



## Review of Relay Services

Consultation

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## Section 1

# Summary

- 1.1 Communications services are important for all citizens, providing access to friends, family and community and helping people to play a full part in society, to take educational opportunities and to look for work.
- 1.2 However, people with disabilities can face barriers when using communications services and, in particular, voice telephony which, by its nature, requires a certain degree of speech and hearing. Although the wide availability and use of broadband and mobile text messaging has provided greater opportunities for disabled people to communicate, people with hearing and/or speech impairments continue to meet barriers when using voice telephony.
- 1.3 The difficulties of disabled people being able to use voice telephony and the important service offered by it are recognised in the regulatory framework under which Ofcom operates. Under the Universal Service Directive ('the Directive') Member States are required to ensure that access to, and affordability of voice telephony for end-users with disabilities is equivalent to the level enjoyed by the majority of end-users. The requirements of the Directive are implemented in the United Kingdom by the Communications Act 2003 ('the Act'), and the Universal Service Order 2003 ('the Order') and require Ofcom to ensure the provision of text relay ('TR') services. Those services allow hearing- and/or speech-impaired end-users to communicate with others through a relay assistant that will convert speech to text and vice versa in order to assist disabled end-users with communication via voice telephony.
- 1.4 Ofcom has therefore imposed Universal Service Condition 4 ('USC4') on BT and General Condition 15 ('GC15') on all communications providers ('CPs') including BT to ensure that disabled users are able to access a TR service, approved by Ofcom, regardless of their choice of telephone provider.
- 1.5 BT currently provides a TR service to comply with its obligations to both its own customers and other CPs. As required by the GC, in order to ensure the affordability of the service, users pay no more than standard telephony charges, even though the average cost of providing the service is around 60p per minute. The ongoing cost to the CPs for each of the 11,000 users is approximately £400 per year based on current levels of usage.
- 1.6 This consultation sets out Ofcom's proposals for amending the regulatory regime in relation to services for disabled end-users and in particular those with hearing and/or speech impairments. The requirement to provide the current TR service, then known as TypeTalk, was originally included as a licence condition for BT and KCom in October 2001, prior to the introduction of the new regulatory framework in 2003. There have been significant technological advances in the communications sector since that time as well as changes to the way in which services are used by consumers. Ofcom is therefore conducting this consultation to assess the extent to which the existing requirements for TR services continue to meet the needs of disabled end-users. In particular, Ofcom is considering whether it is appropriate to require the provision of new services for end-users with hearing and/or speech impairments in order to ensure the greatest level of equivalence as possible under the current framework.

- 1.7 Research amongst people with hearing and/or speech impairments helps us understand some of the criteria relevant when considering equivalent access to communications. Ofcom has conducted a number of pieces of research in recent years to better understand the needs of disabled end-users when accessing communications services. That research suggests that the ability to have natural conversations that are private and where people can interrupt each other is significant. Having flexibility in the choice of communication methods and of devices used and having services that are available when needed are also seen as important factors.
- 1.8 In this review, we have used the findings of the research as a starting point to help us assess the extent to which existing relay services are providing equivalence and whether, particularly in light of changes in technology and services, the obligations we have placed on CPs remain appropriate and continue to meet consumers' needs.
- 1.9 Our research indicates that TR remains a valuable service for many users with hearing and/or speech impairments. Whilst emails, instant messenger and mobile text messaging now provide an important role in meeting these users' communications needs, disabled users felt that a TR service continued to play an important role in ensuring that they were able to communicate with others on an equivalent basis to voice communications. However, the current TR service was criticised for slow conversation speeds and lack of the ability to use the service with mainstream equipment. Users of British Sign Language (BSL), particularly those who find written English difficult, reported finding TR services difficult to use.
- 1.10 Having carefully considered the views expressed during the research and taking full account of technological advances, Ofcom considers that it is appropriate to improve the relay services on offer under the regulatory framework in order to ensure the greatest equivalence possible for disabled end-users. We are therefore setting out proposals for the upgrading of required TR services and for the introduction of video relay (VR) which we believe will provide greater equivalence for BSL users.
- 1.11 In considering which options are appropriate for the delivery of improved relay services, we commissioned a technical study looking at the improvements which might be made and the costs for improving the current relay service. We have also held discussions with stakeholders, including CPs, organisations representing disabled users and providers of relay services and have considered examples of services provided in other countries.
- 1.12 On the basis of these studies and our analysis, we are proposing that requirements for TR should be expanded. We are proposing that the criteria for approval for a TR service should be extended to include requirements to support simultaneous two-way speech with live captions/text and that the service should be accessible via off the shelf/mainstream consumer electronics such as PCs, while still supporting the current level of service to existing terminals.
- 1.13 These improved requirements would provide a flexible relay service which could be used in different ways according to user needs. It would provide many aspects of equivalence identified as important to users. Users of the enhanced service would benefit from support for two-way text, giving the ability to interrupt and support for two-way speech, both of which will enable a more natural flow of conversation. Users would also benefit from the use of mainstream equipment.
- 1.14 We are calling the new service Next Generation Text Relay (NGTR). NGTR will provide increased equivalence and we anticipate that the total cost of the service will

remain within the cap of £15.7 million per year set in the current USC. If this position were to change due to significant increases in take-up and usage, we may need to conduct a further review in order to ensure that the measures remain proportionate.

- 1.15 To implement the change, we propose to amend GC15 to set out an enhanced set of criteria that an approved NGTR service will need to meet. This requirement would apply to all providers of publicly available telephone services and would ensure that there is at least one approved TR service and that disabled end users have a choice of CPs and services that is available to the majority of end-users. We believe that using GC15 only is adequate to ensure the provision of NGTR and we are proposing that the current USC on BT is withdrawn.
- 1.16 We have also examined the case for the introduction of VR services. VR would provide greater equivalence for BSL users, particularly those who find written English difficult which restricts their ability to use TR services. In particular it would meet the equivalence criteria to enable natural conversations. However, the costs of a VR service are significantly higher than those for TR, because of the need to employ specialist BSL interpreters.
- 1.17 Our estimate for medium demand is for an annual cost of £41.6 million or a cost per user of £1,890. But the cost could be significantly higher, for example in our high demand scenario the cost is £113.4 million a year or a cost per user of up to £3,780 a year. We have not been able to identify benefits of a similar scale. We also have concerns that the limitations on the availability of BSL interpreters could currently make it impractical to require CPs to provide an unrestricted service. In light of those considerations, we consider that a requirement to provide an unrestricted VR service would not be appropriate at this time.
- 1.18 However, taking into account the benefits that VR offers to disabled end-users, particularly BSL users who find written English difficult, we remain of the view that VR provides a high level of equivalence for certain end-users. We are therefore proposing to require the provision of a VR service on a restricted basis. We set out a number of options for how a restricted service might operate in order to ensure that the service delivers the greatest benefits for disabled end-users whilst recognising the need to ensure that any measures introduced remain justified. At this stage, we propose to issue a further consultation on the detailed implementation of a VR service once the appropriate level of restriction has been established.
- 1.19 Our research also indicated considerable difficulties experienced by those with hearing and/or speech impairments contacting businesses and public bodies. This suggests that significant benefits could arise if organisations made improvements to their communications services for disabled people, particularly through the use of mainstream services such as mobile text messaging, instant messenger and email or deployment of subsidised relay services.
- 1.20 It is important to recognise this consultation as part of a broader dialogue on the development of services for users with hearing and/or speech impairments. Users, government, businesses and other stakeholders all have an interest in and a role to play in such dialogue and Ofcom will continue to play an active part.
- 1.21 Ofcom is seeking views on our proposals by 20<sup>th</sup> October 2011.

## Section 2

# Introduction

- 2.1 In this section, we discuss the importance of communications services and how the UK telecoms landscape has changed since a text relay (TR) service was first introduced in the 1980s. We discuss what this may mean for those with hearing and/or speech impairments, the legal framework available to us when considering equivalent access to communications for these users and the scope of our review.

### The importance of communications services

- 2.2 Communications services are important for all citizens. They provide people with access to cultural and educational activities and resources, and to services and commerce. They make it easier to participate in civil society, to learn and develop new skills, to connect with their family, friends and community, as well as to search for work. They also allow businesses to engage with a wider range of customers and suppliers.<sup>1</sup>

### The changing communications landscape

- 2.3 Since the 1980s, the way that many consumers engage with technology has changed dramatically and in a relatively short time frame.
- 2.4 A quarter of a century ago, most UK households would have only had access to a basic landline to communicate with others, use of mobile telephones was greatly limited, and the internet was not yet available for public use.
- 2.5 Today, that position has changed dramatically. As set out in the Government's *Digital Britain* Report:

“The communications sector underpins everything we do as an economy and society, to a degree few could have imagined even a quarter of a century ago. Electronic systems and new technology have transformed core elements of UK industry, our media and our public services.”<sup>2</sup>

- 2.6 The use of communications services is therefore more vital than ever for people to engage fully with society, both in a personal and economic sense. The number of services has proliferated during this time with the rapid increase in the use of mobile phones and internet offering new ways to communicate.
- 2.7 However, those with disabilities continue to face challenges in using communications services. In particular, for those with hearing and/or speech impairments, use of voice telephony is difficult or impossible depending on the level of impairment. Yet voice telephony remains a key communications service which is necessary for participation in society. Indeed, in many ways communications services may be even more important for people who may already suffer isolation and exclusion due to their disability.

<sup>1</sup> This was also highlighted in our Access and Inclusion statement in 2009, page 10: [http://stakeholders.ofcom.org.uk/binaries/consultations/access/summary/access\\_inc.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/access/summary/access_inc.pdf)

<sup>2</sup> Available at <http://www.official-documents.gov.uk/document/cm76/7650/7650.pdf>, paragraph 1.

- 2.8 Whilst the growth in the availability and use of broadband and mobile data services, particularly email and mobile text messaging services, has helped those with hearing and/or speech impairments to communicate, voice communication can be a barrier for this section of society.
- 2.9 In a number of countries, governments and regulators have intervened to address this barrier by requiring the availability of relay services. These services enable users with hearing and/or speech impairments to make and receive voice calls using third party relay assistants. In the UK, government has intervened to ensure that a TR service is provided, whereby the relay assistant types the words spoken by the hearing person and speaks the words typed by the hearing- and/or speech-impaired person. This service allows most disabled end-users with hearing and/or speech impairments access to a service which provides a certain level of equivalence to voice telephony and therefore allows them to take advantage of the benefits the service offers.

### **The legal framework**

- 2.10 The legal framework for the requirements on BT and other communications providers (CPs) is set by Articles 7 and 23a of the Universal Service Directive.<sup>3</sup> Under those provisions, Member States are required to ensure that the provision of access to, and affordability of, services for disabled end-users is equivalent to that enjoyed by the majority of end-users.
- 2.11 This requirement has been transposed in the United Kingdom under the Communications Act ('the Act') and Universal Service Order<sup>4</sup> ('the Order') which requires Ofcom to secure the provision of a TR service through the imposition of Universal Service Conditions (USCs) or General Conditions (GCs). Ofcom has imposed a combination of USCs and GCs in order to meet this requirement. Under USC4, BT is required to provide a TR service to those of its users that require it. GC15 requires all providers of publicly available telephone services (including BT), to offer a TR service to their customers. Currently, BT makes the service required under USC4 available to other CPs in order to fulfil their obligations under GC15.
- 2.12 A detailed description of the legislative framework applicable is provided in Annex 5.

### **The review's objective**

- 2.13 This review seeks to assess whether the current arrangements for the provision of relay services provide a sufficient level of equivalence to voice telephony for end-users with hearing and/or speech impairments. In this regard, we have identified equivalence criteria and have considered what improvements and changes might be made to existing services, taking into account changes in mainstream technology and the proportionality of any action by Ofcom.
- 2.14 In considering what measures may be appropriate to ensure equivalent services, Ofcom must have regard to a number of duties set out in the Act and Article 8 of the Framework Directive. In particular, under Article 8 of the Framework Directive and sections 3 and 4 of the Act, Ofcom must ensure that any measures taken are:

- Objective;

<sup>3</sup> Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, as amended by Directive 2009/136/EC, as amended by SI 2011/1209

<sup>4</sup> SI 2003/1904 The Electronic Communications (Universal Service) Order 2003.

- Transparent;
  - Non-discriminatory; and
  - Proportionate to what it is intended to achieve.
- 2.15 Those principles are carried over into section 47 of the Act regarding the setting of GCs and USCs which provides that Ofcom may not impose such a condition unless satisfied that those tests are met.
- 2.16 This is the first substantive review of relay services that Ofcom has carried out since its creation in 2003. In 2005/06 Ofcom reviewed all universal service obligations including, relay services.<sup>5</sup> In addition technical studies have been carried out on behalf of Ofcom, including the study by City University on the “Feasibility of Additional Telephone Relay Services” 2006<sup>6</sup> and extended in 2008 and the study by Plum in 2009 entitled “Voice telephony services for deaf people”<sup>7</sup> (‘the Plum study’) and these have helped inform the debate on relay services.

### Inputs to the review

- 2.17 We have drawn upon a variety of inputs and information sources to help assist us with the review including: meetings with and information from consumer, disability, and industry stakeholders; commercial providers of relay services in and outside the UK; and our international counterparts.
- 2.18 We commissioned Opinion Leader (‘OL’), an independent market research specialist, to carry out market research into the telecommunications needs of hearing- and speech-impaired users. This was published on 4 February 2011.<sup>8</sup>
- 2.19 We also commissioned a technical report from InterConnect Communications on improvements that could be made to the current approved relay service and associated costs. The report contained confidential information and a redacted version of the report can be found in Annex 6.
- 2.20 Previous independent studies, referred to in paragraph 2.16, carried out on behalf of Ofcom have also helped to inform the debate on the review and we draw upon useful insights from these studies in this document.

### Structure of this document

- 2.21 The remainder of this document is structured in the following way:
- 2.22 Section 3 explores factors that might be relevant when considering equivalent access to communications. In doing so it draws upon the main findings of the recent market research by OL.
- 2.23 Section 4 assesses the extent to which the current service provides equivalence. It sets out options for changing the current provision of TR services in the UK with an analysis of costs and benefits and our preferred option.

<sup>5</sup> <http://stakeholders.ofcom.org.uk/consultations/uso/main>

<sup>6</sup> <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/relayservices/>

<sup>7</sup> [http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/voice\\_telep/](http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/voice_telep/)

<sup>8</sup> The full research report by opinion Leader can be found at: <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/ofcom-relay-services/>

- 2.24 Section 5 assesses the extent to which VR would provide equivalence. It explores the costs and benefits associated with introducing VR and considers what, if any, intervention is appropriate.

### Impact Assessment

- 2.25 The analysis presented in this document represents an impact assessment, as defined in section 7 of the Act. In Sections 4 and 5 we discuss all of the relevant factors and options that we have considered, including their impact on stakeholders including both consumers and suppliers.
- 2.26 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. This reflects section 7 of the Act, which requires Ofcom to carry out impact assessments where its proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. However, as a matter of policy Ofcom is committed to carrying out and publishing impact assessments in relation to the majority of its policy decisions. For further information about Ofcom's approach to impact assessments, see the guidelines, Better policy-making: Ofcom's approach to impact assessment, which are on Ofcom's website.<sup>9</sup>
- 2.27 Specifically, pursuant to section 7 of the Act, an impact assessment must set out how, in our opinion, the performance of our general duties (within the meaning of section 3 of the Act) is secured or furthered by or in relation to what we propose.

### Equality Impact Assessment

- 2.28 Ofcom is also required to assess the potential impact of all our functions, policies, projects and practices on the equality of individuals to whom those policies will apply<sup>10</sup>. Equality impact assessments (EIAs) assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity. We have given careful consideration to whether or not our proposal to change the provision of relay services will have a particular impact on race, age, disability, gender, pregnancy and maternity, religion or sex equality. We do not, however, envisage that the proposals contained in this consultation will have a detrimental impact on any particular group of people. Indeed, our proposals focus on furthering the interests of hearing- and/or speech-impaired users and these end-users stand to benefit from any changes to relay services, which will aim to ensure equivalence to voice telephony.

### Our consultation process

- 2.29 We have outlined a number of questions in this document. We invite responses to these questions by 20<sup>th</sup> October.
- 2.30 In Annex 1 we explain how to respond to this consultation, including through video responses from BSL users.

<sup>9</sup> [http://stakeholders.intra.ofcom.local/binaries/consultations/better-policy-making/Better\\_Policy\\_Making.pdf](http://stakeholders.intra.ofcom.local/binaries/consultations/better-policy-making/Better_Policy_Making.pdf)

<sup>10</sup> Ofcom conducts equality impact assessments in order to fulfil its duties under section 149 of the Equality Act 2010.

## Section 3

# Equivalence

- 3.1 We commissioned market research by Opinion Leader ('OL') to help us understand the telecommunications needs and experiences of those with hearing and/or speech impairments. The research helps us identify whether any gaps currently exist in achieving equivalence to voice telephony and to establish criteria for assessing equivalence for this review.

### Summary of the market research

- 3.2 The research involved over 300 face to face and online interviews, as well as focus groups, including users and non-users<sup>11</sup> of relay services and hearing users such as friends/family of users and those who may use relay services in a professional capacity. The research used both quantitative and qualitative methods.
- 3.3 Due to the difficulties of identifying potential users of relay services, the survey could not be conducted with a random sample. Participants in the market research were recruited using several methods (and to some extent were self selecting) to generate a sufficiently large sample for the research. As a result, we cannot state with confidence that the results are representative of potential users as a whole. However, they at least reflect the views of a substantial number of potential users and provide us with useful indicative information.
- 3.4 The research included the following groups of people, who are likely to have distinct communication needs, to help identify the differing level and nature of needs:
- Severely and profoundly deaf BSL users
  - Severely and profoundly deaf non-BSL users
  - Moderately deaf individuals
  - Individuals with both hearing/speech and visual impairments<sup>12</sup>
- 3.5 We set out the main findings of the market research below in respect of preferences for communication services in the context of equivalence. The findings in respect of TR and additional services are out in later sections.

### Communications in context

- 3.6 Habits and preferences for communications vary amongst end-users with hearing and/or speech impairments, and hearing users that communicate with them.
- 3.7 The range of communications methods that were used and reported by participants reflected:
- Individuals' specific needs and preferences - what they find effective and are comfortable with using;
  - The need to take account of the technology used, or not used, by others; and

<sup>11</sup> Non-users in this respect includes those that choose not to use the service, lapsed users or are not aware of the service.

<sup>12</sup> Four participants with visual impairments took part in the market research.

- Different situations such as the need for confidentiality, emotional content or anonymity in conversations in relation to an intermediary such as the relay assistant or an interpreter.

3.8 Some key findings of the market research by OL<sup>13</sup> were:

- There is no 'one size fits all' communications technology that would be suitable for all people who have hearing and/or speech impairments. Different technologies are perceived to have advantages and disadvantages for people depending on their needs and preferences;
- People who have hearing and/or speech impairments make use of a wide variety of communications services, such as mobile text messaging and email, some of which they report as being more suitable for contacting friends and family than for contacting organisations and business;
- The range of methods used to communicate with business and organisations is narrower than that used to communicate with friends/ family. For example, mobile text messaging and email are used by many to communicate with friends, family and work colleagues but not for more formal contacts;
- Mainstream commercially available services such as mobile text messaging and email are only used by a minority to communicate with organisations such as GPs' surgeries, the local council, shops, utilities and trades people. The research found that barriers exist that inhibit communication using these methods with such organisations. For instance, some participants reported that GPs/nurses were able to send mobile text messages or email them (e.g. to remind them of an appointment), but they would not permit a mobile text message/email to be sent back to them;
- BSL users who do not have English as their first language prefer to communicate using sign language because it allows them to express themselves more clearly;
- Having choice in the methods of communication, as well as equipment and technology, is seen as important for those who have hearing and/or speech impairments;
- Having 24/7 availability of communications methods is seen by the majority to be necessary (and important for equivalence);
- The ability to have real time conversations is particularly important to those who were profoundly deaf;
- The ability to communicate effectively with others improves the self-confidence and independence of those with hearing and/or speech impairments; and
- The ability to have private and confidential conversations is important.

### **Criteria for assessing equivalence**

3.9 The concept of equivalence meaning different things to do different groups of people is borne out by the research. For instance the research highlights that there is no

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<sup>13</sup> The full research report can be found at: <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/ofcom-relay-services/>

'one size fits all' communications technology that would be suitable for all people who have hearing and/or speech impairments and that this group have different needs and preferences when engaging with communications services according to their varying levels of ability.

3.10 As shown above, the research does, however, help to draw out some common factors that people with hearing and/or speech impairments consider are important when using communications services. These include:

- the ability to have natural conversations;
- the ability to have private conversations;
- the ability to interrupt conversations as needed;
- having flexibility in the choice of communications methods and devices; and
- having access to these services whenever they are required.

3.11 In sections 4 and 5, we use these factors above to reassess whether the current provision of relay services provides equivalent access to communications and continues to be fit for purpose.

## Section 4

# Text Relay

4.1 In this section we examine the extent to which TR services provide equivalence (as identified in section 3) for users with hearing and/or speech impairments and whether it is proportionate to place any additional requirements in this respect on CPs. We describe the current arrangements for TR services and report market research findings. We then consider the potential costs and benefits associated with additional TR services.

## The current approved text relay service

- 4.2 The current approved TR service is operated by BT and enables both BT and other CPs to fulfil their regulatory obligations. The service handles around 33,000 calls each week with relay assistants and also direct calls between text terminals (which would not normally require a relay assistant). The service is provided by BT via the public switched telephone network (PSTN).
- 4.3 The service enables people with hearing and/or speech impairments to communicate with others through a relay assistant in a call centre, who types what the hearing person says and speaks the words the person with the hearing and/or speech impairment types.
- 4.4 A hearing-impaired user wishing to call a hearing person via the relay service dials a prefix before the other party's number. This automatically brings a relay assistant into the call. The relay operator announces the nature of the call to the hearing person who then speaks. Their words are typed by the relay assistant with the text appearing on the hearing-impaired person's text terminal. The hearing-impaired person might then either speak or type his/her response. Where the hearing-impaired person uses his/her own voice, this is known as 'voice carry over' (VCO).
- 4.5 A speech-impaired user can make use of the system in a similar way except that they have the option of listening directly to the other caller, a technique known as 'hearing carry over' (HCO).
- 4.6 Users primarily access the service via a text-only terminal called a textphone although some users with good speech make use of a screenphone, which can display text but does not have a keyboard as standard.<sup>14</sup> A software package is also available, which allows users to receive calls via the internet. It is also possible to make calls via TR using the software but this requires the user to set up a separate pre-pay account.
- 4.7 The relay service offers a live process which can be initiated from a textphone or by a hearing user using a conventional telephone. In both cases the caller dials a prefix before the number they are calling to use the service. This requires the hearing caller to know three things in advance: that the person they are calling has impaired hearing; that the relay service exists; and what the prefix is.
- 4.8 Figure 1 below illustrates how this TR service works.

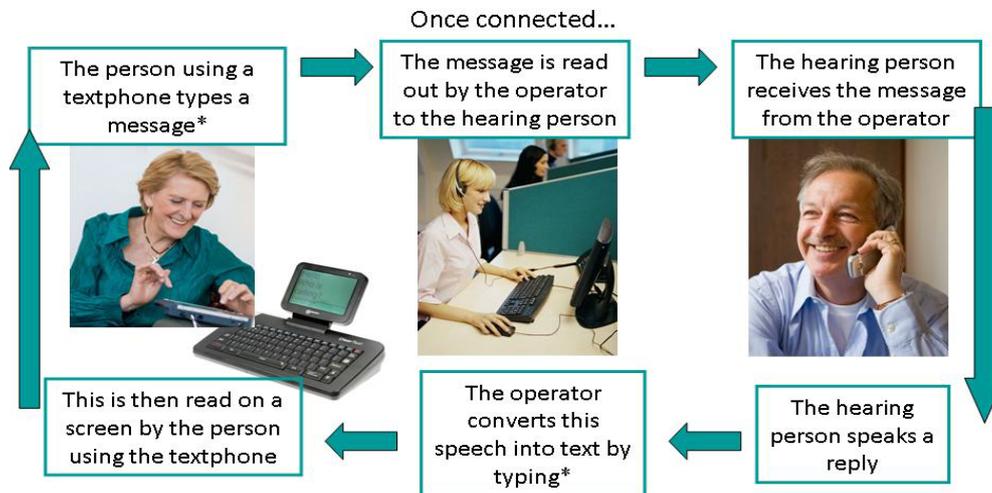
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<sup>14</sup> This means that textphone to textphone calls (i.e. without a relay assistant) cannot be made using this terminal unless an optional keyboard is purchased.

Figure 1

### How does text relay work?

You can use the text relay service from either a telephone or textphone, all you have to do is put a prefix number in front of the number you are trying to contact.



\*The conversation speed relies on the typing speed of the person typing (if they do not use their own voice).

Source: OL market research report.

- 4.9 Additional features of the service are direct text-to-text communication without the intervention of an operator<sup>15</sup> and, as discussed above, VCO and HCO.
- 4.10 The parties at either end of the conversation have to take turns speaking or typing; VCO and HCO require the equipment to drop the text connection while speech is taking place, and this further disrupts the flow of conversation. The current approved service also provides slow conversation speed, typically 30 words per minute (wpm) compared with 170 wpm for a conventional voice call.

#### Market research on the current approved text relay service

- 4.11 The market research found that the current approved TR service was valued by users, particularly those who are profoundly or severely deaf many of whom saw the service as enabling hearing and speech impaired users to achieve a degree of independence, but that users thought the service could be improved.
- 4.12 Some shortcomings identified with the current approved TR service include: the inability to interrupt and lack of a 'real time' conversation; the inability to express or detect emotion; lack of privacy owing to the presence of relay operator; and lack of access to equipment.
- 4.13 A major disadvantage of the current approved TR service, reported by participants, is the slow conversation speed that is achieved. This is primarily due to the need for callers to take turns speaking or typing<sup>16</sup> and 'handover' to the other party, resulting

<sup>15</sup> This is used almost exclusively for communications between two hearing- and/or speech-impaired users.

<sup>16</sup> The Voice Carry Over facility requires the equipment to drop the text connection while speech is taking place, further disrupting the flow of conversation.

in an inability to interrupt a conversation, pauses while handing over and hence not a fluid or natural conversation experience.

## Options for changing the current provision of text relay services

- 4.14 Using the equivalence criteria set out in section 3, Ofcom considers that the current TR service falls short of offering an equivalent service to voice telephony in a number of respects:
- The ability to have natural conversations and to interrupt as needed, with difficulties arising principally from the need for speakers to take turns and handover. Some BSL users in particular expressed difficulty in using TR when BSL was more natural;
  - Providing flexibility in the choice of communications methods and devices, with textphones being the principal device used in most cases; and
  - The ability to have private conversations.
- 4.15 This suggests that improvements to the current approved service would enable users with hearing and/or speech impairments to make calls that were more equivalent to conventional voice telephony, particularly by allowing more real-time and fluid conversations.
- 4.16 Below we consider options for providing an improved TR service to help achieve greater equivalence. We have considered the costs and technical practicalities involved with providing an improved TR service to help assess the proportionality of any regulatory intervention to achieve this greater level of equivalence. We have also considered a 'no change' option where the obligations in relation to TR remain unchanged.
- 4.17 Ofcom recognises that there may be other options for the delivery of communications solutions which benefit disabled end-users which may be used in conjunction with relay services but are beyond the scope of Ofcom's powers in this area. This consultation should therefore be seen as part of a broader dialogue on development of services for users with hearing and/or speech impairments. Users, government, businesses and other stakeholders all have an interest in and a role to play in such dialogue and Ofcom will continue to play an active part.

### Option 1: No change to the current provision of text relay

- 4.18 Under this option the current provision of TR services would not be altered and the current approval criteria TR services would remain unchanged.<sup>17</sup>
- 4.19 Current users of the approved TR service would continue to be able to use the current service, highlighted as a valued service by the market research, and costs to CPs would not be impacted as result.
- 4.20 Relay services can never be fully equivalent to the voice telephony service enjoyed by users with no hearing and speech impairments, due to the nature of the user

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<sup>17</sup> For criteria we used when TypeTalk (now branded Text Relay) was approved in 2003, see Consultation: [www.ofcom.org.uk/static/archive/oftel/publications/consumer/2003/textrelay0603.htm](http://www.ofcom.org.uk/static/archive/oftel/publications/consumer/2003/textrelay0603.htm) Statement: [www.ofcom.org.uk/static/archive/oftel/publications/eu\\_directives/2003/relay0703.pdf](http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/relay0703.pdf)

groups' abilities. On the one hand, therefore, it is arguable that the current approved TR service achieves some (basic) level of equivalence for those with hearing and/or speech impairments, in that it enables end-users to make and receive a telephone call and therefore to communicate with others.

- 4.21 However, as the market research demonstrates, the current approved service suffers from a number of shortcomings (see paragraphs 4.12 and 4.13 above) which work to impede the ability of users to have conversations approaching near-real time conversational speeds. We explore in option 2 the scope for requiring improvement to give end-users with hearing and/or speech impairments greater equivalence to voice telephony.

### **Option 2: Changing/ improving the current provision of text relay**

- 4.22 In order to help understand and consider how the equivalence criteria might be better implemented under an improved TR service, we commissioned a study on the cost of enhanced TR services from InterConnect Communications (ICC) and have also obtained information from BT.
- 4.23 Based on this information, we have identified improvements that could be made, which would significantly improve functionality for end-users with hearing and/or speech impairments. The improvements would:
- Provide simultaneous two-way speech with live captions/text for users making use of Internet-based access methods, enabling a more natural flow of conversation, allowing interjections and removing the need to say 'go ahead' after each part of a conversation. This is of particular benefit to hard of hearing people;
  - Provides simultaneous two-way text for users of Internet-based access methods, enabling a more natural flow of conversation, allowing interjections and removing the need to type 'GA' (go ahead) after each part of a conversation. This is of particular benefit to people who are profoundly deaf;
  - Enable users to continue to use existing dedicated TR terminals and therefore not require investment in new equipment;
  - Enable a wider range of mainstream equipment to be used to access the service e.g. PCs, netbooks, tablets and smart phones (although a conventional call using a mobile or fixed phone or via a VoIP service would still be required). Some uses may depend on the availability of suitable software or applications – the provision of which is beyond the scope of Ofcom's powers; and
  - Increase conversation speeds for users who have good/understandable speech. As noted in paragraph 4.10, current TR conversation speeds are around 30 words per minute (wpm) compared up to 170 wpm for speech. The slow TR speed is partly the result of the time taken to switch between send and receive – we understand relay assistants typically type at around 60 wpm. For users who use NGTR for speech with captions (i.e. caption telephony), on average we expect the spoken half of the conversation will progress at up to 170 wpm and the captioned half at around 60 wpm, potentially delivering conversation speeds of up to 110 wpm<sup>18</sup>.

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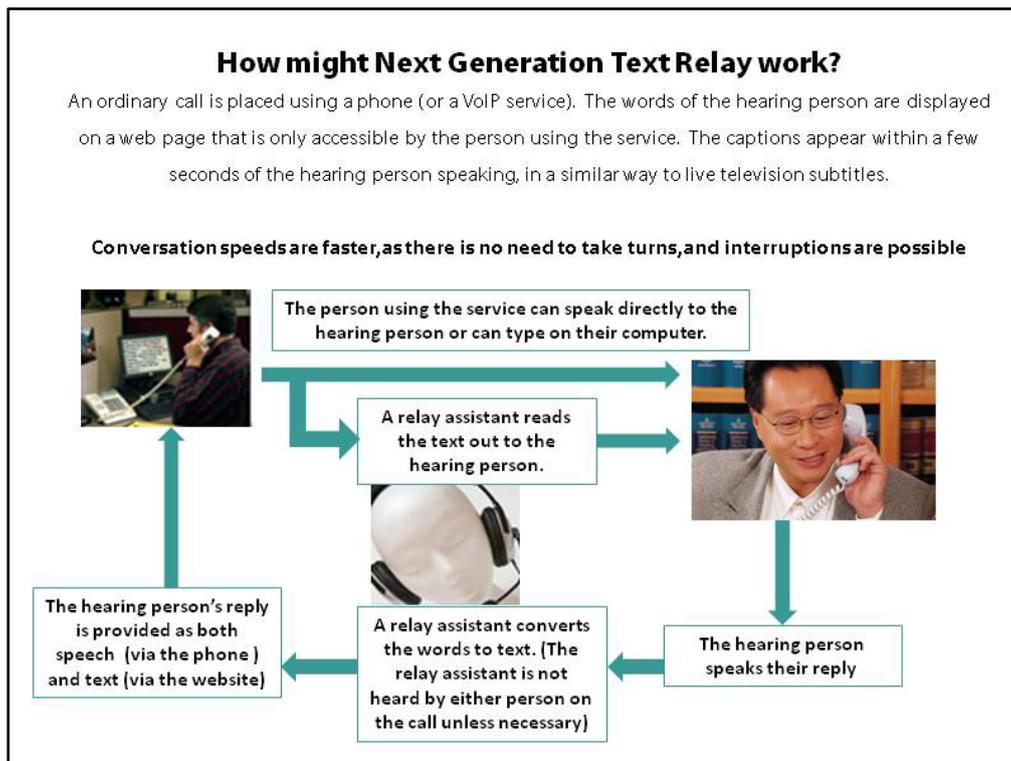
<sup>18</sup> Conversation speed will, to some extent, depend on the number of turn each speaker takes, due to the few seconds delay before captions appear each time the hearing person starts speaking.

- 4.24 We consider that these improvements could be achieved by introducing an Internet Protocol (IP) based overlay network used in conjunction with the PSTN connection. This arrangement would enable the PSTN connection (an ordinary phone call) to be used to initiate and manage the call and provide voice communications, while text would be sent and received via the Internet. Ofcom is not proposing to mandate the detailed technical means of delivery which will be for those subject to the obligation to decide for themselves. This will ensure the most effective means of delivery of the functional criteria Ofcom has identified. Provided a service is able to deliver those functional criteria, it will be capable of being approved by Ofcom.
- 4.25 Internet access is now very widely available in homes and on mobile devices. Broadband take-up is now over 70%, although it should be noted that it should also be possible to access the service via dialup internet access (in which case the voice element of the call could be via mobile phone, a second phone line or a VoIP service providing calls to the PSTN). Additionally 77% of adults already own a PC, laptop, netbook or tablet computer<sup>19</sup> thus saving the additional cost of a dedicated terminal.
- 4.26 We use the term Next Generation Text Relay (NGTR) to refer to a new TR service. NGTR would provide a flexible platform that could be used in different ways depending on the needs of the user, for example:
- For people with understandable speech, by making use of simultaneous two-way speech together with live captions. This would enable a more natural flow of conversation as it would allow interjections to a conversation and remove the need for saying 'go ahead' after each part of a conversation.
  - For improved TR for people with profound hearing loss, by making use of simultaneous two-way text (within the limits of the human relay assistant) together with two way speech, enabling VCO. This would enable a more natural flow of conversation as it would allow interjections to a conversation, some conveyance and detection of emotion by those with some residual hearing and would remove the need to type 'GA' after each part of a conversation.
  - For improved TR for people with speech-impairments, by making use of one-way text together with one or two way speech, enabling HCO. This would enable a more natural flow of conversation as it would allow interjections to a conversation, conveyance of emotion such as laughter and would remove the need to type 'GA' after each part of a conversation.
- 4.27 NGTR would continue to be required 24 hours a day, 7 days a week as the current TR service is. It also offers the benefit of allowing users flexibility in the choice of communications methods and equipment since it will be possible to use traditional fixed telephony, mobile telephony and VoIP services to deliver the NGTR service. In addition, a range of end-user equipment will be capable of using the NGTR service including PCs, laptops and netbooks.
- 4.28 Figure 2 below provides an example of how we envisage NGTR would work:

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<sup>19</sup> Ofcom 'tracker' consumer research, Q1 2011

Figure 2



The system would work in a similar way for people with speech-impairments, except that they would type their replies and the relay assistant would read their words out.

### A comparison of NGTR with Captioned Telephony

- 4.29 In considering improvements to the current approved TR service, we have taken account of views of some disability stakeholders who point to captioned telephony (CT) services in the US,<sup>20</sup> and more recently in the UK, as a type of relay service we should emulate.<sup>21</sup>
- 4.30 CT is an enhanced TR service aimed at those who have some speech and hearing, so is not suitable for the profoundly deaf or people with severe speech impairments. It delivers captions to the person with impaired hearing alongside a conventional two-way telephone call. The hearing person can be heard simultaneously by both the hearing-impaired person and the relay operator, in contrast with the current approved TR service. This has benefits for users who have some hearing as they can detect mood even if they cannot make out the words being spoken.
- 4.31 CT systems generally make use of computer speech recognition to generate the captions, although it is also possible to operate a CT service using typists or

<sup>20</sup> There is only one provider of captioned telephony in the US.

<sup>21</sup> No European Member State currently mandates CT services. A CT service called CapTel was previously available to a limited extent in the UK, but the service closed in late 2007.

palantypists.<sup>22</sup> It is important to recognise that a relay operator is still required to take part in a call even when speech recognition is used.

- 4.32 Ofcom has been funding research into the use of speech recognition technologies to provide automatically generated captions for internet-routed VoIP calls. This work is being conducted by the University of Salford, who have tested speech recognition both with and without the recognition system being trained to recognise the speaker's voice<sup>23</sup>. The research found that training was necessary to deliver adequate accuracy for captions, a view supported by other stakeholders.
- 4.33 It is not currently possible to operate a relay service using speech recognition without using a relay operator whose voice has been trained to use the system who is known as a 'respeaker'.
- 4.34 In CT systems in the US, a CT relay operator, who has trained the software to their voice, repeats the caller's words into a microphone attached to a computer which converts them to text using the speech recognition software. Within a few seconds the text then appears on the deaf person's terminal or on a web page, thus providing a caption alongside the hearing person's voice. The deaf person then typically speaks his or her response which the hearing person hears directly.
- 4.35 Figure 3 below illustrates how CT works:

**Figure 3**



Source: OL market research report.

<sup>22</sup> The speech to text reporter produces a verbatim record of what is said, using a phonetic keyboard (often known as palantype), to be shown instantly on a monitor or screen. However, there are only 23 people on the UK register of speech to text reporters.

<sup>23</sup> See <http://stakeholders.ofcom.org.uk/market-data-research/policy-related-research/usability-research/research/speech-to-text-voip/> for more details of the research. A third phase of work is currently in progress – a real-world evaluation of the prototype system.

- 4.36 CT services in the USA can be accessed either with dedicated phones with big displays for text (these typically cost around £400) or with a conventional phone and a PC, in which case, captions are viewed via a web page.

### **Benefits of NGTR over Captioned Telephony**

- 4.37 Both NGTR and CT appear to offer improved functionality over the current TR service. However, in our view NGTR offers additional benefits compared to CT including:
- NGTR would provide service for three key groups of users; those who are severely and profoundly deaf, text only users and those with hearing impairments who have understandable speech. Conventional CT is well suited to people who have lost some or all of their hearing but who can speak well. It does not provide an adequate service to those who do not have easily understandable speech, primarily the profoundly deaf and people with impaired speech, groups who can both use the current approved TR service.
  - NGTR would also benefit users with no residual hearing as it would better enable them to interrupt and would allow them to have simultaneous two-way text.
  - Existing dedicated TR terminals could continue to be used by any users who prefer them with NGTR but a CT service would require end-users to acquire new terminals in order to use the service. It is worth noting, however, that using existing equipment for NGTR would only allow the existing level of functionality.
  - NGTR would also enable a wider range of mainstream equipment to be used to access the service although a conventional call using a mobile or fixed phone or via VoIP service would still be required. The NGTR service would be accessible using PCs, netbooks, and potentially tablets and smart phones, while those with existing specialised equipment would still be able to access the existing service. Some uses may depend on the availability of suitable software or apps, the provision of which is outside our remit.
  - We have also examined the extent to which NGTR and CT would meet the equivalence criteria to allow real-time conversations. For users making use of new Internet-based access methods, NGTR would provide a CT service. We believe that NGTR will serve to improve the speeds of conversations (as discussed in paragraph 4.23), primarily by allowing interruptions and by eliminating the need to switch between sending and receiving modes. It is difficult to say with certainty by how much speeds will increase but the improvement is likely to be most noticeable for those using the system for CT. Existing CT services use speech recognition, to help increase conversation speeds. Speech recognition technology is evolving, however, and at present we do not believe that it is sufficiently advanced to guarantee low enough error rates to provide certainty that faster conversations would result. We propose not to mandate the use of voice recognition technology at present. We will, however, monitor the impact of NGTR to see how well the service approaches near normal conversation speeds. We will also monitor developments with speech recognition technology going forward to assess the scope to further deliver enhancements to conversation speeds.

- 4.38 The table below compares the proposed NGTR with the current approved TR service and with CT.

**Figure 4**

Feature	Service		
	Current approved TR service	CT	NGTR
Two-way speech	No	Yes	Yes
Live captions	Yes	Yes	Yes
Supports text-only users	Yes	No	Yes
Dedicated terminal or PC/tablet/smart phone	Dedicated terminal. PC can be used for text-only calls. (Separate account needed for outgoing calls)	Dedicated CT phone or PC. Tablet and smartphone use, dependent on app availability	Textphone or PC. Tablet and smartphone use, may depend on app availability
Ability to interrupt	No	Yes	Yes

*Question 1: Do you agree that NGTR would provide greater equivalence than the existing approved TR service? Do you agree that we have considered an appropriate range of improvements?*

## Costs and benefits of NGTR

- 4.39 In order to determine whether it is appropriate to mandate the provision of NGTR we have assessed the incremental benefits that the intervention would achieve along with the incremental costs. The incremental benefit and incremental costs in this case is the additional benefit and cost which result from having an enhanced/improved service compared to those that exist under the current approved TR service.

### Take-up and usage scenarios

- 4.40 There are over 800,000 people in the UK who are severely or profoundly deaf.<sup>24</sup> We have considered a number of take-up and usage scenarios in order to determine the levels of cost and benefit resulting from the introduction of NGTR based upon existing levels of take-up and usage.
- 4.41 We used the quantitative survey that formed part of OL's market research to inform us about the likely levels of take-up (that is, the number of people using the service) and usage (the number of minutes) that could be expected from implementing an NGTR service.
- 4.42 It is important to emphasise that the market research provides indicative figures only. This is because we asked participants to consider how much they would use a service that many of them had never used before, so there is the potential for the results to give an inaccurate projection of usage.

<sup>24</sup> Source: <http://www.actiononhearingloss.org.uk/your-hearing/about-deafness-and-hearing-loss/statistics/adults-who-are-deaf-or-have-a-hearing-loss-in-the-uk.aspx>

- 4.43 While it is difficult to draw firm conclusions from the market research regarding expected take-up and usage, the results suggest that take-up of enhanced relay services would not increase dramatically over current take-up of TR. This is because, as highlighted by the market research, people who have hearing and/or speech impairments make use of a wide variety of communications services such as mobile text messaging and email where they are able to do, particularly when communicating with friends and family.
- 4.44 The market research also sets out that users have a preference for communicating without the presence of a third party relay assistant. We consider that the presence of a third party would likely put downward pressure on the demand for these services.
- 4.45 However, the market research suggests that individuals who already use the service would use an NGTR service more than they use the existing TR service.
- 4.46 We have estimated a 'central case' for what we consider the most likely take-up and usage scenario – the 'medium demand' scenario. Based on the market research and discussions with stakeholders (which we discuss below), for the medium demand scenario we estimate that take-up of NGTR (the number of people using it) would increase by approximately 25%, whilst average usage per person would increase by approximately 75%.
- 4.47 We have also set out high and low demand scenarios which place upper and lower bounds on the level of demand we think realistically possible. Given the uncertainty around likely take-up and usage, we have chosen a relatively wide range for these scenarios:
- **low demand** scenario, we assume that there is no impact on the number of users or average usage by improving the service. We assume that: 11,000 users take-up the service (this is the same as current level of take-up); that the average usage per user is approximately 56 minutes per month (the same as the current level of usage). This results in total usage of just over 7.4 million minutes per year<sup>25</sup>.
  - **medium demand** scenario, we assume that take-up increases by 25%<sup>26</sup> over 5 years<sup>27</sup> whilst average usage per user per month increases by 75% over the

<sup>25</sup> In practice, total usage of the existing TR service has declined in recent years. If this trend continued in future years, actual take-up and usage may be lower than take-up and usage we estimate in the low demand scenario. If this were to occur and apply equally to TR and NGTR, this would not significantly affect the incremental costs. However under a scenario where TR take-up and usage declined while the NGTR take-up and usage that we estimate in the low demand scenario was met, the costs of providing NGTR may actually be slightly higher than the (declining) cost of providing TR. We do not adjust the incremental cost estimates to reflect either scenarios, as we do not have robust information on future take-up and usage of the existing TR service. In addition, we would expect that if NGTR usage was above TR usage, that these additional minutes would also result in some additional incremental benefit.

It is also likely that some calls on NGTR may be shorter than those on TR, as the speed of communication is faster. If users made the same number of calls, and communicated the same content in each call, the total number of minutes could actually fall below the level for TR. On balance, we think that this scenario is unlikely, as users may make more calls and communicate more content as a result of the improved user experience.

<sup>26</sup> The quantitative market research suggested that introducing CT would have a limited impact on the number of people using relay services. The questionnaire asked participants how often they would use TR and CT if it was available on an unrestricted basis (question 16). For severely and profoundly deaf individuals, there did not appear to be notable difference in the number of people who stated

same period.<sup>28</sup> This results in total usage of just over 16.2 million minutes per year. (This is the base case scenario discussed above).

- **high demand** scenario, we assume that both take-up and the average usage per month double over 5 years. This results in 22,000 users, each making 112 minutes of calls per month.

4.48 In addition, in the high demand scenario, we assume that a number of individuals will use NGTR for some calls where they would ordinarily have used a conventional phone, for example to get captions when calling from a loud environment or when making a business call to enable them to follow the conversation more easily. We assume that: an additional 10% of the 700,000 severely and profoundly deaf people in the UK become 'light' users and use the service for an average of 20 minutes per month. That is:

- 70,000 'light' users use the service for 20 minutes per month – total of 16.8m minutes per year
- 22,000 'heavy' users use the service for an average of approximately 112 minutes per user per month (with a total of 29.6m minutes per year)
- This results in a total of approximately 46.5m minutes per year.

4.49 Whilst it is possible that demand could reach the levels identified in the high demand scenario, we consider this unlikely. As discussed above, despite improvements, NGTR still involves having a third party involved in the call, something our market research identified as being of concern for some users.

4.50 With the increased availability of mainstream text-based services, such as email, mobile text messaging and instant messenger, it is likely that individuals will use relay services only where none of these alternatives are viable, for example when contacting banks and healthcare providers. As a result, users are likely to find alternative means of communication where possible, putting downward pressure on demand for relay services.

4.51 We also consider that the low demand scenario is much less likely than the medium demand scenario, because the improved quality of service and better experience of

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they would use TR and CT. However, the proposed NGTR service would likely appeal to a broader range of users than either CT or TR individually (given that it can be used as either a captioning service by those with some speech and hearing, or a text-only service by profoundly deaf users). In addition, discussions with stakeholders suggest that there would be at least a modest increase in take-up from introducing enhanced text-based relay services.

<sup>27</sup> For simplicity we assume that demand increases over 5 years in a linear fashion – that is, the same number of additional people take up the service in each year until maturity. The same is also true for the high demand scenario.

<sup>28</sup> The market research asked severely and profoundly deaf participants how frequently they would use each of the services we are considering if they were available on an unrestricted basis. We have attributed a number of calls per month to each of the options in the questionnaire: Several times a day (150 calls per month), About once a day (30 calls per month), A few times a week (16 calls per month), A few times a month (4 calls per month), Less often than this (2 calls per month), Don't know (0 calls per month). Using this information, we estimated the average calls per month on each of the services for severely and profoundly deaf individuals who answered this question. We assumed that NGTR is equivalent to captioned telephony, given the similarities in functionality. The market research indicated that people would use CT around 75% more frequently than the existing TR service. (Question 16 of the market research.)

using NGTR, compared to the current TR service, is likely to result in the availability of a service which is more attractive to disabled end-users and therefore lead to an increase in take-up and usage.

### Incremental costs

- 4.52 Given these estimates for the level of take-up and usage, we have estimated the incremental costs that would result from an intervention to ensure the provision of NGTR. Since the NGTR service will replace the existing TR service (although it will offer a seamless transfer for those who wish to continue using their existing equipment), we measure the incremental costs of NGTR relative to the costs of the existing TR service. That is, we consider the additional costs that would be faced in providing NGTR relative to TR.
- 4.53 BT's latest costing information for their provision of TR under USC4 indicates that they faced costs of approximately £5.8m in the financial year to April 2011. We understand from discussions with BT that approximately £1.4m of this represents non-recurring costs that resulted from migrating the service from RNID to BT's control.
- 4.54 As a result, the ongoing cost of providing the current approved TR service is approximately £4.4m per year and the average ongoing cost per user is approximately £400 per year.<sup>29</sup> In the same year, the total number of minutes of TR conversations was just over 7.4 million minutes.
- 4.55 Below we compare the costs that BT faces in providing the existing approved service<sup>30</sup> to the costs it would face in providing an NGTR service based on costing done by our external consultants, ICC.
- 4.56 For our **low demand scenario**, estimates from ICC suggest that the incremental capital costs to convert the existing approved TR service to NGTR would be around £348,000 for the low demand scenario. The incremental capital costs represent the capital costs that BT would face in implementing the NGTR service in addition to the capital costs they would incur in continuing to run the existing approved TR service.
- 4.57 In addition to these capital costs, estimates from ICC suggest that the total ongoing costs of providing NGTR would be approximately £4.4m per year for the low demand scenario. This is the same as the ongoing costs that BT incurs in providing the existing approved service.
- 4.58 Given that we estimate in this scenario that levels of take-up and usage remain constant, we assume that all the capital costs would need to be incurred before the service could start operating ('Year 0'). In addition, we assume that the ongoing costs remain constant. See figure 5 below:

**Figure 5**

Costs in £'000s	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5+
Incremental capital costs	348	-	-	-	-	-
Total ongoing costs	-	4,400	4,400	4,400	4,400	4,400

<sup>29</sup> £4.4 million divided by 11,000 users.

<sup>30</sup> BT provides the current relay service and for the purposes of this exercise we refer to BT as the provider. Other providers could be approved by Ofcom to provide a relay service also, though to date no other providers have sought approval.

- 4.59 In this scenario, the ongoing costs at maturity would be approximately £400 per user per year. This is the same as our estimates of the ongoing cost for BT to provide the existing service.
- 4.60 As explained above, the ongoing cost of providing the NGTR service at existing levels of take-up and usage is the same as our estimates of the ongoing cost for BT to provide the existing service. The incremental cost of implementing NGTR under this demand scenario is therefore equal to the £348,000 of incremental capital costs.
- 4.61 For our **medium demand scenario**, as discussed above, we assume that it takes 5 years for demand to reach maturity. As a result, there are incremental capital costs in each year and the ongoing costs increase until the service reaches maturity in year 5.
- 4.62 Using the cost model that ICC provided, we estimated that the ongoing costs of providing the service under the medium demand scenario would be approximately £8.8m per year at maturity. In addition to the ongoing costs, there would also be capital costs of £586,000 spread over the 5 year period. See figure 6 below:

**Figure 6**

Costs in £'000s	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5+
Incremental capital costs	348	133	15	23	30	38
Total ongoing costs	-	5,352	6,223	7,095	7,983	8,812

- 4.63 The incremental ongoing cost of providing NGTR compared to the existing TR service under this demand scenario would therefore be approximately £4.4m per year at maturity. In addition there would also be incremental capital costs of £586,000 over 5 years.
- 4.64 This implies that the total ongoing cost per user would be approximately £640 per year at maturity. The average incremental cost per user at maturity would be equivalent to just over £240<sup>31</sup> per year for operating costs at maturity and £43 of incremental capital costs per user over the initial 5 year period. Under this scenario, increases in total ongoing costs compared to the current TR service would be largely driven both by increases in the number of users and the minutes used per user.
- 4.65 For the **high demand scenario**, as with the medium demand scenario, we assume that it takes 5 years for demand to reach maturity. Using the ICC model, we estimated that ongoing costs would increase steadily to just under £23.7m at maturity. In addition to these ongoing costs, the ICC model indicates that there would be approximately an additional £1.6m of incremental capital costs spread over the first 5 years. See figure 7 below:

<sup>31</sup> We have calculated incremental ongoing costs per user as the average cost per user under the NGTR scenario using minutes per user and total number of users under the medium and high demand scenarios as appropriate, less the average cost per user under the existing TR service and usage levels.

**Figure 7**

Costs in £'000s	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5+
Incremental capital costs	348	283	192	227	262	297
Total ongoing costs	-	8,344	12,224	16,089	19,924	23,695

- 4.66 Under this demand scenario, the incremental cost of providing NGTR above the cost of providing the existing TR service would be approximately £19.3m per year at maturity, with incremental capital costs of £1.6m over 5 years.
- 4.67 The average operating cost of each 'heavy' user under this demand scenario would be approximately £690 per year. This represents an incremental operating cost per 'heavy' user of approximately £290 per year compared to costs of the under the existing service. In addition, there would be incremental capital costs of £47 per 'heavy' user over the initial 5 year period. Under this scenario, increases in total ongoing costs would be largely driven both by increases in the number of users and the minutes used per user.
- 4.68 Figure 8 below summarises the costs for the demand scenarios discussed above:<sup>32</sup>

**Figure 8**

Demand scenario	Ongoing costs		Incremental ongoing costs	
	Overall (£m)	Per user (£) <sup>33</sup>	Overall (£m)	Per user
Low	4.4	400	0	0
Medium	8.8	641	4.4	241
High	23.7	688	19.3	288

- 4.69 The costing set out above reflects the limited economies of scale in providing NGTR. This is because a large proportion of the cost is made up of relay operators' salaries, so a considerable amount of the total cost is variable. Beyond a minimum efficient scale, therefore, larger call volumes would not result in large decreases in the per-minute cost of providing the service.
- 4.70 Figure 9 below sets out the average cost per minute of providing NGTR at maturity in each of the three demand scenarios outlined above:

<sup>32</sup> A further potential incremental cost may arise from the subsidisation of the NGTR service by CPs via slightly higher prices for other telecommunications services such as normal telephone calls. This could lead to a loss of economic value to the extent that any such higher prices caused some reduction in the volume consumed of the other telecommunications services.

However, the total cost of relay services is small in comparison to the total revenue from telephone calls. As a result, any price increases would likely be small. We would therefore expect any resulting loss in economic value to be small.

<sup>33</sup> Cost per user is higher in medium and high scenarios compared to low scenario because a higher usage in terms of minutes per user is assumed in the medium and high scenarios

**Figure 9**

Demand scenario	Average cost per minute
Low	£ 0.59
Medium	£ 0.54
High	£ 0.51

- 4.71 It is worth noting that, while in principle the cost of end-user equipment and broadband subscriptions are relevant to the balance between incremental costs and benefits, we have not included them in the costing exercise. There is considerable uncertainty around what the incremental equipment costs would be. This would depend on how many potential users already have broadband connections, PCs and smartphones – something on which we do not have evidence.<sup>34</sup>
- 4.72 In addition, we consider it unlikely that including equipment and broadband costs would impact the proportionality of the intervention. For the low demand scenario, since take-up and usage are no different to levels for the existing TR service, it follows that users already have TR equipment. Users would then in principle purchase the equipment needed to receive an improved service only if the benefits to them outweigh the costs; such a purchase would therefore in principle be economically efficient.
- 4.73 For other scenarios, we acknowledge that leaving out equipment costs may result in our cost estimates understating the true cost of the service. However, we consider it likely that the incremental cost would be relatively low. A large number of those taking up the NGTR service will likely already have the necessary equipment (PC and internet connection). In addition, if we were to include the cost of purchasing a PC and for example a broadband subscription, we would also need to take account of the additional benefits that users would derive from these services beyond use of the NGTR service.

### Incremental benefits

- 4.74 The incremental benefits of introducing NGTR, and enhanced relay services more generally, can be divided into the following broad categories:
- Consumer benefits - the additional value that consumers derive from using an enhanced service.
  - Externalities - benefits to friends, family and other parties that result from hearing and speech impaired individuals using an enhanced relay service.
  - Broader social value (BSV) - benefits to society more broadly from the availability of these services.

<sup>34</sup> Of the general UK population, over seven in ten people (71%) now have access to a broadband connection at home and more than a quarter (26%) of mobile users now have a smartphone, offering consumers access to much more than just voice telephony. See: <http://www.ofcom.org.uk/static/cm-10/UKCM-1.1a.html>

- 4.75 Below we discuss the benefits that may result from our option to introduce NGTR and assess whether these incremental benefits are likely to exceed the incremental costs.

### Consumer benefits

- 4.76 We attempted to quantify the consumer benefits that an NGTR service would deliver through the market research. However, the results of the research provide indicative data only in this respect and do not appear to be reliable enough to estimate the benefits of relay services robustly in quantitative terms.
- 4.77 We asked a number of questions aimed at quantifying individuals' 'willingness to pay' for enhanced relay services. Estimating willingness to pay is an established method of assessing the value that consumers derive from consuming a good or service. However, it was apparent from discussions with stakeholders that survey respondents would be skewed as a result of the objection some respondents have in considering any level of payment for a TR service, even hypothetical.
- 4.78 We therefore tried to mitigate this risk by asking respondents whether they would rather receive a given sum of money or receive the service in question, so as not to imply that they would have to pay for the service.<sup>35</sup>
- 4.79 Whilst the results from the market research do not enable us to place a robust value on the remaining benefits to consumers of enhanced relay services, it does provide strong qualitative evidence on these benefits.
- 4.80 We have attempted to estimate quantitatively only one of the consumer benefits – the value of time saved from having faster communications as a result of NGTR.
- 4.81 The Plum study<sup>36</sup> estimated that the existing TR service delivers conversation speeds of approximately 30 words per minute (wpm), compared to speeds of around 150wpm for CT. Given that the NGTR service will be capable of delivering a service similar to captioned telephony, we assume that users with some residual hearing and speech using NGTR as a captioning service could increase the speed of their conversations in line with the speeds set out in the Plum report.
- 4.82 There are currently approximately 7.4m minutes of calls made annually with the existing approved TR service. We think that some current TR users would be able to make faster calls if NGTR was introduced. We do not have accurate estimates of how many users this would be, although for the purpose of illustration, we assume that one third of TR calls are made by people with some residual hearing and speech, one third are made by profoundly deaf non-BSL users, and the remaining third are made by BSL users.
- 4.83 We therefore assume that approximately 2.5m TR minutes could be replaced by NGTR calls where the individuals use the service for captioning. This would result in a saving of approximately 2m minutes per year for these users.

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<sup>35</sup> Opinion Leader presented separate groups of respondents with different cash sums, and asked them to choose between the cash sum and access to the service. However, the size of the cash sum generally did not have an effect on the proportion of customers who would take the service. For example, around 60% of one group said they would prefer a cash payment of £20 over a faster text relay service, but a fourfold increase in the cash payment (i.e. to £80) offered to a different group had hardly any effect on the proportion preferring cash, which remained close to 60%. As a result, we concluded that we could not rely on this research to assess the value of the service to potential users.

<sup>36</sup> See: [http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice\\_telep.pdf](http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice_telep.pdf)

- 4.84 We have estimated the value of time using the Department for Transport's (DfT) guidelines.<sup>37</sup> Using the DfT's methodology, we have calculated the value of non-working leisure time in 2011 as being £6.09 per hour.<sup>38</sup> The 2m minutes of time saved would therefore result in a benefit to these users of approximately £200,000 per year.
- 4.85 In addition to the time saved, it is important to note that while the average number of minutes per user per month in the NGTR low demand scenario is the same as for TR, the increased speed of communication would enable users to communicate more information in this amount of time – further increasing the benefits of NGTR.

### **Externalities: benefits to friends, family and other parties**

- 4.86 An externality arises when consumption of a service impacts- positively or negatively- on others.
- 4.87 The Plum study set out that hearing users communicating with hearing- and speech-impaired individuals using the existing TR service also find the service to be frustrating. As part of that study, the consultants interviewed a number of individuals who had previously used a CT service (and which has functionality similar to the NGTR service we are proposing). The research participants indicated that hearing users were considerably more comfortable using CT than the currently approved TR service.
- 4.88 We believe, therefore, that the NGTR service would also benefit hearing individuals communicating with hearing-impaired users. As a result, there may be considerable positive externalities resulting from the availability of these services.
- 4.89 In addition, the time saving from using NGTR instead of the existing TR service would also benefit hearing users to the same extent. That is, each minute saved for deaf users would also result in a minute saved for the hearing person on the other end of the line. We therefore estimate this externality to be worth approximately a further £200,000 per year, as set out above.

### **Broader Social Value**

- 4.90 The Plum study and OL reports also indicated that there are likely to be a number of benefits from enhanced relay services that would accrue to society more broadly.
- 4.91 We therefore believe that there is likely to be some degree of broader social value associated with the introduction of these services. These include<sup>39</sup>:
- Social inclusion - more participation in public life and better informed citizens

<sup>37</sup> Available at <http://www.dft.gov.uk/webtag/documents/expert/unit3.5.6.php#01>. The DfT figures represent the value of time spent travelling. While this is unlikely to reflect exactly the same value as time saved from making shorter phone calls, we believe this is a suitable proxy for our purposes. In our estimate we use the value of non-working travel time, which is lower than the value of travel during working time. Access to Work already provides funding for relay services in the workplace so we assume that the enhanced relay services would be used predominantly for personal use. To the extent that it is also used in the workplace, the time saved as a result of these services may be higher. This therefore represents a conservative estimate of the value of time saved.

<sup>38</sup> The DfT estimated the figure at £4.46 per hour in 2002. The 2011 estimate uses this as a starting point, but updates it to reflect growth in real GDP and changes in RPI. This is consistent with the methodology set out by the DfT.

<sup>39</sup> A number of these benefits have elements of both consumer benefits and broader social value.

- Increased independence and self esteem of hearing-and speech-impaired users
- Reduced loneliness and anxiety of users
- Improved health for users
- Increased employment opportunities
- Increased productivity in the workforce
- Benefits to other business and the wider economy
- Increased access to relay services by people with dual sensory impairments who can access the service via a large screen PC rather than a textphone

4.92 We have not attempted to quantify these benefits, primarily because it is very difficult to know exactly what impact NGTR would have on these variables. For example, it is hard to know with any degree of certainty the extent of the impact NGTR would have on users' health, or their ability to find work.

### **Conclusions on costs and benefits**

4.93 The costing exercise explored above shows that if levels of take-up and usage are unchanged (that is, they follow the low demand scenario), the ongoing cost of NGTR would be about the same as that of the current approved TR service.

4.94 We have also highlighted that there are likely to be a number of benefits to users, friends, family and society more broadly. These are likely to be important although we have not been able to quantify the majority of these benefits. For the one benefit we have quantified, we estimate that the value of the time saved as a result of faster conversations would be approximately £400,000 per year.

4.95 If there is limited impact on levels of take-up and usage, introducing NGTR would deliver incremental benefits while having little impact on the cost of providing the service. In this scenario, the incremental benefits outlined above would likely justify the £348,000 of incremental capital cost. Indeed, the time saving in one year estimated above would more than offset this one-off capital cost. At current usage levels, therefore, we believe that the intervention to introduce NGTR would be proportionate. Any significant increases in cost would therefore be the result of NGTR offering a more popular (and presumably more valuable) service.

4.96 However, we also recognise that there is considerable uncertainty regarding the level of take-up and usage that would be expected if NGTR became available.

4.97 Many products and services can be characterised by a declining marginal benefit of consuming additional units and we believe that relay services are likely to fall into this category. For example, in the case of relay services, we do not expect that consumers would derive twice as much value from being able to make one hour of calls per month as they would from being able to make half an hour of calls per month.

4.98 With declining marginal benefit from making additional calls, but the marginal cost of making additional calls remaining more or less constant,<sup>40</sup> if demand increased

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<sup>40</sup> As demonstrated by the limited economies of scale.

dramatically there is likely to be a level of consumption at which the benefit of making additional calls falls below the associated cost. In such a case, it is possible that an intervention to provide NGTR may become disproportionate on an unrestricted basis.

- 4.99 Likewise, a similar situation could arise if additional people take-up the service. Our research suggests that current TR users derive considerable value from the service. It is possible, therefore, that if take-up were to increase, although a new user would also benefit, the scale of that benefit might be less than the value to an existing user.
- 4.100 As a result, while introducing the NGTR service would likely be proportionate at current levels of take-up and usage, it might not be proportionate if take-up and usage increased dramatically.
- 4.101 The scenarios set out above indicate that the total ongoing cost of introducing NGTR would likely be between £4.4m and £23.7m per year. Therefore, the incremental ongoing cost of providing NGTR (over the existing service) would likely be between zero and £19.3m per year.<sup>41</sup>
- 4.102 In addition to these ongoing costs, implementing the NGTR service would likely result in incremental capital costs of between £0.348m and £1.6m over the initial 5 year period for the service to reach maturity under our base case medium demand scenario.
- 4.103 The existing approved TR service is provided by BT in accordance with the USC imposed on it. That condition imposes a cap on the annual costs of TR which BT is required to meet and stands at approximately £15.7m for the year beginning in July 2011.<sup>42</sup> We believe that the costs of providing NGTR are likely to remain below this cap (for example, the total cost in the low and medium demand scenarios is well below this level).
- 4.104 However, although less likely, it is possible that the costs of NGTR could exceed this cap (as, for example, in the high demand scenario). We recognise that there is a risk of spiralling costs if the service takes off, and that dramatically increased take-up and usage could result in the unrestricted provision of these services becoming disproportionate for the reasons discussed above. In the event that that costs rose significantly we may need to consider making further proposals on the NGTR service such as methods for restricting use or the availability of the service.

## Conclusions and proposal

- 4.105 On the basis of the analysis above, we consider that it is appropriate to impose a requirement to introduce NGTR. In our view NGTR will provide greater equivalence for disabled end-users than the existing TR service by:
- Enabling more natural conversations and giving the ability to interrupt conversations as needed. NGTR would allow users with residual hearing and speech to speak directly to the hearing user, rather than relying on text in both directions. This would enable them to communicate directly with the hearing user thus providing a service which approaches the experience of using a voice call.

<sup>41</sup> Paragraph 4.53 describes that the ongoing costs for the current TR is £4.4m. This is subtracted from the total ongoing cost estimates for NGTR to derive the incremental cost.

<sup>42</sup> This cap was set by Ofcom's predecessor Oftel in 2003 and is revised year on year in accordance with the Retail Price Index.

- Increasing flexibility in the choice of communications methods and devices. The proposed NGTR service would be more suitable for use on mainstream devices such as mobiles, PCs and netbooks and therefore enables disabled end-users to benefit from the widest possible choice of communications service when using the NGTR service. Given the widespread availability of alternative means of making voice calls, this approach offers a similar level of choice to disabled end-users.
- Increasing the feel of a private conversation. While there will still be a relay operator present, for some users – particularly those with some residual hearing and speech – the relay assistant may be invisible to the hearing user. Conversations would continue to be treated as confidential by relay assistants and are subject to strict confidentiality requirements. This approach will ensure, to the greatest extent possible, that disabled end-users are able to enjoy a communications experience which is equivalent to that of making a voice call.

4.106 NGTR would continue to be required 24 hours a day, 7 days a week as the current TR service is. It also offers the benefit of allowing users flexibility in the choice of communications methods and equipment since it will be possible to use traditional fixed telephony, mobile telephony and VoIP services to deliver the NGTR service. In addition, a range of end-user equipment will be capable of using the NGTR service including PCs, laptops and netbooks.

4.107 In reaching that conclusion, we have taken full account of the fact that:

- If levels of take-up and usage are unchanged, the ongoing cost of NGTR would be the same as that of the current approved TR service and the benefits should exceed the capital costs
- At the expected levels of take-up and usage, the benefits are likely to match or exceed the costs.
- Unless take-up and use increases dramatically, it is likely that the total costs will remain within the cap set in the current USC.

4.108 In light of our preferred option which is to require providers of publicly available telephony services to offer NGTR to disabled end-users, we go on to consider the most appropriate means of implementing this requirement.

### **NGTR: implementation**

4.109 In implementing requirements around TR, Ofcom's aims are to ensure that there is at least one approved TR service and that disabled end users have a choice of CPs and services that is available to the majority of end-users.

4.110 To date we have met this aim by placing requirements for TR through a combination of a USC and GC. USC4 requires BT to provide the funds for the operation of a relay service, approved by Ofcom, for all disabled end-users, whether end-users of BT or of any other CP. GC15 requires all providers of publicly available telephony services (PATS) to allow their customers to access an approved relay service to make or receive text calls at the equivalent charge of a standard call.

4.111 These arrangements reflected the Order which previously imposed an obligation on Ofcom to set a USC to secure the provision of TR services. The Order has recently

changed so as to allow Ofcom to impose either a USC or a GC to secure equivalence for disabled end-users.

- 4.112 In our view, a GC alone requiring all providers of PATS to ensure that subscribers who, because of their disabilities, need to make or receive call in text format, are able to access an approved TR service would be sufficient to meet our objectives. This could result in a service provided by BT if BT chose to sell this service to its competitors on a wholesale basis. Alternatively, if more efficient services are available or if PATS providers wish to, they would be free to develop alternative relay services and submit them for approval from Ofcom.
- 4.113 Section 6 of the Act requires Ofcom to keep the carrying out of its functions under review with a view to securing that regulation by Ofcom does not involve the maintenance of regulatory burdens which have become unnecessary. In light of the conclusion above, namely that the regulatory objective can be secured by means of a GC alone, we consider that the USC is unnecessary and should be revoked. We are therefore proposing to amend GC15 to implement the requirements for NGTR and to revoke USC4.
- 4.114 Under GC15.3, all providers of PATS are required to provide a TR service to any of its subscribers “who, because of their disabilities, need to make calls in which some or all of the call is made or received in text format”. GC15.3 further provides that charges for a TR service must be no more than the equivalent price as if the call made was a voice call. The Condition further provides for a special tariff scheme for disabled end-users to compensate them for the additional costs resulting from the additional time taken to make a relay call. Ofcom is not proposing to modify the obligations contained in GC15.3. The improvements to the TR service outlined in Ofcom’s proposals do not affect the operation and rationale of GC15.3 and Ofcom therefore sees no reason to amend that Condition.
- 4.115 In order to implement the improvements to the TR service outlined in this document, Ofcom is proposing to insert a new GC15.5 which will set out the criteria which any TR service must meet. Previously, those criteria have applied when a service has been considered for approval by Ofcom under the existing GC15. However, for the sake of transparency and in order to ensure that all providers of PATS are fully aware of the obligations to which they are subject under the revised GC15, Ofcom is proposing to include those criteria in GC15. The revised GC would include a set of criteria for NGTR set out below:
- Enables users to make and receive calls 24/7, including access to emergency services;
  - Enables the hearing-impaired end-user (whether making or receiving a call) to send and receive text in parallel with the conventional two-way speech elements of the call;
  - Can be accessed according to the users’ preference using existing text relay equipment or off the shelf/mainstream consumer electronics including computers, mobile phone and smart phones. It may not be possible for end-users with legacy equipment to see any benefits from the enhanced service, however the service they receive should not be adversely affected by these changes;
  - The service must not prevent end-users from making and receiving calls to and from end-users of other relay services;

- Enables end-users to access the service without the need to dial a prefix;
- As far as reasonably practicable, the service must allow for conversation speeds equivalent to voice conversation speeds for all end-users;
- The service must guarantee the confidentiality of communications made through the service;
- The service must be approved by Ofcom; and
- CPs mandated to provide the service must comply with any directions which may be set by Ofcom.

4.116 We set out in Annex 7 a notification of our proposal to amend GC15. In Annex 8 we also set out a notification of our proposal to revoke USC4.

4.117 BT has committed to a set of key performance indicators (KPIs) in relation to the existing TR service.<sup>43</sup> Those KPIs are important to ensure the effective operation of relay services is maintained and that the needs of users of the service are met on an ongoing basis. We consider that KPIs are an important part of ensuring that any TR service provided fulfils the objective of ensuring equivalent services and would intend that the revised framework for TR services would continue to follow this model.

4.118 We would therefore expect relay service providers to include KPIs in their applications for approval by Ofcom, covering:

- Relay Assistant's Role;
- Confidentiality;
- Training for relay assistants;
- Call handling response times of standard and emergency calls;
- Conversation voice to text transcription speed;
- Accuracy of voice to text transcription; and
- Complaints handling

4.119 We anticipate that any approval given by Ofcom would be conditional upon the service meeting those KPIs on an ongoing basis. Should the service fail to meet those KPIs, Ofcom would be entitled to withdraw its approval.

*Question 2: Do you agree with the proposal to implement NGTR through the amendment to GC15? Do you agree that the criteria we propose satisfactorily embody improvements we suggest for NGTR?*

4.120 It is desirable for the improvements that come with the NGTR service to be available to users as soon as possible. However, the proposed changes in the criteria will require significant change to the existing service which will take time to plan, implement and test. This will include the need to tender for customised solutions

<sup>43</sup> These KPIs are available in Ofcom's Access and Inclusion statement in 2009, in Annex 5. See: [http://stakeholders.ofcom.org.uk/binaries/consultations/access/summary/access\\_inc.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/access/summary/access_inc.pdf)

based on integrating new hardware and software with the existing service. The importance of maintaining a service through the transition, ensuring that there is no impact on emergency calls, will also have an impact on timelines. Taking these factors and advice from ICC into consideration, we therefore propose that the changes to introduce NGTR should be implemented within 18 months of a statement by Ofcom confirming the amended GC. Notwithstanding this, we would encourage CPs to ensure as rapid a transition to NGTR as practical.

*Question 3: Do you agree that a period of up to 18 months for implementation of NGTR, following an Ofcom statement, is appropriate?*

- 4.121 In setting or modifying GCs or USCs, Ofcom is subject to the requirements of section 47(2) of the Act. That provision requires, in relation to the modification of a GC, that the modification is non-discriminatory, proportionate and transparent. This specific test is supplemented by the duties to which Ofcom is subject under sections 3 and 4 of the Act (including our principal duty of furthering the interests of consumers and citizens).
- 4.122 Ofcom considers that the proposals set out in relation to NGTR are not unduly discriminatory as the proposed requirement would apply equally to all CPs who provide publicly available telephony services. BT will no longer be subject to the USC which applied only to it thus ensuring that all providers are treated in the same manner.
- 4.123 Ofcom further considers that the proposal is a proportionate measure to take to ensure the objective of providing a greater level of equivalence for customers with hearing and/or speech difficulties. Ofcom has considered the extent to which the costs and benefits of the measures under reasonable take-up and usage scenarios remain in balance. If there is limited impact on levels of take-up and usage, then introducing NGTR would deliver incremental benefits while having little impact on the cost of providing the service. Under a medium take-up and usage scenario, the incremental costs of the proposals remain within levels which are commensurate with the benefits offered. Whilst we note the inherent difficulties in quantifying the benefits associated with an enhanced TR service, in our view, those benefits are likely to outweigh the costs to CPs.
- 4.124 We are satisfied that the change is transparent insofar as the nature and reasons for the obligations are clearly set out in this document and the measure will be contained in a GC which will be readily available.
- 4.125 Ofcom is satisfied that the proposed measure satisfies the duties set out in sections 3 and 4 of the Act. In particular, the proposed measure is one which furthers the interests of citizens in relation to communications matters by ensuring the availability of a wide range of communication services to disabled end-users. Ofcom has specific duties in relation to the interests of the needs of persons with disabilities and of the elderly in addition to its principal duty to further the interests of citizens in relation to communications matters. The proposed measures are ones which will improve the quality of communications services offered to those groups and therefore comply with those duties.
- 4.126 As regards the duty to have regard to general regulatory principles as set out in sections 3 and 4, those provisions largely reflect the test set out in section 47(2) (non-discriminatory, proportionate and justifiable) and Ofcom reiterates that position in relation to the duty.

## Section 5

# The case for introducing Video Relay

5.1 In this section we examine the extent to which VR might provide increased equivalence for BSL<sup>44</sup> users. To inform our analysis we have considered our own market research findings and experiences in other countries. We then go on to consider whether or not it is appropriate to impose obligations on CPs to secure the provision of VR services.

## Video relay

5.2 VR services are aimed at users of sign language such as BSL. They require the BSL user to establish a two-way video link with the relay centre before making the call to the hearing person. Once connected, the hearing person speaks to the relay operator, typically a qualified sign language interpreter, who signs via the video link to the BSL user. The BSL user then signs back and the operator speaks to the hearing person.

5.3 VR is generally accessed using a fixed broadband connection via an internet-connected PC although dedicated terminals, which are used with a TV, are also available for proprietary internet-based services. VR services are generally not used with mobile broadband as it does not currently provide data rates that are consistently high enough to deliver the high quality video that signing needs. Live video requires a consistent level of connectivity and mobile network data connectivity tends to be 'bursty', with periods of low or no data flow, resulting in freezes or jumps. Internet video streams, e.g. from YouTube, are usually buffered in the replay device, enabling the video to continue despite periods of low or no connectivity. This approach introduces a delay which is unacceptable in a live call.

5.4 VR services differ from video calls between two sign-language users, using a service such as Skype, as an interpreter takes part in the call, allowing the BSL user to converse with the hearing person who is using a standard voice-only telephone connection.

5.5 VR services are commercially available in the UK, not under regulation, but on a limited basis during working hours and for work purposes to those people who have been assessed as needing them. To support deaf people in their work for making calls, the service is funded primarily by the government's Access to Work scheme.<sup>45</sup>

5.6 Some public bodies, including some local authorities for instance, provide free VR calls to their disabled customers<sup>46</sup> through a reverse charge arrangement with commercial VR providers in the UK.

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<sup>44</sup> It is important to note that BSL is not simply English transcribed into hand gestures. It is in effect a separate language with its own grammar. Consequently some fluent BSL users are not fully fluent in written English.

<sup>45</sup> Access to Work is a Government scheme providing funding for the extra costs of employment due to disability (although employers are still required to make 'reasonable adjustments' for their employees under the Equality Act). This can include an agreed number of hours of face-to-face sign language interpreting or use of video relay.

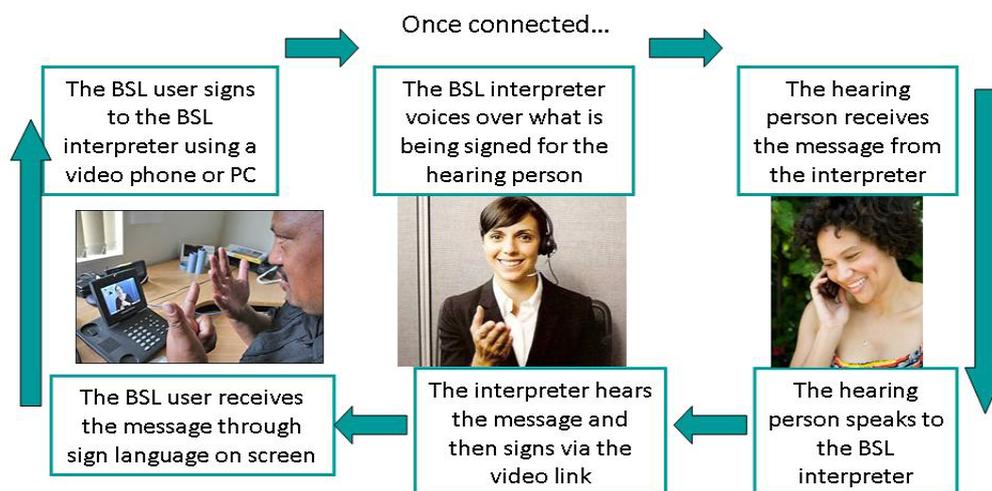
<sup>46</sup> For instance: Manchester City Council <http://www.manchester.gov.uk/signvideo> ; London Borough of Sutton <http://www.sutton.gov.uk/index.aspx?articleid=1> ; and Brent Council <http://www.brent.gov.uk/onestop.nsf/Pages/LBB-3>

5.7 Figure 1 below illustrates how the service works:

**Figure 1**

### How does video relay work?

This service requires a two way video link with the with the relay centre before making the call to the hearing person. **Conversation speeds are faster and approach regular conversation speeds.**



Source: OL market research report.

### Summary of market research on video relay

5.8 Participants in the market research by OL were asked questions relating to a VR service. Some participants had used VR services before, whilst others had no direct experience of this type of service.

5.9 The market research highlighted that the approved TR service does not adequately meet the needs of BSL users, particularly for those who do not have English as their first language. Severely and profoundly deaf BSL users identified VR as being the most useful service to them in comparison to other TR services because:

- Having the ability to communicate in their first language, BSL, would make users feel more comfortable and confident than when communicating in English;
- Being able to see the relay interpreter and see their facial expressions would enable the BSL users to feel the emotional content of the discussion; and
- Conversations via VR would therefore be quicker and more fluid than TR conversations.

5.10 BSL users that participated in the research also identified some potential concerns about a VR service which centred on issues of costs, technology, functionality and confidentiality. For instance some were concerned that:

- The equipment and calls for VR would be costly:

- The quality of image would be poor, because this is largely dependent on broadband speed, and this would make it difficult to interpret signing and lead to errors in interpretation;
- Confidentiality could be impacted because there are a limited number of BSL interpreters who were therefore likely to be known in the community and by the end-user. Participants expressed that this might make some users less comfortable in discussing personal or confidential issues; and
- The variability of interpreters' BSL skills and regional variances in signing could lead to errors in interpretation.

## Provision of video relay services outside the UK

- 5.11 To help gather information on costs, benefits and practicalities, we have considered how VR has been implemented in other jurisdictions both within and outside Europe.
- 5.12 The availability and level of provision of VR service internationally, including Member States, varies considerably. For instance: it is implemented in some countries as the result of government legislation or mandate and in others by charitable sources; times when the service is available vary; and costs per users and sources of funding also vary.
- 5.13 The table below provides a brief overview of those countries that do provide a VR service, whether this provision stems from legislation or on a voluntary basis (e.g. a trial).

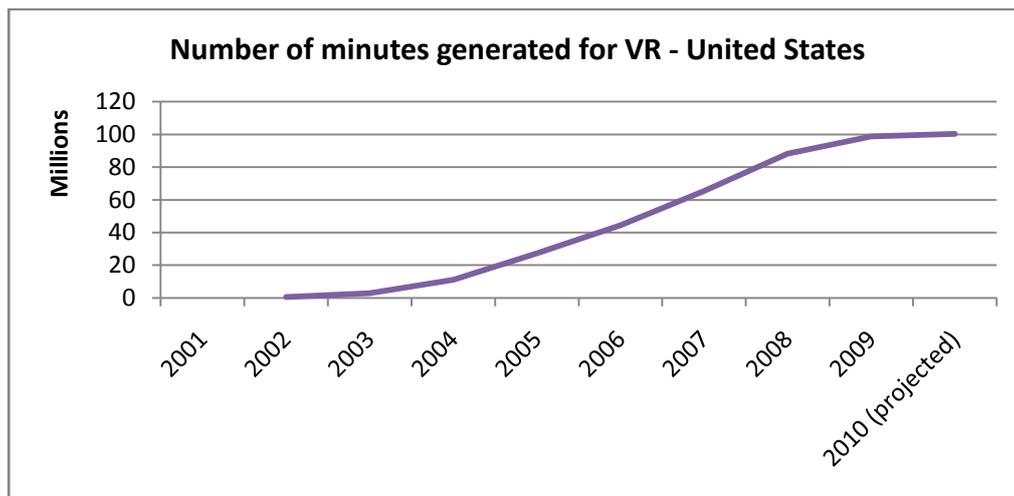
**Figure 2**

Country	Sources of funding	Availability of the service	Other aspects of the service
US	Industry funded (by Government mandate)	Unrestricted service - available 24/7	End-users can choose between competing VR providers
Sweden	Government funded	Until 2010 the hours were 7.00-20.00 on weekdays and 9.00-15:00 on weekends/bank holidays. In September 2010 the hours were extended to 7.00-22.00 on weekdays and 9.00-17.00 on weekends and bank holidays.	Users are required to book long calls in advance (calls of more than 30 minutes)
Norway	Government funded	Restricted service	
Denmark	Government funded for workplace use only	Restricted service. available Monday-Thursday 08.00-16.00, Friday 08.00-14.00	Users are required to book long calls in advance
Germany	Workplace use is Government funded. Private/social use is industry funded, with users paying a proportion of the cost	Restricted service. For the private use VR is available Monday to Sunday from 8am to 11pm. For workplace use VR is available on weekdays only from 8am to 5pm.	Since early 2011, users are required to register as private/social and/or workplace user; a decision, which results in different charges and availability times

Country	Sources of funding	Availability of the service	Other aspects of the service
UK	Commercially available. Government funding available for work use only through Access to work funding. Use also funded by charitable donations.	Restricted service	
France	Commercially available; advance booking necessary	Restricted service	Advance booking necessary
New Zealand	Government funded. Funding capped to the surplus in current Crown funding for the relay service	Restricted service - available for four hours a day on weekdays.	Users are asked not to make long calls
Canada	Trial in two provinces, funded from deferral accounts (money the communications providers were required to reserve pending Government requisitions, e.g. for rural broadband)		The trial has been extended for six months until January 2012. There are up to 400 participants although the actual number has not been published
Australia	Trial funded by the Australian Communications Exchange (a non-profit organisation)	Restricted service -available for 12 hours a day on weekdays	

Sources: Federal Communications Commission (US); Swedish Post and Telecom Agency (PTS) (Sweden); Norwegian Labour and Welfare Organisation (Norway); TegnKom (Denmark); The Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railways (BNetzA) (Germany); L'Autorité de Régulation des Communications Électroniques et des Postes (ARCEP) (France); Ministry of Economic Development (New Zealand); Canadian Radio-television and Telecommunications Commission (Canada); Australian Communications and Media Authority and the Department of Broadband, Communications and the Digital Economy (Australia).

- 5.14 Figure 2 shows that VR provision in most countries is restricted in some way. The exception is the United States where VR is provided 24/7 to all citizens. Experience there has shown us that a VR service that is not restricted could be very popular, but also costly to provide. See figure 3 below.

**Figure 3**

Source: Based on figures from National Exchange Carrier Association reports.

5.15 Based on our research we also understand that the following factors are likely to be important when considering the potential associated costs of providing a VR service. These include for instance:

- When and what times of the day service is available, owing to high costs of running this overnight and also costs for hiring adequately qualified BSL interpreters;
- Likely demand for the service and hence demand for the number of BSL interpreters required to interpret for callers; and
- Distinguishing between VR and video remote interpreting.<sup>47</sup>

## Commercial video relay services in the UK

5.16 In the UK VR is currently available on a commercial basis and many of the factors highlighted above are also borne out through experiences of commercial providers of VR in the UK.

5.17 Commercial VR is not available 24 hours a day, 7 days a week. This appears to be owing to the high costs of running the service overnight and the costs associated with hiring BSL interpreters. Commercial VR is largely used by BSL users whose use of

<sup>47</sup> VR enables BSL users to have telephone conversations with hearing people who are at a different location, whilst video remote interpreting (VRI) is used as a way of bringing an offsite interpreter to provide services where a deaf BSL user and a hearing person are in the same location. As VR and VRI use the same technology it can sometimes be difficult in practice to distinguish between them, and where VR is unrestricted there could be incentives to use it to get VRI. For instance, several people who were interviewed for the Plum study said that would like to use VR as a way of getting interpreters for quick or impromptu meetings. In countries where VR is provided, there are specific prohibitions against using VR to get VRI. This is because it is not considered appropriate to ask the telecoms sector to pay for interpreters where the service provider should be funding an interpreter as part of their obligations under equality legislation. For example in the US, the FCC has ruled that deaf and hearing people in the same room are not permitted to use the VR service to communicate, because the service is designated only for telephone calls. The FCC requires that if a VR interpreter determines callers are in the same location, they must advise both parties that the interpreter must terminate the call.

the service is paid for by Government's Access to Work scheme.<sup>48</sup> Some commercial VR providers also receive some charitable donations, which help to meet the costs for providing the service.

## Options for video relay services

- 5.18 As set out in section 3, the extent to which a service is equivalent to voice calls for one group of disabled end-users may be different from that for another group, depending on the nature of their disability. In the present context, VR services are likely to offer greater equivalence for BSL users than TR or NGTR. BSL users, particularly for those who find written English difficult, are more dependent on the ability to communicate in their first language. Even for those with higher levels of literacy that could use TR or NGTR, VR offers the ability to have more natural conversations.
- 5.19 Given the increased equivalence for BSL users that VR could offer, we have considered options for VR. Alongside these we consider a 'no change' option where current requirements remain unchanged.

### Option 1: Do not require Communications Providers to offer access to VR

- 5.20 Under this option there would be no change to the current arrangements. There would be no requirement on CPs to provide access to an approved VR service.
- 5.21 BSL users would continue to have access to the TR/NGTR service and to commercial VR providers where available funded directly by themselves, through the Government's Access to Work scheme or by businesses and public bodies where they offer free access, as described in paragraph 5.5.
- 5.22 However, for those BSL users not able to use TR/NGTR because they find written English difficult and who are not able to use commercial relay providers because of the high costs, these services are not likely to provide higher levels of equivalence than currently available. Those users would not therefore have access to equivalent services and we do not therefore consider that the no change option would be appropriate.
- 5.23 We explore in options 2 and 3 below the extent to which it might be proportionate to require CPs to provide access to a VR service.

### Option 2: Require the implementation of an unrestricted VR service

- 5.24 Under this option CPs would be required to provide unrestricted access to a VR service that meets criteria set by Ofcom. As with regular voice telephony and the current approved TR relay service, the service would be available 24 hours a day, 7 days a week. CPs would be required to provide access to a VR service that met criteria set by Ofcom, in a similar way to that provided by CPs currently to the TR service. Users would pay no more than the costs of 'standard' voice call with the CP required to meet any shortfall as between the cost of the service and the amount it is entitled to receive in charges.
- 5.25 This option would provide a form of equivalence that is not available to BSL users who are unable to use the TR/NGTR service. In terms of the equivalence criteria, it would also provide BSL users who can use TR/NGTR service with a service that is

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<sup>48</sup> See footnote 46 earlier in section 4.

more natural and in most circumstances faster to use. It would increase the flexibility and range of choice available to BSL users, alongside email, mobile text messaging, instant messaging and, if appropriate, TR. It would also be available via mainstream equipment such as personal computers and netbooks.

- 5.26 We consider below the costs and benefits of requiring the provision of an unrestricted VR service.

### Costs and benefits of providing unrestricted VR

- 5.27 As with NGTR, we have considered the incremental costs and benefits relative to the existing TR service. For the purpose of an impact assessment, it is the incremental cost and benefit relative to the existing TR service that is relevant. An impact assessment should consider the impact of this particular regulatory action – that is, the additional costs and benefits that would result from altering the regulatory framework.
- 5.28 After considering take-up and usage, we discuss below the costs and then the benefits that may result from VR services and assess whether these incremental benefits are likely to exceed the incremental costs.

### **Take-up and usage scenarios**

- 5.29 We have based our estimates for take-up and usage of a VR service on the levels observed in the US. We believe that this is a close comparator for the likely demand for the service in the UK and it is the only country with unrestricted VR where the market appears to have matured.
- 5.30 In 2009, Americans made approximately 25 million VR calls, resulting in approximately 100 million minutes of VR calls.<sup>49</sup> An estimated 150,000 to 200,000 people use VR in the US, out of a population of approximately 400,000 American Sign Language (ASL) users.<sup>50</sup> This means that approximately 38-50% of ASL users use VR. Taking the midpoint of this estimate (44%) and applying it to the UK – where there are approximately 50,000 BSL users<sup>51</sup> – suggests that take-up of VR in the UK would likely be in the region of 22,000 users if we mandate the provision of an unrestricted service. We use this to estimate a ‘central case’ (our medium demand scenario below). This is the level of VR take-up and usage that we consider most likely to occur if an unrestricted service was offered 24/7.
- 5.31 As noted above, in 2009, Americans made approximately 100m minutes of VR calls. Given the estimate of 150,000 to 200,000 VR users, it suggests that each user uses VR for an average of between 42 and 56 minutes per month. We take 50 minutes per month as our central case for average usage in the UK (approximately the midpoint of these estimates).
- 5.32 As with the scenarios for take-up and usage of NGTR discussed in Section 4, there is considerable uncertainty around the likely demand for VR. We therefore selected high and low demand scenarios that we consider reflect the upper and lower bounds

<sup>49</sup> The National Exchange Carrier Association (NECA) estimated that the combined number of VR minutes for 2010 and 2011 would be 200.4 million. See *Interstate Telecommunications Relay Services Fund: Payment Formula and Fund Size Estimate, April 30th 2010*, available from [https://www.neca.org/cms400min/NECA\\_Templates/TRS\\_Landing\\_Page.aspx](https://www.neca.org/cms400min/NECA_Templates/TRS_Landing_Page.aspx)

<sup>50</sup> The numbers are not formally reported but, this is based on estimates by the FCC and relay providers.

<sup>51</sup> Source: CACDP – now known as Signature - press release in December 2006.

of possible take-up and usage and as such we consider they are less likely than the medium demand scenario. As with the scenarios used in the NGTR analysis above, we assume that take-up and usage increase gradually over the initial 5 year period, reaching maturity in year 5.

- **Low Demand** scenario - we assume that: 11,000 users (22% of BSL users – half the amount calculated for the medium demand scenario) take-up the service; each user uses an average usage of 30 minutes per user per month; and that the total number of minutes per year is approximately 4.0m minutes.
- **Medium Demand** scenario - we assume that: 22,000 users (44% of BSL users) take-up the service; each user uses an average usage of 50 minutes per month; and that the total minutes per year is 13.2m minutes.
- **High Demand** scenario - we assume that: 30,000 users (60% of BSL users) take-up the service; each user has an average usage of 100 minutes per month;<sup>52</sup> and that the total number per year is 36.0m minutes.

## Incremental costs

5.33 To help ascertain the likely costs of providing VR in the UK, we have drawn on a number of sources. These include:

- The Plum study 2009<sup>53</sup> estimated costs of VR at between £2.50 and £2.85 per minute;
- A report by NECA on the compensation fund in the United States: this sets out that the current compensation rate is between \$6.2372 and \$6.7025 per minute,<sup>54</sup> currently equivalent to between £3.87 and £4.16.<sup>55</sup> NECA raise concerns about anomalies in the data for recent years of operators' cost submissions and the report notes that there has been a considerable increase in stated costs in recent years; it notes that the weighted average per-minute costs was previously around \$4-\$4.20 per minute, equivalent to approximately £2.50 to £2.60 per minute,<sup>56</sup> and
- Discussion with UK commercial VR providers: these providers suggested that costs are likely to be between £2.40 and £3 per minute.

5.34 Taking the average of the estimates from these three sources (using the mid-point where a source gives more than one estimate) gives a per-minute cost of approximately £3.15 per minute. For the remainder of this costing exercise, we use this estimate as the per-minute cost of providing VR in the UK. We also use the

<sup>52</sup> This estimate may seem high compared to the low and medium demand scenarios, however, we chose a figure for the high demand scenario that would represent a plausible upper bound for average usage.

<sup>53</sup> See: [http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice\\_telep.pdf](http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice_telep.pdf)

<sup>54</sup> Ibid.

<sup>55</sup> £1:\$1.6124 as at 19<sup>th</sup> July 2011

<sup>56</sup> The report by Europe Economics also included an estimate of £4 per minute. This is based on the US compensation rates as set out by NECA. We have therefore not included this estimate, as we are already using the NECA estimate. The report can be found in Annex 3 of Sorenson Communication's response to Ofcom's Draft Annual plan, see:

[http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson\\_Communications.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson_Communications.pdf) . A subsequent revised report can be found at: <http://www.vrstopday.com/wp-content/uploads/Revised-Final-Europe-Economics-Report.pdf>

£4.16 figure and the £2.40 figure as upper and lower bounds for the purpose of sensitivity analysis.

- 5.35 As with NGTR we consider that there are likely to be limited economies of scale beyond a certain minimum efficient scale from providing a VR service, as the majority of the cost relates to cost of employing BSL interpreters. This is consistent with the current tiered compensation rates in the US, where small operators receive approximately \$6.70 per minute, compared to the largest operators (with more than ten times the scale) receiving approximately \$6.24 per minute.
- 5.36 As set out above, we use this estimate of £3.15 per-minute to calculate the total cost of providing an unrestricted VR service in the UK under the three demand scenarios previously outlined above.
- 5.37 Running a VR service on a 24/7 basis would incur additional costs. Discussions with stakeholders suggest that the cost of employing BSL interpreters overnight would be considerably higher than during the day. In addition, we would expect call volumes to decrease significantly overnight, meaning that BSL interpreters would likely interpret fewer calls per hour.
- 5.38 As a result of these two factors, the average cost per minute of calls made overnight could be significantly higher than the average cost outlined above.
- 5.39 Taking the **low demand** scenario, our estimates suggest that at maturity, the low demand scenario would result in total costs of approximately £12.6m per year on the basis of a per-minute cost of £3.15. This is equivalent to just over £1,050 per user per year. Figure 4 below helps to illustrate this:

**Figure 4**

Costs in £m, 2011 prices	Year 1	Year 2	Year 3	Year 4	Year 5+
Total costs	2.5	5.0	7.6	10.1	12.6

- 5.40 Using the higher and lower estimates of per minute costs as a sensitivity check, the total costs at maturity in the low demand scenario could be as high as £16.6m or as low as £9.6m.
- 5.41 Taking the **medium demand** scenario, our estimates suggest that at maturity, the medium demand scenario would result in total costs of approximately £41.6m per year on the basis of a per-minute cost of £3.15. This is equivalent to approximately £1,890 per user per year – the per user cost estimate is higher than in the low demand scenario because of the larger number of minutes per user that is assumed (50 minutes per month rather than 30). Figure 5 below helps to illustrate this:

**Figure 5**

Costs in £m, 2011 prices	Year 1	Year 2	Year 3	Year 4	Year 5+
Total costs	8.3	16.6	24.9	33.3	41.6

- 5.42 Using the higher and lower estimates of per minute costs as a sensitivity check, the total costs at maturity in the medium demand scenario could be as high as £54.9m or as low as £31.7m.

- 5.43 Taking the **high demand** scenario, our estimates suggest that at maturity, the high demand scenario would result in total costs of approximately £113.4m per year on the basis of a per-minute cost of £3.15. This is equivalent to £3,780 per user per year. Figure 6 below helps to illustrate this:

**Figure 6**

Costs in £m, 2011 prices	Year 1	Year 2	Year 3	Year 4	Year 5+
Total costs	22.7	45.4	68.0	90.7	113.4

- 5.44 Using the higher and lower estimates of per minute costs as a sensitivity check, the total costs at maturity in the high demand scenario could be as high as £149.8m or as low as £86.4m. For the remainder of the analysis, we report only the figures based on the £3.15 cost per minute, although we recognise that there is some uncertainty around the per-minute costs as well as the expected take-up and usage.
- 5.45 These costs represent the total cost of providing the VR service in the UK. As set out above, we need to consider the incremental costs and benefits that would result. In the case of VR, however, it is not possible to estimate with certainty what proportion of these costs would be incremental.
- 5.46 It is possible that some potential VR users would be existing TR users, however, we do not have accurate estimates for the proportion of potential VR users for whom this is the case. When this is the case, and these users substitute all their TR usage for VR, the incremental cost of VR would be the total cost of VR minus the total cost of TR (estimated above to be approximately £400 per user).
- 5.47 Stakeholder groups have indicated that VR would be particularly useful for BSL users with low levels of English literacy. It is unlikely that these VR users would be previous users of TR. To the extent that VR users were not previously TR users, the incremental costs would be close to the total costs indicated above. If a considerable proportion of VR users did use the TR service (but no longer do as a result of implementing VR), the incremental costs would be below the total cost levels set out above.
- 5.48 We therefore adjust our total costs to reflect the fact that some users may be substituting TR for VR, making the incremental cost lower than the total cost.<sup>57</sup>
- 5.49 For the **low demand** scenario we estimate that the average incremental cost of VR will likely range from £745 per user per year for those who substitute from TR to £1,145 per user per year for those who were not previously TR users.

<sup>57</sup> It is also possible that some users might substitute the NGTR service for VR. If this is the case, the incremental cost of video relay cost could be lower than indicated above (as the cost of NGTR per user is higher than the cost of the existing TR service under most NGTR demand scenarios). However, most of the benefit of NGTR would accrue to those with some residual hearing and speech. Potential VR users – most of whom are likely to be profoundly deaf from birth – would not derive substantially more benefit from NGTR than TR. As a result, we would not expect these individuals' usage of the NGTR service to differ greatly from their usage of the existing TR service. The costs of their NGTR usage would therefore be similar to the costs of their TR usage, so it would make little difference when calculating the incremental cost whether we are measuring the costs relative to the TR service or the NGTR service.

- 5.50 For the **medium demand** scenario we estimate that the average incremental cost of VR will likely range from £1,670 to £1,890 per user per year depending on the proportion of individuals who substitute TR for VR.
- 5.51 For the **high demand** scenario the average incremental cost of VR will likely range from £3,633 to £3,780 per user per year, depending on the proportion of individuals who substitute TR for VR.
- 5.52 As with NGTR, we have not included the costs of end user equipment. As before, there is considerable uncertainty around the incremental cost of equipment, as this would likely depend on the number of individuals who already have PCs and/or videophones.
- 5.53 In addition, not including equipment costs gives us a conservatively low estimate for the level of costs. If the benefits of an unrestricted VR service are not greater than this conservative estimate for costs, it makes a stronger case that an unrestricted service would not be proportionate.
- 5.54 Figure 7 below summarises the annual total cost and cost per user of VR services.

**Figure 7**

Demand scenario	Total costs		Incremental costs (lower estimate) <sup>58</sup>
	Overall (£m)	Per user (£)	Per user (£)
Low	12.6	1145	745
Medium	41.6	1890	1670
High	113.4	3780	3633

## Incremental benefits

### Consumer benefits

- 5.55 As discussed in Section 4 on the benefits of NGTR, the results of the quantitative survey in the OL market research did not provide results that we could use to estimate robustly the benefits of VR services. (See section 4 for a discussion of the issues we faced in trying to quantify the consumer benefits.)
- 5.56 The OL report, in its qualitative analysis, did help us to identify factors that are relevant in considering the benefits of access to equivalent communications. Below we consider how well a VR service would deliver in each of these categories:
- The ability to have natural conversations and the ability to interrupt conversations as needed - The market research indicates that this is the major benefit of VR because users are able to communicate in their preferred language (BSL); the service allows for a fluid more faster conversation speed; and it enables users to interrupt conversations as appropriate and convey emotion more easily.

<sup>58</sup> The upper estimate for per-user incremental cost in each scenario is provided by the figure in the previous column, under Total costs. Cost per user is higher in medium and high scenarios compared to low scenario because a higher usage in terms of minutes per user is assumed in the medium and high scenarios.

- The ability to have private conversations - The relay assistant is a major part of the call, resulting in a lack of privacy. However, this is inevitable given the nature of this group's needs and subsequent need for a BSL interpreter to assist with calls to and from hearing users.
- Having flexibility in the choice of communications methods and devices - Commercially available VR services in the UK work on either videophones or PC/Macs. Users are also able to use the service on low-cost notebook computers. At present, we do not envisage that VR could be provided reliably over mobile networks due to technical constraints.
- Having access to these services whenever they are required – Given the likely higher costs per minute of providing a service overnight (discussed at paragraphs 5.17 and 5.37-5.38 above), it is unclear whether it would be proportionate to make a VR service available 24/7.

- 5.57 In addition to the benefits set out in these categories, there are a considerable number of BSL users who have difficulties with written English who would not currently have access to the benefits of TR or mainstream services such as email.
- 5.58 As explained in the section 4 on NGTR, there are currently approximately 7.4m minutes of TR calls per year on the existing service. As discussed before, we do not know exactly what proportion of TR calls are made by BSL users, and therefore the number of TR calls that would be substituted for VR. For the purpose of illustration, we assume that one third of these calls are made by people with some residual hearing and speech (who could use NGTR for captioning), one third are made by profoundly deaf non-BSL users, and the remaining third are made by BSL users.
- 5.59 For illustration, we therefore assume that approximately 2.5m TR minutes could be substituted for VR calls if a VR service was introduced, resulting in faster conversations and therefore benefits to users.
- 5.60 The Plum study also set out that the existing TR service delivers conversation speeds of approximately 30 words per minute (wpm), compared to speeds of around 150wpm for VR.
- 5.61 Using the figures from the Plum report, therefore, substituting these 2.5m minutes of TR calls for faster VR calls would result in a saving of approximately 2m minutes per year for these users. Placing a value of £6.09 on each hour saved,<sup>59</sup> this would result in a benefit to these users of approximately £200,000 per year.

### Externalities

- 5.62 An externality arises when consumption of a service impacts- positively or negatively- on others.
- 5.63 We know from the OL and Plum reports, as well as discussions with disability stakeholders, that hearing users are often frustrated by the existing approved TR service. It is also apparent that enabling BSL users to communicate in their preferred language and in real time also results in a considerably less frustrating experience for the hearing user. In light of this we consider that VR would deliver benefits to hearing users as well as profoundly deaf BSL users.

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<sup>59</sup> See footnote 38 in section 4 for a discussion of the value of time.

- 5.64 We also included a number of hearing individuals in our sample for the quantitative section of the market research carried out by OL. However, we do not believe that we can use this information to calculate robust estimates of value for reasons previously stated.
- 5.65 As set out above, we have estimated the time saving benefit of substituting TR calls for VR calls. Since each minute saved for a BSL user also results in a minute saved for the hearing user on the other end of the line, there is also a positive externality on this group. As above, we estimate the value of this externality as being approximately £200,000 per year.
- 5.66 Discussions with stakeholders have indicated that there are also potentially negative externalities associated with these services.
- 5.67 A report (which we discuss below) provided to Ofcom by Sorenson Communications, a provider of VR in the US, on the costs and benefits introducing an unrestricted VR service to the UK VR services in the UK,<sup>60</sup> estimates that an unrestricted VR service in the UK would require 2,053 BSL interpreters at maturity.
- 5.68 Ofcom understands that, at the time of writing there are currently only 519 BSL interpreters on the UK Register of Sign Language Interpreters. Whilst the supply of BSL interpreters is unlikely to be fixed in the long run, stakeholders have suggested that a sudden increase in demand for interpreters as a result of implementing a VR service, could lead to a shortage of BSL interpreters for face-to-face interpreting. While it may be possible to train the necessary interpreters, it is likely that there would be a shortage of interpreters in the medium term. This could result in a negative externality on those requiring BSL interpreters for face-to-face interpreting.

### Broader Social Value

- 5.69 The reports by Plum and OL also identified a number of impacts on Broader Social Value (BSV) that could result from access to enhanced relay services. We believe that such impacts are likely to be relevant for VR, including<sup>61</sup>:
- Social inclusion (more participation in public life, better informed citizens)
  - Increased independence and self esteem of hearing-impaired users
  - Reduced loneliness and anxiety of users
  - Improved health for users
  - Increased employment opportunities
  - Increased productivity in the workforce
  - Facilitates other business and the wider economy

<sup>60</sup> The report can be found in Annex 3 of Sorenson Communication's response to Ofcom's Draft Annual plan, see: [http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson\\_Communications.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson_Communications.pdf) . A subsequent revised report can be found at: <http://www.vrstopday.com/wp-content/uploads/Revised-Final-Europe-Economics-Report.pdf>

<sup>61</sup> A number of these benefits have elements of both consumer benefits and broader social value.

- 5.70 We have not attempted to quantify these benefits, primarily because it is very difficult to know exactly the extent of the impact VR would have on these variables. For example, it is hard to know with any degree of certainty what impact VR would have on users' health, or their ability to find work. However, we recognise the relevance and importance of broader social value and have taken it into account in our provisional conclusions as described below.

### Europe Economics report for Sorenson Communications

- 5.71 Sorenson Communications, a provider of VR in the United States, recently commissioned Europe Economics (EE) to attempt to quantify the benefits of an unrestricted VR service. As set out in Annex 9 we believe this report overstates the benefits of introducing VR.
- 5.72 As explained in greater detail in Annex 9, we are doubtful that the approach in the EE report of including employment benefits is justified and, based on the available evidence we consider that the health benefits are likely to be overstated. Furthermore, the focus in the EE report on total costs and benefits does not necessarily indicate that an unrestricted VR service would be proportionate, as this depends on the benefits of additional usage matching or exceeding the marginal cost (which is estimated above at £3.15 per minute).

### **Summary of costs and benefits of an unrestricted VR service**

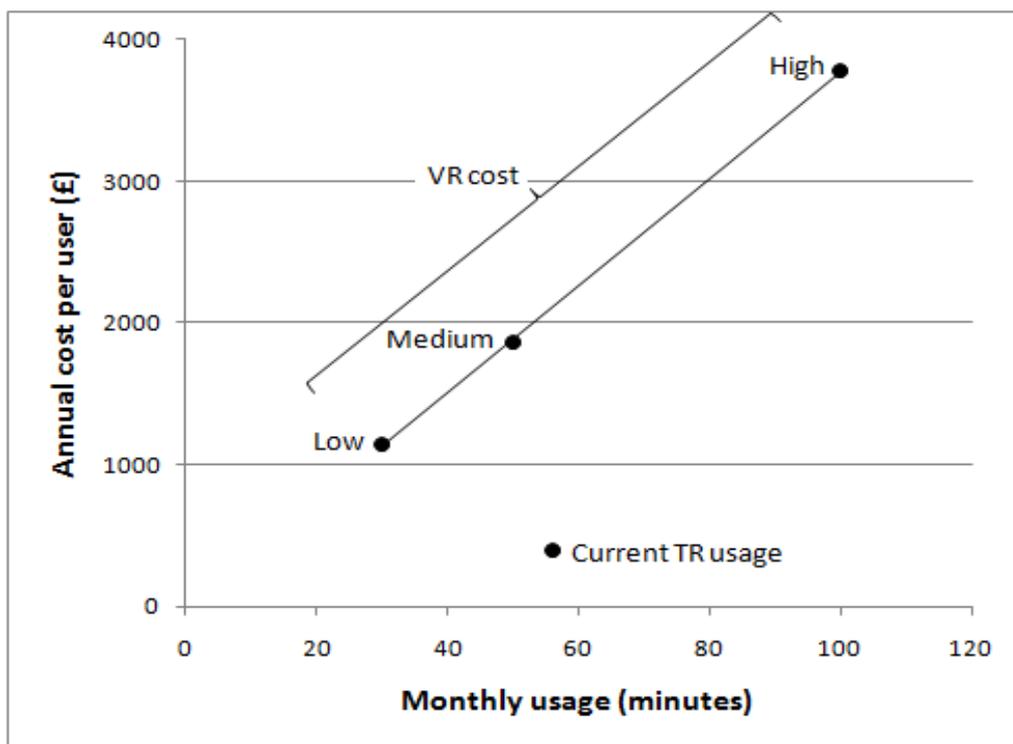
- 5.73 The costing section set out that we estimate that the total cost of providing an unrestricted VR service at maturity in the UK would likely be between £12.6m and £113.4m per year, with our central estimate being £41.6m per year.<sup>62</sup>
- 5.74 We set out above that it is difficult to determine exactly how much of this total cost would be incremental, as it is unclear how many of the potential VR users are currently users of the existing approved TR service.
- 5.75 It is clear from the market research that VR would offer a more equivalent service than the existing TR (or NGTR) for some BSL users – particularly those with limited English literacy. However, given the uncertainty around levels of take-up and usage and the high per-minute cost of the service, there is a considerable risk that an intervention to provide VR in the UK on an unrestricted basis would result in a disproportionate cost to industry.
- 5.76 Figure 8 below shows the cost and number of minutes per user of VR in the low, medium and high demand scenarios. The cost per user of VR is relatively high at £1,145 per user per year even in the scenario with the lowest cost, the low demand scenario. The cost in the medium and high demand scenarios is much higher still, as shown by the height of the dots on the vertical axis in Figure 8 for these scenarios. For example, the cost per user per year is £1,890 in the medium demand scenario.
- 5.77 Figure 8 also shows the current cost and number of minutes per user for the existing TR service, which provides a useful reference point. For example, even in the low demand scenario the cost per user of VR is still almost three times larger than the cost per user of the current TR service of about £400 (see paragraph 4.53). Moreover, this relates to a level of VR usage substantially below the level of usage for the current TR service. The other scenarios for VR, the medium and high demand

<sup>62</sup> The lower estimate could be as low as £9.6m if we take our lowest estimate for the per-minute cost, while the upper estimate could be as high as £149.8m if we take the highest level of per-minute cost.

scenarios, involve more comparable or higher levels of usage, but an even larger gap between the cost per user of VR and the current TR service. This demonstrates the considerable incremental cost of VR compared to TR, and therefore the significant benefit that would need to exist in order for an intervention to mandate the unrestricted provision of VR to be proportionate.

- 5.78 We recognise that there are important benefits from the VR service – consumer benefits, externalities and broader social value, as described above – and we take into account the benefits we have assessed qualitatively as well as those we have been able to quantify. But, consistent with our assessment of the EE report in Annex 9, we have not been able to identify benefits on a sufficient scale that we are confident they would match or exceed the relatively large costs of the VR service especially in the medium and high demand scenarios.

**Figure 8**



- 5.79 As for TR services (see Section 4), we believe that the marginal benefit of consuming additional minutes of VR services is likely to decline as usage increases. That is, if users could access the service for one hour per month, they would be unlikely to derive twice the value that they would from having half an hour of access per month. Likewise, there are likely to be some users for whom the service provides considerable value, while it provides less value for other users.
- 5.80 The evidence suggests that there are unlikely to be considerable economies of scale in providing the service. The near constant marginal cost of making additional calls of about £3.15 per minute, along with the declining value of making additional calls, suggests that at some levels of usage, the benefit of making additional calls would fall below the associated cost. At such levels of consumption, the service could result in a disproportionate cost. This could also be the case when large numbers of users who place a lower value on VR use the service.

- 5.81 Our view, taking into account the available evidence (discussed above and in Annex 9), is that there is a considerable risk that the levels of take-up and usage in an unrestricted VR service would represent a level of consumption that exceeds the benefits that we have been able to identify.
- 5.82 Also, it is unlikely that there would be sufficient BSL interpreters available to provide this service at least in the short to medium term, in particular as it takes several years to train a BSL signer to the highest qualification.<sup>63</sup> Stakeholders have expressed concern to us that a VR service could result in a scarcity of BSL signers for face-to-face interpreting.
- 5.83 For these reasons above, we propose to conclude that requiring the introduction of an unrestricted VR service would not be appropriate at this time and we do not support this option. In our view, the impact of such an option on CPs risks being disproportionate since the costs they would incur could significantly outweigh the potential benefits which might accrue to users of a VR service and society more generally.

### **Option 3: Require the implementation of VR on a restricted basis**

- 5.84 Although at unrestricted levels of usage, we think the benefits of a VR service will not outweigh the costs, at lower levels of usage it may be possible to achieve a large proportion of the benefits an unrestricted service would deliver, without the risk of spiralling costs. We have explored ways in which VR might be restricted to achieve a better balance between costs and benefits.
- 5.85 In the majority of countries outside the UK that offer VR, with the exception of the United States, it is available only on a restricted basis. Some methods for restricting a service for this purpose that we have identified include:
- Limiting the hours and/or days of the week that the service is available
  - Setting a financial cap on spend
  - Providing users with a monthly allocation of minutes
  - Differentiating between workplace and private use
  - Requiring users to book in calls in advance
- 5.86 We set out below a consideration of how such restrictions might work in practice, identifying any concerns we have identified with such approaches at this stage. We welcome stakeholders' comments on these approaches and would wish to consult further on the specifics of any rationing options should this be appropriate following the outcome of this consultation.
- 5.87 In section 3, we identified a need for equivalent services to be available 24 hours a day, seven days a week. The key consideration in this respect is that services should enable disabled end-users to contact the emergency services 24 hours a day. Whilst a restricted VR service may not offer this facility, as set out below, Ofcom has

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<sup>63</sup> There are a number of routes available to becoming a registered BSL interpreter including completing a university course leading to a degree or postgraduate qualification or completing the relevant NVQ and an approved BSL qualification.

mandated emergency SMS (mobile text messaging) so that hearing- and/or speech-impaired people can contact the emergency services by text message at all times. Emergency SMS is free to use, is available to BSL users also, and is in addition to 24/7 TR access to 112/999. In light of this, Ofcom considers that a restricted VR service would not impede access to the emergency services.

### Method 1: time of day restrictions

- 5.88 Under this method, the service would be available for a limited number of hours daily and/or limited to certain days of the week.
- 5.89 This approach is used in several other countries where the service is typically restricted to working hours Monday to Friday. More severe restrictions could apply initially with extended availability possible over time as experience and the availability of interpreters grows.
- 5.90 Figure 9 below shows the level of take-up per user that has resulted in two countries that have a restricted VR service.

**Figure 9**

Country	Hours of availability	Average minutes per user per month
New Zealand	09.00-13.00 Mon, Wed, Fri; 15.00-19.00 Tue, Thu	11.44
Sweden	7.00-22.00 weekdays; 9.00-17.00 weekends and bank holidays	12.3

Source: Ministry of Economic Development, New Zealand and Swedish Post and Telecom Agency (PTS), Sweden

- 5.91 Our research provides some support for this method of restricting usage because it indicated that most benefit to BSL users would be likely to come from increased ability to contact businesses and public bodies. Therefore, the restriction would not prevent the type of usage that generally provides the highest value to the users.
- 5.92 It is possible that this may not reduce usage for example if users chose to use the service during the restricted hours in the same amount as they would a service available 24 hours a day, 7 days a week. It is likely that such restrictions will put some downward pressure on demand for the service with potential VR users continuing to opt for substitutes that are available 24/7 e.g. TR, email and mobile text messaging to contact family and friends. But as it would not guarantee manageable levels of usage, further restrictions of the service, such as those discussed below, may also be needed.
- 5.93 This method would avoid the higher costs of employing BSL interpreters outside normal working hours. We understand that the per-minute costs of running a VR service overnight, where we expect traffic to be much lower than during peak hours, would be considerably higher than the average VR cost used in the calculations. Given the likely low usage of the service overnight (e.g. the current TR service handles very few calls overnight) we consider it unlikely that the incremental benefits of an overnight service would outweigh the high per-minute costs of making such a service available. By focussing availability on daytime hours, the net benefits from the service are likely to be enhanced.

- 5.94 As with the other methods discussed, it is likely that time of day restrictions would have some implementation costs. However, we think the costs would be relatively small and limited to the facility to make the service available only at certain times of the day. We would be grateful for stakeholder views and/or information on costs.

### Method 2: Financial cap

- 5.95 Under this method, the service would be available in accordance with a financial cap set on providers of VR to prevent unreasonable accelerating costs.
- 5.96 The service would need to operate within this cost restriction. To ensure that the cap was not exceeded, the relay provider would need to ensure that that the service was adequately planned and resourced within the cap throughout the year. This could mean that the provider might on occasions – for example, during periods of peak or unexpected demand - not have sufficient interpreters available to meet full demand. This might lead to the deployment of other restrictions discussed here, such as call booking arrangements.
- 5.97 Of course if planning was not adequate and the cap was reached part way through the year, users would potentially be left without access to the service for the remainder of the year.
- 5.98 This method would do nothing to encourage users to prioritise use of the service for more important calls. This method also does not help to ensure that government and businesses meet their obligations under equality legislation.
- 5.99 The implementation costs for this system would be likely to be relatively small as it should be straightforward to create and monitor a spending cap. We would be grateful for stakeholder views and/or information on the costs of implementing this option.

### Method 3: Monthly allocation of minutes

- 5.100 Under this method a relay user would have an allocation of minutes a month charged at the free or subsidised rate.
- 5.101 It would require users to have an account so that the monthly allowance could be monitored. Similar account systems are used currently by commercial VR providers in the UK.
- 5.102 Consumers would continue to make their most important calls (i.e. those which deliver the highest value), but would forgo making their less important (and therefore less valuable) calls. Calls exceeding the allowance could be charged at a full commercial rate or at a rate which reflects a lower subsidised rate.
- 5.103 This appears to be an effective way of balancing the costs and the benefits and ensuring that service growth could be managed. In this way, for example, the allowance could be set at a level that generally allows users to make their most valuable calls such as 30 minutes a month. This is the average usage assumed for the low demand scenario in paragraph 5.32 and would avoid the much higher costs that would arise with higher usage.
- 5.104 Taking into consideration average use of the service (which is below 15 minutes) in countries where VR is provided on a restricted basis (and as discussed in paragraph 5.90), a 30 minute allowance per month for each user appears an adequate quantity

of minutes. This also incentivises efficient use for users that may be able to use other methods for communication where available. This solution would also have the benefit of flexibility as the allowance could be flexed over time as experience shows actual levels of demand and confidence in the availability of interpreters and as the robustness of the system grew. The user, friends or family or employers could purchase additional minutes if desired similar to using a mobile top-up card.

- 5.105 The benefits of a monthly allocation system would be applied equally to all users of the VR service and users would always know how much time they had available to them each month.
- 5.106 A possible difficulty with this solution could be the cost of implementation, both initial set-up and ongoing operation. It is possible that new or modified systems will be needed to make it work. Systems requirements might include:
- Registration facility.
  - Monitoring usage for each user every month to ensure the allocation is not exceeded and a mechanism for informing customers when they have reached their allowance. Consideration would also need to be given to how to deal with calls where the allowance is reached during the call.
  - Treatment of unused minutes, and particularly whether they could be rolled forward.
  - Purchase of additional minutes.
  - Prevention of multiple accounts for single users. Data sharing and coordination would be needed between providers if there was more than one approved VR service.
- 5.107 We would welcome views and information from stakeholders on implementation costs for this solution.

#### Method 4: Differentiating between work place and private use

- 5.108 Under this method, calls would be free or at standard rates for callers from home, but from businesses charged at rates that reflect the cost of the service.
- 5.109 This would help ensure that intervention is targeted at the disabled end-user rather than offering a benefit to those that do not require the service themselves. Under the Directive, Ofcom is required to supply equivalent services for disabled end-users and this option would ensure that regulatory intervention is targeted at those users alone.
- 5.110 However in practice it may be difficult to accurately identify calls originating from business. For example, it may not be possible to identify all business use where, for example, some SMEs and home workers using residential tariffs may be charged free/standard rates. To the extent that business users could be identified though this could provide a degree of control on VR costs and could be viewed as an intervention targeted at disabled end-users where other legislative and government support is not available.
- 5.111 This option could have relatively high implementation costs because of the requirement for a robust system to differentiate between business and residential

users and calls. We would welcome views and information from stakeholders on implementation costs for this solution.

### Method 5: Call booking system

- 5.112 Under this method, users wishing to make VR calls would book a time slot with the relay provider. The Swedish and Danish VR services use such arrangements for longer calls.
- 5.113 This arrangement, which could be applied to all calls or to calls that are expected to be longer, could help the management of the relay service, allowing resources to be managed efficiently through more consistent deployment of interpreters.
- 5.114 As with other methods, it is difficult to specify the impact a call booking system would have on demand for the service and costs. It might be expected that call booking would reduce demand, on the one hand, as users would be required to plan and prepare in advance for long calls, which may not be convenient for them and make the service less attractive to them. On the other hand even if users did try to plan such calls in advance they may not always have a full appreciation of how long a call is likely to be beforehand and this may therefore not provide suitable information in a way which enables the VR provider to manage their resources efficiently; a certain number of BSL interpreters would still be required to be on duty so the scope for cost efficiencies may be limited.
- 5.115 If the called party was not available (e.g. engaged on another call), the deaf person would have to re-book a further slot.
- 5.116 It is possible that this method could enable the service to be provided with a fixed number of BSL interpreters on duty, as it is essentially an appointment system, and if no interpreter were available in the requested slot, the BSL user would need to rebook and accept a later slot which may be less convenient.
- 5.117 As with the other methods discussed, it is likely that call booking would have some implementation costs. We would be grateful for stakeholder views and/or information on costs.

### **Next steps on methods**

- 5.118 We consider that a combination of these various methods could play a useful role in restricting VR usage whilst enabling BSL end-users to use the service to make calls that are important to them.
- 5.119 In particular, based on the evidence currently available to us, we consider that the most user friendly, and also the most equitable, method would be a VR service that provides users with access to the service with a fixed allocation per month, such as 30 minutes a month. Such an allocation, charged at no more than a standard call, may help curb costs whilst enabling end-users to make important calls. All users would be treated equally under this system. In addition, recognising that there is a limited availability of VR interpreters and that our research indicated most benefit would be likely to come from increased ability to contact businesses and public bodies, we consider that the minimum availability of the service should initially be limited to working hours on weekdays. The combined approach of a fixed minutes allocation available at certain times of the day is likely to keep costs reasonable. An allocation of 30 minutes per month seems reasonable given our knowledge of the experience of VR provision in jurisdictions outside the UK on a restricted basis where

users typically consume under 15 minutes per month (see figure 9); and the higher costs associated with VR in particular of hiring BSL interpreters. Users of the VR service would also be able to access other services such as email, mobile text messaging and also TR for communications. This approach would help to achieve a more favourable balance between costs and benefits whilst providing a greater level of equivalence for BSL users.

- 5.120 Monitoring a restricted VR service would be important to assess and adjust restrictions to improve the balance between costs and benefits, as appropriate.

*Question 4: Do you consider that the requirement to ensure equivalent services for disabled end-users would require a mandated VR service in some form for BSL users? Please indicate the basis of your response.*

*Question 5: Do you agree that a restricted service would be more proportionate in providing equivalence for BSL users than an unrestricted service?*

*Question 6: Please provide your views on Methods 1 – 5 for a restricted VR service discussed above. Are there any other methods that are not mentioned that we should consider? In making your response, please provide any information on implementation costs for these solutions which you believe is relevant.*

*Question 7: Do you agree that a monthly allocation of minutes combined with a weekday/business hours service would be the most appropriate means to restricting the service?*

## Further consultation

- 5.121 Following this consultation, we intend to consult again in the first half of 2012 on VR, taking account of stakeholder views. The consultation will contain detail on the costs and benefits of the options for restricted VR which we intend to take forward.
- 5.122 We will also be considering and making proposals on the scope of any obligation we propose, including whether requirements would be placed on providers of PATS (as required for TR), or whether it would be appropriate for the obligation to fall on all providers of Electronic Communications Services (ECS). Given that the means of delivery of a VR service would be over a broadband connection, Ofcom will consider the extent to which it may be appropriate to place an obligation to deliver VR services on the provider of the broadband service. Ofcom also recognises that the purpose of the requirement for Member States to ensure equivalent services is a requirement to ensure services which are equivalent to voice services. In those circumstances, it may be appropriate to place an obligation to deliver VR on providers of voice services. Ofcom will consider this in detail in a further consultation but would welcome any comments at this stage.

## Annex 1

# Responding to this consultation

## How to respond

- A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 20<sup>th</sup> October 2011**.
- A1.2 Ofcom strongly prefers to receive responses using the online web form at <http://stakeolders.ofcom.org.uk/consultations/review-relay-services/>, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.
- A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email [relayservices@ofcom.org.uk](mailto:relayservices@ofcom.org.uk) attaching your response in Microsoft Word format, together with a consultation response coversheet.
- A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.
- Sukh Walia-Chahil  
 Floor 2  
 Ofcom  
 Riverside House  
 2A Southwark Bridge Road  
 London SE1 9HA
- Fax: 020 7981 3333
- A1.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.
- A1.6 Users of BSL who find written English difficult can also submit a response in the following ways:
- Send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files. We will translate your response and publish a translation (unless your response is confidential).
  - Upload a video of you signing your response directly to YouTube (or another hosting site) and send us the URL link. We will translate your response and publish a translation.
- A1.7 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

## Further information

- A1.8 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Sukh Walia-Chahil on 020 7981 3000. You can also call us using textphone on 020 7981 3043.

## Confidentiality

- A1.9 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, [www.ofcom.org.uk](http://www.ofcom.org.uk), ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.
- A1.10 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.11 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at <http://www.ofcom.org.uk/about/account/disclaimer/>

## Next steps

- A1.12 Following the end of the consultation period, Ofcom intends to publish a statement in January 2012 on text relay and to consult further in the first half of 2012 on VR.
- A1.13 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: [http://www.ofcom.org.uk/static/subscribe/select\\_list.htm](http://www.ofcom.org.uk/static/subscribe/select_list.htm)

## Ofcom's consultation processes

- A1.14 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.
- A1.15 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at [consult@ofcom.org.uk](mailto:consult@ofcom.org.uk) . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.16 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Graham Howell, Secretary to the Corporation, who is Ofcom's consultation champion:

Graham Howell  
Ofcom  
Riverside House  
2a Southwark Bridge Road

London SE1 9HA

Tel: 020 7981 3601

Email [Graham.Howell@ofcom.org.uk](mailto:Graham.Howell@ofcom.org.uk)

## Annex 2

# Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

### Before the consultation

A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

### During the consultation

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals. We have allowed 12 weeks for this consultation because part of it falls over the summer period.

A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7 If we are not able to follow one of these principles, we will explain why.

### After the consultation

A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

## Annex 3

# Consultation response cover sheet

- A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, [www.ofcom.org.uk](http://www.ofcom.org.uk).
- A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.
- A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.
- A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at [www.ofcom.org.uk/consult/](http://www.ofcom.org.uk/consult/).
- A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

**Cover sheet for response to an Ofcom consultation**

**BASIC DETAILS**

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

**CONFIDENTIALITY**

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing  Name/contact details/job title

Whole response  Organisation

Part of the response  If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

**DECLARATION**

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

## Annex 4

# Consultation questions

### Section 4 – Text Relay

*Question 1: Do you agree that NGTR would provide greater equivalence than the existing approved TR service? Do you agree that we have considered an appropriate range of improvements?*

*Question 2: Do you agree with the proposal to implement NGTR through the amendment to GC15? Do you agree that the criteria we propose satisfactorily embody improvements we suggest for NGTR?*

*Question 3: Do you agree that a period of up to 18 months for implementation of NGTR, following an Ofcom statement, is appropriate?*

### Section 5 – Video Relay

*Question 4: Do you consider that the requirement to ensure equivalent services for disabled end-users would require a mandated VR service in some form for BSL users? Please indicate the basis of your response.*

*Question 5: Do you agree that a restricted service would be more proportionate in providing equivalence for BSL users than an unrestricted service?*

*Question 6: Please provide your views on Methods 1 – 5 for a restricted VR service discussed above. Are there any other methods that are not mentioned that we should consider? In making your response, please provide any information on implementation costs for these solutions which you believe is relevant.*

*Question 7: Do you agree that a monthly allocation of minutes combined with a weekday/business hours service would be the most appropriate means to restricting the service?*

## Annex 5

# The Legal Framework

## Introduction

A5.1 Universal Service, including the provision of services for disabled end-users in the United Kingdom is secured through the legal framework of the Directive, the Act and the Order as implemented by Ofcom. This Annex sets out the legal framework applying to the provision of services for disabled end-users which are to be secured under the framework before going on to consider the means by which they may be ensured.

## The Directive

A5.2 Originally enacted in 2003, the Directive was amended in 2009. As regards measures for disabled end-users, the amended Directive did not change the substantive obligation on Member States to ensure the provision of equivalent services. However, the means of implementation was amended so as to allow the possibility of imposing measures through GCs only.

A5.3 Article 3 of the Directive sets out the basic rules regarding the provision of universal service in the Member States. To this extent, it provides that:

“1. Member States shall ensure that the services set out in this Chapter are made available at the quality specified to all end-users in their territory, independently of geographical location, and, in the light of specific national conditions, at an affordable price.

2. Member States shall determine the most efficient and appropriate approach for ensuring the implementation of universal service, whilst respecting the principles of objectivity, transparency, non-discrimination and proportionality. They shall seek to minimise market distortions, in particular the provision of services at prices or subject to other terms and conditions which depart from normal commercial conditions, whilst safeguarding the public interest.”

A5.4 Article 7 of the Directive makes provision for specific measures for disabled end-users as follows:

“1. Unless requirements have been specified under Chapter IV which achieve the equivalent effect, Member States shall take specific measures to ensure that access to, and affordability of, the services identified in Article 4(3) and Article 5 for disabled end-users is equivalent to the level enjoyed by other end-users. Member States may oblige national regulatory authorities to assess the general need and the specific requirements, including the extent and concrete form of such specific measures for disabled endusers.

2. Member States may take specific measures, in the light of national conditions, to ensure that disabled end-users can also take advantage of the choice of undertakings and service providers available to the majority of end-users.

3. In taking the measures referred to in paragraphs 1 and 2, Member States shall encourage compliance with the relevant standards or specifications published in accordance with Articles 17 and 18 of Directive 2002/21/EC (Framework Directive)."

A5.5 The effect of Article 7 is to require Member States to impose USCs to secure the provision of equivalent measures for disabled end-users unless they have imposed a GC under Article 23a (contained in Chapter IV). That Article provides that:

"1. Member States shall enable relevant national authorities to specify, where appropriate, requirements to be met by undertakings providing publicly available electronic communication services to ensure that disabled end-users:

(a) have access to electronic communications services equivalent to that enjoyed by the majority of end-users; and

(b) benefit from the choice of undertakings and services available to the majority of end-users.

2. In order to be able to adopt and implement specific arrangements for disabled end-users, Member States shall encourage the availability of terminal equipment offering the necessary services and functions."

## The Act

A5.6 The provisions of the Directive regarding the imposition of USCs are implemented in the United Kingdom through sections 65 and 67 of the Act<sup>64</sup>. Section 65 of the Act provides:

"(1) The Secretary of State must by order ("the universal service order") set out the extent to which the things falling within subsection (2) must, for the purpose of securing compliance with Community obligations for the time being in force, be provided, made available or supplied throughout the United Kingdom.

(2) Those things are—

(a) electronic communications networks and electronic communications services;

(b) facilities capable of being made available as part of or in connection with an electronic communications service;

(c) particular methods of billing for electronic communications services or of accepting payment for them;

(d) directories capable of being used in connection with the use of an electronic communications network or electronic communications service; and

<sup>64</sup> The Act was amended to take account of the amendments to the Directive (and other of the European electronic communications Directives) by SI 2011/1210 The Electronic Communications and Wireless Telegraphy Regulations 2011.

(e) directory enquiry facilities capable of being used for purposes connected with the use of such a network or service.

(3) The universal service order may contain guidance about matters relating to the pricing of things that the order says must be provided, made available or supplied.

(4) Before making or varying the universal service order, the Secretary of State must consult OFCOM and such other persons as he considers appropriate.

(5) Before making or varying the universal service order, the Secretary of State must take due account of the desirability of not favouring –

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

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

over another”

A5.7 Section 67(1) and (8) of the Act provides for Ofcom’s power to set Universal Service Obligations in accordance with the Order, as follows:

“(1) OFCOM may set any such universal service conditions as they consider appropriate for securing compliance with the obligations set out in the universal service order.

...

(8) In setting a universal service condition, OFCOM must have regard to any guidance about matters relating to pricing that is contained in the universal service order.”

A5.8 As regards the implementation of Article 23a of the Directive in relation to the ability to impose a GC for the provision of equivalent services, section 51 of the Act sets out the matters to which general conditions may relate. Insofar as relevant to this consultation, section 51 provides that:

“(1) Subject to sections 52 to 64, the only conditions that may be set under section 45 as general conditions are conditions falling within one or more of the following paragraphs –

(a) conditions making such provision as OFCOM consider appropriate for protecting the interests of the end-users of public electronic communications services;

...

(2) The power under subsection (1)(a) to set conditions for protecting the interests of the end-users of public electronic communications services includes power to set conditions for that purposes which –

...

(c) specify requirements in relation to the provision of services to disabled end-users.”

- A5.9 Ofcom therefore has a general power to set a GC for the purposes of specifying requirements in relation to the provision of services to disabled end-users. However, where it would be more appropriate to set a USC, this may only be done where Ofcom is required to do so by an Order of the Secretary of State.

## The Order

- A5.10 The Secretary of State has chosen to require Ofcom to ensure that such measures are in place for disabled users as follows, at paragraph 6 of the Schedule to the Order:

“6. - (1) Special measures shall be taken to ensure access to and affordability of publicly available telephone services for end-users with a disability equivalent to those enjoyed by other end-users.

(2) The measures to be taken for the purposes of sub-paragraph (1) shall include:

(a) provision of access to the directory information facilities provided for the purposes of paragraph 3 in a form appropriate to meet the needs of end-users with a disability who are unable to use a telephone directory in a form in which it is generally available to other end-users;

(b) provision of priority fault repair services to end-users with a disability as is necessary to ensure access to publicly available telephone services by such end-users;

(c) provision of, and the provision of access to, relay services for end-users with a disability where required to ensure access to publicly available telephone services by such end-users;

(d) methods of billing and methods of accepting payment for publicly available telephone services in an appropriate format for subscribers with a disability, including provision for such subscribers to nominate a third party to handle their billing issues; and

(e) accessibility and functionality of the public pay telephones to be provided for the purposes of paragraph 4 for use by end-users with a disability, including the adequate provision of textphone facilities.”

- A5.11 In order to implement the provisions of Article 23a of the Directive to enable Ofcom to decide, where appropriate, to impose only a GC in order to secure equivalent measures for disabled end-users, article 3A of the Order provides that:

“3A. Where OFCOM has made a general condition under section 51 of the Act in relation to the matters in paragraph 6 of the Schedule,

then OFCOM shall not impose a universal service obligation in respect of those matters.”

## USC and GC

A5.12 Ofcom has ensured compliance with the Directive and the Order through a combination of GCs and USCs. USC 4 for BT provides for a text relay service for disabled users as follows:

“4.1 Subject to paragraph 4.3 and the financial limits set in accordance with paragraph 4.4, BT shall provide the funds for the operation by a person or body (“the relay service provider”) of a Relay Service (“the service”) for all End-users of Publicly Available Telephone Services who need to use Textphones because of their disabilities, whether End-users of BT or of any other Communications Provider.

4.2 BT shall enter into an arrangement with the relay service provider on such terms and conditions as they both consider to be appropriate.

4.3 Nothing in this Universal Service Condition shall be construed so as to:

(a) require BT to provide or provide funds for any Textphones or other Apparatus on the End-user's side of the Network Termination Point; or

(b) prevent BT from recovering part of the value of any funds provided in accordance with paragraph 4.1 from:

(i) any of its End-users accessing the service, subject to paragraph 15.3 of General Condition 15; and

(ii) any other Communications Provider requesting access to the Service for the purpose of enabling that Communications Provider to comply with paragraph 15.3 of General Condition 15 in respect of its own End-users;

as long as the terms and conditions offered by BT for such access are fair, not unduly discriminatory, based on efficiently incurred costs that are directly attributable to the day-to-day operation of the service, and do not oblige any such End-user or Communications Provider to pay for facilities or services which are not necessary or not requested.

4.4 In the absence of contrary agreement between the Director and BT the financial limit applicable to each 12 month period beginning from 25 July 2003 shall be:

(a) for the first 12 month period, £12,368,748, and

(b) for each 12 month period thereafter, the successive amounts produced by increasing that sum year by year (that is to say,

cumulatively) by the percentage equal to the amount of the change in the Retail Prices Index during each previous yearly period.”

- A5.13 USC 4 thus establishes a TR service to be provided by BT to its customers and, where appropriate, to other communications providers. GC15 applies to all communications providers and states, insofar as relevant to the provision of relay services:

“15.3 Subject to paragraph 15.9, the Communications Provider shall ensure that such of its Subscribers who, because of their disabilities, need to make calls in which some or all of the call is made or received in text format, are able to access a Relay Service. Such Subscribers shall be charged for the conveyance of messages to which a Relay Service applies at no more than the equivalent price as if that conveyance had been made directly between the caller and the called person without use of a Relay Service:

(a) except that the calling person may be charged standard local prices for the call made to a Relay Service provider in order to make a call irrespective of whether the call is successful; and

(b) applying a special tariff scheme designed to compensate Subscribers who need to make calls to which a Relay Service applies for the additional time to make telephone calls using a Relay Service.

15.4 Subject to paragraph 15.9, the Communications Provider shall ensure that any End-Users of its services who need to make calls to which a Relay Service applies:

(a) have access to Emergency Organisations, operator assistance services and a Directory Enquiry Facility using short code numbers; and

(b) are able to receive call progress voice announcements in a suitable form.”

- A5.14 The remaining provisions of General Condition 15 cover the requirements set out at (a), (b), (d) and (e) of paragraph 6(2) of the Schedule to the Order.

## Annex 6

# Report: Technical Comments on the Proposed New Relay Platform

### Redacted version

- 5.123 Ofcom commissioned InterConnect Communications (ICC) to provide the following report which provides technical advice on a number of aspects of text based relay service provision and performance. We identified a potential solution to relay service improvement, involving use of the internet, and put this proposal forward to ICC for their consideration and evaluation. The report was in part based on confidential information supplied by a number of different stakeholders and we are therefore unable to release the report in full. This redacted version omits the confidential information.
- 5.124 Due to the nature of the report, and the information supplied, some elements of the report are more affected by redactions than others. In particular many of the contents of the tables have been redacted.
- 5.125 Alongside the report, ICC supplied some information in Excel spreadsheet format. These contain confidential data and it is not possible to make these available in any meaningful form.

**INTERCONNECT  
COMMUNICATIONS**



## **MC / 065: Relay Services Technical Assistance**

**Report: Technical Comments on the  
Proposed New Relay Platform**

**Final V2.0**

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## **MC/065 Relay Services Technical Assistance**

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## Introduction

Ofcom have requested support on the following questions.

1. We now believe that an IP-based 'overlay' network, which would be used in conjunction with a PSTN connection, could provide many of the benefits users have identified as desirable, while still maintaining service to current terminals. The benefits include the ability to use a computer instead of a dedicated text terminal, and continuous bi-directional voice and text communication (delivering VCO, HCO and the ability to interrupt, although not simultaneous two-way relay as that would require two relay assistants). ————— a proposal which includes the provision of dedicated numbers for registered users, reducing the need for a dialling prefix.
  - a. What would be the cost of implementing and operating such a system alongside the existing BT platform?
  - b. A number of users with experience of speech-recognition based caption telephony said that it provided higher text speeds and lower error rates. What is the likely cost differential of setting up and running a service based on re-speakers rather than typists?
  - c. What would be the cost of upgrading the current platform so that users not constrained by their terminals would fully benefit from the improvement in speed? (Assuming a new generation of user terminals, perhaps based on V.90 modems, which could include PCs.)
  - d. Which improvements would be possible if the current platform was replaced and what would the cost of implementing them be?
2. Improvements in the conversation speed and call delays have been identified from consumer research as potentially delivering benefits that would improve the 'equivalence' between relay calls and conventional speech calls. Can you identify the costs of improving these please, ideally to levels typically experienced in speech calls. If possible it would be useful to have costs for intermediate steps.
  - a. Increase in conversation speed by provision of two-way text, allowing interruption by hearing-impaired person (We are interested in two options – the cost of an overlay platform such as has been proposed and the cost of upgrading/replacing the existing platform to provide these features.)
  - b. Increase in conversation speed by provision of two-way text and two operators (one reading, one typing).
  - c. Increasing manning levels to ensure call delay performances of 0/5/10 sec for 90% of standard calls and 0/5 sec for 95% and all emergency calls. (We understand that current KPIs are for 90% of standard calls to be answered within 15 sec. and 95% of emergency calls answered in 5 sec.)
  - d. Manning/call scheduling to ensure no mid-call operator handovers for 90% and 99% of calls. (We are willing to take advice on the percentage levels, for example if 90/95% are 'standard' industry metrics.)

An interim report was provided on 15<sup>th</sup> April 2011 which provided feedback on the technical aspects relating to the functionality of the relay service itself, commenting where appropriate on likely cost implications.

This final report now includes details of cost estimates where these have been possible to develop. These are based on a combination of assumptions about the systems which could be deployed and the likely capital and operating costs which could be involved. Some figures have

been — based on the performance of the current system, some have been obtained from independent equipment manufactures and others have been estimated by InterConnect.

In all cases the figures which are presented in this report represent our best efforts to provide an indication of the likely costs involved based on the information which is available to us at this point in time. New information may become available during future discussions with BT which may result in significant changes to these estimated costs.

## Question 1a – IP “Overlay” Network

As agreed with Ofcom, the concept is not in effect an overlay system but is a replacement for the current system, using the existing centres. Research has shown that in terms of the node functionality, each node for the proposed system would cost around £100k or less depending on the amount of software development required. Initial estimates suggest that for the current level of traffic, there would need to be 2-3 nodes of this nature. These would have a requirement for — E1 circuits each to link them to the PSTN at two different locations to maintain route diversity.

Given that the proposed change is seamless, i.e. transparent to the users, it could be safely assumed that the traffic level would initially remain static. Once the system is in place, familiarity or active promotion of the new facilities may well lead to an increase in traffic.

The costs would initially be due to the equipment cost, installation, accommodation, running costs, ongoing maintenance and any software costs associated with the nodes. It is probable that the agent terminals at the — centres would require a software upgrade to cope with the new facilities. It seems that the current nodes use a similar number of E1 circuits, so although for total transparency the costs of E1 circuits at wholesale prices should be included, there is not likely to be a cost increase for this compared with the current system.

In terms of personnel changes, assuming a static growth in traffic, the numbers would remain the same. However once bedded in, there are a number of factors that may affect call handling.

- i. The new system’s major advantage is that it facilitates end-to-end text calls with an associated simultaneous speech path. If this facility were actively promoted within the text using community and for hearing users, particularly businesses, this would lead to a reduction in calls actually requiring a relay assistant if traffic growth were static. Thus it is possible that a cost reduction is possible in the longer term.
- ii. If there is traffic growth, then a proportion of this will be end-to-end (as in I. above) and some will be an increase in calls handled by relay assistants. Predicting this split presents difficulties, but given that the user survey suggests that having human intervention in a call is seen as a negative, it is likely that most of the increase will be non-relay calls. Any increase in traffic however will eventually reach the capacity of the nodes and later that of the call centres. Consequently any growth predictions should have a variance built-in to take account of the split between relay and direct calls. For the purposes of this report, the assumption has been made that growth takes place in relay calls only. No account has been taken of calls that may be made directly with the new technology.

Consideration needs to be taken of possible variations in cost associated with the locating of the equipment for the proposed system. It is likely that BT would prefer to have the nodes within their existing engineering buildings but an alternative option could be locating the equipment on premises maintained by the provider or a third party. In either case, it is likely that the costs of accommodation would be similar. Thus, for reasons of costing transparency, an accommodation figure is included as part of the total costs for this system. Non-BT

accommodation may have a small effect of the additional cost of providing E1 circuits to the provider's site.

### Costs

The cost estimates have been separated into Capital Costs i.e. one off costs associated with the purchase and installation of the equipment and Operating Costs i.e. the annual costs of running the service. No consideration has been given to the period of time over which the Capital Costs will be recovered or a level of Return on Capital Employed.

Our overall view is that the Capital Costs for a replacement system will be in the order of £350,000 and the annual Operating Costs will be around £4.4 million of which £198,000 will be Relay Assistant training which may not need to be repeated every year.

The cost calculations are shown below, including the assumptions made, and also provided in a separate Excel Spreadsheet.

All costs in pounds £				
<u>Capital Costs</u>	<u>Unit cost</u>	<u>Number of units</u>	<u>Total cost</u>	<u>Notes</u>
Equipment hardware	£ 100,000	2	£ 200,000	Hardware capital cost is an estimate from manufacturer [redacted] of £100,000 per node. The current system uses 2 nodes as this configuration has been maintained although [redacted] has suggested that any new system will use [redacted] nodes.
Equipment software	inc			The software cost is assumed to be included in the hardware cost.
Relay Assistant terminals	£ [redacted]	[redacted]	£ [redacted]	It is assumed that the same number of terminals will be used as the current system. InterConnect estimate a cost of £[redacted] per terminal to upgrade each to use the new system.
[redacted]		[redacted]	£ [redacted]	[redacted] quote a figure of "roughly" [redacted] people taking calls at any one time in the peak period in [redacted]
Relay centre environment				No change to relay centre environment has been assumed.
Installation	£ [redacted]	5	£ [redacted]	Installation cost of £[redacted] per relay and node site assumed.
<b>Total Capital Costs</b>			<b>£ 348,000</b>	

All costs in pounds £					
<u>Current Costs</u>		<u>Unit cost</u>	<u>Number of units</u>	<u>Total cost</u>	<u>Notes</u>
	Node operating costs				
		£ 62,500	1	£ 62,500	£21k workstation support and £1,500 Facilities management plus £40k estimated 20% of platform capital cost for maintenance (£40k)
		£ 62,500	1	£ 62,500	£21k workstation support and £1,500 Facilities management plus £40k estimated 20% of platform capital cost for maintenance (£40k)
	Data network costs	£		£	links, each assumed to be 4x2Mbps, giving 24 E1 circuits
	Accommodation				figure - assumed to include power, A/C costs
		£ 1,044		£	
	Relay Assistant staff costs				Assumed number of staff
		£		£	FTE staff numbers calculated using figures on resource allocation with a 10% uplift to deal with shift overlaps etc
	E1 rentals				
		£		£	figures for cost and number of E1s giving a total of £k for trunks
		£		£	figures for cost and number of E1s giving a total of £k for trunks
	Relay assistant training				Annual training and familiarisation with the new system. Assumed cost £ per trained relay assistant.
		£ 600		£	figure of trained staff. 2 days of training @£200 plus staff costs of £ per day.
	<b>Total Current Costs</b>			<b>£ 4,399,980</b>	

## **Question 1b – Speech Recognition**

Results from consumer surveys tend to indicate that people with direct experience of speech-recognition based systems, e.g. CapTel, have faster speeds and lower error rates. These systems typically do not use speech recognition of the voice caller directly, but employ a relay assistant (RA) who re-voices the caller's words. This has the advantage that the speech to text software can learn the nuances of each RA's voice.

There are a number of options for implementing such a system:

1. Use of a proprietary system such as CapTel. This is the system that most deaf people have experienced. The system is completely based on proprietary standards and in some instances requires specialist customer equipment. The voice recognition or transcription software is integrated within the whole package. It is possible that this system could be a bolt-on to the existing or planned relay platform, or could be run as a parallel service. The manufacturers of this system could not give an indication of price as each system is designed for individual customers.
2. Provide the voice recognition functionality within the existing relay centre(s), using readily available software such as Dragon Naturally Speaking. This would require updating of the existing terminals and calls could then be migrated gradually to the new technology as the typing system is phased out.

The transition from a typing based relay to one that uses re-voicing is not as straightforward as it would seem at first glance. To get the greatest accuracy for the text translation, regardless of software, the RAs need to be in a tightly controlled quiet environment. This is the experience of the providers of CapTel and the company that uses speech recognition for providing live subtitles on television programmes.

In the case of CapTel, the environmental control surrounding the re-voicing personnel forms part of their proprietary specification. The manufacturers claim this is part of the method by which they achieve good levels of accuracy with CapTel. Anecdotal evidence from — suggests that trials with noise-cancelling headsets have produced poor results on their own.

Consequently, whilst the costs would be limited to upgrading the agent terminals to accept voice recognition and holding a central database of voice templates (at least initially), there would be a significant accommodation cost associated with this proposal. There is also an associated training cost for the new relay assistants. According to the company that provides CapTel, average training for new recruits takes about three weeks. Re-voicing is an acquirable skill but to get reasonable accuracy, as well as speed, there is a technique to be learned.

The providers of CapTel in the US felt that there was little overall effect on call duration compared with “traditional” relay services. This would suggest that users were prepared to pass more information as the system was easier to use. There was no evidence from their experience that the use of re-voicing had any negative effect on the relay assistants in terms of stress levels or shift duration. This would lead to the conclusion that, at least initially, there would not be an overall increase in RA requirement if re-voicing were to be introduced.

## Costs

The cost estimates have been separated into Capital Costs i.e. one off costs associated with the purchase and installation of the equipment and Operating Costs i.e. the annual costs of running the service. No consideration has been given to the period of time over which the Capital Costs will be recovered or a level of Return on Capital Employed.

Our overall view is that the Capital Costs for upgrading to a speech recognition system will be in the order of £1.17 million, the majority of which is required to provide the necessary sound proof environments, and the first year's Operating Costs will be around £1.5 million which will be made up of Relay Assistant training. It is likely that this Operating Costs in subsequent years will be significantly lower but some training of new Relay Assistants will certainly be required. These costs are in addition to the costs of installing and running the system as identified in Section 2 above.

The cost calculations are shown below, including the assumptions made, and also provided in a separate Excel Spreadsheet.

All costs in pounds £				
Capital Costs	Unit cost	Number of units	Total costs	Notes
Equipment hardware				It is assumed that no new hardware will be required for this scenario
Equipment software				
	£ 80		£	Unit cost of £80 per terminal is based on the cost of Dragon Naturally Speaking software. Number of terminals are in each location.
Relay Assistant terminals	£ 100		£	Unit cost is the assumed average price of a reasonably quality headset. Number of terminals are in each location.
Relay centre environment				
	£		£	InterConnect estimate of cost per relay assistant position based on need for quiet environment. This may however be significantly different from any formal quotations by suppliers. Number of terminals are in each location though it may not be necessary or economic to convert all centres
<b>Total Capital Costs</b>			<b>£ 1,170,700</b>	



## **Question 1c – Upgrading current platform for improved speed**

Subsequent clarification and discussions with Ofcom have agreed that this is not a viable option and will not be investigated further.

## Question 1d – What improvements would be possible on the replacement platform.

The proposals show that the new platform would be capable of providing the following:

- i. An end to end text path using IP access with an associated voice path;
- ii. The option to bring in a relay assistant as required;
- iii. Support of legacy text terminals via modems built into the nodes (as at present);
- iv. Potential for dedicated text user numbers.

Some of the comments from the customer research brought to light the issues that current relay users felt needed addressing. These included the speed of conversation and the reluctance of people to use a service that has a third-party (the RA) involved. Some aspects of these issues are improved with the proposed platform. Particularly, if users migrate away from the legacy text terminals, there is a real likelihood of text conversations becoming more real-time. For some calls, there will be no substitute for the use of a Relay Assistant and the new technology will make these calls faster.

### ***Captioned Telephony***

Other aspects of the users' perceived shortcomings included a desire to see "captioned telephony." The basic requirement for this service is the development of a suitable terminal that could handle voice and data simultaneously. If this is achieved over a standard PSTN line then a simultaneous voice & data standard (e.g. V70) could be used. The node modems provided for backward compatibility to legacy text terminals currently use the V18 standard<sup>65</sup>. This standard gives compatibility with existing text terminals using the Baudot code, V21, V23 EDT and DTMF. The V18 standard is really an umbrella standard bringing together various historic standards used for text telephones across the world. It does include provision for V70, but in practice does not insist on it. It is likely that the current and proposed node modems could include this functionality or be modified to provide it. If included in the original specification, there would be negligible cost. Upgrading later is likely to incur a cost estimated to be about £1,000 per modem.

It is possible that current production text telephones could be improved or modified to contain V70 functionality. Examples are the DSPG Textlink or the GeeMarc Screenphone. These could offer potential for upgrading to have the V70 capability whilst retaining backward compatibility without major development of new enclosures. These currently retail at around £250 (+VAT). If a sufficient market existed, the upgraded versions would be likely to retail at a similar price.

Alternatively, there are caption telephones available to a proprietary standard in the US. These CapTel phones could be used with the new platform if there was a compatible modem within the node. The CapTel protocol is proprietary and the company that provides these services has historically only leased modems for this purpose. The costs for this are difficult to establish, particularly as the system now being provided for CapTel is customised for the particular relay

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<sup>65</sup> Details of the V18 recommendations are available here <http://www.access-board.gov/telecomm/marketrep/appendices/v18.htm>

service. According to the manufacturers, for some installations, the functionality is contained within their proprietary software and does not require outboard modems.

The CapTel product range also includes an internet-capable unit. This establishes voice connection via the PSTN and the captions are provided over an internet connection. Preliminary enquiries have shown that this unit may be compatible with the new system to provide a more convenient unit for users.

Either of the above caption telephones are available in the United States for around \$400. However, in practice, these are usually heavily discounted by 50% on average by State authorities or other providing organisations.

## **VOIP access**

The term VOIP for the purposes of this report refers to two separate areas. Firstly there are PC or Smartphone based proprietary messaging services e.g. Skype, Microsoft Messenger, Yahoo Messenger, and Google Talk. These may use VOIP as an add-on service and some have the capability to provide PSTN access for incoming and outgoing calls<sup>66</sup>. Secondly there are the end to end voice only PSTN style services offered by other companies (e.g. Vonage, or BT Home Hub).

### 5.2.1 Messaging Services

The PC or Smartphone based text and voice services can be used readily by hearing and deaf people alike as they offer a more equal access to users. The availability of text messaging whilst simultaneously having a voice call provides functionality similar to the facilities proposed — for the new platform. For this reason, hearing or deaf users of these messaging services via their PC or Smartphone are unlikely to make calls to other users of these services via the relay, as they have all the speech and text facilities they are likely to need within their proprietary messaging service package. Calls via the relay by users of these messaging services can however be made to and received from PSTN users in a number of ways depending on the facilities offered by the services and/or chosen by the users.

#### a) Voice users via relay

Currently, voice users of these messaging services can receive calls from the relay if they have opted to have incoming PSTN calls on their messaging service<sup>67</sup>. In effect they have a PSTN number which can be accessed via the relay in the normal way. This situation will not change with the introduction of the new platform.

For voice users of messaging services making calls through the relay, the situation is not as straightforward. Initially voice users need to have access to the PSTN from their messaging service<sup>68</sup>. Currently, no known messaging services provide PSTN access through the 18002 access code, so that voice customers would have to call the — number (——) to gain access. The — number is currently used primarily for incoming international calls rather than for access from within the UK. Without regulatory intervention this situation is unlikely to change with the proposed new system.

#### b) Text users via relay

For a text user to call to or receive calls from a hearing user through the relay using these messaging services there are a number of areas that need to be taken into consideration:

- 1) The text user's PC would need to be capable of carrying a VOIP based voice call using the PSTN access chosen by the caller. Additionally the PC would need suitable software to carry the text portion of the call simultaneously. Associating PC based text calls via the relay to a simultaneous PSTN voice call is the basis of the new platform proposal and simply substitutes the PC based VOIP to PSTN call for the fixed line PSTN

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<sup>66</sup> PSTN access from most platforms may also be achieved by using a 3<sup>rd</sup> party gateway such as "Gtalk-to-VOIP". Details at [www.gtalk2voip.com](http://www.gtalk2voip.com)

<sup>67</sup> PSTN access from most platforms may also be achieved by using a 3<sup>rd</sup> party gateway such as "Gtalk-to-VOIP". Details at [www.gtalk2voip.com](http://www.gtalk2voip.com)

<sup>68</sup> PSTN access from most platforms may also be achieved by using a 3<sup>rd</sup> party gateway such as "Gtalk-to-VOIP". Details at [www.gtalk2voip.com](http://www.gtalk2voip.com)

call envisaged in the proposal. This method should offer little difficulty technically other than the access considerations below.

- 2) Another approach would be to connect the messaging service platform directly to the relay. This means that the relay nodes would effectively be the PSTN-VOIP gateway for the voice path. This would require the active agreement and participation of all the parties involved in the interconnection. Issues surrounding this approach involve the differences between messaging service platforms and the availability of these proprietary standards. Additionally, the call billing system for outgoing calls from text users would require careful consideration. This is discussed in more detail below.
- 3) As messaging systems have many of the features of a textphone, it is feasible that the software used could be configured to emulate a textphone. If the messaging system could connect to the PSTN it may be possible to have simultaneous text and voice via the VOIP functionality. The text interface standard is the issue here. If the connection via the PSTN is to be capable of making or receiving "standard" text calls it will need to be at least V21 compatible. The "modem" for this may be within the messaging system software, or within the PSTN gateway. In practice, the latter is probably the most reliable method, as V21 data over a VOIP circuit is known to be unreliable.

### 5.2.2 PSTN emulated VOIP services

Services which are VOIP based but emulate PSTN lines using a VOIP adapter are commonly available from a number of operators (e.g. Vonage, BT Home Hub). These offer the apparent functionality of a PSTN line and whilst relay calls may be made or received by a voice caller on these lines, they are usually unsuitable for textphone use. This is due mostly to disruption by the VOIP system to the timing required for a successful V21 signal. Additionally, investigations have shown that even the traditionally more robust Baudot signaling, used on legacy textphones, can suffer severe degradation on a VOIP line.

Few of the VOIP service providers offer full connection to the relay via the 18001 and 18002 access codes. Access is viable however using the national access numbers. This may raise billing issues within the relay as these calls cannot often be traced back to the originating service provider. This is discussed in more detail below.

### 5.2.3 Billing issues

#### a) VOIP to PSTN calls

Although originating customers are billed for most calls made via their VOIP provider, there is a problem with access to the platform which makes cost apportionment difficult. Currently VOIP calls to PSTN numbers from most VOIP providers cannot access the relay platform using the 18001 and 18002 codes. Relay access for these calls is limited to using the national access numbers. In many cases calls originating from VOIP providers do not have CLI associated with the call and are presented as "International" or "Out of area." In these cases the onward call cost is part of the operating cost of the relay (i.e. borne by BT). Current call levels to these national access numbers is quite low and any increased traffic would raise a question over payment.

If VOIP service providers were required to access the relay via the standard access numbers, and provide a valid CLI, then a billing arrangement may be feasible. Alternatively, it may be

necessary to have chargeable customer accounts, e.g. pre-pay or billed, to raise charges against which customers would have to identify themselves in a secure way prior to connection.

b) Direct interconnection between Messaging Service and Relay

The direct interconnection of the messaging service to the relay platform would seem to offer customer benefits. In the event of a text caller using this system to call via the relay, the cost of the ongoing PSTN call raises a problem.

With, the new platform effectively providing the gateway to the PSTN, there is no linked CLI to raise a charge for the call. Similarly to the previous case, the likely solution would be chargeable customer accounts. This would need manual identification of the calling customer, or some identification embedded within the messaging service software.

## Question 2a – Two Way Text Provision with Interruption

This is a complex issue and it is first necessary to examine the current situation.

In terms of text to text calls, there is provision for interruption, but this is restricted by the code used and the screen of the text terminal. Interruption is not successful if the older Baudot code is used, but if the assumption is made that V21 is used then the following scenarios apply.

If the call is via a Relay Assistant, the text caller can interrupt the flow of text simply by typing to the RA. This will not cause any problems to the RA as they have a split-screen with separate boxes for outgoing and incoming text. However, because of the limited nature of the screen on legacy text terminals, this will cause garbling of the text on the user's screen. Similarly when the text user is typing, if the voice user interrupts, the text user may receive a garbled message on their screen when the relay assistant starts to type. Consequently, the current relay system is not set up to allow interruptions. If a voice caller tries to interrupt the flow of a text user, the RA will ask them to wait their turn.

If the text user employs Voice Carry Over (VCO), it is not possible for the hearing user to interrupt them as the text terminal is effectively off-line and the relay assistant is locked out of the conversation. The text user cannot hear and is unaware of the voice user trying to interrupt them.

The inability to interrupt is thus mostly based on the basic design of the users' text terminals. Most of these have a one or two line screen which is not suitable for reasonable incoming and outgoing text separation. The GeeMarc Screenphone has a larger screen but does not have the software capability to implement text separation.

With or without the new platform, it may be worthwhile to look at a new generation of textphones that can separate text effectively and thus improve the usability by facilitating interruption.

If a suitably equipped PC is used by the text user, e.g. Using TextTerm software and a V21 capable modem then successful interruption of a text-to-text call would be possible without changing the current platform. However, the system would still not allow interruption on VCO calls for the reasons given above.

The proposed new platform can provide a continuous text-to-text path, end to end, either with or without an associated voice call and thus meets many of these needs. If the text user of the new system is using an internet based connection for text, calling via the relay, then interruption by either the text user or the voice user will be possible. However, if a legacy text terminal is involved with the proposed system, the user will still be required to switch between voice and text and there will be little change from the current situation.

The term VCO is redundant when the system is used with (say) a PC either end with an associated voice call. This is because that method will not require the relay and either party can type or speak as required. This means that if the text user is speaking, the voice user can type back simultaneously to interrupt. The full screen availability provided by a PC will enable straightforward separation of sent and received text for either party.



## Question 2b – Two way text with two operators (Relay Assistants)

Given that the platform is capable of providing a two way text path, the cost of any increase in conversation speed by providing two RAs per call is then a matter of effectively doubling RAs, and available terminals. This in turn leads to an increase in accommodation costs. — figures show that at peak periods, they — RAs logged in. It is a reasonable assumption that for the same peaks for this proposal there would need to be 2 x — RA's logged in. However, this still does not really address the issue of the user terminals, and any figures for costs would have to assume that there would be a growth in users switching from legacy terminals to PC based ones. Calculations will be based on this premise and the current overheaded cost of an RA, given that accommodation would be roughly twice that currently required.

### Costs

The costs associated with this option will be the additional RAs required for each call. We have been advised — that — have spare RA positions and also a significant number of trained RAs available. The costs of this option — will therefore only be the additional staff time. — there will be significant additional costs as it will be necessary to provide additional RA positions, — to meet the busy hour demand, and also to recruit and train additional RAs as well as pay for the additional staff time. In preparing these estimated costs it has been necessary to assume the following:

- There is sufficient space in the — building to accommodate the additional RAs required;
- There will be no changes to the current working arrangements whereby — the — call centre is — during the day;
- Training for a new RA takes 2 weeks.

It is therefore estimated that the additional capital costs for new RA positions will be around £60,000 but the additional annual running costs will be around £4.4 million of which £750,000 will be one off training costs in the first year.

All costs in pounds £				
<u>Capital Costs</u>	<u>Unit cost</u>	<u>Number of units</u>	<u>Total cost</u>	<u>Notes</u>
Equipment hardware				None required
Equipment software				None required
Relay Assistant terminals	£ 500			InterConnect estimate a cost of £500 per new terminal.
			£	— a figure of — dedicated relay terminals in — so no additional terminals are required.
Relay centre environment				No change to relay centre environment has been assumed.
Installation	£ 25,000		£	Installation cost of £25,000 per relay and node site assumed.
<b>Total Capital Costs</b>			<b>£ 60,000</b>	

Review of Relay Services

All costs in pounds £					
<u>Current Costs</u>		<u>Unit cost</u>	<u>Number of units</u>	<u>Total cost</u>	<u>Notes</u>
	Node operating costs				
	— Data network costs				
	Accommodation				
		£		£	— figure - assumed to include power, A/C costs
	Relay Assistant staff costs				Assumed same number of staff
		£		£	FTE staff numbers calculated using — figures on resource allocation with a 10% uplift to deal with shift overlaps etc. This is in addition to the basic provision and represents a doubling of the staff costs.
	E1 rentals			£	
				£	
	Relay Assistant training				Annual training and familiarisation with the new system. Assumed cost £200 per trained relay assistant.
				£	Estimate of an additional pool of — staff required. This represents a doubling of the available Relay Operators to meet the new peak requirement.
	<b>Total Current Costs</b>			<b>£ 4,440,000</b>	

## Question 2c – Time to answer and KPIs

Ofcom have asked us to consider various options relating to changing the KPIs relating to the operation of the current system. Increasing manning levels to ensure call delay performances of 5/10 seconds for 90% of standard calls and 5 seconds for 95% and all emergency calls.

It is our understanding that the current KPIs are for 90% of standard calls to be answered within 15 seconds and 95% of emergency calls are answered within 5 seconds.

The greatest pressure on service levels for call answering is likely to occur during the busy hour so we have based our calculations on this. It is our understanding, —, that in the busy hour the system deals, on average with around 513 calls and they have an average duration of just less than 7 minutes i.e. 418 seconds.

In order to do the necessary KPI calculations we have prepared an Excel spread sheet which will be provided to Ofcom in association with this report. It enables difference scenarios of busy hour traffic volumes, average time to answer calls and percentage of calls answered within that selected time to be modelled.

The KPI relates to the proportion of calls that is answered within x seconds - i.e. the number of calls that get queued and for how long, to look at it from another perspective. The model suggests that at the current levels of traffic and staffing, only about 13% of calls would be subjected to queuing. Therefore a small increase in the number of agents available can make a substantial impact on what happens to that 13% of calls.

Screen shots are provided below for the specific scenarios requested by Ofcom.

### **Current performance scenario of 90% of calls answered within 15 seconds**

### Calculations for Service Standards for the — Voice/Text Relay Service

**Inputs**

Traffic case		Current	Current	50%	100%	400%	800%
Calls per period ( $\lambda$ )	<i>lambda</i>	—					
Length of the period in seconds	<i>period</i>	3,600					
Average call duration in seconds	<i>Ts</i>	—					
Target time to answer in seconds	<i>TASA</i>	15	15	10	5		
Target service level percentage	<i>SLT</i>	90%	90%	95%	99%		

**Preliminary calculations**

Traffic intensity ( $\lambda \cdot Ts$ ) in Erlangs	<i>u</i>	59.57
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**Service Level Calculations**

Agents available	<i>m</i>	—3	—2	—1	—	—+1	—+2	—+3
Agent occupancy percentage ( $\rho = u / m$ )	<i>RHO</i>	88.9%	87.6%	86.3%	85.1%	83.9%	82.7%	81.6%
Erlang-C (percentage of arriving calls queued)	<i>Ec</i>	25.6%	20.6%	16.5%	13.0%	10.2%	7.9%	6.1%

**Outputs**

Service level percentage	<i>SL</i>	80.4%	84.8%	88.3%	91.0%	93.2%	94.9%	96.2%
Immediate answer percentage	<i>IA</i>	74.4%	79.4%	83.5%	87.0%	89.8%	92.1%	93.9%
Average time to answer in seconds	<i>ASA</i>	14.4	10.2	7.3	5.2	3.7	2.7	1.9
Required number of agents	<i>ReqA</i>	—						

**Performance scenario of 90% of calls answered in 10 seconds**

**Calculations for Service Standards for the — Voice/Text Relay Service**

**Inputs**

Traffic case		Current	Current	50%	100%	400%	800%
Calls per period ( $\lambda$ )	<i>lambda</i>	—					
Length of the period in seconds	<i>period</i>	3,600					
Average call duration in seconds	<i>Ts</i>	—					
Target time to answer in seconds	<i>TASA</i>	10	15	10	5		
Target service level percentage	<i>SLT</i>	90%	90%	95%	99%		

**Preliminary calculations**

Traffic intensity ( $\lambda \cdot Ts$ ) in Erlangs	<i>u</i>	59.57
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**Service Level Calculations**

Agents available	<i>m</i>	—3	—2	—1	—	—+1	—+2	—+3
Agent occupancy percentage ( $\rho = u / m$ )	<i>RHO</i>	88.9%	87.6%	86.3%	85.1%	83.9%	82.7%	81.6%
Erlang-C (percentage of arriving calls queued)	<i>Ec</i>	25.6%	20.6%	16.5%	13.0%	10.2%	7.9%	6.1%

**Outputs**

Service level percentage	<i>SL</i>	78.6%	83.2%	86.9%	89.9%	92.2%	94.1%	95.6%
Immediate answer percentage	<i>IA</i>	74.4%	79.4%	83.5%	87.0%	89.8%	92.1%	93.9%
Average time to answer in seconds	<i>ASA</i>	14.4	10.2	7.3	5.2	3.7	2.7	1.9
Required number of agents	<i>ReqA</i>	—+—						

**Performance scenario of 90% of calls answered in 5 seconds**

**Calculations for Service Standards for the — Voice/Text Relay Service**

**Inputs**

Traffic case		Current	Current	50%	100%	400%	800%
Calls per period ( $\lambda$ )	<i>lambda</i>	—					
Length of the period in seconds	<i>period</i>	3,600					
Average call duration in seconds	<i>Ts</i>	—					
Target time to answer in seconds	<i>TASA</i>	5	15	10	5		
Target service level percentage	<i>SLT</i>	90%	90%	95%	99%		

**Preliminary calculations**

Traffic intensity ( $\lambda \cdot Ts$ ) in Erlangs	<i>u</i>	59.57
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**Service Level Calculations**

Agents available	<i>m</i>	—3	—2	—1	—	—+1	—+2	—+3
Agent occupancy percentage ( $\rho = u / m$ )	<i>RHO</i>	88.9%	87.6%	86.3%	85.1%	83.9%	82.7%	81.6%
Erlang-C (percentage of arriving calls queued)	<i>Ec</i>	25.6%	20.6%	16.5%	13.0%	10.2%	7.9%	6.1%

**Outputs**

Service level percentage	<i>SL</i>	76.6%	81.4%	85.3%	88.5%	91.1%	93.2%	94.8%
Immediate answer percentage	<i>IA</i>	74.4%	79.4%	83.5%	87.0%	89.8%	92.1%	93.9%
Average time to answer in seconds	<i>ASA</i>	14.4	10.2	7.3	5.2	3.7	2.7	1.9
Required number of agents	<i>ReqA</i>	—+—						

**Performance scenario of 95% of calls answered in 5 seconds**

**Calculations for Service Standards for the BT Voice/Text Relay Service**

**Inputs**

Traffic case		Current	Current	50%	100%	400%	800%
Calls per period ( $\lambda$ )	<i>lambda</i>	---					
Length of the period in seconds	<i>period</i>	3,600					
Average call duration in seconds	<i>Ts</i>	---					
Target time to answer in seconds	<i>TASA</i>	5	15	10	5		
Target service level percentage	<i>SLT</i>	95%	90%	95%	99%		

**Preliminary calculations**

Traffic intensity ( $\lambda \cdot Ts$ ) in Erlangs	<i>u</i>	59.57
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**Service Level Calculations**

Agents available	<i>m</i>	---	--+1	--+2	--+3	--+4	--+5	--+6
Agent occupancy percentage ( $\rho = u / m$ )	<i>RHO</i>	85.1%	83.9%	82.7%	81.6%	80.5%	79.4%	78.4%
Erlang-C (percentage of arriving calls queued)	<i>Ec</i>	13.0%	10.2%	7.9%	6.1%	4.7%	3.5%	2.6%

**Outputs**

Service level percentage	<i>SL</i>	88.5%	91.1%	93.2%	94.8%	96.1%	97.1%	97.8%
Immediate answer percentage	<i>IA</i>	87.0%	89.8%	92.1%	93.9%	95.3%	96.5%	97.4%
Average time to answer in seconds	<i>ASA</i>	5.2	3.7	2.7	1.9	1.3	1.0	0.7
Required number of agents	<i>ReqA</i>	---	--+4					

The calculations indicate that during the busy hour only an additional 4 relay assistants would be required in order to meet the 5 second answer time for 95% of the calls. The cost implication of this would therefore only be the salary costs of the 4 extra relay assistants for this period of time. It appears from the model results that the desired increases in call answering performance might be achieved with a relatively small increase in staffing. This is because most calls (87% under the current KPI scenario) would be answered without needing to be queued. The additional agents, therefore, would address the small proportion of queued calls. This is statistically a reasonable result given the number of RAs and calls involved.

It is possible that the --- average performance is pulled down by calls handled in --- --- there are only a small number of RAs available. It may therefore be possible to increase the overall performance by employing --- additional ---. At present we do not have sufficient call data to know whether this is a correct conclusion. Overall though it is likely that the cost of increasing this performance will be very small and potentially limited to the employment costs of --- additional --- i.e. £--- per annum per full time equivalent shift

## Question 2d – operator (Relay Assistant) interruptions and handovers

Mid call handover is not the normal case in a “standard” call centre. For most call centres, the call has a fixed purpose and usually one agent handles this call throughout its duration. If the agent cannot finalise the enquiry of problem within a set time frame, it is common practice for the agent to pass the issue on to another department or offer a call back. For this reason there are no apparent standards within the call centre industry for mid-call handovers.

Calls via the relay are variable in duration and do not use the agent, in this case the Relay Assistant, in anything other than a communications facilitation role. It is likely that some calls may need to be handed over for one of the following reasons:

1. Relay Assistants reaching the end of their shift or reach a scheduled break time.
2. Relay assistants being taken for a higher priority call (999).
3. Scheduled closure of centres at night (e.g. — each night).

It is assumed that the majority of calls handed over are due to item 1.above, as the number of emergency calls is low (commonly around 5 in peak periods) and there are likely to be few calls in progress at 23:00. Thus the level of resource available in terms of staffing is unlikely to have much impact on call hand-over statistics. Current figures — show that —% of calls do not have a mid-call handover on an average day. Thus the current set-up is already meeting the first suggested target of 95%.

To achieve an improvement of —% for a 99% level it is suggested that a change to working practice be adopted. Current practice is that RAs stay with a call until its conclusion where possible. There is a potential improvement available if RAs were assured that overtime was payable for calls going past the end of their shift or into break times. The cost uplift for this overtime would be relatively small. This solution would be subject to meeting any health and safety requirements or union agreements for RA’s in terms of shift length and break regularity.

## Question 2e – Traffic growth

Ofcom wish to understand the impact of growth in usage of the system in the coming years. In particular Ofcom have requested that we provide estimates of costs based on the following growth forecasts:

- 50% growth in traffic over 5 years
- Double of traffic over 5 years
- Four-fold increase in traffic over 5 years
- Eight-fold increase in traffic over 5 years

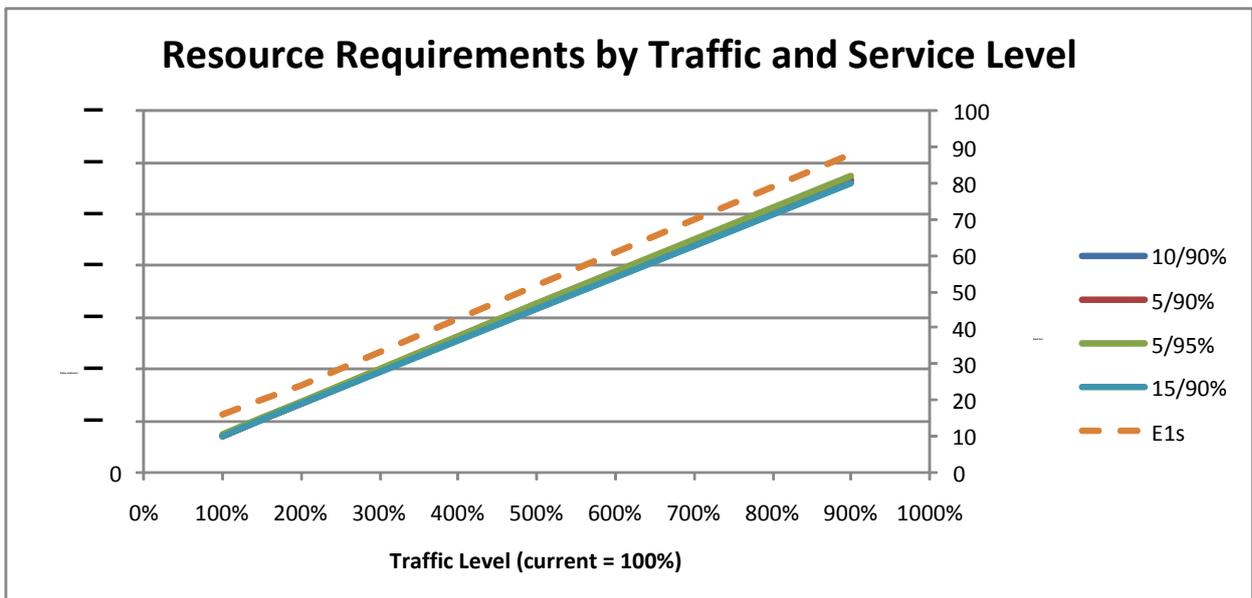
Using the traffic model which we have developed we have run these four growth scenarios for each of the four performance levels used in Section 8 above. The model has calculated the number of Relay Assistants required for each scenario as shown in the table and graph below.

Traffic volume => Current +50% +100% +400% +800%

Relay Assistants

Service level

Service level	Current	+50%	+100%	+400%	+800%
15/90%	-	-	-	-	-
10/90%	-	-	-	-	-
5/90%	-	-	-	-	-
5/95%	-	-	-	-	-



We have also calculated the number of E1 circuits which would be required to carry the forecast traffic in order to then dimension the required Relay Network.

As was identified in Section 8 above the key driver for the increase in the number of Relay Assistants is the volume of calls rather than the quality of service. In developing our cost forecasts we have therefore only done this based on the existing quality of service —

i.e. 90% of calls answered within 15 seconds.

In preparing this costing forecast we have had to make a number of key assumptions:

- The average duration of the calls remains at 418 seconds;
- The arrangements for dealing with the calls at the — centres and the operational timings are unchanged;
- There is sufficient space in the existing buildings for the required expansion of RA terminals;
- The uplift in the number of RAs required in the busy hour is also reflected throughout the 24 hour period;
- All cost forecasts are in today's prices;
- The forecast costs represent the total cost of growing the system each year over the five year period for each scenario;
- Each relay node can deal with up to 4 E1 circuits in and out, i.e. 8 E1s in total
- The nature of the calls remains the same, i.e. that a relay assistant is required, rather than direct text to text communication.

We have modelled four growth scenarios as described above and calculated the additional capital and ongoing current costs on an annual basis. For each growth scenario, the model calculates:

- the numbers of busy hour relay assistants required per year. This figure is derived using the numbers shown above, calculated using our traffic model as required after 5 years and allocating a linear amount of RA growth per year. A percentage busy hour uplift figure is calculated from this which is also used in the growth model to grow the number of RA terminals required.
- The total and additional number of RA terminals per year is calculated using the busy hour uplift percentage. The additional number of RA terminals takes into consideration that there are a number of terminals available \_\_\_\_\_ at present.
- The number of E1 circuits required per year is derived taking the total calculated after 5 years from the traffic model and allocating it in a linear fashion over the 5 years.
- Taking into consideration the number of E1 required, and the assumption that a node can manage up to 8 E1, the total and additional number of nodes is calculated.
- The data network linking the nodes to the operator centres has been grown at the same rate as the E1 circuits, and dimensioned as 1.5 times the number of E1 required from the nodes to the PSTN, as is currently the case based on costs.
- The additional capital costs are calculated using the equipment numbers as described above and the costs used in the calculation of the current system at today's prices.
- The additional operating costs are calculated using equipment as described above and the costs used in the calculation of the current system at today's prices. The staff costs are calculated by taking an additional average FTE per terminal (to take account of the shift pattern) and multiplying this average by the salary cost.

The results of the growth modelling are shown in the following sheets.

**Growth Scenario – 50% Growth over 5 years**

50% growth		<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	Notes
<b>Equipment</b>								
Busy hour RAs		—	—	—	—	—	—	Numbers from external model with even annual growth over 5 years
Busy hour uplift			10%	20%	30%	40%	46%	Represents annual uplift on required number of RAs
<b>RA terminals required</b>								
		—	—	—	—	—	—	Calculates total number of RA terminals required in each location based on equal uplift throughout the day
<b>Additional terminals required</b>								
	Available							
		—	—	—	—	—	—	Calculates additional number of RA terminals required
<b>Relay nodes</b>								
E1s		—	—	—	—	—	—	Number of E1 circuits required to carry traffic from external model
Relay nodes required		—	—	—	—	—	—	Number of relay nodes required based on traffic capacity of — E1s per node
Additional nodes required		0	1	0	0	0	0	Additional nodes needed to be added each year
Data Network		24	26	27	29	30	30	data network required to support traffic based on an uplift of 50% on the E1s which reflects the — cost arrangement

Review of Relay Services

50% Growth								
<b>Capital Costs</b>								
	Unit cost	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
Equipment hardware	£ 100,000		£ 100,000	£ -	£ -	£ -	£ -	Costs per node as used in other calculations
Equipment software								
Relay Assistant terminals								
	£ -		£ -	£ -	£ -	£ -	£ -	Cost per new RA terminal as used in other calculation
Relay centre environment								
Installation	£ 25,000		£ 25,000	£ -	£ -	£ -	£ -	Installation per node as used in other calculations
<b>Total Additional Annual Capital Costs</b>			<b>£ -</b>	<b>£ 7,000</b>	<b>£ 10,500</b>	<b>£ 14,000</b>	<b>£ 16,000</b>	
<b>Operating Costs</b>								
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
Node operating costs	£ -		£ -	£ -	£ -	£ -	£ -	Node operating costs as used in other calculations
Data network costs	£ -		£ -	£ -	£ -	£ -	£ -	Data network costs as used in other calculations
Accommodation								
	£ -		£ -	£ -	£ -	£ -	£ -	Accommodation costs per RA terminal as used in other calculations
Relay Assistant staff costs								
	£ -		£ -	£ -	£ -	£ -	£ -	Average staff cost based on shift calculations in total cost scenario
E1 rentals	£ -		£ -	£ -	£ -	£ -	£ -	Costs as used in other calculations
Relay assistant training								
	£ 600		£ -	£ -	£ -	£ -	£ -	Number of additional RAs requiring training based on ration of 250:164 as used in base calculations. Training costs based on 2 days per new RA as used in other calculations
<b>Total Additional Annual Operating Costs</b>			<b>£ 508,858</b>	<b>£ 900,005</b>	<b>£ 1,330,096</b>	<b>£ 1,720,328</b>	<b>£ 1,924,700</b>	

**Growth Scenario – 100% Growth over 5 years**

100% Growth		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Notes
<b>Equipment</b>								
Busy hour RAs		—	—	—	—	—	—	Numbers from external model with even annual growth over 5 years
Busy hour uplift			19%	37%	56%	74%	90%	Represents annual uplift on required number of RAs
<b>RA terminals required</b>								
		—	—	—	—	—	—	Calculates total number of RA terminals required — based on equal uplift throughout the day
<b>Additional terminals required</b>								
	Available							
		—	—	—	—	—	—	Calculates additional number of RA terminals required Calculates additional number of RA terminals
<b>Relay nodes</b>								
E1s		2						Number of E1 circuits required to carry traffic from external model
Relay nodes required		2	3	3	3	3	3	Number of relay nodes required based on traffic capacity of — E1s per node
Additional nodes required		0	1	0	0	0	0	Additional nodes needed to be added each year
Data Network		24	27	30	33	36	36	data network required to support traffic based on an uplift of 50% on the E1s which reflects the — cost arrangement

Review of Relay Services

100% Growth									
<b>Capital Costs</b>			<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	
	Unit cost								
Equipment hardware	£ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Costs per node as used in other calculations
Equipment software									
Relay Assistant terminals									
	_____ £ 500		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Cost per new RA terminal as used in other calculation
Relay centre environment									
Installation	£ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Installation per node as used in other calculations
<b>Total Additional Annual Capital Costs</b>			<b>£ 131,500</b>	<b>£ 13,000</b>	<b>£ 19,500</b>	<b>£ 26,000</b>	<b>£ 31,500</b>		
<b>Operating Costs</b>			<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	
Node operating costs	£ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Node operating costs as used in other calculations
Data network costs	£ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Data network costs as used in other calculations
Accommodation									
	_____ £ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Accommodation costs per RA terminal as used in other calculations
Relay Assistant staff costs									
	_____ £ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Average staff cost based on shift calculations in total cost scenario
E1 rentals	£ _____		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Costs as used in other calculations
Relay assistant training									
	_____ £ 600		£ _____	£ _____	£ _____	£ _____	£ _____	£ _____	Number of additional RAs requiring training based on ration of 250:164 as used in base calculations. Training costs based on 2 days per new RA as used in other calculations
<b>Total Additional Annual Operating Costs</b>			<b>£ 849,140</b>	<b>£ 1,617,685</b>	<b>£ 2,388,058</b>	<b>£ 3,111,720</b>	<b>£ 3,736,036</b>		

**Growth Scenario – 400% Growth over 5 years**

400% Growth		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Notes
<b>Equipment</b>								
Busy hour RAs		—	—	—	—	—	—	Numbers from external model with even annual growth over 5 years
Busy hour uplift			71%	143%	214%	286%	353%	Represents annual uplift on required number of RAs
<b>RA terminals required</b>								
	—	—	—	—	—	—	—	Calculates total number of RA terminals required in each location based on equal uplift throughout the day
<b>Additional terminals required</b>								
		Available						
	—	—	—	—	—	—	—	Calculates additional number of RA terminals required
<b>Relay nodes</b>								
		2						
E1s		—	—	—	—	—	—	Number of E1 circuits required to carry traffic from external model
Relay nodes required		2	3	4	5	6	7	Number of relay nodes required based on traffic capacity of — E1s per node
Additional nodes required		0	1	1	1	1	1	Additional nodes needed to be added each year
Data Network		24	36	48	60	72	78	data network required to support traffic based on an uplift of 50% on the E1s which reflects the — cost arrangement

Review of Relay Services

400% Growth		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
<b>Capital Costs</b>								
	Unit cost							
Equipment hardware	£ 100,000		£ 100,000	£ 100,000	£ 100,000	£ 100,000	£ 100,000	Costs per node as used in other calculations
Equipment software								
Relay Assistant terminals								
	£ 500		£	£	£	£	£	Cost per new RA terminal as used in other calculation
Relay centre environment								
Installation	£		£	£	£	£	£	Installation per node as used in other calculations
<b>Total Additional Annual Capital Costs</b>			<b>£ 150,000</b>	<b>£ 175,000</b>	<b>£ 202,000</b>	<b>£ 229,500</b>	<b>£ 255,000</b>	
<b>Operating Costs</b>								
Node operating costs	£		£	£	£	£	£	Node operating costs as used in other calculations
Data network costs	£		£	£	£	£	£	Data network costs as used in other calculations
Accommodation								
	£		£	£	£	£	£	Accommodation costs per RA terminal as used in other calculations
Relay Assistant staff costs								
	£		£	£	£	£	£	Average staff cost based on shift calculations in total cost scenario
E1 rentals	£		£	£	£	£	£	Costs as used in other calculations
Relay assistant training								
	£ 600		£	£	£	£	£	Number of additional RAs requiring training based on ration of 250:164 as used in base calculations. Training costs based on 2 days per new RA as used in other calculations
<b>Total Additional Annual Operating Costs</b>			<b>£ 3,009,991</b>	<b>£ 6,001,887</b>	<b>£ 8,994,697</b>	<b>£ 12,002,859</b>	<b>£ 14,757,162</b>	

**Growth Scenario – 800% Growth over 5 years**

800% Growth	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Notes
<b>Equipment</b>							
Busy hour RAs	---	---	---	---	---	---	Numbers from external model with even annual growth over 5 years
Busy hour uplift		140%	280%	420%	560%	700%	Represents annual uplift on required number of RAs
<b>RA terminals required</b>							
---	---	---	---	---	---	---	Calculates total number of RA terminals required based on equal uplift throughout the day
<b>Additional terminals required</b>	Available						
---	---	---	---	---	---	---	Calculates additional number of RA terminals required
<b>Relay nodes</b>	2						
E1s	---	---	---	---	---	---	Number of E1 circuits required to carry traffic from external model
Relay nodes required	2	4	6	8	10	11	Number of relay nodes required based on traffic capacity of --- E1s per node
Additional nodes required	0	2	2	2	2	1	Additional nodes needed to be added each year data network required to support traffic based on an uplift of 50% on the E1s which reflects the --- cost arrangement
Data Network	24	47	69	92	114	132	

Review of Relay Services

800% Growth								
<b>Capital Costs</b>								
		<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	
Equipment hardware	Unit cost £ 100,000		£ 200,000	£ 200,000	£ 200,000	£ 200,000	£ 100,000	Costs per node as used in other calculations
Equipment software								
Relay Assistant terminals								
	£ 500		£	£	£	£	£	Cost per new RA terminal as used in other calculation
Relay centre environment								
Installation	£		£	£	£	£	£	Installation per node as used in other calculations
<b>Total Additional Annual Capital Costs</b>		<b>£</b>	<b>£ 299,000</b>	<b>£ 352,000</b>	<b>£ 405,500</b>	<b>£ 458,500</b>	<b>£ 387,500</b>	
<b>Operating Costs</b>								
		<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	
Node operating costs	£		£	£	£	£	£	Node operating costs as used in other calculations
Data network costs	£		£	£	£	£	£	Data network costs as used in other calculations
Accommodation								
	£ 1,044		£	£	£	£	£	Accommodation costs per RA terminal as used in other calculations
Relay Assistant staff costs								
	£		£	£	£	£	£	Average staff cost based on shift calculations in total cost scenario
E1 rentals	£		£	£	£	£	£	Costs as used in other calculations
Relay assistant training								
	£ 600		£	£	£	£	£	Number of additional RAs requiring training based on ration of 250:164 as used in base calculations. Training costs based on 2 days per new RA as used in other calculations
<b>Total Additional Annual Operating Costs</b>		<b>£</b>	<b>£ 5,882,244</b>	<b>£11,740,635</b>	<b>£17,576,167</b>	<b>£ 23,433,644</b>	<b>£ 29,122,409</b>	

## Summary of Growth Analysis

The table below summarises the additional costs required to meet the traffic growth scenarios modelled. It can be seen that the growth will largely cause a significant increase in salary cost for additional relay assistants.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
<b>50 % Growth Total Additional Annual Capital Costs</b>	£ 128,500	£ 7,000	£ 10,500	£ 14,000	£ 16,000
<b>50 % Growth Total Additional Annual Operating Costs</b>	£ 508,858	£ 900,005	£ 1,330,096	£ 1,720,328	£ 1,924,700
<b>100 % Growth Total Additional Annual Capital Costs</b>	£ 131,500	£ 13,000	£ 19,500	£ 26,000	£ 31,500
<b>100 % Growth Total Additional Annual Operating Costs</b>	£ 849,140	£ 1,617,685	£ 2,388,058	£ 3,111,720	£ 3,736,036
<b>400 % Growth Total Additional Annual Capital Costs</b>	£ 150,000	£ 175,000	£ 202,000	£ 229,500	£ 255,000
<b>400 % Growth Total Additional Annual Operating Costs</b>	£ 3,009,991	£ 6,001,887	£ 8,994,697	£ 12,002,859	£ 14,757,162
<b>800 % Growth Total Additional Annual Capital Costs</b>	£ 299,000	£ 352,000	£ 405,500	£ 458,500	£ 387,500
<b>800 % Growth Total Additional Annual Operating Costs</b>	£ 5,882,244	£ 11,740,635	£ 17,576,167	£ 23,433,644	£ 29,122,409

## Annex A

### Traffic Model

The model uses traffic theory to calculate how many Relay Assistants are required to answer calls to a given quality of service and to calculate the number of E1 circuits needed to carry the calls to and from the PSTN.

The model takes as inputs the number of standard and emergency calls in a typical busy hour (— data for Monday —, for hours 10am - 11am and 11am - noon). The number of minutes of traffic in that hour was also — to calculate an average call duration. The model calculates the number of Erlangs of traffic carried in that hour.

The model takes the number of calls and minutes to calculate the traffic intensity in Erlangs. The model then calculates the number of Relay Assistants required to answer calls to a defined service level using a target time to answer (e.g. 5 seconds) and a target service level percentage (e.g. 95% of calls answered within the specified target time). The user can input their required option. The Erlang C formula is used to model queuing traffic and produces the resulting number of Relay Assistants needed to answer the busy hour calls received at the chosen service level.

The 50%, 100%, 400% and 800% growth scenarios are modelled by growing the busy hour traffic figures — by these percentages. The model is the rerun for each scenario to calculate the number of relay assistants required to answer the calls at the designated service level.

The model also calculates the number of E1 trunks required to carry the traffic to and from the PSTN. Both current and growth traffic is modelled, by using the offered traffic, an assumed grade of service (0.001%) and a route redundancy of 100%. The model uses an Erlang B table in order to calculate the number of E1 circuits, which is a recognised methodology for determining trunk requirements. The model calculates the number of inbound and outbound E1s required by doubling the calculated requirement to cover the need for an inbound and outbound trunk per call.

The model is driven from the “Model” sheet. The predefined traffic option is chosen using the drop down box in cell D6.

The “Target time to answer in seconds” is set in cell D12

The “Target service level percentage” is set in cell D13

Cell E19 is then used to bring the output of the model into range. Entries in this cell will vary from 70 for the current scenario to 560 for the 800% scenario.

## Annex 7

# Notification of proposed modification to General Condition 15

## PROPOSAL FOR A MODIFICATION OF CONDITION 15 OF PART 2 OF THE GENERAL CONDITIONS UNDER SECTION 48(1) OF THE COMMUNICATIONS ACT 2003

### BACKGROUND

A. The Director General of Telecommunications published on 22 July 2003 a notification setting general conditions under section 45 of the Communications Act 2003 (the “**Act**”) which took effect on 25 July 2003. Since July 2003, the general conditions so set have been modified on several occasions and new general conditions have been set by Ofcom (collectively, the “**General Conditions**”).

B. Articles 7 and 23a of the Universal Service Directive requires Member States to ensure that access to, and affordability of, certain communications services for disabled end users is equivalent to the level enjoyed by other end-users. General Condition 15 therefore requires providers of Publicly Available Telephone Services to ensure that subscribers that so require by reason of their disability are granted access to a relay service.

C. Ofcom has considered the extent to which General Condition 15 might be modified to improve the services available to disabled end users in light of technological developments in order to secure equivalence for those end users. Ofcom is therefore setting out proposals to modify General Condition 15 in this Notification.

### DECISION

1. In accordance with section 48(1) of the Act, Ofcom sets out its proposals for modifications to General Condition 15.
2. The proposed modifications are set out in the Schedule to this document.
3. The effect of, and Ofcom’s reasons for making, the proposed modifications are set out in the accompanying consultation document.
4. Ofcom is satisfied that the proposed modifications satisfy the requirements of section 47(2) of the Act.
5. In making the proposals set out in this Notification, Ofcom has considered and acted in accordance with its general duties in section 3 of the Act and the six Community requirements in section 4 of the Act.
6. In this Notification:
  - (i) “**Act**” means the Communications Act 2003;
  - (ii) “**General Conditions**” have the meaning ascribed in recital A above; and
  - (iii) “**Ofcom**” means the Office of Communications.

7. Except insofar as the context otherwise requires, words or expressions shall have the meaning assigned to them in this Notification and otherwise any word or expression shall have the same meaning as it has in the Act.
8. 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.
9. The Schedule to this Notification shall form part of this Notification.

Signed by [                      ]

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

**[Date] 2011**

## SCHEDULE

### ***Proposed Modification to General Condition 15 of Part 2 of the General Conditions***

1 In General Condition 15, insert at paragraph 15.5:

“15.5 A Relay Service provided by the Communications Provider to its Subscribers pursuant to paragraph 15.3 must:

- (a) provide facilities for the receipt and translation of voice messages into text and the conveyance of that text to the terminal of End-Users of any provider of Publicly Available Telephone Services and vice versa,
- (b) provide facilities for the receipt and transmission of voice communications simultaneously with text communications;
- (c) provide facilities for access to Emergency Organisations;
- (d) be available for use by End-Users at all times;
- (e) be capable of being accessed by End-Users of the service from readily available terminal equipment, including textphones, personal computers and mobile telephones;
- (f) not prevent End-Users from communicating with other End-users of other Relay Services;
- (g) not require the dialling of a prefix number for End-Users to access the service;
- (h) insofar as reasonably practicable, allow for communication between End-Users of the service at speeds equivalent to voice communications;
- (i) ensure the confidentiality of communications between End-users of the service;
- (j) comply with any directions in respect of the service which Ofcom may make from time to time; and
- (j) be approved by Ofcom for the purposes of this Condition 15.5.”

2 Paragraphs 15.5 to 15.10 are renumbered as paragraphs 15.6 to 15.11.

3 In the revised paragraph 15.2, 15.3, 15.4, 15.6, 15.7 and 15.9, replace reference to “paragraph 15.9” with “paragraph 15.10”.

4 In revised paragraph 15.10, replace “paragraphs 15.1 to 15.8” with “paragraphs 15.1 to 15.9”.

4 Replace (d) in paragraph 15.11 with the following:

“(d) Relay Service” means any service which complies with the requirements of paragraph 15.5.

## Annex 8

# Notification of proposed revocation of Universal Service Condition 4

## PROPOSAL FOR A MODIFICATION OF UNIVERSAL SERVICE CONDITION 4 UNDER SECTION 48(1) OF THE COMMUNICATIONS ACT 2003

### BACKGROUND

A. The Director General of Telecommunications published on 22 July 2003 a notification (the “**2003 Notification**”) designating BT as a universal service provider for the purposes of section 66 of the Communications Act 2003 (the “**Act**”) which took effect on 25 July 2003. In the 2003 Notification, the Director General of Telecommunications also imposed universal service conditions on BT including Universal Service Condition 4 in relation to the provision of relay services for Textphone users.

B. Articles 7 and 23a of the Universal Service Directive requires Member States to ensure that access to, and affordability of, certain communications services for disabled end users is equivalent to the level enjoyed by other end-users. Ofcom has considered the extent to which Universal Service Condition 4 remains necessary for the purposes of securing equivalence for disabled end users.

C. Ofcom is of the view that Universal Service Condition 4 is no longer required for the purposes of securing equivalence for disabled end users and is therefore proposing to revoke Universal Service Condition 4 in this Notification.

### DECISION

1. In accordance with section 48(1) of the Act, Ofcom is proposing to revoke Universal Service Condition 4.
2. The effect of, and Ofcom’s reasons for, the proposed revocation are set out in the accompanying consultation document.
3. In making its proposal to revoke Universal Service Condition 4, Ofcom has considered and acted in accordance with its general duties in section 3 of the Act and the six Community requirements in section 4 of the Act.
4. In this Notification:
  - (i) “**2003 Notification**” has the meaning given in recital A of this Notification;
  - (ii) “**Act**” means the Communications Act 2003;
  - (iii) “**Ofcom**” means the Office of Communications; and
  - (iv) “**Universal Service Condition 4**” means Condition 4 of Part 2 of the Schedule to the 2003 Notification;

5. Except insofar as the context otherwise requires, words or expressions shall have the meaning assigned to them in this Notification and otherwise any word or expression shall have the same meaning as it has in the Act.
6. 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.
7. The Schedule to this Notification shall form part of this Notification.

Signed by [                      ]

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

**[Date] 2011**

## Annex 9

# “Video Relay Services in the UK” by Europe Economics

## Introduction

A9.1 Sorenson Communications commissioned Europe Economics (EE) to produce a report setting out the costs and benefits of providing a VR service in the UK. Sorenson provided this report to Ofcom in August 2010<sup>69</sup>. Following engagement with Ofcom, Sorenson Communications and EE, a subsequent revised version of the report by EE was provided to us earlier this year- that report is dated 31<sup>st</sup> January and our comments below relate to the January 2011 version of the report<sup>70</sup>.

## Take-up and usage

A9.2 The EE report assumes that 38,000 BSL users take-up VR and use it for an average of 68 minutes per user per month. EE did not provide a rationale for choosing these values for take-up and usage, beyond noting a 2009 estimate by Plum Consulting that there are 50,000 to 70,000 BSL users in the UK.

A9.3 The figure of 38,000 users is higher than the number of users we selected in our demand scenarios (11,000, 22,000 and 30,000 in the low, medium and high demand scenarios respectively). 38,000 VR users would represent up to 75% of the UK BSL population – considerably above the levels of take-up in the US, estimated at 44% in paragraph 5.32 (in Section 5).<sup>71</sup>

A9.4 EE’s estimate of 68 minutes per user per month on average falls between our medium and high demand scenarios (50 and 100 minutes per user per month respectively).

## Costs

A9.5 EE set out two approaches to estimating costs. First, using a ‘unit cost’ methodology, where a per-minute cost of £4 is assumed, EE estimates that the service would cost £785m net present value (NPV) over ten years. This represents an average cost of approximately £3,100 per user per year.

A9.6 The figure of £3,100 per user per year is fairly close to the level implied by our high demand scenario (£3,480 per user per year). While the average number of minutes is lower than in our high demand scenario, the report assumes a higher cost of £4

<sup>69</sup> This version of the EE report can be found in Annex 3 of Sorenson Communication’s response to Ofcom’s Draft Annual plan, see: [http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson\\_Communications.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/draftap1112/responses/Sorenson_Communications.pdf).

<sup>70</sup> The revised January 2011 report can be found at: <http://www.vrstoday.com/wp-content/uploads/Revised-Final-Europe-Economics-Report.pdf>

<sup>71</sup> EE did not test the sensitivity of its results to changes in the level of take-up. However, its estimates may, in principle, be consistent with a substantial net benefit at lower levels of take-up, because a large proportion of the costs are variable.

per minute (compared to £3.15). EE's cost estimate is based on compensation rates in the US. We estimate per-minute costs using a number of sources including US compensation rates.

- A9.7 EE also estimates the costs using a 'bottom-up' methodology, where it calculates the various categories of cost individually. This results in costs of between £735m and £850m NPV over a ten year period (i.e. consistent with its unit cost estimate).
- A9.8 While we have not conducted a detailed bottom up costing of video relay services for this consultation, we have not identified any serious concerns with EE's overall approach to bottom-up costing at this stage.

## Benefits

- A9.9 The EE set out a number of benefits – some quantified and others set out qualitatively.
- A9.10 The report estimates that the quantified benefits of VR would be between £1,100m and £1,300m NPV over the initial ten year period. Figure 10.1 below show the breakdown of these benefits:

**Figure 10.1: Quantified benefits in the EE report**

	Excluding multiplier effects (£m)	Including multiplier effects (£m)
Productivity	12.5	12.5
Employment (direct, high)	230.6	230.6
Employment (direct, low)	200.5	200.5
Employment (multipliers)	0	140.4
Health	898.5	898.5
Total benefits, high	1,141.6	1,282
Total benefits, low	1,111.6	1,251.9

## Improved productivity at work

- A9.11 The report estimates the benefits of time saved from making calls at work. It calculates the total usage of TR as 8 million minutes per year. EE estimates that approximately two thirds of deaf individuals are employed, and assumes that these employed individuals make half of their calls at work, to conclude that around one third of TR calls (2.7 million per year) are made at work, around 365 minutes per employed deaf person.
- A9.12 The report cites the Plum report's estimates of a fivefold increase in speed of VR relative to TR – 150 words per minute compared to 30 words per minute respectively. According to the report, given the faster speed of VR relative to TR, instead of making 365 minutes of calls at work, an employee could replace this with around 75 minutes of VR calls.
- A9.13 Using a figure for the UK 'value added per employee' of £68,782 per year, the report calculates that the benefit of this time saved is equal to £1.5m per year, or £12.5m NPV over 10 years.

A9.14 We note this calculation assumes that all TR users are potential BSL users, which we know is not the case. It is also likely that some of these individuals already have access to enhanced relay services at work through Access to Work. If this is the case, there may not actually be a time saving for these individuals as a result of mandating the provision of a VR service. However, this productivity improvement accounts for only a small proportion of EE's estimated benefit, and we have not considered it in detail at this stage.

### Employment benefits

A9.15 The report estimates that 1,068 BSL interpreter Full Time Equivalents (FTEs) would be needed to provide the VR service at maturity, and that the total FTEs required would be 1,302 including non-interpreter roles.

A9.16 The report estimates that 90% of these jobs would constitute net job creation. Put another way, this suggests that introducing VR would result in 1,172 people<sup>72</sup> entering employment (working for the VR provider) who would otherwise have remained unemployed.

A9.17 The report provides an estimate of the benefit to these individuals of entering the workforce which is equivalent to average UK gross salary over a period of 10 years.

A9.18 In addition to this 'employment benefit', the report assumes that there is a multiplier benefit of approximately 70% of this value to the economy.

A9.19 EE calculates the employment benefit as being worth £201-231m NPV over 10 years, plus an additional £140m when including multiplier effects.

A9.20 In assessing the impact of market interventions, Ofcom does not typically treat increased employment as a benefit, or job losses (e.g. due to increased cost efficiencies) as a negative impact.<sup>73</sup> To take a recent example, Ofcom's Pay TV Statement considered a substantial expansion in take-up of pay TV services, but did not attribute value to any increase in employment from such an expansion.

A9.21 Employees' salaries are generally taken to represent the opportunity cost of their employment, rather than a benefit. In some cases, it could perhaps be argued that one should place some weight on the benefits of increased employment, but there would need to be specific reasons for doing so. However, the EE report does not establish such reasons or provide evidence that the people in question would be unemployed in the absence of the VR service.

A9.22 The multiplier benefit is entirely dependent on the employment benefit and we have not considered it further.

### Health benefits

A9.23 EE estimates that the 'health benefits' of VR are worth £3,600 per user per year. That is equivalent to £136.8m per year at maturity, or £898.5m NPV over the first 10 years.

<sup>72</sup> The report refers to the slightly lower figures of 1,153 people (although we are unsure about the precise derivation of this figure).

<sup>73</sup> Ofcom's approach to impact assessments is set out here:

[http://stakeholders.ofcom.org.uk/binaries/consultations/better-policy-making/Better\\_Policy\\_Making.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/better-policy-making/Better_Policy_Making.pdf)

- A9.24 Quality Adjusted Life Years (QALYs) are often used to assess the impact of health-related issues on individuals' quality of life. QALYs provide a measurement of an individuals' quality of life for a given year, on a scale with maximum value of 1. A value of 1 represents an individual with perfect health for the year in question. A value of 0 represents death, while a negative value represents health problems that are considered worse than death<sup>74</sup>.
- A9.25 There are a number of methods for estimating an individual's quality of life. Two such methods include the EQ-5D method and the HUI3 method. Both give estimates for an individual's quality of life with a maximum value of 1.
- A9.26 EE's value of £3,600 per user per year is based on an estimate for the value of a hearing aid. The EE report cites a study by Götherström et al<sup>75</sup> that considers the impact of video relay services on quality of life. The study finds that "There were no differences [in quality of life] between text telephone relay service and text telephone relay service supplemented with videophone relay service ( $p < 0.05$ )". The study identifies an *average* improvement in quality of life of 0.01 EuroQoL (EQ-5D) units, although this is not statistically significant.
- A9.27 The EE report also cites a study by Grutters et al<sup>76</sup> that estimates the impact of a hearing aid on users' quality of life. In this report, the authors measure the impact of hearing aids on quality of life using a number of measures, including EQ-5D. The report identifies an impact for the value of hearing aids of 0.01 EQ-5D units that is not statistically significant. One of the other measures used indicated a statistically significant impact of 0.12 HUI3 units (another measure of quality of life).
- A9.28 EE assumes that, since the 0.01 EQ-5D measure for the value of VR in Götherström et al (although not statistically significant) was the same as the 0.01 EQ-5D measure for the value of hearing aids in Grutters et al (also not statistically significant), it would be appropriate to assume the value of the two services was the same. EE therefore assumes that the value of hearing aids using the different HUI3 method of 0.12 HUI3 units also represents the value of VR.
- A9.29 Using this HUI3 measure of 0.12 units, EE assigns a monetary value of £3,600 per year for VR using the National Institute for Clinical Excellence's (NICE) estimates for the value of a quality adjusted life year (QALY) – that is the value NICE places on one year of life at perfect health.
- A9.30 In our view the EE report does not provide any robust evidence for the decision to assign the same value to VR as the Grutters et al report assigns to hearing aids. For example, we do not consider that it is robust to rely on the similarity of estimates that are not statistically significant using one measure of the impact of quality of life (EQ-5D) to assume that VR has a similar impact as hearing aids using a different measure of quality of life (HUI3). We have seen no other evidence to support the assertion that having access to VR for 68 minutes per month yields the same benefit as having a hearing aid that enables the user to hear 24 hours per day (as suggested by the EE report).

<sup>74</sup> See for example: <http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/QALY.pdf>

<sup>75</sup> Götherström et al (2004), "A comparative study of text telephone and videophone relay services", *Technology and Disability*, 16(2): 101-109

<sup>76</sup> Grutters et al (2007), "Choosing between measures: comparison of EQ-5D, HUI2 and HUI3 in persons with hearing complaints", *Qual Life Res.* 16(8): 1439-1449

- A9.31 There is also a question about the additional benefit of VR to someone who already has a hearing aid. EE's approach appears to suggest that having the two together would have a health benefit of 0.24 HUI3 units (0.12 units for each). Since the health detriment from deafness is estimated as 0.24 QALYs<sup>77</sup>, EE's approach therefore appears to imply that, on average, having both a hearing aid and VR fully compensates for the health disbenefits of deafness.
- A9.32 Based on the comments set out above, we consider that the EE report has not provided robust evidence to justify its key assumption that access to VR would result in the same level of benefit per user as a hearing aid, and that the estimated health benefits are likely to be significantly overstated.

### Other benefits

- A9.33 EE's report set out a range of other benefits which are not quantified. It is appropriate to include qualitative as well as quantitative evidence in reaching a conclusion on proportionality, and some of the qualitative benefits listed by EE may be additional to the health and productivity benefits described above, for example:
- Benefits to colleagues, friends and relatives of Deaf individuals due to increased ability to communicate effectively;
  - Reduced cost of interpreting and text relay services and hence lower public sector spending and costs incurred by Universal Service providers.
- A9.34 However, other qualitative benefits which EE proposes are likely to be captured by the health benefit measure, for example:
- Increased ability for Deaf entrepreneurs to establish and run companies;
  - Ability for BSL users to use their first language, which allows them to convey emotions and to be expressive when communicating using the telecommunications network; and
  - Improved self-confidence and increased independence for BSL users.

### Implications

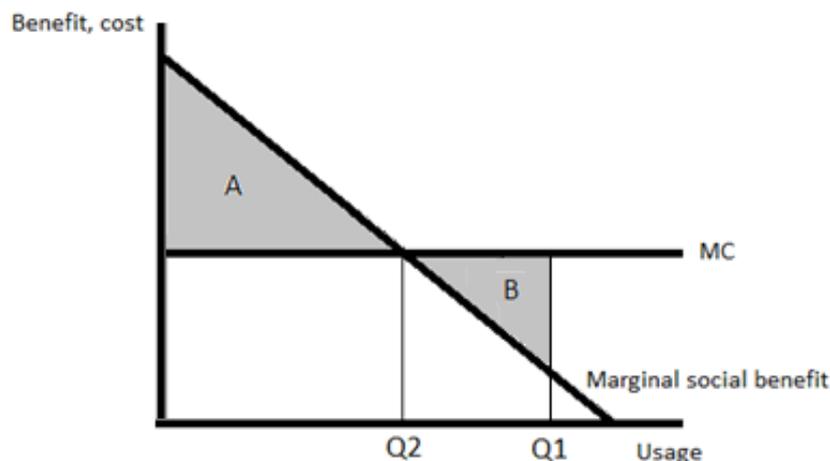
- A9.35 For the reasons set out above, we consider that the estimates of benefits quantified in the EE report are significantly overstated. We are doubtful that EE's approach of including employment benefits, using average salaries and a multiplier effect, is justified. In addition, based on the available evidence, we consider that the health benefits are likely to be significantly smaller than EE's estimate (although we do not have sufficiently robust evidence to provide an alternative quantified estimate).
- A9.36 Removal of employment benefits, and a reduction in the assumed level of health benefits, would have major implications for EE's cost-benefit assessment. If we exclude the employment benefit, then (for the net benefit to be positive) the health benefits and non-quantified benefits would need to have an NPV of at least £722m over ten years. Based on the available evidence, we consider this to be unlikely.

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<sup>77</sup> Australian Communications Exchange (2009), submission to the Department of Broadband, Communications and the Digital Economy, Feasibility Study into an Independent Disability Equipment Program (cited at paragraph 2.91 in the EE report).

- A9.37 In addition, showing a positive net benefit of implementing the service does not necessarily indicate that an unrestricted VR service would be proportionate. The socially optimal outcome is where each additional minute of calls adds the same or more to benefits than it does to costs.
- A9.38 That is, the optimum level of usage from society's perspective is where the marginal social benefits are equal to the marginal costs of provision. The EE report looks only at the total costs and benefits, without consideration of whether the level of usage identified in an un-rated service is proportionate.
- A9.39 Figure 10.2 below illustrates this point:

**Figure 10.2: Illustration of optimal level of usage**



- A9.40 In this Figure, the total impact of an intervention that results in a level of usage Q1 is equal to the shaded area A minus the shaded area B (A represents calls where the benefits exceed the costs, while B represents calls where the costs exceed the benefits). This shows that with diminishing marginal social benefit of making additional calls, but constant marginal costs (MC), an intervention that results in the level of usage Q1 could result in a positive impact on society (if area A is greater than area B).<sup>78</sup>
- A9.41 However, an intervention that results in the level of usage Q1 may not be appropriate. The optimum outcome from society's perspective is for usage levels to be at Q2. Beyond this point, additional minutes of usage are worth less to users (and society) than they cost to provide. This could occur because users do not pay for the cost of provision. Focusing only on the overall net impact, without considering the marginal impacts can therefore result in an incorrect conclusion on the most appropriate intervention.

<sup>78</sup> A further complication is that the social benefit depends not just on the total volume of usage, but also on who is using the service, as different users will have different (marginal) valuations on using the service.

## Annex 10

## Glossary of terms and definitions

Broadband	A data service or connection that is capable of supporting always-on services which provide the end-user with high data transfer speeds. Often used for transmitting bulk data or video or for rapid Internet access.
Caption Telephony (CT)	A type of relay service that allows for conventional two-way speech as well as delivery of captions to the hearing-impaired caller.
Communications Act	The Communications Act 2003, which came into force in July 2003
Communications provider	Provider of electronic communications services over an electronic communications network
Content Service	A service consisting of one or both of the following- the provision of material with a view to its being comprised in Signals conveyed by means of an Electronic Communications Network; the exercise of editorial control over the contents of Signals conveyed by means of a such a network
Electronic communications service	Any service consisting in, or having as its principal feature, the conveyance by means of an Electronic Communications Network of signals, except in so far as it is a content service
Electronic communications network	A transmission system for the conveyance, by the use of electrical, magnetic or electro-magnetic energy, of signals of any description; and such of the following as are used, by the person providing the system and in association with it, for the conveyance of the Signals (i) apparatus comprised in the system; (ii) apparatus used for the switching or routing of the Signals; and (iii) software and stored data
General Conditions	Obligations on all communications providers
HCO - Hearing Carry-Over.	The ability for a relay service to deliver the other parties speech to the hearing-impaired user.
Internet	A global network of networks, using a common set of standards (e.g. the Internet Protocol), accessed by users via a service provider.
Internet Protocol (IP)	The data protocol used for routing and carriage of messages across the internet and similar networks.
Internet Service Provider (ISP)	A company that provides access to the internet.
Member States	Countries that are part of the European Union. There are currently 27 EU Member States.
Mobile Broadband	Various types of wireless high-speed internet access through a portable modem, telephone or other device.
Netbook	A small, lightweight, and inexpensive laptop computer.
Node	Equipment which enables the interconnection of relay assistant's terminals and headsets, telephone circuits, and the internet.

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.
Platform	A system, comprised of operator and user equipment and services or functions provided by the system operator.
PCs/Macs	Personal computers.
Public switched telephone network (PSTN)	The PSTN is the network of the world's public circuit-switched telephone networks. Originally a network of fixed-line analogue telephone systems, the PSTN includes mobile as well as fixed line telephony.
Publicly Available Telephone Service (PATS)	A service made available to the public for originating and receiving, directly or indirectly, national or national and international calls through a number or numbers in a national or international telephone numbering plan.
RNID	The UK's largest charity supporting deaf people. Now known as Action on Hearing Loss.
Speech recognition	A technology in which computer software translates spoken words into a text. Currently the technology is only able to accurately recognise speech from voices that it has been trained to recognise, unless the required vocabulary is very low (automated call centre systems work well with untrained voices when the options are simple Yes/No or the numbers 0-9).
Tablet (PC)	A mobile computer, larger than a mobile phone or personal digital assistant, integrated into a flat touch screen and primarily operated by touching the screen. It often uses an onscreen virtual keyboard or a digital pen rather than a physical keyboard.
Text Relay (TR)	A system which allows hearing and speech-impaired people to converse over the telephone with hearing callers by converting their speech to text and vice versa. The conversion is done by Relay Operators working at a Relay Centre.
Universal Service conditions	Obligations on one or more designated Universal Service Providers.
Universal Service Directive	Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (amended by Directive 2009/136/EC).
Universal Service Order	Order made by the UK government that transposes the Universal Service Directive into UK law.
Universal Service Providers	BT and, in Hull, KCom, who have certain licence obligations designed to ensure that a basic level of telephony service is available to everyone in the licensed area upon request.
VCO - Voice Carry-Over	The ability for a relay service to deliver the hearing-impaired person's speech to the other caller.
Videophone	A telephone with a video screen, capable of full duplex (bi-directional) video and audio transmissions for communication between people in real-time.