



Guidelines on the use of battery back-up to protect lifeline services delivered using fibre optic technology

Statement

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Section 1

Executive summary

- 1.1 Superfast broadband is now available to 58% of UK premises¹ with deployment set to continue over the coming years. Increasing numbers of UK consumers are signing up to superfast broadband packages (i.e. those that offer >24Mbit/s) in response to concerted efforts to raise consumer awareness. This allows them to take advantage of the media-rich content that is being offered, such as video streaming and gaming.
- 1.2 Superfast broadband can be delivered to customers in a variety of ways, but the focus of this statement is on 'fibre to the premises' (FTTP) networks, where optical fibre is deployed all the way from the local exchange to the customer's property. Although this is expected to result in the highest speed broadband capability to customers, optical fibre does have one intrinsic limitation with respect to traditional telephony.
- 1.3 A conventional telephone² draws the necessary power for operation from the local exchange via the copper telephone wires, and as a result can continue to function even when there is a power cut at the premises. However, optical fibres are unable to support this arrangement as they do not conduct electricity.
- 1.4 The consequence of this limitation in fibre optic networks is that, if there is a power failure at the property, and absent any other measures being taken, the telephone will stop working. Hence calls, including calls to the emergency services, are not possible.
- 1.5 In practice, a back-up supply of power to ensure that calls can be made over optical fibre networks during a power cut is normally supplied via a battery installed at the customer's premises. The question that arises from solutions of this type is the length of time over which the battery back-up remains operational. It is on this question that we have recently consulted.
- 1.6 Given the expected growth in fibre optic networks over the next few years and in light of recent survey evidence that suggests that communications providers are adopting a mix of power back-up solutions in their current deployments, we believe that this represents an appropriate time to address this issue.
- 1.7 Our consultation therefore proposed the following principles, applying to both new-build and 'overlay' FTTP deployments:
 - A battery back-up should always be provided to support publicly available telephone services (PATS) provided over FTTP.
 - The minimum duration of the back-up facility should be 1 hour.

¹ Infrastructure Report, Ofcom, 1st November 2011, <http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf>

² For the purposes of this Statement a conventional telephone is one in which the customer premises equipment (usually the handset) can be connected directly into the network termination point (NTP) on a copper-based line and function without any intermediate equipment.

- Communications providers should take appropriate steps to ensure that the needs of vulnerable consumers requiring additional protection, who depend on 999/112 to a greater extent than the majority of the population, are addressed.
- 1.8 Overall, the responses we received can be divided into three broad categories: those that generally considered our proposals reasonable; those that argued for a higher minimum battery duration; and, those that argued that battery back-up should not be expected or if so, only on an optional basis.
- 1.9 The safety of human life represents an extremely important citizen interest and therefore is central to our consultation and subsequent guidelines. Having taken responses to our consultation into consideration, we remain of the view that the principles proposed above, and on which we consulted, are most likely to result in back-up facilities that customers will maintain over time and hence provide more effective protection. We are also of the view that it is practicable for operators to comply with these principles.
- 1.10 Therefore, for the reasons set out in this document, we consider that the guidance set out in the consultation document is appropriate and proportionate.
- 1.11 We recognise that we are at an early stage of FTTP deployment in the UK. We will keep this guidance under review, and issue revised guidance if that appears appropriate, taking account of market and technology developments.

Section 2

Introduction

- 2.1 Increasing numbers of people in the UK are signing up to superfast broadband packages (i.e. those that offer >24Mbit/s) in response to concerted efforts to raise consumer awareness of these services and the increasing number of locations from which such services are being made available. Superfast broadband allows customers to take advantage of the media-rich content that is increasingly being offered, such as video streaming and gaming.
- 2.2 Superfast broadband can be delivered to customers in a variety of ways, including DOCSIS 3.0 (as in Virgin Media's cable network), VDSL (as in BT's up to 40Mbit/s 'Infinity' products) and Fibre to the Premises (FTTP). The focus of this document is on FTTP deployments, in which the copper access network is completely replaced by fibre.
- 2.3 Although FTTP deployments have so far been restricted to trials and pilots in the case of larger communications providers, and small-scale deployments from local or regional communications providers, BT has announced its intention to deploy FTTP to cover around 4 million households in the next 2-3 years³ and Virgin Media has also announced⁴ FTTP deployments in the future. We also expect additional FTTP deployments as a result of the BDUK⁵ initiative over a similar timeframe.
- 2.4 Although FTTP provision leads to a superior broadband experience to the customer, the way in which FTTP systems support traditional telephony differs materially from conventional copper lines.
- 2.5 When a service is provided using a conventional copper exchange line, this provides power to the telephone, as well as carrying calls. Customers using conventional telephone services based on copper wires should therefore retain the ability to make a telephone call using a corded telephone in the event of a power cut
- 2.6 By way of contrast, in an FTTP deployment, the customer's telephone is connected to an optical network terminal (ONT). The ONT cannot be powered via the FTTP network, and is therefore powered from the mains. If there is a power cut at the property, and there is no alternative power supply, the telephone ceases to function. Hence calls, including calls to the emergency services, are not possible.
- 2.7 In practice, alternative power during a power cut is normally supplied via a battery back-up facility installed at the customer's premises. It is the performance of this back-up facility that is the subject of this document.

³ BT announced FTTP will comprise a quarter of the 66% coverage of superfast broadband deployment plans: <http://www.bbc.co.uk/news/10111724>

⁴ "Virgin Media lays new digital foundations with Persimmon Homes", Press release, November 2010, <http://mediacentre.virginmedia.com/Stories/Virgin-Media-lays-new-digital-foundations-with-Persimmon-Homes-1cd.aspx>

⁵ Summary Broadband Delivery Framework: <http://www.culture.gov.uk/publications/8512.aspx>

- 2.8 In 2008, Ofcom consulted and subsequently published a statement on our expectations for FTTP technology in new-build developments, in which we supported a battery duration of 4 hours⁶.
- 2.9 Since that guidance was issued, a number of developments have taken place, which lead us to believe that our guidance on battery back-up provision should be reviewed, in particular:
- Feedback received from early optical fibre deployments indicates that battery back-up facilities supporting at least 4 hours' protection may be expensive to procure, difficult to install and hard to maintain. These issues could not only constrain the rollout of FTTP technology, but also limit the effectiveness of the facilities.
 - We commissioned a survey⁷ of existing schemes, and this concluded that our guidance on battery back-up needed to be reviewed given the wide variety of solutions being offered in practice.
 - Changes have been made to the General Conditions of Entitlement, in particular General Condition 3 (GC3), as a result of the implementation of the revised EU Electronic Communications Framework in the UK. The changes increased the obligations on communications providers to maintain the availability of their networks, and are therefore relevant to the issue of battery back-up.
 - Large infrastructure providers, in particular BT⁸ and Virgin Media, intend to deploy FTTP technology to significant numbers of homes, and we expect additional regional FTTP deployments as a result of the government's BDUK initiative.
- 2.10 In light of these developments, we considered that it was necessary to review our guidance with respect to battery back-up with a view to ensure that our guidance remained appropriate and proportionate going forward.
- 2.11 We therefore consulted on this matter on the 28 June 2011⁹. We received 16 responses, from infrastructure providers, equipment vendors, professional bodies and individual members of the public. The arguments made and points raised during this process are set out in this document along with our response.

Views from consultation respondents

- 2.12 Overall, around a third of respondents agreed with the general focus of the consultation in terms of the need to mandate a back-up power facility for FTTP deployments to support calls to the emergency services, and the proposed duration over which such back-up would be available. Respondents who disagreed with our proposal did so for a variety of reasons. For example, a number of respondents

⁶ Statement on Next Generation New Build - Delivering super-fast broadband in new build housing developments, Ofcom, September 2008, http://stakeholders.ofcom.org.uk/binaries/consultations/newbuild/statement/new_build_statement.pdf

⁷ "UK local fibre access deployment study", Analysys Mason, January 2011.

<http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/local-fibre-access.pdf>

⁸ BT has recently announced the first exchanges at which it will offer superfast broadband exclusively using FTTP technology. <http://www.openreach-communications.co.uk/superfast/where-and-when/>

⁹ "Battery back-up for superfast broadband services which use fibre optic technology" <http://stakeholders.ofcom.org.uk/consultations/superfast-broadband/summary>

wanted longer power provision durations, whereas others argued for no battery provision to be required, or if so only on an optional basis.

- 2.13 There was, however, a widespread consensus that this was a suitable time to review the guidance for battery back-up.
- 2.14 In the remainder of this document, we review the responses received in regards to the scope, risk assessment and proposed principles that were set out in the consultation and address the arguments and concerns raised.

Section 3

Regulatory approach

- 3.1 In this Section, we summarise our duties and obligations with particular regard to the matter of ensuring uninterrupted access to PATS. Five consultation responses concerned the legal and regulatory framework within which our guidelines would apply, and these are addressed in this Section.

Basis for our guidelines

- 3.2 When the EU communications regime was implemented in the UK on 25 July 2003, licences granted under the Telecommunications Act 1984 were replaced by the General Authorisation regime. Under this regime, operators do not require a license in order to provide services to members of the public, but they do have to comply with the General Conditions of Entitlement. These Conditions are imposed by Ofcom under Part 2 of the Communications Act 2003 (the Act) and they apply to the providers specified in them.
- 3.3 The requirements in GC 3 are particularly relevant to the issue of battery back-up, and were initially imposed in July 2003 to implement the Community obligations in Article 23 of the Universal Service Directive (2002/22/EC).
- 3.4 That Article has been replaced by a new Article 23 by virtue of Article 1(14) of the so-called Citizens' Rights Directive (2009/136/EC). On 23 May 2011, Ofcom published its statement entitled 'Changes to the General Conditions and Universal Service Conditions – Implementing the revised EU framework'¹⁰. That statement includes our decisions on changes made to GC3, which now reads (in the relevant part):

3.1 The Communications Provider shall take all necessary measures to maintain to the greatest extent possible

[...]

(c) uninterrupted access to Emergency Organisations as part of any Publicly Available Telephone Services offered.

- 3.5 That obligation applies to a "Communications Provider" as defined in GC3.3, namely *"a person who provides Publicly Available Telephone Services and/or provides a Public Communications Network over which a Publicly Available Telephone Service is provided"*.
- 3.6 The expression "provide" (and cognate expressions) is to be construed in accordance with section 32(4) of the Act. It will therefore depend on the factual circumstances in each case as to who is to be regarded as "providing" the services or network for the purposes of GC3. It is the responsibility of communications providers to ensure that they apply and comply with these obligations (where they apply to them); the failure of which may lead to Ofcom's intervention. However, as explained in the consultation, we note that the apparatus installed in the customers' premises into which customers connect their in-home equipment in the present context (i.e. the ONT) constitutes an integral part of an electronic communications network, but the customer premises equipment (CPE), such as the telephone, does not.

¹⁰ <http://stakeholders.ofcom.org.uk/binaries/consultations/gc-usc/statement/Statement.pdf>

3.7 For reasons discussed in our consultation, we consider that it is important to propose guidelines on the specific issues covered by them to set out our general approach in investigating compliance of the GC3 obligations. The basis for any guidelines we may decide to adopt is therefore something that appear to us incidental or conducive to the carrying out of our functions under the Act, in particular for the purposes of taking any enforcement action going forwards.

General duties

3.8 Under the Act, our principal duty is to (a) to further the interests of citizens in relation to communications matters and (b) to further the interests of consumers in relevant markets, where appropriate by promoting competition. We consider that safety of life matters represent an important citizen interest and therefore are central to our considerations.

3.9 In performing our duties, we are also required to have regard to a range of other considerations, which appear to us to be relevant in the circumstances. In the context of continuity of telephony services, we consider that a number of such considerations are relevant, for example:

- the circumstances of citizens who appear to us as needing special protection;
- the desirability of encouraging the availability and use of high speed data transfer services; and
- the desirability of encouraging investment and innovation in the telecommunications market.

3.10 In performing our principal duty, we must also have regard to principles appearing to Ofcom to represent the best regulatory practice. We also place emphasis on the following of Ofcom's own general regulatory principles¹¹ as particularly relevant to the guidelines we have adopted in this Statement:

- ensuring that our interventions are evidence-based, proportionate, consistent, accountable and transparent in both deliberation and outcome;
- seeking the least intrusive regulatory mechanisms to achieve our policy objectives;
- consulting widely with all relevant stakeholders and assessing the impact of regulatory action before imposing regulation upon a market.

3.11 We believe that the guidelines we have adopted will help achieve these objectives by providing stakeholders with clarity and certainty on how in general we intend to approach compliance with GC3 in relation to the specific issues covered by the guidelines. Our general and non-binding approach is contained in the principles set out in Section 6, which comprise our guidelines.

3.12 However, we wish to make it clear that we may depart from the guidelines set out in Section 6 in individual cases. They are simply intended to set out the general approach we would normally expect to take in investigating compliance with the GC3 obligations, but they will not have binding legal effect and each case will be considered on its own merits. If we decide to depart from them, we will set out our

¹¹ <http://www.ofcom.org.uk/about/sdrp/>

reasons for doing so and they may be subject to further review and revision from time to time.

Views from consultation respondents

- 3.13 A number of concerns were raised in response to our consultation regarding the legal and regulatory framework in which our guidelines would apply. Hyperoptic Limited (Hyperoptic), Scottish and Southern Energy (SSE) and Virgin Media sought clarification as to whom the terms of GC3 would apply. Hyperoptic also made reference to our existing VoIP guidelines, highlighting what they considered to be inconsistencies between our proposed guidelines and the VoIP guidelines. Finally, Virgin Media and Chaltel argued that a wider range of General Conditions, beyond GC3 should apply to our consideration of the availability of telephony services.

Responsibility for ensuring compliance to GC3

- 3.14 Hyperoptic contended that our proposed guidelines appeared to place obligations directly on providers of public communications networks (PCNs). In its response, it was argued that GC3 applies only to providers of PATS and to impose the guidelines onto providers of PCNs would require a change to the wording of GC3, which itself would require separate consultation.
- 3.15 Virgin Media also expressed concerns that the consultation would impose battery back-up obligations on those offering broadband-only services, for which the specific requirement regarding access to emergency services in GC3 does not apply.
- 3.16 SSE also sought clarification as to whom the obligation to provide a battery back-up would apply. Their view was that for technical reasons the infrastructure provider would be better able to assess the customer's individual circumstances and provide the necessary equipment that would support power to the network termination equipment. Service providers, they argued, would be more numerous than PCN providers and hence greater efficiencies would be achieved as a result of PCN-delivered back-up facilities.
- 3.17 Fujitsu pointed out that in the future a number of infrastructure provision scenarios may arise, for example 'wires-only' installations whereby the infrastructure provider lays the optical fibre to the customer's premises, but leaves the equipment provision to a downstream business (e.g. a broadband provider or ISP). In such circumstances, they argued, it is unclear as to whom the obligations of GC3 would apply. Fujitsu argued that the guidelines should apply only to PATS providers.
- 3.18 We disagree with the arguments by Hyperoptic and Fujitsu. As we explain above, GC3 already applies to PATS providers as well as providers of PCNs (over which a PATS is provided). Thus, there is no need to change the wording as Hyperoptic argues, nor is it appropriate to limit the application of the guidelines as Fujitsu argues in these circumstances.
- 3.19 As regards Virgin Media's argument about broadband-only services, we clarify that our guidelines would not apply to broadband-only services where they do not constitute PATS.
- 3.20 As to the requests for clarification by SSE and Fujitsu as to whom the GC3 obligations (including battery back-up) apply, the answer to this issue requires an analysis of the facts in each case.

- 3.21 Depending on the individual factual circumstances, an infrastructure provider may well be the person who is to be legally regarded as the provider of the service in question. We drew attention to this matter in the consultation at paragraph 3.4 where we stated that *“The expression “provide” (and cognate expressions) is to be construed in accordance with section 32(4) of the Communications Act 2003. It will therefore depend on the factual circumstances in each case as to who is to be regarded as “providing” the services or network for the purposes of GC3. It is the responsibility of communications providers to ensure that they apply and comply with these obligations (where they apply to them); the failure of which may lead to Ofcom’s intervention.”*
- 3.22 Therefore, our guidelines cannot (and do not seek to) extend the persons (e.g. description of communications providers) to whom the obligations contained in GC3 apply. Instead, the guidelines provide guidance to communications providers, falling within the definition of a communications provider for the purposes of GC3, who provide superfast broadband using fibre optic technology on how we intend to generally approach compliance with, in particular, GC3.1(c).

Additional obligations beyond GC3

- 3.23 Virgin Media and Chaltel argued that a number of General Conditions and their annexes apply when considering the availability of PATS in addition to GC3, for example GC10 (customer information), GC15 (Users with disabilities) and GC5 (Emergency planning).
- 3.24 Communications providers are expected to meet the obligations of all General Conditions where applicable. The purpose of our guidelines is specifically to help communications providers considering or planning the deployment of FTTP meet their obligations under the terms of GC3. Other obligations under other General Conditions remain in force and would need to be met (where applicable) independently of, and in addition to, those contained in GC3.

Broadband-only services and consistency with VoIP guidelines

- 3.25 Hyperoptic cited the guidelines produced by Ofcom with respect to the provision of voice over IP (VoIP) services. These guidelines, Hyperoptic argued, *“concluded that VoIP service providers should negotiate SLAs with relevant PCNs concerning quality of service but that battery back-up for CPE should be a matter for each individual VoIP service provider in its discretion”*. Hyperoptic believed that VoIP providers that also provide the underlying fibre network would therefore be required to take full account of the guidelines outlined in our consultation, whereas third party VoIP providers, who have no commercial relationship with the network provider, could avoid such obligations as it would be impractical for them to ascertain the identity of the network provider and negotiate appropriate SLAs.
- 3.26 Hyperoptic and Virgin Media also argued that if the CPE had no back-up power capability, the provision of power back-up at the ONT would be redundant and potentially misleading to a customer as they may erroneously feel that they have a degree of protection in the event of a power failure. This scenario may occur either because the customer has a DECT phone, or if a broadband-only service was provided over the fibre infrastructure (in which no standard telephone is connected).
- 3.27 However, Ericsson claimed that with data services becoming ever more important and potentially supporting life-saving applications, the requirement to provide power

back-up facilities should be applied also to data (e.g. broadband-only) services over FTTP.

- 3.28 As set out in the consultation, our guidelines deal with what we expect to be a typical FTTP scenario whereby the ONT forms part of the electronic communications network itself. This means that regulatory obligations concerning an electronic communications network would include elements up to and including the ONT, but exclude consumer elements such as DECT phones and VoIP CPE (e.g. computers). Furthermore, these guidelines apply to a particular network architecture that we expect to be widely adopted; solutions that are materially different in terms of the technology used or the services offered to the customer would be considered on a case-by-case basis.
- 3.29 Our guidelines regarding the regulation of VoIP services are equally applicable to communications providers providing service over copper or fibre infrastructure, irrespective of commercial relationship between the communications provider and the network infrastructure provider.
- 3.30 We support the view that data services are becoming increasingly important and that some of these services could offer significant benefits to consumers with regards to health or safety matters. However, our primary concern in these guidelines is to provide guidance on how communications providers providing PATS over FTTP can meet their obligations under GC3 and therefore we do not consider it appropriate to extend the scope of these guidelines to include data services at this time.

Section 4

Scope

- 4.1 Our consultation sought to address a relatively new technology that we see being deployed in increasing volumes in the UK, which raises questions about the underlying assumptions related to telephone and broadband services. We are not expressing a preference for any given technology, merely outlining how we expect the existing GC3 obligations to apply in the particular scenario set out in the consultation.
- 4.2 Specifically, the consultation considered a scenario whereby a communications provider deploys optical fibre from a point of presence (e.g. an exchange) to a customer's premises. In this scenario, fibre is brought to the premises and is terminated by an ONT device installed at, usually inside, the customer's property.
- 4.3 The equipment used for the ONT is powered from the customer's mains supply, which allows the effective functioning of both the customer-facing ports as well as the optical transceiver that maintains communication with the communications provider's systems. This technology is commonplace for FTTP deployments around the world, as it has been standardised, and components and systems are manufactured in large volumes, hence lowering prices.
- 4.4 Due to the power requirements of the ONT, the normal method of maintaining power if there is mains power outage is the provision of a battery back-up. In our consultation, we indicated that in our review of battery back-up there were four options to be considered:
- retaining our support for 4 hour battery back-up provision that we provide in our existing new-build statement and associated guidance;
 - increasing the minimum battery back-up duration;
 - reducing the minimum battery back-up duration;
 - removing the requirement to provide battery back-up for FTTP.
- 4.5 We excluded alternative access technologies and non-access (e.g. backhaul and core) infrastructure, seeking to address only the FTTP scenario described above.
- 4.6 However, we did state that the scope of our consultation addressed both new-build infrastructure deployments (where no existing telecoms infrastructure would exist) as well as 'overlay' installations where a property is likely to already be passed by and/or have access to an existing telephone line.

Views from consultation respondents

- 4.7 Respondents were divided as to whether the scope of the consultation was appropriate. While around half believed that the scope was appropriate, others raised a number of issues. Some highlighted the fact that the performance of the exchange equipment plays an important role in the overall availability of a service and therefore should be included in the analysis. Others argued that the scope of the consultation should be widened to incorporate other access methodologies in order to provide a consistent set of guidelines across access technologies. Some

respondents were concerned that the broadening of the scope of our consultation to include 'overlay' deployments represented a significant extension to the existing guidelines, which raised legal, economic and practical issues. In particular, arguments were raised that customers choosing to purchase fibre-optic broadband services can also choose to retain the existing telephone line where one already exists.

Extension of scope to include 'overlay' deployments

- 4.8 While BT and IFNL specifically agreed that the obligations for FTTP deployment should be the same for overlay installations as for new-build developments (so as to provide consistency with respect to products and customer expectations), Virgin Media and Hyperoptic expressed concern over the extension of obligations for deployments to existing properties.
- 4.9 Hyperoptic argued that the consumer makes a positive choice to adopt new infrastructure and therefore can make informed choices as to whether to take an offered broadband service. Virgin Media also argued that the consultation did not adequately explain why an obligation to provide battery back-up should be expected where an FTTP network is installed and the existing copper line remains. Virgin Media was concerned that the overall costs of FTTP broadband provision would increase as a result of the requirement to provide a battery back-up in all cases even where voice may continue to be provided over copper.
- 4.10 As set out in the consultation at paragraph 4.10, the consultation concerned the provision of fibre to households or business premises that rely on fibre irrespective of whether premises have legacy copper lines available. In such circumstances, the providers of both the FTTP network and the conventional network may fall within the definition of a communications provider for the purposes of GC3 and thereby be obliged to comply with GC3. The scope of the guidelines has been extended to reflect relevant market developments and changes in the scope and application of GC3 itself. As set out above, our adopted guidelines cannot (and do not seek to) extend the persons (e.g. description of communications providers) to whom the obligations contained in GC3 apply.
- 4.11 We discuss the costs associated with battery back-up for of FTTP deployments in Section 5. With regard to the argument that customers could choose to continue to take voice services over the existing copper infrastructure, we believe that customers receiving fibre optic broadband would expect that the underlying infrastructure is also capable of supporting telephony services (as is the case for copper lines) and will seek to minimise their telecoms spend by taking advantage of the single fibre line.
- 4.12 Evidence suggests that consumers seek to minimise their telecommunications spend where possible. Currently around 15% of households (typically lower income) have no fixed telephony service, relying instead on mobile communications for their telephony.¹² Furthermore, around 53% of households take bundled telecommunications services primarily as a way to reduce overall telecommunications spend.
- 4.13 We therefore consider that it is highly unlikely that customers will maintain (and pay for) two fixed connections to the property; one for broadband and one for telephony.

¹² The Communications Market Report (CMR), Ofcom, 4th August 2011.
<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/uk/>

We are not aware of any general uptake of this from current broadband deployment. Customers are unlikely to see the option of keeping the existing copper line when taking fibre-optic broadband as a realistic choice and will seek solutions to obtain voice by other means. As a result, the single fibre connection will in many cases, just as it would be for new-build, ultimately support both voice and data services to the customer, and hence we consider it appropriate to extend our guidelines to include 'overlay' networks.

Inclusion of backhaul and exchange-based network elements

- 4.14 The British Security Industry Association (BSIA) and Chaltel were concerned that the scope of the consultation was too narrow, focussing only on the availability of the facilities provided in customers' premises. They argued that similar, or more stringent, requirements should be imposed on any roadside cabinet equipment and exchange-based systems.
- 4.15 While generally supporting the consultation scope, IFNL also highlighted the fact that service availability depends on exchange-based equipment.
- 4.16 Our consultation acknowledged that other network elements contributed to the overall service reliability in addition to the equipment that may reside in the customer's premises. However, as discussed above, our guidance is aimed to deal with a specific limitation of FTTP.

Consistency across access technologies

- 4.17 Ericsson argued that other NGA technologies (such as fibre delivered to the distribution point) may also require customer-provided power for continued operation, and therefore similar power back-up requirements should be considered for such cases. Similarly, Hyperoptic contended that a hybrid access network architecture consisting of fibre from an exchange to an intermediate point with Ethernet or other metallic line from there to the customer's premises could fall within the scope of our consultation, as power to support the customer terminal equipment would also need to be supplied from the customer's property.
- 4.18 As set out above, our consultation focused on the provision of superfast broadband through the provision of FTTP, whereby the FTTP ONT, for which battery back-up is essential, forms part of the electronic communications network itself. Given the imminent and large scale deployment of this specific FTTP approach, we consider that it is appropriate to provide guidance in this particular respect at this time. We have not looked at other approaches or technologies and do not consider that the assessment made and conclusions drawn would necessarily apply in other scenarios. Therefore, such scenarios are outside the scope of our consultation and our guidelines.
- 4.19 We would assess deployments of alternative technology configurations on a case-by-case basis. However, we would remind all communications providers to whom GC3 applies that, in the absence of specific guidelines, they would need to satisfy themselves that they are compliant with the technology-neutral obligations of GC3.

Section 5

Specific impact issues

- 5.1 In our consultation, we presented specific results of our risk assessment into back-up facilities to support telephony services over optical fibre installations. In this Section, we summarise the main points, along with the key arguments made by respondents. This Statement should be read together with our consultation document for our full reasoning and assessment.
- 5.2 Our consultation set out the principles and duties that we believe are relevant (summarised in Section 3), particularly regarding the interests of citizens, and the criteria against which the options have been assessed. All of these criteria affect the citizen/consumer either directly or indirectly. From the consumer perspective, we believe that these criteria can be summarised in the following terms:
- the level of protection afforded by the solution with respect to the risk that such protection would be called upon (in particular the likelihood that the back-up facility would be called upon in an emergency);
 - the costs associated with the provision of the solution, and the possible risk to infrastructure investment and competition that may result. High deployment costs incurred by communications providers could result in limited availability of fibre access services offered to consumers, and such costs may be passed on to customers;
 - the costs and practicalities associated with the maintenance (i.e. replacement) of batteries (irrespective of whether the communications provider or the consumer takes responsibility for the battery maintenance), and the risk and consequences if such maintenance does not occur;
 - the potential environmental issues of battery disposal/recycling;
 - the issues that could arise in accommodating the solution by consumers and the potential implications for FTTP adoption.
- 5.3 To achieve these duties and objectives, we specifically sought to:
- allow for the protection of consumers if there is a power cut to enable emergency calls where proportionate;
 - minimise, where possible, the burden on consumers in accepting and maintaining the protection solution;
 - promote efficient levels of investment in fibre access deployment and encourage competition in these markets.
- 5.4 Our assessment consisted of reviewing the power outage statistics reported by Ofgem which included their frequency and duration. We then considered the frequency of emergency calls made from fixed line phones to establish an approximate likelihood that an emergency call would be required during a power cut to a premises.
- 5.5 In summary, we found that:

- The probability that an emergency call would be made at the same time as a domestic power failure can be extremely small (of the order of many millions to one).
- Each year millions of urgent calls are made to the emergency services. The number made from fibre access lines, hence relying on battery back-up in the event of a power cut, will depend on a number of other factors including the rollout of FTTP as well as DECT and mobile phone usage and availability.
- The protection offered by a battery back-up of 1 hour is such that it should remain operational for around 74% of the time during power outages. This rises to 94% for a 4-hour battery lifetime.
- There would be an anticipated correlation between power outages and emergency calls. We expected that this would lead to more calls being made during power cuts, many being made fairly soon after the outage, thus increasing the effective protection of shorter battery back-ups.

5.6 We therefore judged that the provision of battery back-up in fibre access deployments provided a necessary benefit to consumers, although the additional level of protection offered by successively longer back-up durations falls significantly after the first hour.

5.7 We further considered that a minimum battery back-up provision of 1 hour constituted a proportionate measure for communication providers to adopt in their FTTP deployments, offering protection to customers in a manner that is sustainable over time, for the majority of cases but longer back-up may need to be provided in some cases.

Views of respondents

5.8 Mr Bartlett, BSIA, BT, C&WW, Ericsson, SSE, Mr Shersby and an unnamed respondent generally supported our proposed guidelines that expected a battery back-up to be provided in FTTP installations. However, BSIA and Mr Shersby argued for longer batteries than were proposed in our consultation. IFNL, KCOM and Mr Thomson argued that the battery should be optional for customers to take if they so choose while two more contended that a battery was not necessary. A number of respondents challenged aspects of the assessment or the underlying basis of the analysis itself.

Arguments for longer battery durations

5.9 BSIA argued for longer battery back-up durations, stating “*The power outages in the UK vary by geographical location and any proposed battery back-up needs to take this into account. The European standards for remotely monitored security systems require a minimum of 8 hours battery back up. But the BSIA realise the difficulty of supplying this sort of back-up.*”

5.10 In addition, we received responses from members of the public who felt strongly about the issue of battery back-up and were worried about the consequences of batteries with a more limited capacity.

5.11 The unnamed respondent and Ericsson wanted the requirement to provide a back-up facility and its duration to be regularly reviewed to ensure that it remained appropriate particularly in the light of VoIP and mobile phone take-up.

- 5.12 The primary focus of our guidance is to provide general guidance on how communications providers deploying FTTP can meet their obligations under GC3(1)(c), which requires communications providers to take all necessary measures to maintain, to the greatest extent possible, uninterrupted access to Emergency Organisations. While we accept that a number of additional benefits can arise from the availability of telephone services (such as health and security monitoring systems), it is with this primary focus that our considerations of proportionality need to apply.
- 5.13 We appreciate the strength of feeling on the issue of battery back-up expressed by some respondents. We reiterate from our consultation that we consider that safety of life matters represent an important citizen interest and therefore are central to our consultation and subsequent guidelines. In conducting our analysis and reaching our conclusions, we fully considered the advantages and disadvantages associated with the options set out in paragraph 4.4 above. As set out in paragraph 5.7 above, we concluded that a minimum battery back-up provision of 1 hour constitutes a proportionate measure for communication providers to adopt in their FTTP deployments, offering protection to customers in a manner that is sustainable over time, for the majority of cases. We do not consider that the responses contain new information or arguments that would lead us to revisit the analysis and resulting conclusions set out in the consultation.
- 5.14 Our consultation also acknowledged that in some cases consumers may need greater protection. We have a particular concern about vulnerable consumers who depend on 999/112 to a greater extent than the majority of the population, but there may also be a case for providing enhanced protection to households that have a history of long-duration power outages. We consider that communications providers should take appropriate steps to address such needs, taking account of the specific local circumstances.

Optional Battery

- 5.15 IFNL, KCOM and Mr Thomson argued that a battery back-up should be an option for customers to take if they feel it is necessary. IFNL contended that well informed customers should be able to decide on the importance they place on their telephony service. KCOM added that customers are already familiar with the limitations of DECT phones hence customers should be able to understand the capabilities limitations of FTTP technology. Both KCOM and IFNL highlighted cost savings and environmental benefits that could arise were batteries to be discretionary.
- 5.16 We reiterate that GC3 sets a high level of protection for communications providers to achieve. As we set out in our consultation, we believe that making the availability of a battery optional would not comply with the obligations set out in GC3. These require communications providers to take '*all necessary measures to maintain, to the greatest extent possible ... uninterrupted access to the emergency services*'.
- 5.17 Furthermore, we believe that even well-informed customers may not make an objective assessment of their risks¹³ and hence may place themselves at unnecessary risk. We therefore consider the requirement to provide battery back-up to be appropriate and proportionate.

¹³ By way of an example, see "How unrealistic optimism is maintained in the face of reality", T. Sharot, C.W. Korn & R.J. Dolan, Nature Neuroscience (2011) doi:10.1038/nn.2949, 9 October 2011. <http://www.nature.com/neuro/journal/vaop/ncurrent/full/nn.2949.html>

DECT and mobile phone usage

- 5.18 In the assessment of risk in our consultation, we considered a variety of factors, some of which were quantifiable and others that were not. Those that were considered in a qualitative manner included the anticipated deployment of FTTP, the take-up and usage of mobile phone services and the propensity of customers to have only DECT phones in the property.
- 5.19 Both Hyperoptic and Virgin media were concerned that the consequences of high mobile phone usage and widespread use of DECT phones had not been sufficiently addressed in our analysis. Specifically, they argued that users of DECT phones would derive no benefit from the existence of a battery installed with the ONT as the DECT phone itself would fail in the event of a power cut. The higher the proportion of customers that rely on DECT phones, the less benefit the ONT battery would provide. Virgin provided DECT phone take-up figures from 2004 and pointed out that such usage would have grown significantly since then. Virgin also highlighted the fact that mobile handset take-up is high and that more emergency calls are now made using mobile phones than from fixed lines.
- 5.20 As set out in the consultation (and above), our guidelines deal with what we expect to be a typical FTTP scenario whereby the ONT forms part of the electronic communications network itself. This means that regulatory obligations concerning an electronic communications network would include elements up to and including the ONT. Those regulatory obligations do not apply to consumer devices, such as DECT phones.
- 5.21 We recognise, however, that the ability to make a call will also depend on the continued operation of consumer devices. We were not able to quantify in our consultation the implications of DECT phone and mobile phone availability, but this does not mean that we ignored their implications. Our consultation, and the associated impact assessment, considered both DECT and mobile technologies and indicated the areas of uncertainty that is associated with them. For example, in the case of DECT, we do not know how many homes are totally reliant on this technology, and for mobile phones we cannot determine the correlation of power failure to coincident mobile basestation failure.
- 5.22 We reiterate that GC3 sets a high level of protection for communications providers to achieve. Our assessment has been made by reference to the terms of GC3. In this context, we would stress that GC3 requires communications providers to take all necessary measures to maintain, to the greatest extent possible, uninterrupted access to Emergency Organisations as part of any PATS offered. However, it does not ultimately guarantee access as the regulatory obligations of GC3 apply to the elements up to and including the ONT but do not extend to the CPE, such as the telephone. From the evidence presented in consultation responses, we consider that a 1 hour battery back-up is readily achievable and therefore we judge it to be a proportionate expectation for communications providers to provide to meet the obligations of GC3.

Intra-household power failures

- 5.23 Chaltel also challenged our assessment of the probability that a power failure would occur in the household. It argued that a large number of power failures in a property occur as a result of electrical failures in the property, for example blown fuses and trip-switches. If left unnoticed, particularly at night, a battery (of any reasonable duration) would run down and hence an emergency call would not be possible.

- 5.24 We agree that power failures can occur in the households as a result of circuit overloads or other events that cause fuses to blow or circuit breakers to activate. However, we also consider that in the majority of such situations the householder is able to rectify the situation relatively quickly and easily. We believe that risks to the safety of life are more acute when the restoration of power is not in the gift of the householder, and hence our focus on 'external' power failures attended to by the power distribution organisations.

Costs associated with battery back-up

- 5.25 Hyperoptic and Virgin raised concerns over the costs that would be associated with the provision of back-up power facilities. Virgin asserted that mandating battery back-up for all FTTP deployments, particularly for overlay scenarios, would prevent a justifiable business case from being adopted. Moreover, Hyperoptic claimed that a battery back-up facility would represent up to 50% of their overall equipment costs.
- 5.26 Our consultation did acknowledge and took due regard of the costs associated with battery back-up facilities citing independent analysis into the costs associated with the FTTP architectures that are the focus of this guidance.
- 5.27 The response from Hyperoptic concerned a hybrid architecture which is materially different to that of the primary focus of this guidance, and would therefore need to be considered separately.
- 5.28 The response from Virgin contained no evidence to support their assertion that battery back-up would prevent a business case to be made, and we reiterate that from the evidence presented in other consultation responses, we consider that a 1 hour battery back-up is readily achievable. We therefore judge it to be a proportionate expectation for communications providers to provide to meet the obligations of GC3.
- 5.29 We received no specific evidence from the other respondents to counter the overall cost assumptions that were presented in the consultation. In examining any specific case we would consider any relevant additional evidence that was presented.

Power over fibre solutions

- 5.30 Chaltel challenged the underlying basis on which this guidance is made and the consequent conclusions. In summary, Chaltel argued that current telephone technology allows almost continuous operation irrespective of the power availability in the customer's property and this is standard by which other solutions should be judged. It is not a valid assumption, Chaltel claimed, that a battery back-up was the only solution to the question of telephone availability during domestic power outages.
- 5.31 Chaltel proposed a mechanism that would allow basic telephony services to be supported using optical power provided by the exchange-based equipment. In this way, telephone availability over FTTP could, it was argued, be similar to current copper-based technology. Chaltel contended that the requirements of GC3, and the EU Framework directives on which they are based, can only be met through the adoption of such an approach.
- 5.32 We consider that the proposed solution from Chaltel is not sufficiently mature for us to consider in our impact assessment. In particular, we are not aware of any commercially available systems in the market and therefore we are unable to determine the solution's capital costs, installation implications, maintenance

requirements and broadband capabilities. However, if Chaltel or other stakeholders obtain evidence of such matters, we would welcome them drawing it to our attention in the future.

- 5.33 As set out above, our guidelines provide guidance on how providers of superfast broadband over fibre optic technology may meet their obligations under GC3. If it is possible for communications providers to use alternative means to comply, including the proposed solution described by Chaltel, then we will consider the merits of such solutions on a case by case basis.

Alarms and notification

- 5.34 BT suggested that a call to the emergency services should be ‘flagged’ to inform the call handler that the caller is on an FTTP line.
- 5.35 While such a mechanism may be beneficial in that it could alert the call handler to the fact that the caller’s line may cease to function as a result of the finite battery duration, we acknowledge that technical and process issues may also arise in the correct handling of this information. Given that we have not been able to consider these issues in detail, we do not consider that it would be appropriate for us to set out specific expectations in our guidelines.
- 5.36 The unnamed respondent argued that when there was an issue with the battery at the customer premises, in addition to customer notification, an alarm should be raised to the relevant communications provider so as to aid maintenance and support.
- 5.37 We do not intend to provide detailed guidance on how communications providers should manage the provision and maintenance of the battery backup solutions adopted. Alarm generation and monitoring may be one such method, as may a proactive maintenance regime. We would expect communications providers to develop procedures and practices that are appropriate to the solution adopted.

Enhanced protection for vulnerable customers

- 5.38 In our consultation, we stated that it was likely that there would be a small number of individual consumers for whom additional protection beyond 1 hour may be necessary in order to provide a commensurate level of protection.
- 5.39 There were a number of reasons why this may be the case, for example:
- vulnerable customers who depend on 999/112 services to a far higher extent than the majority of the population and for whom additional protection would be particularly important;
 - households that have a history of long-duration power outages.
- 5.40 We therefore proposed that communications providers should take steps to address the needs of such individuals. We considered that due to the different circumstances that customers may face and the solutions that may be available to communications providers of different scales and with different resources, a specific solution could not be specified.

Views of respondents

- 5.41 While most respondents conceded that vulnerable individuals would exist and would benefit from additional protection, responses were mixed as to how best to achieve this, or whether it was practicable to identify and subsequently serve such customers.
- 5.42 BSIA agreed in principle with the proposal for enhanced protection facilities, but they argued for a clear, unambiguous statement of intent of how communications providers will provide this additional protection. On the other hand, BT did not believe that it was appropriate to indicate what technology approach should be taken.

Clarification of responsibilities

- 5.43 S&SE and Virgin questioned on whom the obligation to identify and subsequently address the needs of vulnerable customers applies.
- 5.44 As set out in Section 3 above, the obligation to comply with GC3 applies to those communications providers that fall within the definition of a Communications Provider for the purposes of GC3.

The identification of vulnerable customers

- 5.45 C&WW, Hyperoptic and IFNL argued that the identification of vulnerable customers would be difficult to achieve, although Virgin Media and the unnamed respondent pointed out that communications providers normally have a 'priority fault repair service', which would be one mechanism by which vulnerable customers could be identified (and S&SE also noted that power companies keep priority services registers of vulnerable customers). IFNL pointed out that customer churn would further complicate customer identification as the network infrastructure provider may not be aware of the changing circumstances of individuals once fibre optic installation is complete.
- 5.46 We consider that, where a communications provider assesses whether customers require additional protection, the process of identifying potentially vulnerable customers should not be unnecessarily onerous on a communications provider.
- 5.47 Firstly, Ofgem annually publishes power outage statistics for each of the individual power distribution companies and the geographic area that they serve. This information should provide a high level indication whether a customer might experience significantly longer than average power outages.
- 5.48 Secondly, we do not consider asking additional questions of customers about their circumstances would constitute an undue impediment to the provision of optical fibre services. Customers that have previously needed emergency assistance, have been significantly affected by long-duration power cuts, or are currently listed as a vulnerable individual on, for example, power distribution company databases¹⁴ are likely to reveal this if asked by the communications provider.
- 5.49 We emphasise that we do attach particular importance to the needs of vulnerable consumers. We do not propose to specify in detail how those needs should be met, given that this is likely to depend on individual circumstances, but we do expect communications providers to address these needs in a responsible manner.

¹⁴ Should communications providers need to verify this information with the relevant organisation(s), they may need to seek the customer's consent.

Costs associated with additional protection

- 5.50 Hyperoptic and IFNL argued that offering additional facilities would be expensive to provide (for example, due to the costs associated with increased inventory).
- 5.51 Our consultation recognised that there are a number of different approaches that communications providers may decide to adopt in order to address the needs of vulnerable customers. However, we do consider it important that communications providers should respond appropriately and responsibly to the needs of vulnerable customers, making available suitable solutions (for example, the provision of a larger battery) to such customers.
- 5.52 The costs associated with the provision of such facilities would depend on the number of customers for whom enhanced protection was required, the amount of protection provided and the specifics of the solution developed. How the costs of such facilities are recovered would also be a matter for communications providers to establish as part of their product/service specification.

Documenting compliance

- 5.53 We encourage communications providers to carefully document the steps they take in ensuring compliance with GC3 obligations, including our guidelines. Such documentation is likely to assist with any investigation we may carry out, particularly with regard to vulnerable customers.

Section 6

FTTP Battery Back-up Guidelines

- 6.1 This Section describes the key principles that we believe provide communications providers (to whom GC3 applies) in assessing their compliance with obligations under GC3 with respect to the continuity of availability of telephony services over FTTP.
- 6.2 These principles derive from our consideration of the matters discussed in consultation document and the previous Sections of this statement and of the responses and arguments put forward by respondents.
- 6.3 These principles (which together comprise our new guidelines) supersede our position regarding battery back-up for FTTP as set out in previous statement¹⁵ and guidance¹⁶ in their relevant parts and those documents should be read accordingly.

Principle 1 – A battery must always be provided

- 6.4 We consider that the provision of a battery back-up capability for fibre access installations represents a minimum necessary measure for communications providers to deploy, allowing consumers to access the emergency services from fixed line communication services.
- 6.5 By battery back-up, we are referring to one or more self-contained units capable of providing electrical power over an extended period of time to enable uninterrupted access to emergency organisations, where the service constitutes PATS.
- 6.6 This principle applies to communications providers deploying FTTP infrastructure to new-build as well as existing properties that may, at the time of installation, already be served by a copper line.
- 6.7 We consider that making battery back-up an optional capability for consumers to elect to have provided would not meet the obligations under GC3.
- 6.8 If the consumer takes responsibility for the replacement of batteries, then the communications provider should provide appropriate guidance as to how this is achieved. In such circumstances, we would normally expect replacement batteries to be easily obtainable.
- 6.9 The battery back-up unit should have a facility making the customer aware that the battery is low or has failed, so that a replacement can be obtained promptly. If the communications provider retains responsibility for battery maintenance, Ofcom would expect that procedures and practices are developed that are appropriate to the solution adopted.

¹⁵ Statement on Next Generation New Build - Delivering super-fast broadband in new build housing developments, Ofcom, September 2008,
http://stakeholders.ofcom.org.uk/binaries/consultations/newbuild/statement/new_build_statement.pdf

¹⁶ New Build Investment Guidance on Telecoms Regulation, Ofcom, May 2009
<http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/NewBuildGuidance.pdf>

Principle 2 – The minimum battery duration should be 1 hour

- 6.10 We consider that 1 hour battery back-up capability represents an appropriate minimum level of protection to provide to customers taking FTTP services for the majority of cases. In other words, if a communications provider were to provide battery back-up capability of less than 1 hour in any particular case, we would expect to find the obligations under GC3 have not been complied with.
- 6.11 It is, however, the responsibility of communications providers (to whom GC3 applies) to ensure that they in all cases meet the obligations under GC3. This may mean that in specific cases that enhanced protection with battery back-up capability of more than 1 hour should be provided to the customers in question.
- 6.12 In this context, we remind communications providers of other regulatory obligations that may also apply and be relevant to battery back-up. In particular:
- General Condition 9: In offering to provide, or providing, a connection to a PCN and/or PECS, Communications Providers (as defined for GC9) shall specify (among other things) at least the services provided, including in particular whether or not access to Emergency Services and Caller Location Information is being provided, and any limitations on the provision of access to Emergency Services. We consider that information about battery back-up capability is relevant to that obligation.
 - General Condition 10: Communications Providers (as defined for GC10) shall ensure the publication of clear and up to date information on prices/tariffs as well as standard terms and conditions, in respect of access to and use of PATS, including a description of the PATS offered and any types of maintenance service offered.
 - Annex 3 to General Condition 14: Service Providers (as defined for GC14) shall provide certain minimum consumer information to Domestic and Small Business Customers, including clear and readily accessible information, during the Sales Process, in the Terms and Conditions of Use and in any User Guide; that, although access to Emergency Calls is provided, the Service may cease to function if there is a power cut or failure.
- 6.13 Therefore, in addition to providing the minimum battery back-up provision discussed above, we also would expect that the sufficient information is available so that prospective customers can make an informed decision as to whether to take the fibre optic broadband service, and if so, allow customers to derive and maintain the maximum benefit from the battery back-up. Customer information could include:
- The key differences between fibre access technology and the existing copper-based telephony provision, particularly with respect to the ability to make calls in the event of a power outage at the premises.
 - The levels of back-up that the offered solution provides and what this means for the customer in terms of fixed-line access to the emergency services in the event of a power failure.
 - What equipment the battery supports (usually only the ONT), hence the implications if, for example, DECT phones are used in the household.

- The capacity/characteristics of the battery to support the minimum level of back-up (for example the associated Ah rating) and how new batteries can be obtained.
 - The importance of maintaining power to the ONT whenever possible to prevent unnecessary battery usage/drain and to maximise the availability of the telecommunications network (for example, not to switch the power off at night).
- 6.14 It is anticipated that there will be some individual consumers for whom additional protection beyond 1 hour may be necessary in order to provide a commensurate level of protection, for example households that have a history of long-duration power outages and vulnerable customers who depend on 999/112 services to a far higher extent than the majority of the population and for whom additional protection would be particularly important. Therefore, we consider that communications providers should take appropriate steps to, where appropriate, identify and address the needs of customers that would benefit from additional protection.
- 6.15 We recognise however, that there are a number of different approaches that communications providers may decide to adopt in order to address the needs of such customers.
- 6.16 One approach may be the development of an enhanced protection facility that is offered to those individuals that need additional protection.
- 6.17 Other options may include the deployment of a common, enhanced, protection facility to all customers in order to minimise, for example, development and inventory management costs, while still addressing the needs of individual vulnerable customers.
- 6.18 We would consider the approaches adopted by communications providers on a case by case basis to determine whether they address the needs of their customers.
- 6.19 Whatever approach is taken, we encourage communications providers to carefully document the steps they take in ensuring compliance with GC3 obligations, including our guidelines. Such documentation is likely to assist with any investigation we may carry out, particularly with regard to vulnerable customers.
- 6.20 Noting the pace of technological developments, we are likely to revisit this guidance as and when required to reflect any relevant developments, such as FTTP ONT power consumption, inherent battery technology, electricity distribution network availability, alternative communications methods along with FTTP take-up and usage patterns.