidelines on the essential requirements for network security and integrity*, Ofcom, 9 October 2002

http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/guid1002.htm

⁴⁰ <http://www.ofcom.org.uk/consult/condocs/voipregulation/voipstatement/voipstatement.pdf>

- 3.43 Ofcom undertook, therefore, to consult in summer 2007 on whether it should require certain VoIP providers to provide 999 / 112 access and, in assessing the need for that requirement, it undertook to carefully consider the possible impact on competition and on market entry and innovation by VoIP providers. The July 2007 Consultation met that commitment by proposing a modification to GC 4 to require 999 / 112 access from all PECS that enable users to call normal national or international numbers.
- 3.44 This Statement summarises and evaluates the significant responses to that Consultation and explains Ofcom's conclusions.

International context

- 3.45 In June 2007, we polled other European regulators on their approach to regulating VoIP and in particular VoIP and emergency services access. Their responses are summarised in Figure 2.

Figure 2: Ofcom poll of VoIP and emergency services access in Europe, June 2007

	Broadband penetration / population	Emergency services access from type 2 VoIP services?	Emergency services access from type 4 VoIP services?
Denmark	31.9%	Y	Y
Netherlands	31.8%	N	Y
Switzerland	28.5%	Y	Y
Norway	27.7%	N	Y
Finland	27.2%	Y	Y
Sweden	26.0%	N	Y
Belgium	22.5%	No response	
United Kingdom	21.6%	N	N
Luxembourg	20.4%	N	Y
France	20.3%	Y	Y
Austria	17.3%	Y	Y
Estonia	17.2%	N	Y
Germany	17.1%	No response	
EU	15.7%		
Spain	15.3%	N	Y
Italy	14.8%	No response	
Portugal	13.8%	No response	
Slovenia	12.6%	No response	Y
Ireland	12.5%	Best endeavours	Y
Hungary	11.9%	N	Y
Czech Republic	10.6%	N	Y
Latvia	9.3%	Y	Y
Poland	6.9%	N	Y

Source: OECD broadband statistics to December 2006; Ofcom poll of ERG regulators June 2007

- 3.46 Regarding emergency services access over VoIP in other countries with high-broadband penetration, the USA and Australia require type 4 VoIP services to offer emergency services access. Australia has recently decided to consult with industry on the implications of also requiring emergency services access from type 2 VoIP services⁴¹. Hong Kong requires type 2 and type 4 VoIP services to offer emergency

⁴¹ See http://www.acma.gov.au/WEB/STANDARD/pc=PC_310364 and <http://www.frlj.gov.au/ComLaw/Legislation/LegislativeInstrument1.nsf/0/2981B0B34FC20E33CA2573>

services access. Canada requires type 2, type 3 and type 4 VoIP services to offer emergency services access⁴².

European Regulatory Developments

- 3.47 The European Commission launched the first review of the principles and implementation of the common framework in 2006, including a public consultation⁴³. The review is intended to improve spectrum management, streamline market reviews, consolidate the single market, strengthen consumer and user rights, improve security, and remove outdated provisions. A Communication reporting on the consultation and the draft Proposals for European Parliament and Council Directives modifying the regulatory framework for electronic communications and services were published on 13 November 2007. Of particular relevance to this Statement, the Proposals remove the gating criterion of providing access to the emergency services from the PATS definition, require Member States to ensure customers of ECS providers are informed about whether a service has emergency services access and require ECS providers to inform customers about a lack of emergency services access before they enter into a contract and regularly thereafter. It is important to stress that these are draft proposals that must still go through the EU legislative process. Also, the draft provision on customer information, if adopted, would be a minimum harmonisation requirement; Member States would remain free to require greater emergency services provision.
- 3.48 The European Regulators Group (ERG) has established a VoIP Harmonization Task Force with the intention of reaching a common position on VoIP regulation later this year. It published a public consultation on a *Common Position on VoIP (draft) of the ERG High Level Policy Task Force on VoIP* on 24 October 2007⁴⁴. Ofcom considers the ERG's draft common position on emergency services access over VoIP is consistent with the decision it adopts in this Statement.

[86000846F1/\\$file/TelecomEmergencyCallServiceAmDet2007No1.pdf](#), page 3. The July 2007 Consultation said that Australia required type 2 and type 4 VoIP services to provide emergency services access.

⁴² See <http://www.crtc.gc.ca/archive/ENG/decisions/2005/dt2005-21.htm>

⁴³ See the European Commission DG Information Society website for more information: http://ec.europa.eu/information_society/policy/ecommm/tomorrow/index_en.htm

⁴⁴ Common Position on VoIP (draft) of the ERG High Level Policy Task Force on VoIP, 24 October 2007 http://erg.eu.int/documents/cons/index_en.htm

Section 4

Policy decision

Introduction

4.1 This section summarises Ofcom's policy objectives and sets out the two policy options for meeting those objectives that it consulted on in the July 2007 Consultation. It also summarises and evaluates the significant consultation responses and explains Ofcom's reasoning for adopting one of the options, with modifications in light of the responses.

Policy objectives

- 4.2 The key objective of the 2006 and July 2007 Consultations was to ensure there is a high level of 999 / 112 access. Consumers and citizens in the UK traditionally enjoy high levels of 999 / 112 access. VoIP services are the only public voice call services that do not consistently allow 999 / 112 access in the UK; all PSTN fixed services allow 999 / 112 access and all mobile PSTN services provide 999 / 112 access where there is coverage. This level of access is highly valued by consumers and citizens and helps the emergency services to provide high quality services. Accordingly, Ofcom regards it as important that these benefits are not lost as a result of changes in services or technology.
- 4.3 In meeting that objective, we aimed to take account of the desirability of regulating in a way that did not favour one technology over another or one means of providing technology over another⁴⁵.

Ofcom's approach before the July 2007 Consultation

- 4.4 As highlighted in Section 3 of this Consultation, in the 2006 Consultation, Ofcom discontinued its interim forbearance policy, which meant that type 4 VoIP services that met the PATS gating criteria had to comply with the PATS GCs. We withdrew the *Essential Requirements Guidelines*, which had been written with traditional PSTN services in mind, and proposed *Guidelines on the application of PATS obligations to VoIP service providers*, which entered into force on 29 March 2007 (the Guidelines), and a *Code on the provision by Service Providers of consumer information to Domestic and Small Business Customers for the provision of Services*, which entered into force on 29 May 2007 (the Code of Practice). We also clarified GC 18 on number portability.
- 4.5 Ofcom considered that this approach, combined with strong consumer preference for services with emergency services access and the fact that most VoIP services were being used as secondary lines (which meant that existing services with emergency services access were not being substituted), would ensure good continued provision of 999 / 112 access.

⁴⁵ Section 4(6) of the Act provides:

The fourth Community requirement is a requirement to take account of the desirability of Ofcom's carrying out their functions in a manner which, so far as practicable, does not favour—

(a) one form of electronic communications network, electronic communications service or associated facility; or

(b) one means of providing or making available such a network, service or facility, over another.

Challenges in meeting the policy aims

- 4.6 In its March 2007 Statement, Ofcom decided to review the question of how to ensure maximum availability of 999 / 112 access. A number of developments led Ofcom to consider the issue should be reconsidered, including:
- since the 2006 Consultation, there had been a rapid increase in the growth of VoIP services, increasing the potential for consumer detriment;
 - generally, VoIP service providers did not seem to be offering emergency services access⁴⁶, despite Ofcom's original intention behind its interim forbearance policy and the incentives to provide emergency services access set out in the previous consultations; and
 - there appeared to remain a large degree of confusion about the availability of 999 / 112 access from VoIP services, which could lead to delays in users successfully contacting the emergency services. The October 2006 research indicated that about three in four users of VoIP services that did not offer 999 / 112 access thought that the service provided 999 / 112 access or did not know;
 - various 2006 Consultation respondents supported those concerns.
- 4.7 Ofcom considered ensuring access to emergency services could be a crucial issue moving forwards. Ofcom undertook to consult further in summer 2007 on 999 / 112 access over VoIP and in particular on whether, and if so how, certain VoIP services should be required to offer 999 / 112 access. In assessing the need for that requirement, Ofcom said it would carefully consider the possible impact on competition and on market entry and innovation by VoIP providers. The July 2007 Consultation met that commitment.

Policy Options

- 4.8 In the July 2007 Consultation, Ofcom weighed up two policy options for responding to the question of 999 / 112 access over VoIP. Ofcom considered those options reflected its bias against regulatory intervention to encourage innovation and the need to regulate to protect citizens and consumers. The options were:

Option 1: Do not mandate 999 / 112 access for VoIP services

Option 2: Mandate 999 / 112 access for type 2 and type 4 VoIP services

- 4.9 Ofcom then asked respondents if they considered it should consider any other policy options.

Q.1 Do you consider Ofcom should consider any other policy options? Please describe your proposed option(s) and explain what you consider would be the advantages and any disadvantages.

Respondents' Views on Q.1

- 4.10 Around a quarter of respondents to the July 2007 Consultation, mainly from industry, considered Ofcom should consider some other policy options.

⁴⁶ Ofcom communications tracking survey Q.4 2006.

- 4.11 Two industry respondents and an industry alliance considered Ofcom should refrain from imposing 999 / 112 requirements until the ongoing review of the EC Communications Directives (see from paragraph 3.47) is complete. The alliance considered that, otherwise, Ofcom might impose inconsistent obligations, fragmenting the EU communications market. One industry respondent said the Commission proposes to amend Art. 20, Directive 2002/22/EC by inserting “Member States shall ensure ... subscribers are clearly informed whether or not access to emergency services is provided. Providers of ECS shall ensure that customers are clearly informed of the lack of access to emergency services in advance of the conclusion of a contract and regularly thereafter”. It considered that wording is consistent with Option 1.
- 4.12 They also suggested Ofcom should give the current regulations (the Guidelines and Code of Practice) 12, 18 or 24 months to work before evaluating their impact and proposing a change in regulation, if necessary. The alliance considered Ofcom should use that time to update data on VoIP services and technology and access to 999 / 112, e.g. means of improving customer warnings and use of IP in public safety networks and transitioning to survivable communications systems.
- 4.13 One industry respondent considered Ofcom should introduce additional policy objectives like quality increases, presence awareness, access to third party software applications and high privacy protection and should take measures to support the development and adoption of VoIP like supporting naked DSL, ensuring network neutrality on fixed or mobile networks, facilitating consumer switching between ISPs, and e-mail portability.
- 4.14 One industry respondent commented that any policy option should be consistent with a free market and open standards to ensure UK consumers receive the most effective 999 / 112 capabilities promptly, while permitting their continued evolution and innovation.
- 4.15 If Ofcom did require 999 / 112 access over VoIP, an industry respondent considered it should reintroduce the interim forbearance policy that had applied up to the 2006 Consultation (see from paragraph 3.30). It considered withdrawing that policy had led providers to withdraw 999 / 112 access because the PATS GCs are onerous and providers receive no obvious benefits. It commented that the Cost-Benefit Analysis (CBA) in the July 2007 Consultation was a UK-wide analysis and that the cost-benefit ratio for a given operator might be very different. That might lead providers to look for another way to avoid qualifying as a PATS provider, e.g. not allowing outgoing international calls, to the detriment of consumers. A Government respondent understood VoIP providers are concerned that complying with PATS GCs will hinder development of VoIP services and 999 / 112 access. It said it would welcome an option that decoupled 999 / 112 access from the PATS GCs.
- 4.16 As a variant of the Options Ofcom set out, three industry respondents and an industry alliance considered Ofcom should also consider an option to require 999 / 112 access from type 4 VoIP services that replace traditional PATS services but not type 2 VoIP services that supplement traditional PATS services; that would stifle innovation; the justification given for not considering them separately wasn't sufficient; users might expect 999 / 112 access from “replacement” services. A Government respondent and an industry respondent suggested Ofcom adopt a graduated approach to requiring 999 / 112 access by addressing type 4 services first as those likely to cause greatest user confusion.

- 4.17 An industry respondent considered Ofcom should reconsider its type 2 and type 4 classifications; VoIP is a continuum of services from simple, substitute services to complex, pure integrated peer-to-peer applications. Considering Option 2, a trade association and an industry respondent suggested Ofcom review the different range of services that fall under the category of type 2 VoIP services (and therefore Option 2). It drew Ofcom's attention to "Click to Call" services, which can be selected on a website or other application to connect to a number or a limited set of numbers pre-selected by the provider or a user; corporate VoIP products where 999 / 112 access is provided through the PSTN on the host's existing telecoms equipment, e.g. the PBX.
- 4.18 Another respondent considered Ofcom should consider a policy where nomadic type 2 and type 4 VoIP services are only required to provide 999 / 112 access in the customer's country of residence. It considered it would be impractical and unreasonable to require access to multiple international emergency services. Also, although providers should encourage users to update their location, it considered most wouldn't.
- 4.19 Another quarter of respondents responded to say they agreed that the range of policy options was suitable.
- 4.20 A trade association said it may be more appropriate to require type 4 providers only to provide 999 / 112 access but thought the European Commission is likely to place the obligation on all services that allow calls out to the PSTN.
- 4.21 A Government respondent and an industry respondent considered the decision to preclude type 1 and type 3 services should be kept under review to maintain public safety. The industry respondent commented that users receive calls from PSTN numbers on type 3 services and several softphones for type 1 and type 3 services look like traditional fixed or mobile handsets and it's not possible to see which VoIP service is available.
- 4.22 Another industry respondent considered in the future, Ofcom should reconsider its definitions of voice service types because the roll out of next generation networks (NGN), on-net VoIP, IP interconnection and next generation access (NGA) are making the demarcation between VoIP and "traditional telephony" meaningless.

Ofcom's Views on Responses to Q.1

- 4.23 Regarding the review of the EC Communications Directives, the Commission issued draft proposals on 13 November 2007. To become law, the Commission's proposals must go through the EU legislative process. We consider it's necessary to act sooner to protect consumers and citizens from delay in contacting the emergency services over VoIP. Ofcom will ensure regulation is consistent with the new Directives. Because the Universal Service Directive is a minimum harmonisation Directive, Option 2 would be consistent with the current proposals. In any case, the proposals may change following consideration by the European Parliament and the Council. Option 2 is also consistent with the draft ERG common position on emergency services access over VoIP and regulation in various European and other countries with high broadband penetration.
- 4.24 As regards the suggested option of waiting to evaluate the impact of the measures adopted in the March 2007 Statement, Ofcom said in that Statement that because of the increase in VoIP take-up, under provision of 999 / 112 access and consumer confusion, 999 / 112 access over VoIP required further consideration beyond the

measures adopted in the Statement, and undertook to consult this summer on requiring 999 / 112 access from certain VoIP services.

- 4.25 The July 2007 Consultation acknowledged that it was too early to measure the impact of mandating the Code of Practice, but noted that, at a time when customer information was provided voluntarily, 64% of VoIP users surveyed in the October 2006 research were with a provider that did not provide 999 / 112 access. 78% of those thought that they were or didn't know. A total of 76% of all users surveyed were confused about whether they had access. 50% of all users were at particular risk because they were with a provider that didn't give 999 / 112 access but they thought that it did⁴⁷. We noted that 999 / 112 access has some characteristics of a public good, which the market will not provide optimally.
- 4.26 We cannot ignore the risk that, even when they are given full information, it may be inherently difficult for new customers to recognise the importance of 999 / 112 access (and information about it) because they have other more immediate priorities like price and daily functionality; 999 / 112 access is something they might need in the distant future, if at all. Other citizens might only realise they can't access 999 / 112 from a VoIP service when they try to call 999 / 112 (see July 2007 Consultation from paragraph 4.30).
- 4.27 Going forward, we will keep developments in VoIP services and technology and user behaviour under review to see if our regulations need to be adapted. The Code of Practice will continue in force during the compliance period for providing 999 / 112 access, and will be reviewed and updated to coincide with the deadline.
- 4.28 Ofcom considers the additional policy objectives suggested in paragraph 4.13 fall outside the scope of the July 2007 Consultation.
- 4.29 For information, regarding network neutrality, Ofcom said in the March 07 Statement (from paragraph 8.19):

Ofcom considers that network neutrality is not as significant an issue in Europe as it has been in the US. While this debate is important and is likely to continue, the existing market structure, the level of competition in service provision and the regulatory policy in Europe, combined with powers to address such issues under the existing regulatory framework will be sufficient to address issues that arise in relation to network neutrality now and in the future, e.g. the ability to impose an end-to-end connectivity obligation under Art. 5 of the Access Directive.

We introduced regulation to facilitate consumer switching between ISPs in December 2006 and we're monitoring the results⁴⁸.

- 4.30 Regarding the comment that any policy option should be consistent with a free market and open standards, our October 2006 research showed that sufficient 999 / 112 access hasn't been provided without a regulatory requirement.
- 4.31 As regards the suggestion that Ofcom should reinstate the interim forbearance policy, if the PATS gating criteria are met, a service is automatically PATS and must

⁴⁷ In the October 2006 research, we compared respondents' statements on whether they could access 999 / 112 from their VoIP service with our information about the provider they were with.

⁴⁸ See *Broadband Migrations – Enabling Consumer Choice (Regulatory Statement)*, 13 December 2006 <http://www.ofcom.org.uk/consult/condocs/migration/statement/statement.pdf>

comply with the PATS obligations, as confirmed by the European Commission's Expert Group on Emergency Access in a response dated 23 May 2006 to our 2006 Consultation.

- 4.32 The ERG VoIP Harmonisation Task Force suggested emergency services access should be removed from the PATS gating criteria in *Common Position on VoIP (draft) of the ERG High Level Policy Task Force on VoIP*, 24 October 2007. At present, the review of the EC Communications Directives proposes to do so. If adopted, all services that meet the remaining gating criteria would be PATS and have to provide emergency services access, i.e. all services (i) available to the public (PECS) (ii) for originating and receiving national and international calls services (iii) through a number or numbers in a national or international telephone numbering plan.
- 4.33 In the meantime, our Impact Assessment shows that the benefits of Option 2 for consumers and citizens would significantly outweigh the compliance costs for industry, including the cost of complying with the PATS GCs, and would not significantly affect innovation. Therefore we don't agree that complying with the PATS GCs will significantly hinder the development of VoIP services generally or 999 / 112 access in particular.
- 4.34 Regarding the response that the CBA in the July 2007 Consultation was a UK-wide analysis, Ofcom doesn't conduct CBAs for individual providers; it has to consider the costs and benefits of its proposals for the UK as a whole.
- 4.35 Having considered the consultation responses, we consider we were justified to propose requiring 999 / 112 access for type 4 and type 2 services together. Our policy objective is to ensure a high level of 999 / 112 access to protect consumers and citizens from delay in accessing 999 / 112. We consider there's a material risk of user confusion for all services that allow users to make calls out to the PSTN. That functionality is key, not whether the service is intended to supplement or replace PSTN services. That's because it creates the risk that, in a stressful emergency situation, a user may go for the "wrong" phone and lose valuable time in reaching the emergency services. The fact that type 4 services also allow users to receive calls is less relevant; we don't propose to require 999 / 112 access for type 3 VoIP services. In the October 2006 research, all the VoIP users surveyed said they had access to a landline or a mobile phone⁴⁹ but, for public safety, both types of service provide 999 / 112 access. Also, as stated in the July 2007 Consultation, Ofcom considers any current difference in service features, technology or risk of consumer confusion between type 2 and type 4 VoIP services is likely to become negligible or disappear: traditional telephone handsets are increasingly capable of supporting type 2 or type 4 VoIP services and, for VoIP phones that plug into a PC, some new phones don't require the PC to be switched on in order to function (July 2007 Consultation, paragraph 4.57). Our Impact Assessment suggests that the benefits of Option 2 for consumers and citizens would significantly outweigh the costs of compliance for industry.
- 4.36 On the use of "type 2" and "type 4" categories, we note they have been adopted by the ERG. We recognise that, in implementing Option 2, it's necessary to ensure we don't capture services that we consider don't create a material user expectation or risk of confusion about 999 / 112 access (see paragraph 4.181).

⁴⁹ But 3% had no landline and 7% said they had a landline but didn't use it.

- 4.37 On the suggestion that we consider a policy to require nomadic services to provide 999 / 112 access in the customer's country of residence only, different jurisdictions have different rules. The GCs set out the rules that apply within Ofcom's jurisdiction.
- 4.38 Regarding the responses in favour of the range of policy options, the proposed EC Communications Directives do not propose to extend the emergency services access requirement, although they do remove emergency access from the PATS definition. See paragraph 4.23.
- 4.39 On the suggestion that we should keep type 1 and type 3 services under review, as stated in the July 2007 Consultation, at present we consider a material risk of user confusion arises for VoIP services that allow users to make calls out to the PSTN. Moreover, we consider type 1 services are unlikely to constitute an ECS and so are not subject to Ofcom regulation. We will keep developments in VoIP services and technology and user behaviour under review to see if our regulations need to be adapted.
- 4.40 Ofcom is considering the impact of Next Generation Networks and Next Generation Access on the provision of voice call and other communications services⁵⁰. We recognise NGA are likely to replace PSTN or "traditional" voice call services with VoIP.

Ofcom's Evaluation of Policy Option 1

- 4.41 The July 2007 Consultation provided the following evaluation of policy Option 1.
- 4.42 Option 1 means a continuation of the status quo. VoIP providers can offer 999 / 112 access on a voluntary basis. Type 4 VoIP providers that offer 999 / 112 access and meet the other PATS gating criteria will become PATS and have to comply with the PATS GCs, taking into account the Guidelines on complying with GC 3 and 4 as regards the reliability of 999 / 112 access over VoIP and the provision of caller location information to the emergency services. The Code of Practice requires VoIP providers to give their domestic and small business customers information about the availability and limitations of 999 / 112 access over VoIP.
- 4.43 The main arguments in favour of this option are that it would give Ofcom more time to monitor and review the impact of the Guidelines and the Code of Practice on the provision of 999 / 112 access by VoIP providers, given that they came into force in spring 2007. It might also limit the regulatory compliance costs on VoIP providers. Ofcom has considered that important in the past to enable VoIP services to innovate and grow market share and bring more consumer choice and competition.
- 4.44 The arguments against Option 1 mirror the points in favour of Option 2, explored below. Essentially: there is an under provision of 999 / 112 access over VoIP; consumers and citizens are confused about 999 / 112 access over VoIP; research suggests that customer information is unlikely to be enough to tackle under provision or consumer and citizen confusion; VoIP take-up is growing and VoIP services and technology are becoming increasingly similar to PSTN services, increasing the risk of confusion.
- 4.45 According to Ofcom's impact assessment, the incremental benefits of Option 1 would be zero (no extra contribution to consumer protection) and the incremental costs to VoIP providers would be zero (no extra compliance costs). That's because Option 1

⁵⁰ See <http://www.ofcom.org.uk/research/telecoms/reports/nga/>

represents a continuation of the current situation (July 2007 Consultation, paragraph A5.26).

- 4.46 The July 2007 Consultation asked respondents for comments on Ofcom's evaluation of policy Option 1.

Q.2 Do you have any comments on Ofcom's evaluation of policy Option 1, which is to not require VoIP services to allow 999 / 112 calls?

Respondents' Views on Q.2

- 4.47 A significant majority of respondents to this question, from industry, Government and the emergency services, agreed with Ofcom's evaluation of policy Option 1.
- 4.48 An emergency services respondent commented there's no emerging trend to provide 999 / 112 access as a common function of VoIP. It's unlikely to be strongly demanded by consumers when making a purchasing decision and it isn't in providers' interests to offer functionality that adds cost and threatens competitive pricing without consumer demand. It considered a voluntary approach to 999 / 112 access is likely to lead to user confusion and false assumptions about availability.
- 4.49 A Government respondent said it would be extremely concerned if a growing percentage of the population was unable, and unaware that they were unable, to access 999 / 112 through their phone service. Even those with a mobile phone could lose valuable, life-saving minutes by trying to call 999 / 112 from a VoIP service without access. Research shows that every minute a person suffering a heart attack waits for help reduces chances of survival by 10%.
- 4.50 Another Government respondent considered, with the current voluntary approach, it will only be a matter of time before confusion about 999 / 112 access results in loss of life. VoIP customers (or other occupants) are unlikely to fully appreciate the implications of not having 999 / 112 access until it's too late.
- 4.51 A number of industry respondents said, in particular, that Ofcom had conducted a fair analysis of the risks and benefits; many consumers won't or won't want to understand the technological differences between fixed landline and VoIP services; it's highly likely that customers will be confused; 999 / 112 access is a valid expectation and consumers may rely on a VoIP service and remove basic PSTN phone services; 999 / 112 access is a necessity and mustn't be lost in the transition from PSTN to VoIP.
- 4.52 An industry respondent pointed out that Option 1 has costs for PSTN fixed line providers. There is a call revenue loss to VoIP providers but no reduction in the infrastructure costs of providing 999 / 112 access.
- 4.53 A trade association said, however, it's important Ofcom considers '112' services and the '116XXX' range recently mandated by the EU Commission. The outcome of this consultation should consider any known future services related to "must carry" obligations and any overheads that may follow.
- 4.54 Of those that disagreed with Ofcom's evaluation, an industry respondent said that the evaluation of Option 1 was minimalist compared to Option 2 and that all options should include a more realistic evaluation of the development and characteristics of Internet-based voice offerings, which materialise nearly every day.

- 4.55 An industry alliance considered Option 1 is a pragmatic approach to balance public safety and consumer education with innovation, competition, consumer benefits and available technology. An industry respondent said that Option 1 recognises that VoIP is a new frontier in communications and would avoid subjecting it to legacy telecommunications regulation. The industry alliance said Option 1 should be given at least 1 year to work, followed by an additional study and stakeholder input. Option 2 could undo Ofcom's success in fostering the development of innovative services and could jeopardise VoIP's role in public safety communication.
- 4.56 The industry alliance commented that, in Ofcom's research, only 14% of VoIP households said they used VoIP to make or receive calls from the PSTN; 86% used type 1 and would have no expectation of accessing 999 / 112. Similarly, an industry respondent asked if the October 2006 research asked how consumers use VoIP. If they use it as a text messenger, for video conferencing or as an alternative cheap international call plan, it's an additional means of communication; we shouldn't assume they expect 999 / 112 access. Ofcom could require all VoIP operators to send an automated welcome message stating whether there's 999 / 112 access.

Ofcom's Views on Responses to Q.2

- 4.57 We agree with the comments made in support of our evaluation of Option 1.
- 4.58 Ofcom considers Option 1 would fail to reach a balance between furthering the interests of consumers and citizens and enabling innovation, choice and competition. We don't agree with the suggestion to wait to evaluate the impact of the measures adopted in the March 2007 Statement: we consider it's necessary to act sooner to protect consumers and citizens from risk of delay in contacting the emergency services. The fact that users may have alternative means of accessing 999 / 112 doesn't overcome the risk that they may reach for the "wrong" phone in an emergency situation, losing valuable time. The Impact Assessment estimated the costs and benefits of that happening in only 1/100 cases in households that had and were using VoIP services and still found that the benefits of Option 2 would significantly outweigh the costs of industry compliance and competition and innovation would not be significantly affected.
- 4.59 The July 2007 Consultation and Impact Assessment relate to 999 and 112. The 116XXX number range falls outside the scope of this consultation. If it is designated, Ofcom considers that would not affect the desirability of requiring 999/112 access from VoIP services.
- 4.60 Ofcom seeks to take account of the different characteristics of the products it regulates and to adapt regulation where appropriate, as demonstrated by the withdrawal of the Essential Requirements Guidelines and adoption of Guidelines on the application of PATS obligations to VoIP service providers (the Guidelines) in the March 2007 Statement.
- 4.61 The question underpinning our policy is whether the service allows calls out to the PSTN because that is when user confusion leading to the risk of delay in accessing 999 / 112 is material. The Impact Assessment considered households that had and currently used VoIP services. The fact that the VoIP service has not replaced PSTN services or that it provides services in addition to voice calls doesn't overcome that risk. We have refined our modification to GC 4 so that the requirement to provide 999 / 112 access applies to type 2 and type 4 VoIP services that allow calls to be made to national, or national and international numbers. That excludes services that are for calling international numbers only. See paragraph 4.181.

- 4.62 The Code of Practice currently requires providers that don't offer 999 / 112 access to provide an automated message stating there's no 999 / 112 access. We consider it's a useful measure but not sufficient because, by the time the user has heard and acted on that message, they may have lost valuable time.
- 4.63 We will keep developments in VoIP services and technology, other voice call and communications services and user behaviour under review to see if our regulations need to be adapted.
- 4.64 The July 2007 Consultation then asked if respondents were in favour of policy Option 1.

Q.3 Do you consider Ofcom should adopt policy Option 1? Please give your reasons.

Respondents' Views on Q. 3

- 4.65 A significant majority of respondents to this question, from industry, Government and the emergency services, agreed with Ofcom that it should not adopt Option 1.
- 4.66 A Government respondent considered adopting Option 1 could jeopardise public safety; the public expect easy 999 / 112 access from telecoms equipment. Delays in notifying the emergency services could increase risk to emergency responders.
- 4.67 An emergency services respondent considered evidence shows Option 1 isn't viable. It could open the door to "Cherry Picker" providers who want to make a rapid profit with minimal costs, to the detriment of responsible VoIP providers. The consumer could pay the ultimate price by not having 999 / 112 access when they need it.
- 4.68 Another emergency services respondent considered VoIP is increasingly likely to become the main or only phone. Enhanced functionality and appearance will obscure differences with PSTN telephony. Everyone must be able to access 999 / 112 regardless of age, race, disability or prior knowledge of the equipment. Anything less will lead to false assumptions and a false sense of security.
- 4.69 A number of industry respondents agreed Option 1 was unlikely to achieve optimal availability of 999 / 112 access because of the disappointing voluntary adoption of 999 / 112 access and consumer and citizen confusion about the capabilities of their VoIP service; it would leave an unacceptably high risk of users relying on a VoIP service without 999 / 112 access in an emergency; it would increase confusion as VoIP becomes more popular and VoIP services more closely resemble traditional voice services; consumer protection has to be a priority. A trade association added that Option 1 would also be out of line with national regulations in other EU Member States.
- 4.70 One industry respondent noted, however, that Option 2 might not be commercially viable for some operators; regulation mustn't stifle competition by setting the regulatory bar too high.
- 4.71 Those that considered Ofcom should adopt Option 1 were all from industry. One respondent considered 999 / 112 access should be voluntary because industry has the incentive to meet social objectives and can best determine how; Ofcom should give industry time to develop solutions. Limited government regulation should only be considered if voluntary industry activity fails. Heavy regulation inhibits flexibility and innovation, to consumer detriment.

- 4.72 Another respondent considered Ofcom should adopt Option 1 for VoIP services that supplement PSTN services or are PC-based, and Option 2 for VoIP services that replace PSTN services.
- 4.73 An industry respondent and an industry alliance suggested Ofcom should adopt Option 1 for the next 12 months. One considered the Code of Practice had been adopted after significant discussion with stakeholders and it is the best option at this time. The other considered that after 12 months it would be reasonable for the UK to harmonise with other European regulators by adopting Option 2.

Ofcom's Views on Responses to Q.3

- 4.74 We agree with the comments made in support of our proposal not to adopt Option 1.
- 4.75 We don't agree that Ofcom should give industry time to develop a solution to 999 / 112 access or that requiring 999 / 112 access would inhibit innovation. In the pre-consultation phase for the 2004 Consultation, when Ofcom first proposed the Code of Practice as a policy option, existing and potential VoIP providers indicated that most would want to offer 999 / 112 access. But the provision of 999 / 112 access by VoIP services has not occurred in the absence of regulation. For example, in the October 2006 research, 64% of VoIP users surveyed had a service that did not provide 999 / 112 access. As regards innovation, the Impact Assessment estimated that Option 2 would not have significant effects on innovation and, overall, the benefits of Option 2 would significantly outweigh the costs of industry compliance.
- 4.76 We also disagree with the suggestion that we should adopt Option 1 for PC-based or supplementary VoIP services. Regarding PC-based services, the way they are used is increasingly similar to the way "traditional" fixed and mobile services are used, creating a significant risk of user confusion: VoIP phones increasingly "look and feel" like traditional fixed PSTN handsets; some do not require the PC to be switched on in order to function; fixed and mobile PSTN handsets are increasingly able to support VoIP. On VoIP used as a supplementary rather than as a replacement voice call service, the fact that users may have alternative means of accessing 999 / 112 doesn't overcome the risk that they may reach for the "wrong" phone in an emergency situation, losing valuable time. The Impact Assessment estimated the costs and benefits of that happening in only 1/100 cases in households that had and were using VoIP services and still found that the benefits of Option 2 would significantly outweigh the costs of industry compliance.
- 4.77 Regarding the suggestion that Ofcom should adopt Option 1 for 12 months, we consider it's necessary to act sooner to protect consumers and citizens from risk of delay in contacting the emergency services.
- 4.78 We consider the Code of Practice is a useful, but not a sufficient, measure to protect consumers and citizens. We recognised that might be the case when the Code of Practice was made mandatory in the March 2007 Statement. At a time when consumer information was provided voluntarily, 64% of VoIP users surveyed in the October 2006 research were with a provider that did not provide 999 / 112 access. 78% of those thought that they were or didn't know. A total of 76% of all users surveyed were confused about whether they had access. 50% of all users were at particular risk because they were with a provider that didn't give 999 / 112 access but they thought that it did. Further research conducted in April-May 2007 found that only 14% of respondents with VoIP types 1, 2 or 4 were aware that there are some types of voice call that could not be made from VoIP. 21% didn't know if there were or

not⁵¹. Research suggests that, in general, there is a breakdown between the provision of information by industry and how that information is received or used by VoIP users. See from paragraph 4.90.

Ofcom's Evaluation of Policy Option 2

- 4.79 VoIP has introduced one-way services that allow users to make calls to traditional fixed or mobile phones but not to receive calls (called type 2 VoIP services); they aren't caught by the definition of PATS or General Condition 4. Regarding VoIP services that allow users to make calls to and receive calls from traditional fixed or mobile phones (called type 4 services), the Universal Service Directive 2002/22/EC provided a definition of PATS that included "access to the emergency services", creating circularity; PATS services must allow access to the emergency services, but only services that allow access to the emergency services are PATS.
- 4.80 The July 2007 Consultation proposed that, under Option 2, Ofcom would modify GC 4.2 so that PECS that allow national and international calls to ordinary numbers would have to allow any user to access 999 / 112 free of charge.
- 4.81 They would also have to make caller location information available to the network used to connect the call to the emergency services, to the extent technically feasible, and conduct a risk assessment on network integrity and adopt a mitigation strategy. Type 4 VoIP providers that meet the PATS gating criteria would have to comply with the PATS obligations.
- 4.82 The July 2007 Consultation set out six main arguments in support of this option:
- 1) Stakeholder responses to the 2006 Consultation by the Government, the emergency services, the Royal National Institute of Blind People (RNIB) and the Royal National Institute for Deaf People (RNID);
 - 2) Under provision of 999 / 112 access over VoIP services;
 - 3) Consumer and citizen confusion about 999 / 112 access from VoIP services;
 - 4) Developments in VoIP take-up and technology;
 - 5) Technology neutrality; and
 - 6) Ofcom's Impact Assessment.

2006 Consultation stakeholder responses

- 4.83 Responses to Ofcom's 2006 Consultation, especially by Government, the emergency services, the RNID and the RNIB, expressed strong concern about Ofcom's policy on 999 / 112 access over VoIP services.
- 4.84 In summary, they considered consumers and other citizens were confused about whether VoIP voice call services offered 999 / 112 access. Delay in contacting the emergency services could result in serious harm. They considered the measures adopted, including the Code of Practice requiring VoIP providers to provide customer

⁵¹ Survey conducted for Ofcom by Jigsaw Research, from a representative sample of 1050 telephone consumers in the UK, April-May 2007, unpublished. Question is based on a small sample of 83 respondents and therefore data is indicative.

information on the availability and standard of 999 / 112 access, were not sufficient to address that.

- 4.85 A response on behalf of the Home Office, the Police Service and other agencies stated:

“We are dealing here with an important public safety issue, with the possibility of thousands of consumers living and working without immediate means of summoning emergency assistance and, very possibly, without the knowledge that they are in such a situation. That is too important an issue to leave entirely to the marketplace to resolve ...

... the Home Office does not believe that any of the advantages that New Voice Services [like VoIP] provide should be at the expense of public safety ... we have very serious concerns for those people who decide to opt for systems or for those people, who through circumstance, have to use a telephone service whose providers do not allow “999 or 112” access ...

The Home Office is particularly concerned, in the absence of regulation, about the following points:

- In the event of fire, accident or criminal offence (including domestic violence), a subscriber might be unable to make an immediate call to the emergency services from their phone ...
- Over half the estimated 80,000 annual rape incidents are perpetrated by a partner or a former partner of the victim. The absence of a home with immediate “999 or 112” access could assist the attacker ...
- Other vulnerable groups, e.g. people with learning disabilities and young people, might be similarly disadvantaged ...

The Home Office is very concerned that a proposal not to mandate access to emergency services for New Voice Services [like VoIP] will start to erode universal access to emergency services, something that would have detrimental public safety consequences”⁵².

- 4.86 The Association of Chief Police Officers of England, Wales and Northern Ireland (ACPO) responded that:

“... ACPO welcomes any new technology that affords access to more effective and efficient telecommunications services; however the embracing of new technology is subject to the overarching requirement that such innovations result in an improvement of existing services not degradation. There are certain requirements and capabilities that ACPO still feels must be incorporated with the provision of such services as a basic minimum: 1. Access to emergency services ...”⁵³

- 4.87 The RNID stated:

⁵² <http://www.ofcom.org.uk/consult/condocs/voipregulation/responses/homeoffice.pdf>
⁵³ <http://www.ofcom.org.uk/consult/condocs/voipregulation/responses/acpo.pdf>

“Consumers of telecommunications services are used to a certain scope and quality of service and have expectations about availability, functionality ... The evidence has demonstrated that unless measures are taken to protect vulnerable consumers, unregulated and unconstrained markets result in a very uneven playing field, in particular for people with disabilities. RNID is concerned that Ofcom’s proposed framework does not consider those vulnerable user groups in sufficient measure ...”⁵⁴

- 4.88 The RNIB raised similar concerns⁵⁵.
- 4.89 Respondents to the 2006 Consultation also raised points about specific areas of Ofcom policy, which are included in the following paragraphs.

Under provision of 999 / 112 access from VoIP services

- 4.90 In the pre-consultation phase for the 2004 Consultation, when Ofcom first proposed the Code of Practice as a policy option, existing and potential VoIP providers indicated that most would want to offer 999 / 112 access. That was so they could compete with other providers and try to avoid any loss of life because a customer could not call 999 or 112. That was one of the reasons why Ofcom recommended mandating the Code of Practice and considered mandating 999 / 112 access from VoIP services was not necessary.
- 4.91 However, the provision of 999 / 112 access by VoIP services has not occurred in the absence of regulation. For example, 64% of VoIP users surveyed in the October 2006 research had a service that did not provide 999 / 112 access.
- 4.92 As Ofcom flagged up in the 2006 Consultation, one reason why market forces might not be sufficient to deliver Ofcom’s policy aim of a high level of 999 / 112 access is the nature of 999 / 112 access itself (2006 Consultation paragraph 3.7). In particular, 999 / 112 access has some characteristics of a public good, which the market will not provide optimally. The benefits of 999 / 112 access can be enjoyed by any citizen, not only the subscriber. If Ofcom does not regulate to mandate 999 / 112 access, VoIP providers or subscribers would be able to “free ride” by providing or using a service that doesn’t offer 999 / 112 access and relying on other providers or other citizens to allow them to make a 999 / 112 call, or on other citizens to make it on their behalf (see the Impact Assessment in the July 2007 Consultation, paragraph A5.13).
- 4.93 Ofcom is concerned that may put individual consumers and citizens at risk and cause the under provision of 999 / 112 access to society as a whole and that, without regulation, that situation will grow worse as VoIP develops and consumer take-up grows (see below).

Consumer and citizen confusion about 999 / 112 access from VoIP services

- 4.94 The second key reason Ofcom chose to mandate the Code of Practice was because, provided they were well-informed about 999 / 112 access, it considered it was likely consumers would strongly prefer services with 999 / 112 access, including if they cost more.

⁵⁴ <http://www.ofcom.org.uk/consult/condocs/voipregulation/responses/rnid.pdf>

⁵⁵ <http://www.ofcom.org.uk/consult/condocs/voipregulation/responses/rnib.pdf>

- 4.95 An industry-Ofcom working group was set up to draft the Code of Practice in 2005. Before compliance with the Code of Practice became mandatory in May 2007, many of the main industry players voluntarily provided information on 999 / 112 access on their website, in their terms and conditions and, for VoIP services without 999 / 112 access, when a user tried to call 999 or 112.
- 4.96 In the July 2007 Consultation, Ofcom acknowledged that it was too early to measure the impact of mandating the Code of Practice. However, at a time when consumer information was provided voluntarily, 64% of VoIP users surveyed in the October 2006 research were with a provider that did not provide 999 / 112 access. 78% of those thought that they were or didn't know. A total of 76% of all users surveyed were confused about whether they had access. 50% of all users were at particular risk because they were with a provider that didn't give 999 / 112 access but they thought that it did. In further research conducted in April-May 2007 only 14% of respondents with VoIP types 1, 2 or 4 were aware that there are some types of voice call that could not be made from VoIP. 21% didn't know if there were or not⁵⁶.
- 4.97 The October 2006 research suggested that, in general, there is a breakdown between the provision of information by industry and how that information is received or used by VoIP users. Ofcom cannot ignore the risk that, even when they are given full information, it may be inherently difficult for new customers to recognise the importance of 999 / 112 access (and information about it) because they have other more immediate priorities like price and daily functionality; 999 / 112 access is something they might need in the distant future, if at all.
- 4.98 The Home Office responded to the 2006 Consultation along those lines:
- “the services that did not provide “999 or 112” access would tend to be cheaper and the inability to call the emergency services might not be a paramount concern at the time of purchase”.
- 4.99 The RNID commented:
- “RNID does not believe that there is any evidence to support the notion that deaf and hard of hearing people will be informed suitably about the limitations of access to emergency services during the sales process and at the point of signature”.
- 4.100 Existing customers might not pay sufficient attention to information, fail to recall it at a later date or simply become confused in a stressful emergency situation when it is necessary to call 999 or 112.
- 4.101 Moreover, even if a VoIP provider provided full information to its own customers, other citizens might only realise they cannot access 999 / 112 from a VoIP service when they try to call 999 or 112. VoIP customers might not take into account the needs or awareness of visitors to their household like friends, relatives or a baby sitter, for example.
- 4.102 To inform other citizens if there is no 999 / 112 access, the Code of Practice requires VoIP providers to provide a physical label for equipment (on request) or information on the PC screen stating there is no 999 / 112 access and to play an announcement

⁵⁶ Survey conducted for Ofcom by Jigsaw Research, from a representative sample of 1050 telephone consumers in the UK, April-May 2007, unpublished. Question is based on a small sample of 83 respondents and therefore data is indicative.

each time a 999 / 112 call is attempted reminding the caller that 999 / 112 access is unavailable.

- 4.103 Some respondents to the 2006 Consultation considered those measures were inadequate given the risk of consumer detriment. The Home Office said:

“the person calling “999 or 112” might not be the one who purchased the phone and might not notice the sticker during the stress generated in an emergency; the sticker might not be in a language that the caller understood”.

- 4.104 ACPO responded:

“This evidently poses another concern as to who will be required to ensure the “sticker” is in place on the handset? What are the implications for the blind, those who have reading difficulties or those whose first language is not English?... handset labels can easily, and in the interest of aesthetics will, be removed”.

- 4.105 RNID said:

“obviously any spoken announcements about access to emergency numbers will not be heard by many deaf and hard of hearing people”,

and RNIB commented:

“a printed label is clearly inadequate for many people, especially as it could not be in very large type ... if you try to make an emergency call and are then met, in the best scenario, with a clear spoken network announcement, valuable time may have been lost”.

- 4.106 Because the October 2006 research suggests that there is a significant proportion of VoIP consumers that, knowingly or unknowingly, take a VoIP service without 999 / 112 access, Ofcom is concerned that will lead to the lower provision of 999 / 112 access than is desirable for society as a whole. Ofcom is also concerned about the risk that consumer or citizen confusion about the availability of 999 / 112 access over VoIP will lead to delays in successfully contacting the emergency services and result in harm.

Developments in VoIP take-up and technology

- 4.107 When Ofcom decided in favour of mandating the Code of Practice and against mandating 999 / 112 access over VoIP, it undertook to review its position as VoIP provision grew. There was a significant development in VoIP take-up and technology between the 2004, 2006 and July 2007 Consultations.

- 4.108 Ofcom’s communications tracking survey in Q4 2006 found that 10% of UK households said they used a VoIP service (approx. 2.4 million), which was twice the proportion for Q4 2005 (5% of UK households)⁵⁷. For context, Wholesale Line Rental (WLR) services are used by 2.3 million households, cable by 4.1 million households, and unbundled local loops (LLU) by 2 million premises.

⁵⁷ See the Ofcom *Research Report: Voice over Internet Protocol (VoIP)*, 26 July 2007, www.ofcom.org.uk

4.109 Also, VoIP voice services are becoming increasingly mainstream and less distinct from traditional PSTN services. In particular, UK and international trends suggest that VoIP providers that want to target the mass market will increasingly offer type 4 phone-based VoIP services that supplement or replace PSTN services⁵⁸. In the October 2006 research, although all the VoIP users surveyed had access to a landline or a mobile phone, 3% had no landline and 7% said they had a landline but did not use it⁵⁹.

4.110 In their response to the 2006 Consultation, ACPO raised the point that:

“At present it is assumed that VoIP systems will be used as secondary devices and so a traditional system offering full functionality will also be available ... The VoIP technology however directly competes with the functionality of landline systems, and to an extent for the nomadic systems with that of mobile telephony. Consumers do not like paying for the same service twice ... The timescale for the take-up of VoIP systems as the primary telecommunications device may therefore be much shorter than Ofcom is anticipating ...”

4.111 Moreover, Ofcom is aware that several PSTN and broadband providers are considering the business case for migrating customers from voice call services that use a PSTN fixed line to type 4 VoIP by using naked DSL⁶⁰ or LLU to provide a bundled voice and broadband service, with no PSTN service. That is likely to cause a step increase in the number of households with VoIP and reduce the number of households with a PSTN fixed line service, which is the principal source of 999 / 112 access at present.

4.112 Another point is that, as VoIP take-up grows, it will increasingly be used by less technology-aware consumers, so confusion could well increase. As VoIP is present in more homes and businesses, regardless of the other voice call services available at the same location, the risk of a consumer or citizen reaching for a VoIP service in an emergency that does not offer 999 / 112 access will grow.

Taking into account technology neutrality

4.113 In meeting our key policy objective of ensuring a high level of 999 / 112 access, Ofcom takes account of the desirability of regulating in a way that does not favour one technology over another or one means of providing technology over another (see Section 4(6) of the Act).

4.114 In the 2006 Consultation, Ofcom stated:

“Consumers benefit most when new technology can be adopted quickly, when regulatory rules do not prevent new services from being offered, and when competition between old and new services occurs on a level playing field. It is also important that as technology develops, measures to protect consumers are revised to ensure that they are still fully effective (paragraph 3.3) ...”

⁵⁸ For example, see *US Broadband Telephony Forecast, 2007 to 2012: Cable MSOs assert their dominance in the VoIP market, 2007*, JupiterResearch.

⁵⁹ See the Ofcom *Research Report: Voice over Internet Protocol (VoIP)*, 26 July 2007, www.ofcom.org.uk

⁶⁰ Naked DSL services use unbundled copper loops to provide a broadband only service, with no associated PSTN connection.

Ofcom has sought to strike a balance between creating a market where consumers' choices of new and innovative services as individuals are not constrained by regulation while society collectively continues to benefit from widespread availability of 999 / 112 access" (paragraph 3.23).

- 4.115 In the July 2007 Consultation, Ofcom considered, because of under provision of 999 / 112 access over VoIP, consumer and citizen confusion about 999 / 112 access over VoIP and the developments in VoIP take-up and technology, mandating 999 / 112 access over type 2 and type 4 VoIP services was necessary to reach a balance between enabling innovation, choice and competition and protecting consumers and citizens. In the past, there had also come a point when it was necessary to mandate 999 / 112 access over mobile PSTN services.

Ofcom's Impact Assessment

- 4.116 The July 2007 Consultation included an Impact Assessment to assess the potential benefits and costs of Option 2 as compared to Option 1. Specifically, the Impact Assessment considers the potential for Option 2 to save lives by reducing consumer confusion about 999 / 112 access over VoIP and resulting delays in contacting the emergency services.
- 4.117 The Impact Assessment found that, even using conservative estimates of benefits and high estimates of costs, the benefits for consumers and citizens of Option 2 would significantly exceed the costs for type 2 and type 4 VoIP providers. See the summary of the Impact Assessment in Section 6. The full Impact Assessment is in Annex 5 of the July 2007 Consultation.

Mandating 999 / 112 access over type 2 and type 4 VoIP

- 4.118 Option 2 relates to type 2 and type 4 VoIP services only. That is because there is an important difference in functionality between types 2 and 4 and types 1 and 3.
- 4.119 Type 2 and type 4 VoIP services allow users to make voice calls out to the PSTN but type 1 and type 3 do not (type 1 does not allow users to receive calls from the PSTN either). Ofcom considers consumers and citizens are, therefore, much more likely to expect to be able to make 999 / 112 calls out to the PSTN from a type 2 or a type 4 VoIP service than from a type 1 or a type 3 VoIP service and that lives within this group of consumers are not materially at risk because of confusion about whether to use a VoIP service to call 999 or 112.
- 4.120 Ofcom gave separate consideration to the case for mandating 999 / 112 access for type 2 VoIP services and for type 4 VoIP services. We recognise that there are some differences between these services, especially in terms of the service features and the regulations that apply to providers. We also note that, in the October 2006 research, 65% of households with VoIP claimed to have a type 2 or type 4 VoIP service⁶¹.
- 4.121 Ofcom considers it is most common for type 2 VoIP services to be PC-based. Type 4 VoIP services are often phone-based. The higher prevalence of PC-based services with type 2 VoIP might suggest consumers of those services are at less risk of reaching for a service in an emergency that does not offer 999 / 112 access: usually

⁶¹ The figures suggest some respondents use different types of VoIP in combination, especially with type 1.

their PC would have to be on and, especially where a headset is used, the service might “look and feel” less like a PSTN service, which would offer 999 / 112 access.

- 4.122 However, Ofcom considers any difference in service features or risk of consumer confusion between type 2 and type 4 VoIP services is likely to become negligible or disappear: traditional telephone handsets are increasingly capable of supporting type 2 or type 4 VoIP services and some new VoIP phones do not require the PC to be switched on in order to function. Trends in VoIP development suggest providers targeting the mass market will increasingly promote type 4 services.

Ofcom’s Policy Recommendation

- 4.123 Ofcom’s previous position of mandating consumer information about 999 / 112 access over VoIP allowed VoIP providers to innovate and develop, offering more consumer choice and increasing competition. The Code of Practice will continue to play an important role in providing information about 999 / 112 access and the standard of that access.
- 4.124 However, Ofcom considers the under provision of 999 / 112 access by VoIP services, consumer and citizen confusion about 999 / 112 access, and developments in VoIP take-up and technology mean that the Code of Practice will not be sufficient to ensure a high level of 999 / 112 access in the UK in the future. Option 2, which would apply in addition to the Code of Practice, would enable Ofcom to meet its policy aim of maintaining a high level of 999 access throughout the UK and to fulfil its overarching duty under the Act to protect consumers and citizens.
- 4.125 The six factors discussed in the section provide a robust rationale for Option 2. We consider it is likely to deliver significant benefits (lives saved), which would exceed the costs of compliance, as shown in the Impact Assessment.
- 4.126 Ofcom then asked respondents if they were in favour of Option 2.

Q.4 Do you have any comments on Ofcom’s evaluation of policy Option 2, which is to require VoIP services that allow calls out to ordinary numbers to allow 999 / 112 calls?

Respondents’ Views on Q.4

- 4.127 Around two-thirds of respondents to this question agreed with Ofcom’s evaluation of Option 2.
- 4.128 Respondents from industry, Government and the emergency services considered the consultation set out a sound evaluation of the preferred policy option and provided sufficient justification for its adoption. Emergency services respondents said the evaluation covered many of the concerns they had raised in the 2004 and 2006 Consultations and identified the clear benefits to public safety.
- 4.129 An industry respondent welcomed the cautious, conservative approach taken in the Impact Assessment assumptions, which gave the Impact Assessment greater credibility, as did the fact that the benefit was based on a very small proportion of 999 / 112 calls and was robust across a range of sensitivities. Another considered the cost-benefit analysis (CBA) demonstrated that it’s reasonable to expect VoIP providers to adopt or develop a system to provide 999 / 112 access, which in its experience, could be implemented cost effectively.

- 4.130 A trade association considered Ofcom's evaluation of the risks was realistic and, because end-user expectations differ between types of VoIP service, it was right to focus on type 2 and type 4 VoIP services, where the requirements are most needed.
- 4.131 One industry respondent agreed there's no solution to provide all users with sufficient, timely notification in emergency situations that a service doesn't offer 999 / 112 access without causing confusion and delay. It was nonetheless concerned that other parties regard VoIP services as inferior to traditional services and that that opinion is being transferred to the public. It considered VoIP, when implemented correctly, can provide a more reliable and higher quality service.
- 4.132 An industry respondent said that the proposed modification to GC 4 doesn't limit the requirement to provide 999 / 112 access to all VoIP type 2 and type 4 services but seems to apply to all PECS that allow calls to the PSTN. It asked Ofcom to clarify the scope of the proposal and how it links with the current PATS gating criteria.
- 4.133 Around one third of respondents to this question disagreed with Ofcom's evaluation of Option 2; they all came from industry.
- 4.134 Regarding stakeholder responses to the 2006 Consultation, an industry alliance said ACPO and the Home Office did not support Option 2 but the US FCC approach of imposing emergency services access on type 4 VoIP services only, with no auto-location requirement. It thought Option 2 would limit disability access to many type 2 services by limiting new technology that could be of use, e.g. video conferencing so deaf people can communicate in sign language.
- 4.135 An industry respondent and an industry alliance considered the evaluation of under provision of 999 / 112 access and consumer and citizen confusion was based on out of date or incomplete data, leading Ofcom to overestimate the need to impose 999 / 112 access. The alliance said there was no new data since March 2007 showing the current rules weren't working or that growing VoIP take-up would mean consumers had no 999 / 112 access. The industry respondent said there was no evidence consumers are confused about 999 / 112 access. It considered reversing policy could increase consumer confusion. A trade association considered many type 2 users are unlikely to want to be able to access 999 / 112. Ofcom has over-stated the risk given that users use their services infrequently. Instead of asking customers whether they think they have 999 / 112 access, Ofcom should have asked whether they intend to use their VoIP service to call 999 / 112. If Ofcom decides on mandatory provision, it must ensure it will achieve the desired objective.
- 4.136 One industry respondent that did not provide 999 / 112 access said that was not related to "free-riding". It considered providing 999 / 112 access would be irresponsible. Because it provides a peer-to-peer software application and relies on the Internet, users' PCs, the underlying network and power supply, the respondent considered it could not guarantee call completion. Also, many people (colleagues, friends, family) around the world can share its user IDs and credits meaning that call origination and routing could send requests to the wrong emergency response centre and it cannot provide caller identification or location information.
- 4.137 Regarding developments in VoIP take-up, an industry respondent noted Ofcom's Communications Market Report 2007 stated that VoIP users are more likely to have a fixed line and use of a mobile, and therefore sources of 999 / 112 access, than the average UK adult and the October 2006 research stated that all respondents had access to a landline or a mobile, and thus weren't relying on VoIP as a replacement for traditional voice call services. The industry alliance commented that Ofcom's

October 2006 research hadn't measured users' expectations of 999 / 112 access for supplementary and replacement VoIP services separately.

- 4.138 The industry alliance considered the Communications Market Report 2007 showed a low level of VoIP use for calling the PSTN and that few users used VoIP daily as it considered they would use a traditional home phone. It said the data on VoIP take up in Ofcom's Communications Market Report 2007 conflicted the research relied on in the July 2007 Consultation.
- 4.139 On the development of VoIP technology, an industry respondent said Ofcom's light-touch approach to VoIP regulation has allowed the VoIP market to grow, especially types 1, 2 and 3 where most calls are PC-based, don't resemble a PSTN service and use a PC-based USB VoIP telephone; Option 2 may decrease competition and innovation.
- 4.140 The industry alliance considered as VoIP matures, type 2 VoIP services in particular will become more distinct from PSTN services by incorporating features not possible over the PSTN. It considered "type 2" would catch "Click to Call" services that do not generate user expectation or user confusion about 999 / 112 access. An industry respondent said Ofcom seemed to be taking traditional phone services as a reference for defining or regulating VoIP, which was backward-looking and had no regard for VoIP's technical characteristics and user behaviour. It considered that, in the near future, most consumers or employees would use multiple distinct fixed and mobile voice applications, e.g. voice modules in office software applications for collaboration, in CRM and ERP packages or in social networking sites, websites and games. It considered users don't perceive these voice applications as "telephone services" and don't expect 999 / 112 access.
- 4.141 The industry alliance agreed with Ofcom's evaluation that type 4 VoIP services are likely to replace traditional PSTN services in the future but considered type 2 VoIP services would not: they are marketed and perceived as supplementary to PSTN services so customers don't terminate their fixed line when they take up type 2 VoIP; research shows that, out of a range of new communications technologies, "IP telephony using PC" has one of the lowest impacts on replacement of "wireline calls" (3%)⁶²; it is free to use, PC-based, has a software interface, microphone and PC speakers; users expect low call quality and lack of reliability from free services.
- 4.142 An industry respondent said the evaluation should have explained the needs of the emergency services. Another said it should have dealt with the limitations on caller location information from nomadic or mobile VoIP services.
- 4.143 On European and international regulation, summarised in the Background section of the July 2007 Consultation, the industry alliance and an industry respondent said there isn't broad consensus among national regulators. The alliance considered Ofcom's poll and characterisation of obligations in other countries was inaccurate: the poll of other European regulators was artificial because Ofcom had applied a "self-created" type 2 category; the German regulator hadn't decided whether to impose 999 / 112 access on substitute VoIP services; Canada imposes emergency services access on type 4 services only.

⁶² J.D. Powers and Associates "Session on Competition in Applications and its Implications for Traditional Telephony Services (i.e. the Impacts of IM, e-mail, VoIP on Voice Telephony in particular) – Impact of Competition thus far", *Incidence of Alternative Methods Replacing Wireline Calls (All Wireline)*, KMB Video Conference, 8 May 2007. IP Telephony using PC (3%) is compared to E-mail (48%), Wireless Phone (31%), Instant Messaging (22%), Pre-paid phone card (18%), Dial-around service (4%), Post-paid phone card (issued by LD company) (2%).

Ofcom's Views on Responses to Q.4

- 4.144 We agree with the comments made in support of our evaluation of policy Option 2.
- 4.145 In response to the comment that some parties regard VoIP as inferior to traditional services, we agree that VoIP services can offer significant benefits to consumers (see paragraph 3.8) and we recognise that the Internet was designed to be highly resilient. We welcome the provision of high quality and reliable VoIP services.
- 4.146 The proposed modification to GC 4 related to all PECS that allowed national and international calls. We recognise that it's important to ensure we don't capture services that we consider don't create a material user expectation or risk of confusion about 999 / 112 access, in order to better reflect our policy objective. We have, therefore, refined the modification to GC 4 to exclude "Click to Call" services. They are services that can be selected on a website or other application to connect to a number or a limited set of numbers pre-selected by the provider or the user. We have also limited the requirement to VoIP services that allow calls to national, or national and international, numbers, to exclude services that allow calls to international numbers only. See paragraph 4.181. Some type 4 VoIP services are likely to meet the PATS gating criteria as a result of providing 999 / 112 access and will have to comply with the PATS GCs.
- 4.147 Turning to the respondents that disagreed with Ofcom's evaluation of Option 2, a respondent said that ACPO and the Home Office supported requiring 999 / 112 access for type 4 VoIP services only. We don't agree with that assertion: in its response ACPO supported Option 2 and did not propose any other policy options for consideration. The Home Office response came from the Covert Investigation Team. It suggested Ofcom should consider a graduated approach to adopting Option 2 by requiring 999 / 112 access for type 4 services first because it considered they generate greater risk of consumer confusion than type 2 services. In addition, Communities and Local Government, in relation to the emergency services, and Ambulance Policy at the Department of Health supported Option 2.
- 4.148 Regarding caller location information, we do not propose an auto-location requirement at this time because that isn't technically feasible, as required by GC 4. We will keep what "technically feasible" means under review. See Section 5.
- 4.149 We consider Option 2 would meet the concerns regarding disabled users raised by RNIB and RNID in response to Ofcom's 2006 Consultation. Based on our Impact Assessment, we consider the costs of compliance with Option 2 would not be sufficient to significantly harm innovation and that they would be significantly outweighed by the user benefits.
- 4.150 In response to the submission that there is no new research since the March 2007 Statement on the provision of 999 / 112 access or consumer confusion, we acknowledged in the July 2007 Consultation that it was too early to measure the impact of mandating the Code of Practice (July 2007 Consultation, paragraph 4.30). But we consider the results of the October 2006 research are relevant because industry provided customer information on 999 / 112 access on a voluntary basis following the 2004 Consultation. In that research, 76% of VoIP users surveyed were confused about whether they had 999 / 112 access. Therefore, we consider Option 2 would not increase consumer confusion but rather it would ensure that VoIP services meet existing consumer and citizen expectations.

- 4.151 To estimate the number of households that have VoIP in the UK, we only considered households that had and were currently using VoIP. We consider that is the driver of the risk of confusion that might lead to delays in contacting the emergency services, and not sole or main use of a VoIP service.
- 4.152 While Ofcom's communications tracking survey 2007 estimated that 14% of VoIP users use it every day, it also estimated that 30% use it several times a week and 26% at least once a week, making a total of 70% of VoIP users using the service at least once a week⁶³.
- 4.153 Even if they don't intend to use a VoIP service to access 999 / 112, Ofcom considers there is a material risk that, in a stressful emergency situation, a VoIP customer or another user will reach for a VoIP service without 999 / 112 access to call the emergency services. Moreover, the Impact Assessment estimated the costs and benefits of a user reaching for a VoIP service instead of a fixed or mobile PSTN service in only 1/100 cases and still found that the benefits of Option 2 would significantly outweigh the costs of industry compliance (see the Impact Assessment in the July 2007 Consultation, from paragraph A5.162).
- 4.154 We will monitor and review our policy and its implementation to ensure our policy objective is met.
- 4.155 Regarding the response that providing 999 / 112 access from a peer-to-peer VoIP service would be irresponsible, the emergency services and Government consider it's better for public safety for VoIP services to provide 999 / 112 access with limitations than no 999 / 112 access. Similarly, mobile PSTN services provide 999 / 112 access where there is network coverage. Currently, caller location information is either provided by the caller or can be narrowed down to a network cell. We consider the requirements allow for the features and limitations of how VoIP services are able to provide 999 / 112 access. Type 2 VoIP providers aren't subject to GC 3; type 4 PATS providers at a fixed location are. All providers should carry out a formal risk assessment on network integrity, including a risk mitigation strategy, as set out in the Guidelines. Regarding caller location information under GC 4, for mostly fixed services we would expect a registered address and VoIP flag on the emergency call handling database. For mostly nomadic or mobile services we would expect a VoIP flag only. The flag would prompt the call handler to ask for the caller's current location. We support and encourage ongoing standards work to develop an improved caller location information solution, for example by NICC. See from paragraph 5.39.
- 4.156 The Communications Market Report and the October 2006 research used the same data on VoIP households' access to a landline or mobile phone and frequency of use of the VoIP service; they do not conflict.
- 4.157 Although all of the VoIP users surveyed said they had access to a landline or a mobile phone, 3% said they had no landline and 7% said they had a landline but didn't use it. Even where another voice call service is available, we are concerned that, in a stressful emergency situation, a user might attempt to access 999 / 112 from a VoIP service without access and lose valuable time in contacting the emergency services⁶⁴.

⁶³ See The Communications Market 2007 at http://www.ofcom.org.uk/research/cm/cmr07/cm07_print/

⁶⁴ The research referred to in paragraph 4.142 found that the amount of replacement of "wireline" communications by VoIP "could change as 51% of users said they'd use it More Often".

- 4.158 On “light-touch” regulation to allow the development of VoIP technology, we consider the increasing take-up of VoIP services, under provision of 999 / 112 access and consumer and citizen confusion about 999 / 112 access meant that it was time to propose Option 2 to meet our policy aim of maintaining a high level of 999 access throughout the UK and fulfil our overarching duty under the Act to further the interests of citizens and the interests of consumers, where appropriate by promoting competition (Part 1, Art.3(1)).
- 4.159 The emergency services need all citizens to be able to contact them quickly and easily in an emergency. Ideally they also need caller location information; we support current standards work to improve what is technically feasible.
- 4.160 Lastly, Option 2 is consistent with ERG discussions and regulation in many European and other countries with high broadband penetration. The VoIP categories used in this Statement are used by the ERG. The information in Section 3 was provided by the National Regulatory Authorities concerned. Germany did not provide information on whether it requires 999 / 112 access for type 2 VoIP services; it said it does require access for type 4 services. Canada requires 999 / 112 access for type 2, 3 and 4 VoIP services⁶⁵. See from paragraph 3.46.
- 4.161 In the July 2007 Consultation, Ofcom asked if respondents were in favour of policy Option 2.

Q.5 Do you agree that Ofcom should adopt policy Option 2? Please give your reasons.

Respondents' Views on Q.5

- 4.162 A significant majority of respondents to the July 2007 Consultation considered Ofcom should adopt Option 2, although some respondents suggested refining the draft modification to GC 4 implementing the policy. Responses in favour of Option 2 came from industry, Government and the emergency services.
- 4.163 Respondents from the emergency services considered Option 2 would address the concerns they set out in response to the 2006 Consultation; it's essential for public safety that anyone with access to a phone can call 999 / 112, irrespective of the technology and the caller's age, race, disability or prior knowledge of the equipment; public expectations regarding the availability of 999 / 112 access should be met.
- 4.164 A professional body for engineering and technology considered VoIP is the likely future direction of all telephone communications; it's essential an emergency number is preserved; the challenges of providing 999 / 112 access are best undertaken when the technology is still in its infancy. It considered most of the public couldn't be expected to differentiate between VoIP and non-VoIP services, especially in an emergency when speed of summoning help is crucial.
- 4.165 A trade association considered appropriate levels of 999 / 112 access are key to public safety and Ofcom's proposal would help to remove the end-user confusion and misunderstanding identified in Ofcom's research. It also supported Ofcom's commitment to regulating in a way that doesn't favour one technology over another, especially for VoIP services as regards service reliability and caller location information.

⁶⁵ Except long distance only services.

- 4.166 One industry respondent said it's essential VoIP regulation takes a balanced approach to competition and consumer protection. Various industry respondents considered Option 2 provides the level of consumer protection required due to end user confusion and the increasing take up of VoIP, especially as a replacement for PATS services, where they considered the risk of harm is greatest. Another said that in its experience, most users, especially business users, aren't aware or concerned about whether they are using a VoIP or PSTN service; it's imperative that 999 / 112 access is transparent for users. One considered Ofcom has no choice but to adopt Option 2 because the marketplace hasn't changed in the way the public expects; providers that might have gained market share by offering a product without 999 / 112 access and might not have ensured end users are aware of that difference would have to invest to bring their product into line.
- 4.167 One industry respondent considered that providers that seek to position themselves as offering a comparable service to fixed and mobile PSTN providers should be subject to the same obligations; the contrary would be unfair and discriminatory.
- 4.168 An industry respondent and a trade association considered Option 2 would bring the UK in line with national regulation in many other EU Member States and with the ERG's proposal. The industry respondent welcomed Ofcom's international approach and supported a harmonised approach by international regulators. It commented that Option 2 should apply to all services made available to UK consumers, irrespective of the provider's location, as otherwise providers might seek to avoid compliance by being offshore.
- 4.169 One industry respondent noted that the proposed modification to GC 4 didn't limit the requirement to provide 999 / 112 access to type 2 and type 4 VoIP services but appeared to apply to all PECS that allow users to make calls to the PSTN. They asked Ofcom to clarify the scope of the proposal and how it links to the current PATS gating criteria. Another suggested creating a new type of VoIP product, type 5, for large corporate products consisting of a VoIP overlay that interface with PBXs and provide 999 / 112 access over the PSTN, meaning there's no need to provide 999 / 112 access on the VoIP overlay. It noted there are already provisions on 999 / 112 access to the PSTN from large private networks across several sites and suggested Ofcom refresh guidance published as the Code of Practice for Private Telecommunications Networks (NICC, ND1406:1997/10).
- 4.170 A trade association reiterated its suggestion that Ofcom should consider '112' services and the '116XXX' range recently mandated by the EU Commission. The outcome of this Consultation should consider any known future services related to must carry obligations and any overheads that may follow.
- 4.171 An industry respondent said it would like Ofcom to provide clear guidance on the regulations and guidelines to avoid confusion.
- 4.172 The respondents that considered Ofcom should not adopt Option 2 all came from industry.
- 4.173 A couple of respondents considered Option 2 would put VoIP in the same category as PSTN services, which could contradict provider messages that 999 / 112 access is not available and increase the risk to the public, especially as VoIP spreads to less technology-aware users.
- 4.174 One considered some users wouldn't understand VoIP is less reliable in an emergency because it is reliant on a power supply, unlike a PSTN line. DECT

phones are an exception but VoIP is also reliant on broadband access and computer operating systems. It considered VoIP technology has not changed enough since the 2006 Consultation to warrant a change in policy.

- 4.175 A couple of respondents considered Option 2 could increase risk of confusion and delays because the draft modification to GC 4 fails to take account of the technical characteristics of different VoIP services and the diversity of supply of 999 / 112 access. Consumers could expect to access 999 / 112 from a PC, webpage, TV, etc and be confused about what web pages and applications would allow them to do so.
- 4.176 An industry alliance considered adopting Option 2 would be inconsistent with Ofcom's statutory duties and principles: ensure a wide range of ECS; seek the least intrusive regulatory mechanisms to achieve policy objectives; aim to remain at the forefront of technological understanding. It might cause existing services to withdraw from the market and it would seriously stifle new services; it isn't the least burdensome option for industry; it ignores technical realities.
- 4.177 A couple of industry respondents considered Option 2 could undermine the vital, growing function that VoIP services fulfil in emergency situations because of the resiliency and redundancy of IP networks e.g. after the 7 July 2005 attacks in London, VoIP voice calls were possible when other services were down. VoIP-based emergency communications networks that can re-route around infrastructure failures during disaster response and recovery would ensure hardier networks and more reliable 999 / 112 access.
- 4.178 The industry alliance thought adopting Option 2 would limit disability access to many type 2 services by limiting new technology that could be of use, e.g. video conferencing so deaf people can communicate in sign language.
- 4.179 One industry respondent considered it may be too early to adopt Option 2 for type 2 services; Ofcom should promote 999 / 112 access and adopt Comreg the Irish regulator's approach to ensure "best endeavours". But it considered Option 2 would be an important step for type 4 VoIP services by requiring VoIP services that look like a traditional phone to act like one.
- 4.180 An industry respondent said, if Option 2 can't be enforced on all providers, including those based overseas, Ofcom could create consumer expectation and confusion about 999 / 112 access. It considered if Ofcom succeeded in enforcing it, providers would be likely to avoid locating in the UK and seek to block access to their VoIP services from the UK, restricting innovation.

Ofcom's Views on Responses to Q.5

- 4.181 We agree with the responses in favour of adopting Option 2. We also agree that the modification to GC 4 implementing Option 2 should be refined. The proposed modification to GC 4 related to all PECS that allowed national and international calls to numbers in a national or international numbering plan. It's important to ensure we don't capture services that we consider don't create a material user expectation or risk of confusion about 999 / 112 access, in order to better reflect our policy objective. We have, therefore, excluded "Click to Call" services, which we define as services that can be selected on a website or other application by a user and that only connect the user to a number or a limited set of numbers pre-selected by the provider or the user.

4.182 To aid understanding, the definition of “Click to Call Service” in the modification to GC 4. 2 covers the following examples:

- a commercial website that provides a button for users to click on to speak to a member of the company’s customer services team or an on-line game that provides a button in an advertisement for users to click on to order a product, i.e. the user can only select the service to call one number that is pre-selected by the provider;
- an application that can be selected by a user and that connects them to other users that use the same application. For example, an application that gives users a local number to use to call other users and, when it is dialled, connect the call to each user’s PSTN phone. Or a “call me” button on a user’s blog or in a virtual world on the Internet that connects a call to the user’s PSTN phone when another user clicks on it. In these cases, the user can only select the service to call a number or set of numbers that have been pre-selected by users of the same application.

4.183 We have also clarified that the modification applies to VoIP services that allow calls to national, or national and international, numbers⁶⁶. The previous wording, “a Public Electronic Communications Service enabling origination of national **and** international calls”, would have meant that services allowing users to make national calls only, or international calls only, would not have been caught by the requirement to provide 999 / 112 access. We consider consumers and citizens are significant risk of expecting to be able to call the emergency services from a VoIP service that allows them to make national or national and international calls, but not where the service only allows them to make international calls.

4.184 See Annex 1 for the full modification to GC 4.

4.185 For clarity, in respect of corporate products consisting of a VoIP overlay that interface with a PBX and provide 999 / 112 access over the PSTN, the modification to GC 4 does not have the effect of requiring providers to provide 999 / 112 access over the VoIP overlay as well. GC 4 requires communications providers to ensure end users have 999 / 112 access – it does not require them to provide 999 / 112 access over every component of a communications solution. So in this case, providing 999 / 112 access over the PSTN component of the product meets the GC 4 requirement. The NICC Code of Practice for Private Telecommunications Networks remains in effect.

4.186 We set out further guidance on complying with the modification to GC 4 in Section 5 of this Statement.

4.187 Regarding the respondents that considered Ofcom should not adopt Option 2, we disagree that requiring 999 / 112 access will increase risk to the public by contradicting provider messages that access is not available. We consider users, especially those that are less technology-aware, are likely to expect a service that allows national calls out to the PSTN to allow 999 / 112 access. VoIP is currently the only public voice call service in the UK that is not required to allow 999 / 112 access. The October 2006 research found that 78% of VoIP users without 999 / 112 access thought they did have access or didn’t know. We consider requiring access will reduce confusion by meeting consumer expectations.

⁶⁶ “national” includes local numbers.

- 4.188 On network integrity and service reliability, type 2 VoIP providers aren't subject to GC 3; providers of type 4 PATS at a fixed location are. However, all providers should carry out a formal risk assessment, including a risk mitigation strategy. PATS providers should take all possible steps to ensure network integrity and reliability and to the greatest extent possible, but only for the aspects of the network that they control. The Code of Practice will remain in force to inform customers about the features and limitations of VoIP services, including their reliance on a power supply and broadband access. The Code of Practice will be revised and updated to coincide with the entry into force of the requirement to provide 999 / 112 access. We consider it's safer for users to have 999 / 112 access with some limitations than no 999 / 112 access. The emergency services agree.
- 4.189 We consider VoIP take-up, services and technology have changed sufficiently since the 2006 Consultation to justify a change in policy. In the 2006 Consultation, when we proposed mandating the Code of Practice and not mandating 999 / 112 access over VoIP, we undertook to review our position as VoIP provision grew. In Ofcom's communications tracking survey, 10% of UK households said they used a VoIP service (approx. 2.4 million) at the end of 2006, twice the proportion for the end of 2005 (5% of UK households). For context, WLR is used by 2.3 million households, cable by 4.1 million households, and LLU by 2 million premises (of which just over 500,000 are MPF). Furthermore, VoIP voice services are becoming increasingly mainstream and less distinct from traditional PSTN services. In the October 2006 research, although all the VoIP users surveyed had access to a landline or a mobile phone, 3% said they had no landline and 7% said they had a landline but did not use it. Regarding technology, traditional telephone handsets are increasingly capable of supporting type 2 or type 4 VoIP services and, for type 2 services, some new VoIP phones don't require a PC to be switched on in order to function. We consider any difference in service features or risk of consumer confusion between type 2 and type 4 VoIP services is likely to become negligible or disappear as a result.
- 4.190 Regarding its consistency with Ofcom's statutory duties and principles, we consider Option 2 will further the interests of citizens and consumers by reducing the risk of confusion about 999 / 112 access over VoIP leading to increased delays in contacting the emergency services. The Act says we should further the interests of consumers, where appropriate by promoting competition. The Impact Assessment assessed the potential impact of Option 2 on competition or innovation and found that they would not be significantly affected. See Section 6, especially from paragraph 6.26.
- 4.191 We aim to remain at the forefront of technological understanding – we invited information on caller location information and network resilience in the July 2007 Consultation and met various stakeholders. We participate in the NICC's work, including its standards work on caller location information from VoIP.
- 4.192 We take account of the desirability of regulating in a way that does not favour one technology over another or one means of providing technology over another (Section 4(6) of the Act). In doing so, we seek to take account of the different characteristics of the products we regulate and adapt regulation where appropriate, e.g. by withdrawing the Essential Requirements Guidelines and issuing the Guidelines in the March 2007 Statement, which cover caller location information (GC 4) and network reliability (GC 3) for VoIP providers.
- 4.193 We don't agree that Option 2 will undermine the role of VoIP in emergency situations because the Impact Assessment found that Option 2 will provide important benefits for consumer and citizen safety and will not significantly affect innovation.

- 4.194 On disability access, we consider Option 2 will meet the concerns raised by RNIB and RNID in response to our 2006 Consultation. We welcome improvements in disability access to communications services. Based on the Impact Assessment, we consider the industry costs of complying Option 2 will not be sufficient to significantly affect innovation and the benefits for all users will be significantly greater.
- 4.195 Ofcom will seek to enforce GC 4 against providers that provide services in the UK, regardless of where they are based. As regards providers relocating, Option 2 is in line with the ERG's draft common position on VoIP and the current situation in many EU Member States and other countries where broadband penetration is high.

Section 5

Mandating access to the Emergency Services

Introduction

- 5.1 As a result of the July 2007 Consultation, Ofcom considers that, in addition to mandating the Code of Practice in its March 2007 Statement, it should extend the GC 4 requirement to ensure any user can access 999 / 112 from PATS at no charge to all PECS that allow national calls to be made, excluding "Click to Call" services. That means that type 2 VoIP services and type 4 VoIP services that allow national calls to be made, except "Click to Call" services, must provide 999 / 112 access. Annex 1 contains a marked up version of GC 4 showing the changes. Annex 2 contains the Notification of the modification under Section 48(2) of the Communications Act 2003.
- 5.2 The requirement will enter into force on **8 September 2008**.
- 5.3 This section will consider some of the practicalities for VoIP providers of complying with the modified GC 4.

Complying with GC 3, the proposed modification to GC 4 and the Code of Practice included in GC 14

- 5.4 The following sections set out the standards VoIP providers have to meet regarding providing caller location information (GC 4) and ensuring network integrity and service reliability (GC 3). The Code of Practice (part of GC 14) contains additional obligations.
- 5.5 It should be noted that these measures are already in force for the VoIP providers that provide 999 / 112 access. The impact of mandating 999 / 112 access for most type 2 and all type 4 VoIP providers is that those that do not currently provide 999 / 112 access also have to comply with the relevant standards.

Caller location information

- 5.6 To meet the modified GC 4, providers have to enter into an agreement to interconnect with a network for emergency services access (directly with BT or C&W or indirectly through a third party). GC 4 requires providers of a Public Telephone Network (PTN) to make caller location information available to the emergency services handling a 999 / 112 call, to the extent technically feasible. So providers are obliged to provide those interconnecting networks with location information, to the extent technically feasible.
- 5.7 Ofcom recognises that some VoIP providers are concerned about providing caller location information to the emergency services because they often offer geographical numbers for use outside of their usual area, e.g. a VoIP consumer registered in Manchester can request a Bristol number. Moreover, for nomadic or mobile VoIP services, the provider cannot be sure where the user will call from.
- 5.8 Ofcom's *Guidelines on the application of PATS obligations to VoIP service providers* (the Guidelines) set out in the Annex 5 of the March 2007 Statement entered into

force on 29 March 2007. They describe Ofcom's approach to applying certain requirements of GC 3 and GC 4 to VoIP providers by providing clarity on some of the legal concepts and by describing the factors Ofcom would take into account when investigating possible contraventions.

5.9 On the provision of location information, the Guidelines provide that (from paragraph A5.81):

"A5.81 It is possible for a VoIP service provided over a xDSL, cable modem or Wi-Fi broadband connection to provide its location or location of its associated broadband access network termination point in a number of ways, as outlined below. This information could then be passed directly to the emergency operator service. Some options on how this could be provided are discussed below.

A5.82 The simplest approach is for the emergency operator (the operator who receives the 999 or 112/112 call in the first instance), to request location information when the call is received. They could be prompted to do this in the case of a 999 / 112 call by use of a flag that highlights that the call is from a VoIP service.

A5.83 A second broad approach is for the user to input location details prior to using the VoIP service. This information could then be matched against the E.164 number when a call is received by the emergency operator. For this approach to be effective location information would need to be obtained from the VoIP user prior to calls being made and this information would need to be populated in the emergency operator database and matched against the E.164 number received. In addition the E.164 number could be flagged as being from a VoIP service which could prompt the emergency operator to confirm the location with the caller.

A5.84 Where a service is used in a nomadic manner (i.e. there are multiple locations that the VoIP service is being used from) then the user would need to input location information at each new location they are at. This could be facilitated by the VoIP service provider requesting their customer to periodically update the location at which they are using the service, or for the VoIP service provider to monitor the customer's IP address and request revised location information when the IP address changes.

A5.85 A third approach is to use the IP network and IP addressing to provide location information. Location based solutions are used in the commercial world in particular with respect to control of TV content rights and ecommerce. The BBC uses software which locates an IP address down to city/country level in the UK. They use this to be able to restrict access to certain content rights (e.g. where the rights are for UK only) and users are only allowed to view the content if their source IP address matches part of the IP address range assigned to UK. In the US similar software and topology information is used to stop baseball matches being shown 'live' to internet subscribers living near baseball grounds with granularity achieved down to zip code level.

A5.86 The granularity of such a solution could reach the targets required by emergency services but only if ISPs collaborate in providing IP address and topology information to a central database. It would be of interest to understand how granular can location be made based on IP v4 addressing. Ofcom understands that such a solution would be constrained by the use of private addressing and NAT. However, it is likely that that future NGN deployment will largely use IPv6 so that a higher level of granularity could be achieved. Standards work to provide location in IP network is ongoing, NICC has a working group looking at providing location in IP networks, as indeed has ETSI and the IETF, eCall proposals from the EC propose a minimum data set, including location, should be provided to support the emergency services across Europe.

A5.87 Another approach could be to incorporate GPS/A-GPS or other GNSS (such as Galileo) receivers in the broadband adaptors which provide connectivity for the voice service. It is worth noting however, that GPS receivers suffer from the limitation that indoor coverage is problematic, not many users would attach an external antenna and CPE cost would increase.

A5.88 Another alternative would be for all 999 / 112 calls to be made from a PSTN line in the case where a PSTN line remains in place. This could be done by using intelligence in a broadband adaptor (when using xDSL service) to force all 999 / 112 calls to PSTN line. This solution enables the continued provision of location to the emergency services based on the PSTN network termination point and associated service location”.

5.10 The Code of Practice under GC 14 requires VoIP providers to give domestic and small business customers information on emergency location information (from paragraph 12):

“12. In respect of Emergency Location Information:

a) where the Service provided by the Service Provider does provide access to Emergency Calls and the Service is to be used principally at a single fixed location, the Service Provider shall require its Domestic and Small Business Customers to register with it the address of the place where the Service is going to be used prior to activation of the Service (the location information), so that up-to-date location information can be used for Emergency Location Information;

b) where the Service Provider has reasonable expectation that, or has been informed that, the service is to be accessed from several locations, the Service Provider shall recommend that its Domestic and Small Business Customers register and update the location information with it, whenever accessing the Service from a new location, so that up-to-date information can be used for Emergency Location Information;

c) the Service Provider shall advise its Domestic and Small Business Customer at the Point of Signature, in any User Guide, and in any Terms and Conditions of Use of any limitations on the location

information that will be provided to the Emergency Services as Emergency Location Information, if the location information they have provided is not up-to-date. This advice shall be clear and readily accessible;

d) where the Service Provider does not provide Emergency Location Information, it shall provide clear and easily accessible information to this effect to all Domestic and Small Business Customers at the Point of Signature, in any User Guide, and in any Terms and Conditions of Use. The same information shall also be made available to prospective Domestic and Small Business Customers as part of the Sales Process”.

- 5.11 In the July 2007 Consultation, Ofcom said it understood the approaches used by VoIP providers that provide 999 / 112 access were for the emergency operator to request location information when the call is received or for the user to input location details before using the VoIP service, and to keep those updated. IP address tracking and GPS were under development but are not, to the best of Ofcom’s understanding, technically feasible. Ofcom said it would continue to discuss the practicalities of providing caller location information over VoIP with VoIP providers and the emergency services. The priority for the emergency services was that a high level of 999 / 112 access is maintained.
- 5.12 Ofcom said that, in any case, PSTN mobile phone users have 999 / 112 access where they have coverage and also have to give their location when calling because the location information available over mobile networks is usually limited to cell site information and cannot necessarily pinpoint a specific address.
- 5.13 Ofcom then invited information on the current means and future possibilities and limitations for providing caller location information.

Q.6 Ofcom invites information on (a) the current means, future possibilities and limitations for providing caller location information

Respondents’ Views on Q.6(a)

- 5.14 The Guidelines discuss various methods of providing caller location information. There was general consensus that the only options that are currently technically feasible are for VoIP users to be flagged on the Emergency Services Database (ESDB) to prompt the operator to ask for the caller’s location, or for the ESDB to contain the VoIP user’s registered address and a VoIP flag to prompt the emergency call handling operator to verify that is the caller’s current location.
- 5.15 A trade association and two industry respondents commented that the March 2007 Statement drew valid parallels with 999 / 112 access from mobile PSTN services because “where technically feasible” applied in the past and caller location information is not yet as precise as for fixed PSTN services. Respondents welcomed Ofcom’s commitment to take account of the desirability of regulating in a way that doesn’t favour one technology over another.
- 5.16 A respondent that provides an emergency call handling service explained how it currently works: the ESDB is pre-loaded and updated at least every 24 hours with the registered name and address of VoIP customers. The calls and address records are flagged in ESDB as needing confirmation. Providers that use the call handling service can download name and address data up to 4 times a day to ESDB and flag

an address as VoIP. 999 / 112 calls emerge from the IP environment to the PSTN at the PSTN-IP Gateway (PIG), where the provider providing the PIG, which might be the original VoIP provider or an aggregator providing the PIG to a number of VoIP providers, is requested to tag the calls as VoIP-originated. If available, the user's Caller Line Identification (CLI) or E164 number is carried into the PSTN leg of the call. Calls arrive at the 999 / 112 operator centre and are flagged to operators as a VoIP emergency call. The operator asks the caller for verbal confirmation of their location. The operator connects the call as normal or, if the caller has moved their phone (currently unlikely), searches for the nearest Emergency Control Room to route the call to.

- 5.17 Another emergency call handling service provider considered our proposals don't go far enough in providing emergency operators with a means to call back. It commented that fully enforcing NICC document Requirements on Communications Providers in relation to Customer Line Identification Display Services and Other Related Services (ND1016:2004/09) would partly resolve the question of caller location information for 999 / 112 access and security. But the emergency call handling service provider would still require independent means of identifying location due to nomadic or mobile use.
- 5.18 A trade association commented that providers should be required to pass on address information as provided by customers; they can't always verify its accuracy. It said the emergency call handling service providers require VoIP providers to use dedicated links or prescribed secure software to provide location information. It considered they should review their processes to enable providers to send location information more easily and cheaply; customers should be able to provide their information over a standards-based Internet connection. Another respondent suggested Ofcom pressure emergency call handling service providers to provide a standardised, real-time interface for VoIP providers to provide location information, e.g. using SIP.
- 5.19 Various respondents stressed the importance of periodically reviewing what "technically feasible" means. An emergency services respondent considered guidance on interpreting "where technically feasible" might be necessary; cost, while significant, is not necessarily a technical constraint. An industry respondent flagged that the choice of standard or process will be influenced by market-driven requirements. An industry respondent said "technically feasible" must not be used as a "get out" clause and there must be a consistent approach to the provision of location information between different types of communications provider.
- 5.20 Considering other options, a professional body for engineering and technology suggested that fixed VoIP services should require the user to enter their postcode and property number at the time of installing the VoIP equipment and service. The user provided 'location' data would be stored locally in non-volatile memory (the 'location' data should typically be less than 16 characters), be automatically retrieved when 999 or 112 is rung and be inserted in the outgoing data stream as a plurality of whole data 'location' bursts during the emergency call. The emergency service provider would be progressively equipped with the means to decode these 'location' bursts and interpret them using the national postcode database to obtain location information. It would seek location confirmation during the call. The 'location' burst data might require identifying descriptor bit sequences, which may increase the 'location' burst to greater than 16 characters in size. The user provided data would need to be secure and only capable of being retrieved by dialling 999 / 112 at the VoIP installation i.e. not capable of external activation and interrogation. Means would need to be provided for the location data to be amended if the VoIP installation

changed location. Nomadic and mobile VoIP services would need to automatically raise a flag with the emergency service provider to prompt the caller for location information.

- 5.21 An emergency services respondent said the option of nomadic users inputting their location at each location (A5.84) might be inaccurate. An industry respondent and two trade associations considered it would be impractical. One respondent considered users would view requests for address information as disruptive; regulation or education wouldn't change that. Users might enter any data just to access the service – providers must find a simple process or not involve the user. The trade association said it would require the VoIP provider to pass frequent updates to the emergency call handling service, which may not be possible unless the interface is automated. Even if they provide the initial registration address over an automated interface, providers are unlikely to have an automated process for providing updates.
- 5.22 One industry respondent considered the option of using IP addresses (A5.85-86) is imperfect because location information is often inaccurate and a high percentage of residential DSL customers are allocated IPs from a common pool. Because DSL circuits are sold to customers with a telephone circuit, it may be possible to populate location fields with the location information for that phone line. Because ISPs sell connectivity to individual customers, it's feasible to expect them to provide location information on a per-customer basis. Another industry respondent said IP addresses shouldn't be used because that would require complex cooperation between multiple ISPs and VoIP providers.
- 5.23 On the option of using GPS/A-GPS or other GNSS receivers (A5.87), an individual respondent suggested a GSM modem could handshake with the nearest base station, providing basic location information without incurring any costs. It would be available indoors, but mobile operators would have people handshaking with their network who had no intention of initiating a call.
- 5.24 An industry respondent suggested that geolocation information could be included in VoIP call set-up, provided the information is available in the device. But it may "disappear" when converting to a PSTN service.
- 5.25 An industry respondent commented that the NICC Task Group is working on architecture and interfaces to enable location to be established automatically. It assumes the VoIP provider, ISP and access provider can be different commercial organisations; it's possible for ADSL access networks but requires more cooperation between the call handling centre, VoIP provider, ISP and access networks, new network entities to be developed/deployed by the location information server and VoIP positioning centre, new interfaces for all Http/Https and XML, systems development; it uses international standards where available; it covers providers based overseas; it doesn't rely on user updates or the device establishing its location, e.g. GPS. NICC will consider cable, fibre, WiFi and GSM and end-to-end IP calls when NGN becomes clearer. A trade association said the NICC was looking at "90%" solutions, which will return the correct location in most circumstances but will return no result or a wrong result in some.
- 5.26 Another respondent highlighted the standards work carried out by IETF, ECRIT and NENA i3 but said it was too early to know what the timeframe and level of accuracy would be.

- 5.27 On caller location information in general, an emergency service respondent highlighted that due to language barriers, disability, injury or illness, many callers that require an ambulance can't communicate their address. If the phone company can't provide caller location information, it can cause delay or inability to get help. If the caller can give their address, confirming the location can take time. London Ambulance Service estimates that EISEC and ALSEC caller location identification functionality for 999 / 112 calls made using standard landlines saves on average 45 seconds per call. For serious, immediately life-threatening 999 / 112 calls, this can make a significant difference. The technology available may limit the granularity of information that can be provided, but Ofcom should push phone providers to develop the technology to meet the needs of the emergency services and their customers, who expect to be able to get rapid help in an emergency. Another emergency service respondent said CLI is of increasing importance to the fire and rescue service. The current FiReControl project and Regional Control Centres use CLI to mobilise to incidents when the caller can't give their location. Also, 999 / 112 access without reliable CLI can make it difficult to manage malicious false alarms or hoax calls. A Government body considered that, as raised in response to the 2006 Consultation, all telecoms providers should provide accurate caller location information for all 999 / 112 calls through an electronic interface rather than as part of verbal call handover.
- 5.28 An industry alliance considered obligations on location information should not apply to type 2 VoIP providers. They should apply to PATS or PTN providers only, to the extent that is technically feasible and within the control of the provider. It said that, as encouraged in the March 2007 Statement, type 2 VoIP providers are working with standards bodies like NICC, ECRIT, IETF and NENA and in their own labs to find an automatic caller location solution. It considered it's unreasonable and unnecessary to replicate existing arrangements designed for legacy networks; requiring caller location might mean type 2 VoIP has to be fixed, limiting consumer options, one of VoIP's public safety advantages and the advantages of the Internet; it's impossible to know where a type 2 VoIP service is being accessed from, especially Click to Call type 2 services.
- 5.29 One industry respondent said it couldn't provide caller location information at all because its type 2 VoIP application is based on peer-to-peer software and its user accounts and credits are shared by users at different locations. It wasn't clear whether it would be able to evolve its software to meet future agreed standards. It said it alerted its users to the lack of caller location information and didn't believe they confused its service with a PSTN service.
- 5.30 Another industry respondent considered the primary obstacle for VoIP providers is the inability of current technologies to automatically generate accurate location information at the edge of the network. Legacy or incumbent carriers typically control the only connections to public safety officials, creating a bottleneck that halts innovation of next-generation services and raises prices to consumers. A recent U.S. FCC submission said location standards and technologies are in early development; it will be many years before a solution is ready on a system-wide basis. Given this timeframe, they opposed Ofcom requiring caller location for VoIP services, especially a specific technology or standard. They are better developed by industry experts who are on the cutting-edge of innovation. New technology could enable global solutions for 999 / 112 access and location information.

Q.6 Ofcom invites information on (b) how long it is likely to take a VoIP provider to meet current requirements on caller location information, in the event that Option 2 is adopted.

Respondents' Views on Q.6(b)

- 5.31 Emergency services respondents considered accurate caller location information should be provided as soon as possible.
- 5.32 As regards providing a registered address and a VoIP flag or a VoIP flag on the ESDB, the majority of respondents considered 6 months would be the minimum reasonable implementation period to allow for interconnection with an emergency call handling service and setting up a location-data interface.
- 5.33 An emergency call handling service provider described the necessary steps as: i) commercial contracts for emergency call handling; ii) collecting name and address data from customers; iii) network changes to flag calls from each VoIP provider; iv) development of data transfer systems for name and address information from the VoIP provider's systems to the call handling database; v) more complex network changes if the VoIP service doesn't provide a standard PSTN phone number as a network CLI for end users. It highlighted that some steps, e.g. iv), are joint tasks so there could be a bottleneck if many VoIP providers apply at the same time – the work would be programmed and providers processed in turn. Steps iii), ii), v) could take several months depending on the VoIP providers' systems expertise, the number of customers without accurate registered addresses, the method for allocating and setting up meaningful phone numbers into PSTN call set-up and customer records.
- 5.34 A trade association said VoIP providers could reasonably be expected to set up a method for customers to provide up-to-date details and to transfer them to the ESDB in 6 months. It agreed that setting up arrangements with the ESDB could be a bottleneck, and said that Ofcom should consult with the managing parties before setting a compliance deadline.
- 5.35 Estimations of when the NICC solution will be available varied. An industry respondent considered recommendations for ADSL and Cable and international standards could be made by the end of 2007. In 6 months the technical feasibility of the solution will become clearer; it could be implemented in 12-18 months. Two emergency call handling service providers and an industry respondent agreed an NICC solution will be available in 12-18 months.
- 5.36 A trade association thought the NICC solution will be available in the next 2 years because NICC standards (albeit based on IETF standards) must be completed and ratified and then an infrastructure put in place. The infrastructure requires the involvement of dozens or even hundreds of ISPs, many of which have no financial or regulatory incentive to co-operate.
- 5.37 Another industry respondent said that ubiquity of location information won't be achieved in the short-medium term. That should be reflected in the continued use of "where technically feasible", which was applied to mobile PSTN services.
- 5.38 One industry respondent said that it will be many years before agreed standards for providing automatic caller location information are ready on a system-wide basis. Given this timeframe, it opposed Ofcom requiring caller location information for VoIP services, especially a specific technology or standard. It thought solutions are better developed by industry experts who are on the cutting-edge of innovation.

Ofcom's Views on Responses to Q.6(a) and (b)

- 5.39 Regarding the requirement, to the extent technically feasible, to make caller location information for all calls to 999 / 112 available to the emergency organisations handling those calls, at present Ofcom considers the technically feasible solution is for the VoIP providers concerned to provide the registered address of their VoIP customers to the ESDB, accompanied by a VoIP flag to alert the emergency call handling operator to ask the caller to confirm their location.
- 5.40 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 because the caller is unlikely to be there, we consider the test of "to the extent technically feasible" may be met by providing a VoIP flag only for all 999 / 112 calls. That would alert the emergency call handling operator to ask the caller for their location. An example would be a mobile business VoIP service used at separate premises from the company's registered address / PBX.
- 5.41 We must stress that the solutions in 5.29 and 5.30 are drafted in the current environment and we expect the meaning of "technically feasible" to change as technology progresses. 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, for example in the context of the NICC's work.
- 5.42 We will continue to monitor technical progress. We expect to conduct a formal review in early 2009 with a view identifying new "technically feasible" standards and setting a deadline for meeting them.
- 5.43 Ofcom considers "technically feasible" may include costs to the extent that the caller location information solution must be feasible, or reasonable. In considering what is reasonable, Ofcom will place particular weight on the importance of providing 999 / 112 access for public safety.

Network integrity and service reliability

- 5.44 In the July 2007 Consultation, we said that type 4 VoIP providers that provide PATS at fixed locations⁶⁷ also have to comply with GC 3, which requires network integrity and uninterrupted 999 / 112 access. Type 2 VoIP services are PECS and do not have to comply with GC 3, even if they provide 999 / 112 access under a modified GC 4. But the Guidelines do require all VoIP providers that provide 999 / 112 access to carry out a formal risk assessment for that service and to implement a risk mitigation strategy (see the Guidelines, paragraph A5.66).
- 5.45 In the Guidelines we acknowledge that VoIP providers cannot ensure network integrity and service reliability to the same extent as fixed PSTN network operators. PATS VoIP providers subject to GC 3 must take all reasonably practicable steps to maintain, to the greatest extent possible, network integrity and service reliability but only for the aspects of the network that they control. See also the March 2007 Statement, from paragraph 4.44, where we specified that all reasonably practicable steps must be taken and that they must all be taken "to the greatest extent possible".

⁶⁷ For nomadic VoIP, "fixed locations" is understood as the contractually agreed fixed location. *New Voice Services: a Consultation and Interim Guidance*, Ofcom, 6 October 2004 and *Statement on the Regulation of VoIP Services*, Ofcom, 29 March 2007, Annex 5, *Guidelines on the application of PATS obligations to VoIP service providers*, from paragraph A5.53.

5.46 In any case, it is rare for a single provider to control all aspects of call conveyance end-to-end. An LLU operator, for example, depends on BT's management of the copper loops, but LLU operators are required to allow 999 / 112 access. Certainly, there are technical measures type 2 and type 4 VoIP providers can take to prioritise 999 / 112 call traffic where they have control, and some providers already do so.

5.47 Specifically, the Guidelines provide that (from paragraph A5.63):

“A5.63 A provider who does control all aspects of the network from end-to-end may be able to provide a high level of network integrity through controlling quality of service and prioritising traffic.

A5.64 In respect of the service/application and IP network layers, there are a number of steps that a VoIP service provider (including those offering nomadic services) could take in respect of the elements they do control. Possible measures include:

- engineering the VoIP service to minimise latency and specifying minimum requirements for use of the service such as bandwidth and contention ratios;
- marking the VoIP traffic for priority (QoS) in an IP network in accordance with an agreed DiffServ or IntServ class of service⁵⁶ scheme. This can then be used between interconnected IPv4 networks and may be maintained both in IP headers (precedence bits) and interconnected MPLS networks (EXP bits);
- designing their networks to minimise routing hops, providing sufficient redundancy including call servers, gateways and network capacity, to deal with any throughput issues during re-routing or congestion;
- proactively managing any customer premise equipment to dynamically alter the properties, such as packet and or window size, to maximize throughput for voice traffic in response to observed network performance;
- implementing deep packet inspection to identify and prioritise voice traffic in those parts of the network in which it has control;
- implementing home subscriber server, gateways and call servers close to significant sources and sinks of traffic to other networks;
- in the case of an xDSL service, using the associated PSTN line (which is provided with the DSL service) for 999⁶⁸ access. This would ensure that in the event of power cut/failure or broadband service outage, all 999 calls would be routed to the associated PSTN line, by use of software or control in the CPE/broadband adaptor.

A5.65 Ofcom is not suggesting that any of these specific measures should be regarded as mandatory in order to demonstrate compliance with GC 3. Indeed, these guidelines are intended to

⁶⁸ In the Guidelines, references to 999 include 112, the single emergency call number for the EU.

provide certain general assistance as to how Ofcom might assess compliance, bearing always in mind more generally that:

- the word “reasonably” imports an objective test, but the onus is on the relevant communications provider to establish that “all reasonably practicable steps to maintain, to the greatest extent possible” have been taken to secure compliance with the applicable obligations in GC 3; and
- while “reasonably practicable” is in isolation a somewhat less strict standard as compared to simply what is “practicable”, the relevant communications must show that not only that *all* such steps have been taken but also that they have so been taken “to the greatest extent possible”.

A5.66 We do, however, consider that all communications providers providing 999 access can reasonably be expected to carry out a formal risk assessment for that service. Such a formal assessment is expected to include:

- producing a model of the network elements used to provide that service;
- defining a set of performance parameters which characterise the end to end performance of that service (e.g. MTBF);
- identifying which of the elements are most likely to fail, or suffer from degraded performance, and what the consequence would be for the performance parameters;
- determining which elements are critical in relation to the end-to-end service performance, and what risk mitigation strategy might reasonably be adopted in relation to those elements; and
- determining and implementing a risk mitigation strategy that might reasonably be adopted in relation to those critical elements.

A5.67 In some cases, there are likely to be elements of the end-to-end network that VoIP service providers do not directly control. For example, they may rely on a different broadband provider (xDSL, cable modem, licensed wireless or UMA) to provide access to their VoIP services. Since reliability of the service provided over the network depends on the integrity of the underlying access and interconnected networks, this could present problems for VoIP service providers in complying with their obligations under GC 3.

A5.68 In the 2004 Consultation, Ofcom raised the issue of how a VoIP service provider who does not control the underlying network may ensure network integrity. Most respondents were of the opinion that service level agreements (“**SLAs**”) between VoIP service providers and infrastructure providers were an effective way of ensuring network integrity and reliability. Ofcom is of the view that such agreements may help improve network integrity.

A5.69 Therefore, in investigating any potential breaches of GC 3 by VoIP service providers, Ofcom would consider what SLAs on quality and reliability VoIP service providers have entered into with their respective providers of underlying network services. For example, where a broadband access is provided by a different provider, then it may be appropriate that the commercial agreements between the VoIP service provider and broadband access provider would include agreement on the priority mechanisms employed to ensure that any agreed marking or classification of traffic is maintained. Ofcom may expect that such SLAs make provision for service classes and characteristics for VoIP traffic.

A5.70 Nomadic use presents particular challenges in respect of ensuring network integrity since the user may use a wide range of access networks and so putting in place SLAs may present greater difficulties.

A5.71 Another consideration that Ofcom will examine in an investigation would be any provisions to ensure continuity of service in the case of a power outage at the customer premise. In the case of a PSTN service, continuity of service is ensured through line powering which provides power from the exchange.

A5.72 The provision of VoIP services (particularly when provided over existing xDSL, cable modem, licensed wireless and UMA) involves the use of Customer Premise Equipment (“**CPE**”) which is not powered by the broadband service or network termination point or equipment. In the 2004 Consultation, Ofcom asked whether line powering was appropriate for VoIP services (question 23). It was not considered a viable option by any respondent. In light of this, Ofcom would not currently expect a VoIP service provider to provide line powering to VoIP CPE.

A5.73 In the absence of line powering, there are other options to ensure continuity of service in the case of a power outage at customer premises (such as the use of battery back-up or uninterruptible power supply (“**UPS**”). Ofcom's view is that the decision to provide battery backup for CPE should be left to the VoIP service provider, who may provide such a facility as part of a service offering.

A5.74 However, it is worth noting in respect to network termination equipment:

- in the US, at least one cable operator provides a cable modem with battery backup which ensures the service is still available as a result of local power outages;
- some VoIP service providers focussing on the business market carry out comprehensive audits when providing IP voice services (such as a review of power requirements including battery and UPS options when specifying solutions for business critical purposes);
- cable operators in the US advise customers on UPS options for their network terminating equipment”.

- 5.48 The Code of Practice under GC 14 requires VoIP providers to give domestic and small business customers information on the reliability of 999 / 112 access and calls (from paragraph 5):

“Service reliability

5. Each Service Provider shall provide to its Domestic and Small Business Customers clear and readily accessible information regarding whether its Service may cease to function if there is a power cut or power failure, or a failure of the Broadband Connection.

6. The information in paragraph 5 above shall be provided during the Sales Process, within the Terms and Conditions of Use, and in any User Guide issued by the Service Provider.

7. The following text is an indicative example of the information to be provided in paragraph 5 above, that can be adapted to the specific requirements of Service Providers:

“IMPORTANT INFORMATION: If your Broadband Connection fails, your voice service will also fail. Your service may cease to function if there is a power cut or failure. These failures may be caused by reasons outside our control.”

...

Reliability of Access to Emergency Calls

11. Where the Service Provider provides access to Emergency Calls but the Service may cease to function if there is a power cut or failure or a failure of the Broadband Connection the Service Provider shall:

- a) provide its Domestic and Small Business Customers with clear and readily accessible information, during the Sales Process, in the Terms and Conditions of Use and in any User Guide; that, although access to Emergency Calls is provided, the Service may cease to function if there is a power cut or failure, or a failure of the Broadband Connection;
- b) take reasonable steps to ensure that Domestic and Small Business Customers acknowledge in the form of a signature (or online equivalent), at the Point of Signature, that they understand that Emergency Calls will fail if there is a power cut or failure or a failure of the Broadband Connection, (the following text is an example of the wording that could be used):
- c) provide evidence to Ofcom of the acknowledgement in paragraph 11 (b) above, within five working days; following a written request from Ofcom;
- d) during the sales process, give the Domestic and Small Business Customer the choice whether to receive (at no charge other than reasonable postage and packaging if applicable), Labels which state that Emergency Calls may fail:

- where a screen or display is used with the Service, a Label would normally be an on-screen message or display using a clear and readily accessible graphic, words or icon that Emergency Calls cannot be made using the Service; and
- in other circumstances a Label would normally be (at the Customer's choice) either a piece of paper to be attached to the Service Access Terminal or software facilities for producing such labels (e.g. a PDF file).

"I understand that this service allows calls to the emergency services numbers 999 and 112. However I understand that calls will fail if there is a power cut or my broadband connection fails."

- 5.49 Ofcom will continue to discuss the implications of the possible difference in 999 / 112 service quality between VoIP services and PSTN services with the emergency services. The priority for the emergency services is that a high level of 999 / 112 access is maintained.
- 5.50 Ofcom considers it likely that consumers will expect a similar call quality to the one they receive when they call a PSTN number over VoIP, which is the case for mobile phone 999 / 112 access.
- 5.51 Our cost-benefit assessment (CBA) used current statistics on reported modem connection failure rates (2%) to adjust any estimated benefits from Option 2 down by 2% to proxy the reduction in the quality of service when accessing 999 / 112 from a VoIP service compared to the PSTN. We consider we would be able to justify our proposal to mandate 999 / 112 access even if there was a significantly larger difference in quality of service.
- 5.52 In the July 2007 Consultation, we invited comments on providing network integrity and service reliability.

Q.7 Ofcom invites information on (a) the current means, future possibilities and limitations for providing network integrity and service reliability

Respondents' Views on Q.7(a)

- 5.53 On current practices, an on-net VoIP provider and network operator said it uses a range of measures for different products: the network has degrees of resilience built into its key components; CPE has fallback to the PSTN; its retail and wholesale arms have an SLA for IPStream, including performance measurements for repair; internal processes include real-time system monitoring and incident analysis. It identified current limitations as: local power failure; local equipment failure; congestion on customers' WAN/LAN; poor broadband performance; problems with the call server platform, PSTN gateways, peering between it and other providers. Mitigation strategies exist, depending on cost, technology and network design. For the future, it is considering ways to allow pre-paid type 2 VoIP customers to receive emergency operator call back; offer wholesale VoIP access products with prioritisation of 999 / 112 calls during network congestion and manual hold for 999 / 112 operators; protect consumer platform integrity from detrimental traffic.
- 5.54 A significant majority of industry respondents welcomed the principle set out in the March 2007 Statement that VoIP providers are responsible for complying with GC 3 for the parts of the network that they control. Various industry respondents

commented that different types of VoIP service are able to provide different degrees of reliability: on-net VoIP providers have greater control than Internet-based VoIP providers. Although Internet-based VoIP providers can make provisions in their own network to provide network integrity, it's technically unfeasible to control broadband networks provided by other providers. One respondent commented that it would also be commercially unfeasible.

- 5.55 A trade association said it agreed with the principle of complying to the extent "reasonably practical"; it noted other technologies like fixed and mobile PSTN services are also subject to periodic failure. An emergency service respondent made a similar point and said that mobile PSTN users appreciate that where they have no signal they have no service, and this appears to be generally accepted. It considered market forces will drive improvements.
- 5.56 A professional body for engineering and technology commented that new telecommunication systems need to be resilient enough to respond to the needs of the whole community for which they are intended.
- 5.57 An industry respondent said it would welcome continued development of non-binding guidance as VoIP services mature. One industry respondent said it's becoming increasingly difficult to assess what is "reasonably practical". Another thought VoIP technology is mature enough for Best Current Practices to be developed.
- 5.58 Regarding SLAs, a trade association considered it's only possible to secure an SLA with a broadband or network operator where there's a commercial relationship between the VoIP provider and the network operator and where a service is provided by the network operator directly to the VoIP provider. An industry respondent said it wouldn't be practical or possible to put in place SLAs over parts of the network beyond the VoIP provider's control, e.g. network access. Another considered it might be on-net or network operators only that could affect an SLA on Quality of Service (QoS). ISPs or small operators have insufficient resources to provide bandwidth management facilities or to guarantee to interconnect SLAs with multiple operators. Another industry respondent said SLAs aren't the right way to ensure QoS over another network because they aren't a technical solution but a commercial tool with the primary focus of ensuring reparation post-incident. It considered Ofcom should look at technical solutions that can be included in SLAs; require that providers must not degrade the quality of one service over another in order to deny access; require providers to enter into negotiations with a provider on request about providing a voice interconnect service; require the creation of a common voice peering point, like LINX for Internet peering; monitor the CPE market.
- 5.59 One industry respondent said that a major limitation for Internet-based VoIP providers is the "last mile" provided by the local telecom or cable company; it suggested providers could extend their own network up to the local telecom company's collocation. Another industry respondent said Internet-based VoIP providers might be able to provide more control of network integrity and service reliability if services like naked DSL were offered.
- 5.60 With the advent of Next Generation Networks (NGN), an industry respondent considered that it will become a significant challenge to establish best practice in network integrity and service reliability because performance levels will be compared with those in legacy PTNs, which have different technology and network topology. NGNs aren't the same as, and may not afford the same level of resilience and reliability as, legacy networks. That doesn't mean quality levels will necessarily drop.

Ofcom should undertake formal analysis of quality levels of VoIP and other voice services to enable informed debate and policy.

- 5.61 An industry respondent and an industry alliance considered that network integrity and service reliability requirements were designed for the traditional wireline environment; they shouldn't apply to Internet-based VoIP providers.
- 5.62 The industry respondent said that, in the March 2007 Statement, Ofcom said the network integrity requirements under Art. 23 of the Universal Service Directive (2002/22/EC) wouldn't be relevant when the VoIP service is used in locations that aren't fixed. Because one of the key benefits of VoIP services is that they aren't fixed it considered, based on Ofcom's view, they shouldn't be subject to network integrity requirements.
- 5.63 The alliance said there's no sign of a consumer problem. In research, Internet-based VoIP users claim to experience the same or better voice quality and service reliability than over fixed PSTN services, or that calls connect more quickly. They considered mandating technology standards now might harm innovation; in a competitive environment the market is the best regulator. The alliance said industry has adopted its own QoS standards.
- 5.64 Another industry respondent said that, because its users create a peer-to-peer cloud on the Internet, it has no capability of ensuring network integrity or service reliability. It considered it is difficult to envisage providing 999 / 112 access in the UK in the foreseeable future.
- 5.65 In the July 2007 Consultation, we also invited comments on the time that would be required to meet current requirements on network integrity and service reliability.

Q.7 Ofcom invites information on (b) how long it is likely to take a VoIP provider to meet current requirements on network integrity and service reliability, in the event that Option 2 is adopted.

Respondents' Views on Q.7(b)

- 5.66 An emergency service respondent said it was important for public safety that requirements on network integrity and service reliability are met as soon as possible.
- 5.67 A number of industry respondents considered 3 months is not a realistic period to enable communications providers that offer 999 / 112 access to conduct a formal risk assessment of network integrity and service reliability and implement mitigation strategies effectively. One industry respondent and a trade association suggested a 12 month compliance period.

Ofcom's Views on Responses to Q.7(a) and (b)

- 5.68 The Guidelines provide that PATS fixed VoIP providers should take all possible steps to ensure network integrity and reliability and should do so to the greatest extent possible, but only for the aspects of the network that they control. All VoIP providers that provide 999 / 112 access should carry out a formal risk assessment and adopt a risk mitigation strategy.
- 5.69 We agree it's likely that consumers will expect a similar call quality to the one they receive when they call a PSTN number over VoIP, which is the case for mobile PSTN 999 / 112 access (July 2007 Consultation, paragraph 5.18).

- 5.70 Ofcom will continue to monitor developments in what steps to maintain network integrity are “reasonably practicable” for VoIP providers to take and, when appropriate, will review and update the Guidelines. We will also continue to consider developments in voice call services and NGA more generally.
- 5.71 On the question of SLAs, in A5.68 – A5.71 of the Guidelines, Ofcom adopted a flexible approach that identifies SLAs as one measure that may help network integrity. In response to the comment that SLAs are a commercial tool, the Guidelines focus on the technical solutions that may be contained in an SLA; we would focus on those when investigating any potential breaches of GC 3.
- 5.72 On the comment that network integrity requirements are suited to traditional wireline services only, Ofcom withdrew the *Essential Requirements Guidelines* because they were suited to traditional PSTN providers; they implied that the provider had ownership or direct control over the end-to-end network used to provide the call (March 2007 Statement, from paragraph 4.16). We issued *Guidelines on the application of PATS obligations to VoIP service providers* (the Guidelines) to explain how we would investigate potential contraventions of GCs 3 and 4 on network reliability and 999 / 112 calls to aid transparency and understanding of the requirements by VoIP providers (March 2007 Statement, Annex 5).
- 5.73 Regarding the applicability of GC 3 to nomadic VoIP, or any VoIP, services the March 2007 Statement says
- 4.86: Many VoIP services are marketed and used as nomadic services. Ofcom considers that services provided at a contractually agreed location which is fixed in its nature (such as the end user's residential home or business) would be a service provided at a fixed location. However, there is often nothing to prevent a user technically from connecting to the service from another location (such as a Wi-Fi hotspot or Internet café). Ofcom remains of the view that the network integrity requirements in Article 23 of the USD (as transposed in GC 3) would not be relevant when the service is used in locations which were not fixed in their nature.
- 5.74 That means that GC 3 is applicable to all fixed VoIP services and to all nomadic VoIP services when they are used at their contractually agreed fixed location⁶⁹. We do not agree with the comment that, because many VoIP services can be used nomadically, this condition should not apply at all. We undertook to review our position when we review the GCs and to contribute to the European Commission's ongoing review of the regulatory framework.
- 5.75 We welcome the provision of high quality VoIP voice calls and self-regulatory initiatives to improve QoS. We do not consider that we are mandating specific technology standards. The Impact Assessment considered the cost of providing 999 / 112 access, including the cost of complying with the PATS GCs like GC 3, and it found that the costs would not significantly harm innovation or competition and would be significantly outweighed by the benefits to consumers and citizens. See Section 6, especially from paragraph 6.26.
- 5.76 We comment on the period required for compliance with Option 2 in Section 8 below.

⁶⁹ GC 3 implements Universal Service Directive (2002/22/EC) Art. 23, which refers to “PATS at fixed locations”.

- 5.77 In the July 2007 Consultation, we then asked for responses about complying with the other PATS GCs.

Q.8 Do you have any comments on complying with the other PATS General Conditions, in the event that Option 2 is adopted?

Respondents' Views on Q.8

- 5.78 A professional body for engineering and technology said VoIP technology is the likely future direction for all telephone communications; the challenge(s) of providing 999 / 112 access are best met while the technology is still in its infancy.
- 5.79 An industry respondent considered VoIP should comply with the same GCs as fixed and mobile PSTN services; it welcomed a technology neutral approach. Another considered it would benefit consumers because currently the consumer has the choice of apparently similar products that in fact offer significantly different services.
- 5.80 An emergency service respondent said that, for the police, some GCs are critical, e.g. 999 / 112 access and caller location information. Others like directory services and itemised billing are less critical, although it benefits from the audit trails they provide. It asked if a tiered compliance system could be introduced so that suppliers could enter the market meeting the priority requirements and have a period of grace to comply with the second tier.
- 5.81 A trade association said the European Commission proposes to remove the gating criteria of "access to emergency services" from the definition of PATS. In terms of compliance with the PATS obligations, type 4 providers are likely become PATS under European law, irrespective of Ofcom's proposals. It considered many of the PATS GCs are sensible and amount to basic consumer protection, e.g. GC 10 (transparency of information) and GC 12 (itemized bills). Others, like GC 8 (Operator Assistance, Directories and Directory Enquiry Facilities) contain provisions that may become redundant in the 21 century. It understood Ofcom is about to review the GCs. Another respondent said Ofcom should incorporate any new requirements before enforcement.
- 5.82 An industry respondent said smaller or non-UK Internet-based VoIP providers would have difficulty meeting some GCs like GC 5 on emergency planning, GC 8 on operator access, directory enquiries and directories; GC 13 on non-payment of bills.
- 5.83 An industry alliance considered VoIP is not another type of telephone service; it's a new frontier in communications. Rules designed for PSTN services should be rethought for new technology. The alliance and a number of industry respondents said that complying with PATS GCs might make some VoIP services economically unviable. Because type 2 providers wouldn't become PATS, one industry respondent considered many would decide not to offer or to withdraw type 4 services, which could reduce consumer choice and slow VoIP adoption. Two said that smaller providers would leave the UK marketplace, stifling innovation and harming UK competitiveness. On the other hand, one industry respondent considered if some providers went out of business that would be a high price, but one paid for public safety.

Ofcom's Views on Responses to Q.8

- 5.84 Ofcom notes that various respondents supported PATS VoIP providers' compliance with the PATS GCs. The following section focuses on the areas where respondents objected to compliance with the other PATS GCs.
- 5.85 The Impact Assessment used a survey of VoIP providers and potential providers conducted for Ofcom by Intercai Mondiale (the Intercai survey). It found that only the smallest providers in the market would be likely to consider the cost of complying with Option 2, including the PATS GCs, a deterrent to entry. Because there are already over 30 providers in the market, Ofcom considers additional small firm entrants that provide type 2 or type 4 VoIP services are unlikely to significantly contribute to overall welfare (e.g. net benefit) (July 2007 Consultation, paragraph A5.36). Any detrimental impact on overall entry (including innovation and dynamic efficiency losses) is likely to be small (paragraph A5.119). The Intercai survey found that the costs of complying with GCs 5, 8, 10, 11, 12, 13 would be largely business as usual.
- 5.86 Regarding the removal of "access to the emergency services" from the PATS definition, the Proposal for a Directive Amending Directive 2002/22/EC⁷⁰ Art. 2(c) provides "Publicly Available Telephone Service' Means a service available to the public for originating and receiving, directly or indirectly via carrier selection or pre-selection or resale, national and/or international calls through a number or numbers in a national or international telephone numbering plan". To become law, the Commission's proposals must go through the EU legislative process.
- 5.87 On the question of GCs that offer consumer protection, the difference between PATS and PECS requirements has been raised by the draft ERG common position on VoIP, which discusses extending some PATS GCs to type 2 VoIP services.

⁷⁰ Proposal for a Directive of the European Parliament and of the Council Amending Directive 2002/22/EC on Universal Service And Users' Rights, 13 November 2007.

Section 6

Summary of the Impact Assessment

Introduction

- 6.1 In the July 2007 Consultation, Ofcom considered two policy options for meeting its policy aim of ensuring a high level of 999 / 112 access as VoIP take-up and technology develop: do not mandate 999 / 112 access (Option 1) and mandate 999 / 112 access over type 2 and type 4 VoIP services (Option 2).
- 6.2 Ofcom recommended Option 2 because it had identified significant benefits, which exceeded the costs. This section summarises the Impact Assessment that supported that position.
- 6.3 Impact Assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making and are commonly used by other regulators. This is reflected in Section 7 of the Communications Act 2003, which generally means we have to carry out IAs where our proposals would be likely to have a significant effect on businesses or the general public, or where there is a major change in our activities.

Summary of the Impact Assessment

- 6.4 Ofcom's Impact Assessment considered the impact on different stakeholders of requiring 999 / 112 access to be provided over VoIP. Both costs and benefits were taken into account and quantified where possible. The Impact Assessment took account of the fact that market forces and consumer information might not be enough to ensure a high level of 999 / 112 access because of the nature of 999 / 112 access itself. The Impact Assessment also considered the result of Ofcom's communications tracking survey for Q.4 2006 and the October 2006 research: VoIP take-up was growing, a significant proportion of VoIP users did not have a service that provided 999 / 112 access and many VoIP users were confused about whether they had 999 / 112 access.
- 6.5 Ofcom's Impact Assessment assessed the costs and benefits of Option 2 relative to Option 1.

The benefits of requiring 999 / 112 access over type 2 and type 4 VoIP

- 6.6 The key benefit identified in the Impact Assessment for Option 2 was:
- eliminating critical delays resulting from confusion about 999 / 112 access, potentially saving lives.
- 6.7 Ofcom estimated that benefits would range from £24 - £34 million over the next five years in net present value (NPV)⁷¹.

⁷¹ The NPV of future costs and benefits ("net" means that costs are subtracted from benefits) occurring over a number of years is the value of an equivalent single sum today, calculated by applying an appropriate discount rate to future amounts.

The costs of providing 999 / 112 access

- 6.8 The key costs identified in the Impact Assessment for Option 2 were:
- the costs to type 2 and type 4 VoIP providers of enabling 999 / 112 access; and
 - compliance costs of meeting additional GCs for type 4 VoIP PATS providers
- 6.9 Ofcom estimated that industry costs would be approximately £10 million over the next 5 years in NPV terms.
- 6.10 The cost of Ofcom's proposal for type 2 and type 4 VoIP providers that don't currently provide 999 / 112 access would be approximately £4.11 in NPV terms over 5 years per household. That equates to approximately £0.91 per household per year on an annuity basis⁷².

Conclusion

- 6.11 Ofcom estimated Option 2 would provide a net benefit of £14 - £24 million in NPV terms.
- 6.12 Referring to the full Impact Assessment in Annex 5 of the July 2007 Consultation, we then asked respondents if they agreed with our approach to assessing the potential costs and benefits of the policy Options.

Q.9 Referring to the full Impact Assessment in Annex 5, do you agree with Ofcom's approach to assessing the potential costs and benefits of policy Options 1 and 2?

Respondents' Views on Q.9

- 6.13 A significant majority of emergency service and industry respondents agreed the Impact Assessment took the right approach.
- 6.14 An industry respondent considered the CBA for Option 2 uses reasonable assumptions, a cautious approach and gives fairly robust results. Ofcom has taken a very cautious approach to the number of lives saved. To the extent there are benefits of lives saved from using non-ambulance emergency services or benefits from preventing delays that would have led to worse injury, harm or damage to property, the gross benefits of Option 2 will be understated. That's a powerful point in favour of accepting any positive net benefit.
- 6.15 An emergency services respondent noted that CBAs aren't exact, especially when dealing with variables like "number of lives saved". The CBA only quantifies, therefore, benefits related to the ambulance service, although the other emergency services are likely to also attend a proportion of emergencies. The ancillary benefits of early intervention that result from 999 / 112 access, e.g. reducing fire damage or crime, maintaining a free flow of traffic, public reassurance, rapid return to normality, are discussed but not quantified in the CBA model. It agreed with the industry respondent that if they had been, the case for 999 / 112 access would be even stronger.

⁷² Ofcom derived a cost per household by dividing the NPV industry cost of compliance over 5 years by the number of households that by 2011/12 (a) would use a VoIP service that does not have 999 / 112 access and (b) would use a type 2 or type 4 VoIP service (i.e. £10,204,664 / 2,480,400 households).

- 6.16 Another emergency services respondent considered the Impact Assessment underestimated the negative impact of Option 1. It should have made clearer that “12% of ambulance 999 calls are immediately life-threatening” is an estimate; around 30% of 999 calls are classified as Category A (immediately life-threatening, 8 minute response) and around 50% are classified as Category B (serious, but not immediately life-threatening, 19 minute response). Not all these calls turn out to be immediately life-threatening but the patient must be rapidly assessed to rule out complications not revealed by the caller or to prevent further deterioration. A delay in face to face assessment through delay in calling 999 / 112 and in locating the patient represents a risk and a cost in terms of health outcome; that should have been reflected in the CBA.
- 6.17 Regarding the costs estimate, a couple of industry respondents commented that the technology and cost structures are very different for on-net VoIP providers or PSTN operators and Internet-based VoIP providers.
- 6.18 An industry respondent considered a ceiling of £1m on annual costs was too low. A commercial forecast on the ongoing costs of providing 999 / 112 access to its end users based on a residential model provided by C&W and prices from a number of telecommunications providers that provide a 999 / 112 service, found that a provider with 100,000 users should expect ongoing direct costs of approximately £1.4m per annum. But it didn't believe this should have an impact on the decision whether to adopt Option 2.
- 6.19 Of those that disagreed with the approach taken in the Impact Assessment, an industry respondent and an industry alliance considered Ofcom's approach to assessing the potential costs and benefits of policy Options 1 and 2 was too narrow; it failed to consider the full range of type 2 services or the negative competitive (consumer choice) and economic impacts. Ofcom estimated Option 2 would cost industry £9.4 million in 2007-2008. Many type 2 services generate limited average revenue per user (ARPU) (many are free/ low cost); additional compliance costs will have significant impact; they have no substitute in the market. Another industry respondent said the £0.91 per household per year estimated cost is likely to exceed the ARPU of many type 2 providers. Those high costs (much to be absorbed over one year) would be likely to force some smaller VoIP providers from the marketplace. The Communications Market Report 2007 notes that VoIP use in the UK is decreasing, falling from 20% in Q4 2006 to 18% in Q4 2007. A recent Datamonitor report states UK businesses are trailing the rest of Europe and the US in VoIP adoption. The alliance said Ofcom should take account of possible delay in competition from type 4 services, loss of consumer savings, reduction in services available by raising barriers to entry or causing the exit of some providers; the quantitative and qualitative impact on public safety by increasing consumer confusion and delays because it's quicker to use the PSTN to access 999 / 112.
- 6.20 Another industry respondent considered the estimate of 10 new Internet-based VoIP providers over 5 years is a major flaw in the Impact Assessment's basic assumptions. There are numerous new entrants monthly, providing solutions accessible over the Internet from various platforms – software, software modules, hardware, applets for portable devices, plug-ins for web browsers, web-only portals for outgoing calls, call-back reachable from fixed or mobile Internet connections. That means the cost estimations are wrong. The strictly quantitative approach of the Impact Assessment seems an artificial mathematical exercise to justify a preconceived policy.

- 6.21 A trade association considered the Impact Assessment was flawed because the cost assessment was based on a survey of a very small sample of providers and their responses weren't accurately reflected in the survey's conclusions.
- 6.22 The trade association also considered the estimates of customer use and the potential for confusion seem over-stated; the Impact Assessment found that 10% of households have a VoIP service but Ofcom's Communications Market Report found that only 14% of VoIP users say they use VoIP every day and many say they have only used it "at least once". Ofcom's report finds that "VoIP users are more likely to have the use of a mobile and a fixed line than UK adults as a whole". In Ofcom's survey, 78% of VoIP users surveyed did not have access to 999 / 112 but believed that they did. This results in a conclusion that over one million households in the UK (1 in 24) are unable to dial 999 / 112 and are unaware of this fact. This seems to take no account of the fact that only a small proportion of VoIP users are using it as their main means of making outbound calls.
- 6.23 Overall, the trade association considered comparing the cost of saving lives with the cost to operators of complying with GCs is a rather worthless exercise. Ofcom should instead concentrate on how to ensure that all providers of telephony services can offer uninterrupted 999 / 112 access with the minimum red tape.

Ofcom's Views on Responses to Q.9

- 6.24 Ofcom notes that respondents were broadly in agreement with Ofcom's preferred option. The following section considers the areas where respondents objected to the analysis and findings of Ofcom's Impact Assessment. The objections can be grouped under four headings.
- 6.25 Ofcom has not made any changes to the Impact Assessment in light of the comments made.

Barriers to entry and forgone competition and innovation

- 6.26 A number of respondents considered that Option 2 would increase the costs of regulation sufficiently so as to raise barriers to entry, which in turn would reduce innovation and competition in the market.
- 6.27 Ofcom considers that with approximately 30 operators currently in the market (based on 500 survey respondents naming their VoIP supplier in Ofcom's October 2006 research), the additional allocative, productive and dynamic efficiency gains from further competition are likely to be minimal. Any minimal costs arising from mandating 999 / 112 access will not be disproportionate and will reflect the desired trade-off between facilitating competition and innovative VoIP service offerings and the requirement for a basic consumer service including 999 / 112 access.
- 6.28 Ofcom notes various Internet-based providers that offer type 2 and type 4 VoIP services currently provide 999 / 112 access voluntarily. This suggests that other Internet-based VoIP operators will also be able to cover the costs of providing 999 / 112 access and therefore enter the market.
- 6.29 Ofcom notes that there are relatively few sunk costs related to entry as a VoIP provider, particularly when compared to the provision of other communications services, and considers the additional requirement on type 2 and type 4 VoIP providers to provide 999 / 112 access, while entailing some costs, will not materially raise sunk costs in the market going forward. Ofcom notes that the proposals may

impact on entry decisions for those business models not based on offering 999 / 112 access with a type 2 or type 4 VoIP service. However, the relevant comparison for assessing barriers to entry is whether the proposals impact on the sunk costs of entrants to the market given the proposal to reflect the overriding consumer interest for all type 2 and type 4 VoIP services to provide 999 / 112 access. On this basis Ofcom considers barriers to entry will be low.

Market entry assumptions

- 6.30 Ofcom's on-net entry assumption reflects the high fixed costs of entry for a network operator undertaking large fixed investments to interconnect with BT's fixed network. Ofcom's assumption that 5 new network-based operators would enter the market over the next five years is likely to represent the high end estimate of this type of entry. This is particularly the case given that single product entry (i.e. VoIP-only entrants) would be even less likely to invest in the significant fixed network investments required to build out to BT's fixed network than, say, a full service provider offering traditional and VoIP-based telephone services. Therefore, Ofcom considers that its assumptions regarding on-net entry are robust and are likely to indicate the maximum possible network-based entry over the period for which costs are estimated.
- 6.31 Although we recognise that there were high levels of internet-based VoIP entry as VoIP services initially took off in the UK, our Internet-based VoIP entry assumption is a forward looking assumption reflecting the growing maturity of the market, as well as the type of operator likely to be affected by the regulations. Ofcom considers that, in addition to the Impact Assessment analysis based on 30 known suppliers offering VoIP (whose costs are grossed up to reflect the total industry size), an additional 40% are likely to enter the market over the next 5 years (i.e. 12 new entrants), who will take market share away from existing providers.
- 6.32 Ofcom considers there will continue to be a proliferation of smaller operators over the next 5 years. However, Ofcom considers many of these operators will be unlikely to incur any material costs of compliance (in contrast to the costs reported for on-net and the [larger] Internet-based VoIP providers).
- 6.33 For instance, one respondent commented that Ofcom failed to consider the costs of compliance for "numerous new monthly entrants" providing type 2 VoIP services (i.e. "Click to Call" services, including call-back reachable from fixed or mobile Internet connections). Ofcom has changed the modification to GC 4 to specifically exclude "Click to Call" services. The same respondent also referred to entrants providing VoIP using platforms that are likely to be relevant for type 1 entry (i.e. PC-to-PC VoIP services) which, again, are not be subject to the requirement to provide 999 / 112 access over VoIP.
- 6.34 Ofcom does not agree that it has used an artificial mathematical exercise to quantify the costs of the requirement to provide 999 / 112 access. Ofcom has taken a practical, empirical approach to assessing costs for two different types of suppliers, both existing and likely to enter the market over the next 5 years.

Estimation of individual supplier cost

- 6.35 Ofcom does not agree that its survey is small or that it has not reflected the survey's conclusions accurately.

- 6.36 Ofcom examined cost data provided by 12 VoIP providers, whose combined share of households with a VoIP service represented a significant share of the total number of households using VoIP. Ofcom then grossed these cost estimates to reflect the overall size of the industry.
- 6.37 Ofcom ensured that all supplier responses to the survey were carefully considered. Ofcom accepted all cost estimates that were reasonable and based on plausible assumptions about how Ofcom would interpret and enforce the application of the GCs to suppliers offering 999 / 112 access. Ofcom also applied a number of sensitivities where the maximum possible cost estimated by a supplier was imputed for all suppliers of its type, even where other suppliers in that supplier group submitted a lower cost estimate. Ofcom demonstrated that even for these sensitivities there was a positive net benefit from mandating 999 / 112 access over VoIP.

Estimating the level of benefits

- 6.38 Ofcom considers that access and current use of a VoIP service is the driver of the risk of confusion that might lead to fatal delays in contacting the emergency services in the event of a life-threatening incident, and not sole or main use of a VoIP service in the household for making outbound calls.
- 6.39 Ofcom estimated the number of households that have VoIP by using its communications tracking survey. The survey question on which this estimate was based is "Have you or anyone in your household ever used [VoIP] services to make voice calls using the Internet at home?" Respondents could answer "yes but stopped using", "yes and currently using" and "no". Ofcom only used the number that responded "yes and currently using" as the estimated number of households using VoIP in the UK (an estimate of 10% at Q4 2006).
- 6.40 Where the VoIP service in these households does not offer 999 / 112 access, users have the potential to be confused in a life-threatening situation, reach for the VoIP phone, attempt a 999 / 112 call and waste valuable time, which could increase the risk of loss of life.
- 6.41 Ofcom considers it would significantly understate the underlying risk, and the size of benefits from saving lives from mandating 999 / 112 access, if Ofcom only estimated the number of VoIP households at risk based on households where VoIP is the main means of making outbound calls.
- 6.42 Ofcom notes that respondents to the Consultation have not provided alternative evidence to suggest the risk of confusion leading to fatal delay is only based on VoIP being the main communications service used in a household.
- 6.43 In any event, Ofcom notes that its estimate of likely benefits is conservative, and underestimates the total benefits of mandating 999 / 112 access by restricting the analysis to cases of risk of confusion leading to fatal delays in respect of approximately 4% of all 999 / 112 calls to the emergency services. This bias to underestimate the total benefits has been noted and reiterated by a number of respondents to the Consultation, who considered it strengthened the argument for requiring VoIP services to provide 999 / 112 access.

Section 7

Modifying General Condition 4: Emergency Call Numbers

Introduction

- 7.1 We have decided to modify General Condition (GC) 4: Emergency Call Numbers. The modification extends the GC 4 requirement to ensure any user can access 999 / 112 from PATS at no charge to all PECS that allow national calls to be made, excluding "Click to Call" services. That means that type 2 VoIP services and type 4 VoIP services that allow national calls to be made, except "Click to Call" services, must provide 999 / 112 access.

General Condition 4.1: Emergency Call Numbers

- 7.2 Ofcom's powers to modify GCs are set out in Sections 47 and 48 of the Communications Act 2003 (the Act) and the scope of GCs is limited by Section 51. In turn, these sections implement a number of Articles from European Directives.

- 7.3 GC 4.1 requires providers to:

ensure that any End-User can access Emergency Organisations by using the emergency call numbers "112" and "999 or 112" at no charge

- 7.4 General Condition 4.1 implements USD Article 26(1):

Member States shall ensure that, in addition to any other national emergency call numbers specified by the national regulatory authorities, all end-users of publicly available telephone services, including users of public pay telephones, are able to call the emergency services free of charge, by using the single European emergency call number "112".

- 7.5 This Article reflects the aims set out in the recitals (12 and 36):

For the citizen, it is important ... for users to be able to call emergency telephone numbers and, in particular, the single European emergency call number ("112") free of charge from any telephone, including public pay telephones, without the use of any means of payment.

It is important that users should be able to call the single European emergency number "112", and any other national emergency telephone numbers, free of charge, from any telephone, including public pay telephones, without the use of any means of payment.

Scope of General Conditions

- 7.6 The Act establishes categories of conditions that Ofcom may set. We will extend GC 4.1 under the category of Section 51(1)(a):

conditions making provisions such as Ofcom consider appropriate for protecting the interests of end-users of public electronic communications services.

7.7 This in turn derives from paragraph 8 of the annex to the Authorisation Directive.

Tests for modifying General Conditions

7.8 In modifying conditions, Ofcom is required to meet various tests set out in the Act. These tests and Ofcom's assessment of how these are met in connection with the proposed modification to GC 4 are set out below.

Section 3 – Ofcom's general duties

7.9 Section 3(1) of the Act sets out the principal duty of Ofcom:

- To further the interests of citizens in relation to communications matters; and,
- To further the interests of consumers in relevant markets, where appropriate by promoting competition.

7.10 Ofcom is required by this Section to carry out its functions in line with this duty. Ofcom considers that its modification to GC 4 falls within the scope of Section 3 of the Act. In particular, it will further the interests of consumers and citizens by reducing the risk of delays in contacting the emergency services.

Section 4 – European Community requirements for regulation

7.11 Section 4 of the Act requires Ofcom to act in accordance with the six European Community requirements for regulation. In summary these requirements are to:

- Promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;
- Contribute to the development of the European internal market;
- Promote the interests of all persons who are citizens of the European Union;
- Not favour one form of or means of providing electronic communications networks or services, i.e. to be technologically neutral;
- Encourage the provision of network access and service interoperability for the purpose of securing:
 - i) Efficient and sustainable competition; and
 - ii) The maximum benefit for customers of Communications providers; and
- Encourage compliance with certain standards in order to facilitate service interoperability and secure freedom of choice for the customers of communications providers.

7.12 For the reasons set out above, and in particular, that it would further the interests of consumers and citizens by reducing the risk of delays in contacting the emergency services, Ofcom believes that its decision meets these requirements.

Section 47 – Test for setting or modifying conditions

7.13 As set out under 47(1) of the Act, in modifying a condition, Ofcom must be satisfied that the test set out under 47(2) has been met. The test is that the modification is:

- Objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates;
- Not unduly discriminatory against particular persons or against a particular description of persons;
- Proportionate to what it is intended to achieve; and
- Transparent in relation to what it is intended to achieve.

The modification must be objectively justifiable

7.14 Ofcom considers that modifying GC 4 is justified because it will reduce confusion about 999 / 112 access over VoIP services used to call the PSTN, reducing the risk of delays in contacting the emergency services. It is likely to reduce harm to consumers and citizens and, potentially, help save lives.

The modification must not discriminate unduly against particular persons or against a particular description of persons

7.15 Ofcom considers the modification to GC 4 does not discriminate unduly between providers. It might be argued that to allow the existing situation to continue could discriminate in favour of VoIP providers and against conventional PSTN providers, which would continue to bear the cost of the 999 / 112 service. We also consider compliance costs are insufficient to materially harm competition.

The modification is proportionate

7.16 We conclude from the Impact Assessment that our decision is proportionate; we conclude the benefits of regulation far outweigh the costs of regulation. As explained in Section 5, Ofcom has also taken into account the particular circumstances of VoIP providers in providing Guidance on the application of various regulatory provisions.

The modification is transparent

7.17 We consider this Statement and modified GC 4 clearly set out what is expected of providers as a consequence of the decision.

Procedure for modifying General Conditions

7.18 Section 48 requires Ofcom to publish a notification of any modification to a General Condition. This is set out in Annex 2.

Section 8

Next Steps

Compliance Period

- 8.1 As explained in the July 2007 Consultation, Ofcom aims to apply a compliance period that gives VoIP providers adequate time to comply with the regulation and ensures that consumers have 999 / 112 access as soon as practicable. Based on the information we had available when we launched the July 2007 Consultation, we proposed that the modification to GC 4 should enter into force 3 months after publication of this Statement. We then invited detailed calculations and reasoning about the technically feasible implementation time for 999 / 112 access and undertook to carefully consider that information and use it to review the compliance period, if necessary.

Q.10 Do you agree that 3 months would be a suitable compliance period, taking into account the steps VoIP providers would have to take to comply with the modification to General Condition 4 and any additional General Conditions and the need to reduce the risk of harm to consumers and citizens? Please give detailed calculations and reasoning to support your response.

Respondents' Views on Q.10

- 8.2 In addition to written responses, Ofcom held stakeholder meetings with the main emergency call handling service providers to discuss the practicalities of VoIP providers setting up 999 / 112 access.
- 8.3 A significant majority of respondents considered 3 months would be too short a compliance period because of the practical steps required to provide 999 / 112 access and meet the relevant GCs.
- 8.4 The emergency services respondents commented that it's necessary to reduce as soon as possible the period during which the current, unsatisfactory situation is allowed to continue, giving rise to risk of harm to VoIP consumers and other users. But they noted the compliance period must reflect what providers can reasonably achieve. Regarding Government respondents, only Ambulance Policy at the Department of Health agreed that 3 months was a suitable compliance period; they provided no reasoning in support. On the other hand, Covert Investigation Policy at the Home Office proposed 2-3 years.
- 8.5 An emergency call handling service provider that provides an off-the-shelf solution said VoIP providers would realistically require around 6 months to establish 999 / 112 access, allowing for development work and problem resolution. Depending on the VoIP provider, some steps can take several months to complete e.g. collecting user name and address data; network changes to flag calls; more complex network changes if the VoIP service doesn't provide a standard network CLI for end users. That particularly affects type 2 VoIP providers due to levels of systems expertise and number of customers without accurate registered names and addresses.
- 8.6 It considered there was likely to be a bottleneck at its end because it would have to provide 999 / 112 access services to a number of VoIP providers in a limited period. Some steps are joint tasks like developing systems to transfer user name and address data from the VoIP provider's system to the emergency call handling

- database. It estimated it would need at least 6 months in which to schedule providers.
- 8.7 An emergency call handling service provider that provides bespoke emergency call handling solutions said the minimum time for establishing 999 / 112 access is 6 months, not including time required by the VoIP provider for development work and problem resolution. It would also require time to deal with the likely bottleneck at its end.
- 8.8 Both emergency call handling service providers expected to be able to provide an emergency call handling service with CLI and improved caller location information based on ongoing work by standards bodies, especially NICC, in around 12-18 months.
- 8.9 On average, industry respondents considered they require 6-9 or 9-12 months to provide 999 / 112 access and meet the associated requirements under the Guidelines, Code of Practice and PATS GCs. Ofcom is aware of Internet-based VoIP providers that have provided 999 / 112 access in around 6 months at a time when there was no bottleneck at the emergency services call handling provider.
- 8.10 One industry respondent considered, for providers that have a solution to support 999 / 112 access, 3 months would be sufficient to establish new interconnects, test them and check compliance with the PATS GCs, as relevant. Providers with no current solution would require 6 months.
- 8.11 Another industry respondent commented that 3 months is a fairly short period in telecoms terms and, although VoIP providers are generally more nimble than PSTN telephony providers, it may be necessary to make complex changes to offer 999 / 112 access and meet the PATS GCs, as relevant. It considered 6-9 months would be more reasonable. A trade association agreed.
- 8.12 One industry respondent said standard lead times for delivery of an interconnect circuit from one emergency call handling service provider is 3 months; VoIP providers need time to negotiate commercial aspects of the solution and agree technical aspects. It considered providers should demonstrate they have taken steps to enter into negotiations with an interconnect partner within 3 months with a view to providing a full 999 / 112 service within 9 months. It commented Ofcom should ensure the price of emergency call handling services aren't artificially inflated during this period because it will have created an artificial market with a fixed timescale.
- 8.13 Another industry respondent said that, because services and platforms would need to be re-engineered and new internal processes developed, it favoured 9-12 months.
- 8.14 A trade association considered VoIP providers could provide 999 / 112 access with no caller location information in 2-3 months; establish interfaces to pass caller location information to the emergency call handling centres in 12 months; comply with all PATS GCs in 12 months. Another industry respondent favoured 12 months.
- 8.15 Two industry respondents said they were unable to give an estimate. One said it was impossible especially for type 2 services because they're more likely to disappear from the market if Option 2 is adopted. It and an industry alliance recommended Ofcom consider the time taken to implement emergency access for other services in the UK and overseas. Another industry respondent reiterated its position that, given the characteristics of its peer-to-peer VoIP application, it found it hard to envisage providing 999 / 112 access in the UK for the foreseeable future.

Ofcom's Views on Responses to Q.10

- 8.16 The compliance period must balance the need to reduce the risk of harm to consumers and citizens from delay in contacting the emergency services as soon as possible with the need to place a proportionate, reasonable requirement on industry.
- 8.17 In light of consultation responses and stakeholder meetings, we consider the compliance period should be 9 months from publication of this Statement. Therefore the modification to GC 4 will enter into force on **8 September 2008**.
- 8.18 That deadline is designed to give VoIP providers time to provide 999 / 112 access and to carry out any associated development work; conduct a formal risk assessment on network integrity and implement mitigation strategies; PATS VoIP providers time to comply with the PATS GCs; the emergency call handling service providers time to schedule in the potentially significant number of VoIP providers that will need to establish 999 / 112 access in a fixed timeframe..
- 8.19 Particularly given the vital role of 999 / 112 access for public safety, we will monitor and strictly enforce compliance with the deadline.

Monitoring, review and enforcement

- 8.20 Ofcom considers its chosen approach is, in the present environment, a robust solution to meet its policy objective of ensuring a high level of 999 / 112 access.
- 8.21 However, we recognise the dynamic nature of VoIP services and technology and the potential for changes in consumer behaviour. In the July 2007 Consultation we proposed, therefore, to continue to monitor and research developments in those areas to inform our approach to VoIP regulation in general. We also proposed to continue our consumer education activities in order to increase awareness about any differences between VoIP voice call services and PSTN services. We asked for comments on our monitoring, review and enforcement proposals.

Q.11 Do you have any comments on Ofcom's proposed approach to monitoring, review and enforcement?

Respondents' Views on Q.11

- 8.22 A number of respondents from industry and the emergency services stated that monitoring and enforcement are vital to ensure effective regulation. They highlighted the need to ensure regulation is enforced equally for providers based in the UK and offshore to ensure it's fair for industry and, given the possible consequences of non-compliance, that consumers and citizens are properly protected. One said consumers will be attracted to non-compliant services because of lower prices and the availability of offshore providers on the Internet. A couple of respondents considered monitoring and enforcement will be difficult given the number of new entrants and the fact that the licensing regime no longer applies.
- 8.23 Ofcom's approach to date in providing non-binding guidelines for the VoIP industry was supported by an industry respondent, which said there must be an ongoing dialogue so new models of best practice can emerge.
- 8.24 An industry respondent and a trade association suggested one enforcement option for offshore type 4 VoIP providers is to withdraw numbers allocated under the UK numbering plan. If they use numbers allocated to a third party range holder, Ofcom

could require the range holder to block their use or withdraw them. They considered enforcement would be more difficult against type 2 VoIP providers that don't use numbers from the UK numbering plan. The trade association supported Ofcom's proposal, made in another consultation⁷³, to adopt a consumer protection test for number allocation.

- 8.25 A professional body for engineering and technology suggested, like for mobile service providers, requirements could be placed on the underlying network operators, which provide the infrastructure and breakout/in gateways to the PSTN and/or its NGN equivalent. They have the ultimate sanction of denying access to non-compliant VoIP providers.
- 8.26 One respondent suggested Ofcom ask all VoIP providers to provide details of feasibility and timescales for providing 999 / 112 access.
- 8.27 Another industry respondent repeated its position that applying and trying to monitor legacy services regulation for VoIP would impede innovation and life-saving advances. Ofcom should allow industry time to develop solutions to meet the emergency response needs of UK consumers and public safety authorities and should only consider imposing limited regulation if voluntary industry activity fails – but not Option 2. Another said Ofcom should take a step back and monitor the extent and characteristics of Internet-based voice applications that don't seek to substitute traditional PSTN services and usage patterns of those applications by UK consumers and businesses.

Ofcom's Views on Responses to Q.11

- 8.28 Ofcom is resolute about achieving a high level of compliance with its regulations. We will proactively monitor compliance and, if necessary, take enforcement action. That includes against VoIP providers that are based outside of the UK.
- 8.29 We will inform industry of the new obligation. The other steps we will take are likely to include a mystery shopping exercise and formal requests for information to identify non-compliance. We will consider any complaints about non-compliance.
- 8.30 If evidence suggests that a provider is not complying, Ofcom can act swiftly to instigate compliance procedures. Where Ofcom determines there are reasonable grounds to believe a GC has been contravened, it can issue a provider with a notification under Section 94 of the Communications Act 2003 (the Act). A Section 94 notification will set out the steps that Ofcom believes a provider should take to ensure that it becomes compliant with the condition, along with the consequences of the breach that Ofcom believes should be remedied. Failure to fully comply with a Section 94 notification will lead Ofcom to consider issuing an enforcement notification under Section 95 of the Act and/or imposing a penalty under Section 96 of the Act. Penalties may be as much as 10% of the provider's relevant turnover. Under Section 100 of the Act, Ofcom ultimately has the power to suspend a provider's right to provide ECS where the provider consistently fails to comply with conditions.
- 8.31 We are also available to answer questions about complying with the modification to GC 4 and the PATS GCs. To ask questions or to arrange a stakeholder meeting, contact Helen.Keefe@ofcom.org.uk, tel. 020 7783 4963.

⁷³ Ofcom Consultation, Consumer Protection Test for Telephone Number Allocation, 17 May 2007 <http://www.ofcom.org.uk/consult/condocs/numberingcpt/numbering.pdf>

Annex 1

Modification to General Condition 4

This section shows the modification to General Condition 4. Additions are in bold. Deletions are struck through.

GENERAL CONDITION 4: EMERGENCY CALL NUMBERS

- 4.1 The Communications Provider shall ensure that any End-User can access Emergency Organisations by using the emergency call numbers “112” and “999 or 112” at no charge and, in the case of a Pay Telephone, without having to use coins or cards.
- 4.2 The Communications Provider shall, to the extent technically feasible, make Caller Location Information for all calls to the emergency call numbers “112” and “999 or 112” available to the Emergency Organisations handling those calls.
- 4.3 For the purposes of this Condition,
- (a) “Caller Location Information” means any data or information processed in an Electronic Communications Network indicating the geographic position of the terminal equipment of a person initiating a call;
 - (b) “Communications Provider” means:
 - (i) in paragraph 4.1, a person who provides **a Service, or provides access to such Service** ~~Publicly Available Telephone Services, or provides access to such Publicly Available Telephone Services~~ by means of a Pay Telephone;
 - (ii) in paragraph 4.2, a person who provides a Public Telephone Network;
 - (c) “Pay Telephone” means a telephone for the use of which the means of payment may include coins and/or credit/debit cards and/or pre-payment cards, including cards for use with dialling codes. For the avoidance of any doubt, references to a Pay Telephone include references to a Public Pay Telephone.;
 - (d) “**Service**” means a **Public Electronic Communications Service enabling origination of calls to numbers in the National Telephone Numbering Plan but shall exclude any Click to Call Service**;
 - (e) “**Click to Call Service**” means a service which may be selected on a web-site or other application by an End-User and which connects the End-User only to a number or a limited set of numbers pre-selected by the Communications Provider or an End-User.

Annex 2

Modification to General Condition 4 of the General Conditions of Entitlement

Notification of a modification under Section 48(1) of the Communications Act 2003

Modification of General Condition 4 of Part 2 of the General Condition Notification regarding Emergency Call Numbers under Section 48(1) of the Act for the purpose of requiring access to Emergency Call Numbers.

WHEREAS

A. The Director General of Telecommunications (the “Director”) issued on 22 July 2003 the General Conditions Notification, which took effect on 25 July 2003 by way of publication of a notification pursuant to section 48(1) of the Act;

B. By virtue of the Communications Act 2003 (Commencement No. 1) Order 2003 (S.I. 2003/1900 (C.77)) made under sections 411 and 408 of the Act

(i) certain provisions of the Act were commenced on 25 July 2003 for the purpose only of enabling the networks and services functions under those provisions to be carried out by the Director; and

(ii) those provisions of the Act are to have effect as if references to Ofcom were references to the Director;

C. OFCOM issued a notification pursuant to section 48(2) and 86 (1) of the Act setting out its proposals for the modification of General Condition 4 (as amended) on 26 July 2007, entitled *Regulation of VoIP Services: Access to the Emergency Services* (the “Notification”);

D. A copy of the Notification was sent to the Secretary of State in accordance with section 50(1)(a) of the Act and to the European Commission in accordance with Section 50(6) of the Act;

E. In the Notification and accompanying explanatory statement, OFCOM invited representations about any of the proposals set out therein by 20 September 2007;

F. By virtue of section 48(5) of the Act, OFCOM may give effect to any proposals to modify or set general conditions as set out in the Notification, with or without modification, where:

(i) they have considered every representation about the proposals made to them within the period specified in the Notification; and

(ii) they have had regard to every international obligation of the United Kingdom (if any) which has been notified to them for this purpose by the Secretary of State;

G. OFCOM received responses to the Notification and has considered every such representation made to it in respect of the proposals set out in the Notification and the accompanying explanatory statement; and the Secretary of State has not notified OFCOM of any international obligation of the United Kingdom for this purpose;

THEREFORE

1. OFCOM in accordance with section 48 (1) of the Act hereby make the following modification of General Condition 4 (as amended) of Part 2 of the General Condition Notification, regarding Emergency Call Numbers.
2. The modification is set out in the Schedule to this Notification.
3. The effect of, and OFCOM's reasons for making, the modification referred to in paragraph 1 above is set out in the accompanying statement.
4. OFCOM consider that the modification referred to in paragraph 1 above complies with the requirements of sections 45 to 50 of the Act, as appropriate and relevant to its proposal.
5. In making the modification set out in this Notification, OFCOM have considered and acted in accordance with their general duties in section 3 of the Act and the six Community requirements in section 4 of the Act.
6. Copies of this Notification and the accompanying statement have been sent to the Secretary of State in accordance with section 50(1)(a) of the Act and to the European Commission in accordance with Section 50(6) of the Act.
7. The modification shall enter into force on 8 September 2008.
8. In this Notification:
 - i) 'the Act' means the Communications Act 2003;
 - ii) 'General Condition Notification' means as set out in the Schedule to the Notification under Section 48(1) of the Communications Act 2003 published by the Director General of Telecommunications on 22 July 2003; and
 - iii) 'OFCOM' means the Office of Communications.
9. Except insofar as the context otherwise requires, words or expressions shall have the meaning assigned to them in this Notification (including the Schedule) and otherwise any word or expressions shall have the same meaning as in the General Condition Notification and, subject to such meanings, otherwise any word or expression shall have the same meaning as it has in the Act.
10. For the purpose of interpreting this Notification:
 - i) headings and titles shall be disregarded; and
 - ii) the Interpretation Act 1978 shall apply as if this Notification were an Act of Parliament.
11. The Schedule to this Notification shall form part of this Notification.

Gareth Davies
Competition Policy Director

A person authorised by Ofcom under paragraph 18 of the Schedule to the Office of Communications Act 2002

5 December 2007

Annex 3

Responses Received

Non-confidential responses

A3.1 Ofcom received 5 confidential responses and 25 non-confidential responses to the Consultation. The non-confidential responses were from:

- Association of Chief Police Officers of England, Wales and Northern Ireland (ACPO)
- Ambulance Policy, Department of Health
- Barker, Mr B.
- BT
- Cable & Wireless (C&W)
- Chief Fire Officers Association
- Covert Investigation Team, Home Office
- Fire & Resilience Directorate, Communities and Local Government (CLG)
- Digifonica Enterprises Ltd
- Easynet
- Federation of Communication Services (FCS)
- Hughes Network Systems Ltd
- Institute of Engineering and Technology (IET)
- Intel Corporation
- Inuk Networks Ltd
- ITSPA
- MCom
- Name Withheld 1
- NetTek Ltd
- Skype
- T-Mobile
- The VON Coalition

- THUS
- UKCTA
- Vonage

Annex 4

Glossary

3G: the third generation of mobile phone technology, which allows wireless broadband connection

Broadband: A service or connection that is generally defined as 'always-on' and provides a bandwidth greater than 128kbit/s

CBA: Cost-Benefit Assessment

CPS: Carrier Pre-selection. The facility that allows customers to opt for certain defined classes of call to be carried by a communications provider that they select in advance (and with which they have a contract) without having to dial a routing prefix, use a dialler box, or follow any other procedure

DECT: Digital European Cordless Telephony. A DECT phone is a cordless fixed phone

EC: European Community

ECN: Electronic Communications Network

ECS: Electronic Communications Service

ERG: European Regulators Group

EU: European Union

GC: General Condition

IA: Impact Assessment

Interconnection: Where one Public Electronic Communications Network is linked to another to enable users of one of them (a) to communicate with users of the other one; (b) to make use of services provided by means of the other one (whether by the provider of that network or by another person)

Interoperability: The technical features of a group of interconnected systems that ensure end-to-end provision of a given service in a consistent and predictable way

IP: Internet Protocol. The packet data protocol used for routing and carriage of messages across the Internet and similar networks

ISP: Internet Service Provider. A company that provides access to the Internet

LLU: Local Loop Unbundling. A process by which BT's exchange lines are physically disconnected from BT's network and connected to other operators' networks. This enables operators other than BT to use the BT local loop to provide services to customers

MPF: Metallic Path Facilities. These are the pair of copper wires that run from a Main Distribution Frame at a telephone company local exchange to the end user's home or business premises

Naked DSL: A DSL service (e.g. broadband) provided without existing PSTN line voice services

NGA: Next Generation Access

NGN: Next generation network

NP: Number Portability, which allows consumers to keep their phone number when they change provider

NVS: New Voice Services. A term used by Ofcom in a previous consultation to describe new VoIP services

Ofcom: Office of Communications. The regulator for the communications industries, created by the Communications Act 2003

Oftel: Office of Telecommunications, whose functions transferred to Ofcom on 29 December 2003

PATS: Publicly Available Telephony Service, a category of ECS

PBX: Private Branch Exchange

PC: Personal Computer

PDA: Personal Digital Assistant (a handheld computer)

PECN: Public Electronic Communications Network

PECS: Public Electronic Communications Service

PSTN: Public Switched Telephony Network

PTN: Public Telephone Network. A network over which PATS is provided

QoS: Quality of Service

Service provider: A provider of electronic communication services to third parties. Some Service Providers have their own network

SLA: Service Level Agreement

VoIP: Voice over Internet Protocol. A technology that allows users to send calls using Internet Protocol, using either the public internet or private IP networks

Voice over Broadband (VoB): A Voice over Internet Protocol service provided over a broadband Connection

Wi-Fi: Wireless Fidelity based on IEEE 802.11x standards

WiMax: Worldwide Interoperability for Microwave Access – Broadband wireless based on IEEE 802.16 & ETSI HiperMAN standards

WLR: Wholesale Line Rental. A regulatory instrument requiring the operator of local access lines to make this service available to competing providers at a wholesale price