



Next Generation New Build

Delivering super-fast broadband in new build housing
developments

Statement

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Section 1

Executive Summary

Introduction

1.1 In our April 2008 Next Generation New Build consultation we set out to clarify the regulatory environment for fibre network deployments in new build developments. We outlined our proposed approach and asked for views on a number of issues covering:

- Standardisation of wholesale access products;
- Ofcom's approach to promoting competition and consumer choice;
- Meeting existing regulatory obligations;
- Providing uninterrupted access to emergency services; and
- Duct access.

In this statement we outline the views of consultation respondents on these issues and provide guidance on our regulatory approach.

1.2 Our focus in this statement is specifically on next generation access networks deployed where no telecoms infrastructure yet exists, in other words new build fibre deployments. The *Delivering super-fast broadband in the UK* consultation, published in parallel to this statement further sets out our overall approach to regulating next generation access networks more generally, and its main focus is on next generation access overlay networks, where fibre replaces parts of existing access network infrastructure.

Regulatory approach

1.3 The central aim of our regulatory approach for new build fibre deployments is to promote competition, which will provide consumers with the benefit of choice. We are keen to avoid the situation where consumers in a new build development with a fibre network only have access to the services and products of a single communications provider. In order to ensure that this does not happen we want to promote competition in both infrastructure ownership and service provision, by ensuring appropriate wholesale access products are made available.

1.4 For new build fibre deployments, if it is apparent that there is only one telecoms access network then we would expect the operator of that network to provide access to it on a fair, reasonable and non-discriminatory basis through fit for purpose wholesale access products. Our approach applies equally to all new build fibre developments and operators.

1.5 At this stage we intend to adopt an approach to regulation based on setting out our expectations rather than formal regulatory intervention. As the market for new build fibre will initially be relatively small, this is likely to be less intrusive, and thus costly, to the industry which in turn should mean that it is more effective for consumers. It should also provide the new build fibre industry with an opportunity to develop flexibly and adapt as the market evolves and grows. However, if this less formal approach proves ineffective, we will undertake the relevant assessments and reviews, and, where necessary, impose formal obligations.

- 1.6 Until new market reviews are completed *existing* regulatory obligations will only apply to the extent that existing market definitions encompass these kinds of fibre deployments.

Wholesale access products

- 1.7 In order to ensure contestability and competition in new build fibre deployments, we believe that both passive and active wholesale access products may have a role to play.
- 1.8 We would expect new build fibre infrastructure providers to install spare capacity in their ducts and use sub-ducting to ensure that the capacity of any installed duct is sufficient to support duct sharing in the future, should that prove necessary to ensure effective competition.
- 1.9 We would expect operators to consider the provision of an Active Line Access-based product to support effective competition between service providers. We would like to see a standardised Active Line Access-based products support the five competitive characteristics that we have identified in our work with operators, vendors and consumer groups¹. We will continue to work with industry to ensure that the identified characteristics are supported by wholesale access products, and will help push forward the process of standardisation.

Replication of existing regulatory products

- 1.10 Currently BT and KCOM (in the Hull area) have been found to hold a position of significant market power (SMP) in certain markets and accordingly regulatory obligations have been placed on them. In fulfilling these regulatory obligations BT and KCOM are offering a number of 'regulatory' products. However, in a new build fibre network we recognise that it may be impractical and/or unnecessary to exactly replicate these existing regulatory products. Therefore we prefer to adopt a pragmatic approach to the wholesale products that are used to fulfil any regulatory obligations or expectations.

Uninterrupted access to emergency services

- 1.11 Ofcom's interpretation of General Condition 3.1(c) is that the access network needs to be capable of supporting uninterrupted access to Emergency Organisations in the event of a loss of power in the consumer premise. In a 'copper' access network this requirement is usually fulfilled by the ability to power the telephone line from the exchange. However, it seems that there are currently no technologies commercially available that enable such line powering in a fibre access network and therefore in order to fulfil this requirement it is likely that backup power supplies would need to be installed in the consumer premise.
- 1.12 We would expect the network providers to initially supply the relevant customer premise equipment with a backup power supply. As per our VoIP guidelines², the voice service providers do not always have the necessary control of the underlying network infrastructure and therefore may be unable to have control of the necessary network integrity and service reliability to ensure uninterrupted access. We would therefore expect these providers to take all reasonable steps, such as completing risk assessments and coming to service level agreements with network providers in order

¹ <http://www.ofcom.org.uk/telecoms/discussnga/eala/ethernetala/seminar/>

² <http://www.ofcom.org.uk/consult/condocs/voip/voipstatement/voipstatement.pdf>

to comply with the General Condition but would, at this stage, leave to the voice service provider the decision to provide an alternative power supply themselves.

- 1.13 The decision about the exact length of time a backup power supply should last is for network and service providers to determine. However, to provide an indication of what level of time we would consider practicable and reasonable, we support the option chosen by new build fibre providers that are generally initially opting for backup lasting at least 4 hours. This is also in line with the options followed internationally.

Section 2

Background and Context

Introduction

- 2.1 Today over 58% of all households have a broadband connection and over 82%³ have a choice of multiple providers. Consumers are using their broadband connections to access an increasingly diverse range of new applications and services. With this, some of today's consumers are also expecting services to move beyond the relatively low speeds that are currently widespread.
- 2.2 Stemming from this changing consumer usage and expectations is a general consensus that current generation access networks based on copper will, at some point, be replaced by next generation access networks using fibre technologies designed to overcome the bandwidth limitations of copper technology.
- 2.3 In the UK the first examples of next generation access networks are being deployed as part of new housing developments. These early deployments are welcomed by us as they provide the first opportunity to observe the potential of new, faster broadband services in practice. They also highlight some of the practical challenges associated with the provision of next generation access networks.
- 2.4 In our April 2008 Next Generation New Build consultation we set out to clarify the regulatory environment for next generation access network deployments in new build developments. We outlined our proposed approach and asked for views from stakeholders on a number of issues covering: standardisation of wholesale products, Ofcom's approach to promoting competition and consumer choice, the application of existing regulatory obligations, providing uninterrupted access to emergency services, and duct access. In this statement we outline the views of consultation respondents on these issues as well as outline guidance around our regulatory approach.
- 2.5 Our *Delivering super-fast broadband in the UK* consultation, published in parallel to this statement further sets out our overall approach to regulating next generation access networks. Its main focus is on next generation access networks, where fibre replaces parts of existing access network infrastructure. In this statement we seek to outline our regulatory approach specifically for next generation access networks deployed where no telecoms infrastructure yet exists, in other words new build fibre deployments.

Opportunities and Challenges

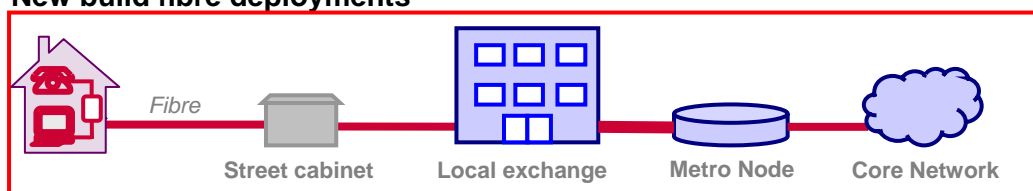
- 2.6 The introduction of next generation access networks will bring about a fundamental change in telecommunications infrastructure. Fibre deployments in new build premises present both new opportunities and challenges.
- 2.7 As the first practical application of next generation access networks, new build fibre deployments face challenges in terms of uncertainty. It is not yet known exactly what systems, equipment and services will prove successful or what technical problems may emerge. At the wholesale level, it is not yet clear what the level of demand will be, what sort of products may be successful, and how the systems of different

³ Proportion of premises connected to unbundled BT exchanges

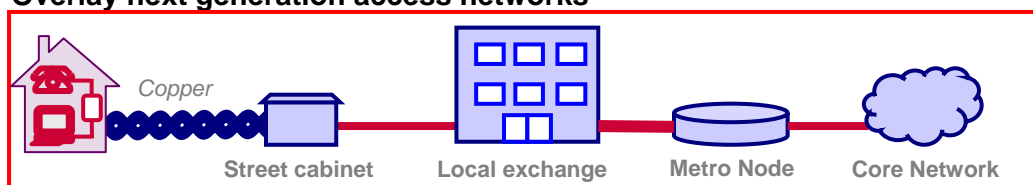
operators will interact with each other. It is also not clear exactly what level of consumer demand there will be, what sort of products and services customers will want and what they will use their connections for. Having said this, new build fibre deployments also provide a unique opportunity to try out new products and services both at a wholesale and retail level on a smaller scale, ahead of wider next generation access rollouts.

- 2.8 Based on the announced plans by investors in next generation access in the UK, a fundamental difference between new build fibre deployments and next generation access overlay networks elsewhere will be the technology connecting the end customer with the street cabinet and exchange. In new build fibre deployments, the fibre technology will generally go all the way into the end-customer's home. In contrast in overlay next generation access networks, there will still be a copper loop between the street cabinet and the end customer. It is the prevalence of fibre technology in new build deployments that drives the key regulatory issues we are addressing in this statement.

New build fibre deployments



Overlay next generation access networks



- 2.9 We are already seeing that new build fibre is providing new players with the opportunity to enter the market for fixed telecoms networks and services. For the new entrants themselves there may be challenges in understanding how the market will work in terms of consumers, competition but also regulation. For the market as a whole, the entry of new providers may introduce new ideas and innovations, building on the experiences gained in other sectors and new perspectives on service provision and delivery.

Market conditions and industry activity

- 2.10 Current economic conditions and specifically the conditions in the housing market are likely to affect the number and timing of new build developments being completed and, with this, the rate at which new build fibre will be deployed.
- 2.11 The Government has previously announced a target of 2 million new homes to be built by 2016 and 3 million by 2020. In a speech in July 2008, Caroline Flint, Minister for Housing, outlined that housing starts and completions are currently each down by around a fifth compared with the same time in 2007. In addition to this, lending conditions are very tight, with mortgage approvals having fallen by 60 per cent compared to the previous year. The minister outlined that despite these short term challenges the Government's longer term goals and target for building more housing remain.
- 2.12 The growing population and trends towards increasingly smaller households means that demand for more housing will continue. While current economic conditions may

mean that the rate at which this demand is met will slow, the overall level of demand itself will remain, or even grow over time.

- 2.13 For new build developments this suggests that while the current economic conditions are creating a challenging environment, over the longer term continued demand for housing is likely to lead to the starts and completions picking up again. This is likely to present opportunities for further new build fibre deployments.
- 2.14 In terms of industry activity, there are a number of new developments that have confirmed their intentions to deploy fibre. These include:
- Ebbsfleet Valley in Kent;
 - Titanic Quarter in Belfast;
 - Wembley Park in London;
 - MediaCityUK in Salford; and
 - Corby in Northamptonshire.
- 2.15 Having said this, over half of new build homes are still served using copper rather than fibre. This is largely due to the majority of new builds being on infill sites, rather than large green field site developments that require completely new telecoms infrastructure to be rolled out. Using fibre in infill new build sites may be an area of potential growth of fibre deployments going forward. If first deployments of fibre prove successful, home builders may be more willing and likely to use this technology for all new builds.
- 2.16 It is also worth noting that we have completed some work specifically on the Ebbsfleet Valley development. Following consultation in June, in August 2008, Ofcom published a statement granting BT Retail consent to charge non-uniform prices for certain telephony services when it pilots the delivery of telephony services over optical fibre cables at Ebbsfleet⁴.

Aims of the statement

- 2.17 We have two main aims for this statement:
- We want to present Ofcom's regulatory approach for the key areas of concern discussed in consultation responses and related stakeholder engagement.
 - We want to, where relevant, provide guidance to market players around what Ofcom's regulatory approach may mean for them.

Structure of the statement

- 2.18 The rest of this document is structured as follows:
- Section 3 will provide an outline of our regulatory approach and how current regulation will apply to different providers
- Section 4 to 6 will outline views from consultation respondents and our regulatory approach and guidance for:
- Wholesale access
 - Replication of existing regulatory products
 - Uninterrupted access to the emergency services

⁴ http://www.ofcom.org.uk/consult/condocs/ebbsfleet_fibre/statement/

Section 3

Regulatory approach

Ofcom's primary duties

- 3.1 As we have previously outlined in our consultation document, Ofcom's principal duties, as defined by section 3(1) of the Communications Act 2003, are:
- to further the interests of citizens in relation to communications matters; and
 - to further the interests of consumers in relevant markets, where appropriate by promoting competition.
- 3.2 In addition, we have a number of statutory duties and powers relevant to next generation access deployments. In meeting those duties, Ofcom:
- is required to secure the availability throughout the UK of a wide range of electronic communications services;
 - must have regard, where relevant, to the desirability of encouraging investment and innovation in relevant markets; and
 - must have regard, where relevant, to the desirability of encouraging the availability and use of high speed data transfer services throughout the United Kingdom.

Regulatory principles

- 3.3 Underpinning our regulatory approach in both new build and overlay next generation access networks are five regulatory principles. These are based on the original regulatory principles outlined in our 2005 Strategic Review of Telecommunications⁵ but also expanded to reflect the differing characteristics of next generation compared to current generation access networks⁶:
- *contestability*: an investment is contestable when it can be made by more than one potential investor. We think that timely and efficient investment will best be achieved by making the investment contestable, allowing any operator who considers that there is a business case for deploying next generation access infrastructure to invest, as soon as they wish;
 - maximising potential for *innovation*: we believe that the scope for innovation and differentiation is essential for competition in next generation access, and that infrastructure ownership enables maximum innovation. Where this is not practical other forms of access should give as much control of the underlying infrastructure as possible to maximise the potential for innovation;
 - *equivalence*: strong competition in current generation broadband has been helped by ensuring that all operators are able to buy exactly the same wholesale products, with the same processes and at the same price, as vertically integrated operators with significant market power. We propose to apply this principle to next generation access. If new build telecoms infrastructure becomes a bottleneck asset, i.e. one that cannot be replicated, then access to that asset should be provided on equivalent terms between competing providers and the asset owner's downstream divisions;

⁵ http://www.ofcom.org.uk/static/telecoms_review/index.htm

⁶ See: http://www.ofcom.org.uk/consult/condocs/nga/future_broadband_nga.pdf

- reflecting *risk* in returns: we recognise that anyone who makes investments in next generation access is likely to face significant commercial risks. Regulation should reflect these risks in order to provide appropriate incentives to invest in the first place; and
- regulatory *certainty*: the regulatory regime should be clear and in place for a reasonable period of time to provide investors with the clarity needed to invest with confidence.

Promoting choice in new build fibre deployments

- 3.4 We believe that it is desirable for consumers in new build areas to be able to buy similar basic fixed telecoms services as consumers elsewhere but would also like to see them have access to new innovative services. As a result, the central aim of our regulatory approach for new build fibre deployments is to promote competition, which in turn provides consumers with the benefits of choice.
- 3.5 Where there is only one access network infrastructure in a given area controlled by one operator, there is a possibility that the operator could choose only to make its own service available at a price that it sets independent of competitors. The choice for consumers in this case would effectively be between taking the only service available at the prevailing price, or forgoing a fixed line service altogether. This is a situation that we want to avoid and as a result want to promote both contestability and competitive access.

Promoting competition in infrastructure ownership

- 3.6 There are various ways in which competition could be supported in a new build environment. New build developments provide opportunities to have competing access networks, as the incremental cost of installing multiple networks or additional physical capacity is likely to be much lower in new build compared with upgrading existing networks. The installation of either parallel ducts or a single duct but with spare capacity would allow other operators to install competing networks.
- 3.7 Even where multiple networks are not deployed together initially, or where duct is not deployed, other options for later deployments of access networks exist. Competing networks may be deployed later by using wireless technologies, using alternative wayleaves or operators may choose to incur the costs of the civil works associated with installing a new or additional network where buildings and infrastructure already exist.
- 3.8 However, giving other operators the ability to install competing networks does not automatically equate to competition. There may be situations where, even though other operators could install competing networks, the economics of supporting multiple networks in a given location may not be viable. In these cases the promotion of competition in service provision is likely to be required.

Promoting competition in service provision

- 3.9 If there is only one network, competitive access to that network is likely to be required to promote competition in services for consumers. This can be achieved by the network owner or operator providing wholesale access products that allow competitors to provide services to end customers over the access network.
- 3.10 Wholesale access may be provided on commercial terms. From our conversations with potential new build fibre investors it is clear that they are often keen to attract as

many service providers as possible to their network and propose 'open access' networks using wholesale access in order to provide end customers with the greatest possible choice. Where wholesale access is provided in this way but service based competition nevertheless fails to materialise, regulatory intervention may be required.

Regulatory obligations in next generation access networks

Views from consultation respondents

- 3.11 Respondents generally supported our approach to promoting competition and consumer choice.
- 3.12 However, multiple communication providers highlighted that the limited size of new build developments acts as a deterrent to investment in this area. This suggests that the nature of the market may not lend itself to the levels of competition and consumer choice experienced in the current copper market. Further respondents, generally those that did not support duct access, suggested that infrastructure competition in new build would be inefficient and not feasible.
- 3.13 BT suggested that, in considering ways of promoting competition and consumer choice, a balance between obligations on infrastructure providers and incentives to invest would have to be found. It further suggests that the business case for next generation access would be undermined if there were too many obligations aimed at promoting competition.
- 3.14 Further, respondents highlighted concerns about continued regulatory uncertainty surrounding new build fibre developments. Greater clarity was requested on what regulation would apply to different players and what this would mean for them in practice.

General approach

- 3.15 As indicated above, the cornerstone of our approach to new build fibre developments is that consumers should have a choice between competing service providers. We do not want to be overly prescriptive about how that objective should be achieved. Indeed, as set out in *Delivering super-fast broadband in the UK* and discussed further in the next section, we believe that effective competition could be achieved using a variety of wholesale access products, both active and passive in nature. However, we recognise the need for us to establish some clear expectations, in order to provide greater regulatory certainty for prospective investors.
- 3.16 In the light of the analysis undertaken and the inputs received during this consultation process, our expectations are as follows:
- In a new build environment, if it is apparent that only one telecommunications access network is viable then we would expect the operator of that network to provide access to it on a fair, reasonable and non-discriminatory basis through fit for purpose wholesale products.
 - We would encourage operators to use open standards when developing wholesale access products and to agree the implementation with prospective wholesale customers.
 - We would expect new build developers to install spare duct capacity and use sub-ducting, the adoption of which should ensure that the capacity of the installed

duct would be sufficient to support duct sharing in the future, should that prove necessary for effective competition. This is discussed further in the next section.

- In addition, we would expect operators to consider the provision of an Active Line Access (ALA)-based product, which is capable of supporting effective competition between service providers. The characteristics of such a product are discussed further in the next section, and in more detail in our *Delivering super-fast broadband in the UK* consultation.

- 3.17 These expectations apply equally to all new build developments and operators.
- 3.18 It is important to note that at this stage these are expectations and not formal regulatory requirements. In order to impose formal obligations it would be necessary for us to carry out a market review, and find that the operator in question holds a position of significant market power (SMP).
- 3.19 At this stage we have chosen to clearly express our expectations in order to help to avoid that operators incur unnecessary costs which may be caused by network re-engineering carried out at a later stage in order to implement effective and appropriate wholesale access products after network roll-out. In the case of new build fibre deployments, we would prefer to signal our expectations up front, as this is likely to be both more effective for consumers and less disruptive and costly for the industry.
- 3.20 At the same time, it is important to emphasise that, should this approach of signalling prove ineffective in particular cases, we would be prepared to undertake the relevant market reviews, and to impose appropriate formal SMP obligations where relevant, in the event of an SMP finding.
- 3.21 As should be apparent from the above, at this stage we are not seeking to define the markets into which wholesale products such as ALA-based products and duct access might fall. That exercise would only be undertaken in the event of a market review. In our view, however, it is highly likely that an operator would hold a position of SMP if their network was the only one available to consumers in the new build area.
- 3.22 The question of how *existing* regulatory obligations will be applied in new build areas is covered in section 5 below. In general, our position is that until new market reviews are completed *existing* regulatory obligations will only apply to the extent that existing market definitions encompass these kinds of fibre deployments

Universal Service Obligation

- 3.23 Universal Services ensure that basic fixed line services are available at an affordable price to all citizen-consumers across the UK.
- 3.24 The scope of the Universal Service Obligations (USO) is defined by the Universal Services Directive⁷. The Secretary of State for Trade and Industry (now the Secretary of State at the Department of Business, Enterprise and Regulatory Reform) specified the services which must be provided throughout the UK in the Universal Service Order (the Order)⁸. The Order has been implemented by Ofcom

⁷ Directive 2002/22/EC of the European Parliament and of the Council on universal service and users' rights relating to electronic communications networks and services

⁸ The Electronic Communications (Universal Service) Order 2003 (SI 2003 No 1904), see: <http://www.opsi.gov.uk/SI/si2003/20031904.htm>

through specific conditions on the current Universal Service Providers (USPs), BT and KCOM in Hull.

- 3.25 Services included under the USO are: special tariff schemes for low income customers; a connection to the fixed network, which includes functional internet access; reasonable geographic access to public call boxes; and the provision of a text relay service for customers with hearing impairments.

Views from consultation respondents

- 3.26 Although we posed no questions directly related to Universal Service Obligations in the consultation document, a number of respondents outlined their views on this issue for new build fibre deployments.
- 3.27 BT was of the view that USO should fall on the infrastructure provider, whoever that may be. It highlighted that the development of standard wholesale access products and interfaces could help to meet these requirements. BT also suggested that further consideration should be given to USO in a next generation access setting, highlighting that it is important that decisions about requirements are not taken too early and risk becoming obsolete or unnecessary as a result of changes proposed at an EU level.
- 3.28 KCOM believed that it would be invidious for the two USO incumbents to be required to carry out an overbuild where the investment occurred by another operator.
- 3.29 Thus questioned how the USO would apply in the setting of new build developments served by communications providers other than BT. Specifically it asked whether BT would have to provide a competing overlay network or whether it would be able to outsource its service provision to another provider.

USO in new build fibre developments

- 3.30 New build fibre deployments raise questions for both USPs and infrastructure providers around the obligation to provide a connection to the fixed network. The differences between current and next generation access technologies might raise questions about whether the way USO services are delivered to customers may need to change. Further, current plans for new build fibre deployments indicate that there will be locations where USPs are not themselves the primary infrastructure providers, as has predominantly been the case in current copper infrastructure. These factors together mean that fulfilling USO in new build fibre deployments could pose new regulatory issues.
- 3.31 In March 2006 we published a guidance document on fibre access for new build premises and community broadband access networks⁹. In this we provided further details around our regulatory position with regard to the USO in this context. This guidance continues to apply. However, we would like to provide additional clarity on a number of points:
- The Universal Service Directive does not specify a technology for the delivery of USO services. Therefore, the move from copper to fibre does not automatically alter the application of the USO. As we outlined in our 2006 guidance, USPs cannot refuse a request to provide service as unreasonable solely on the basis that the customer lives/works within an area already provided with fibre.

⁹ <http://www.ofcom.org.uk/telecoms/ioi/orp/fibreaccess/>

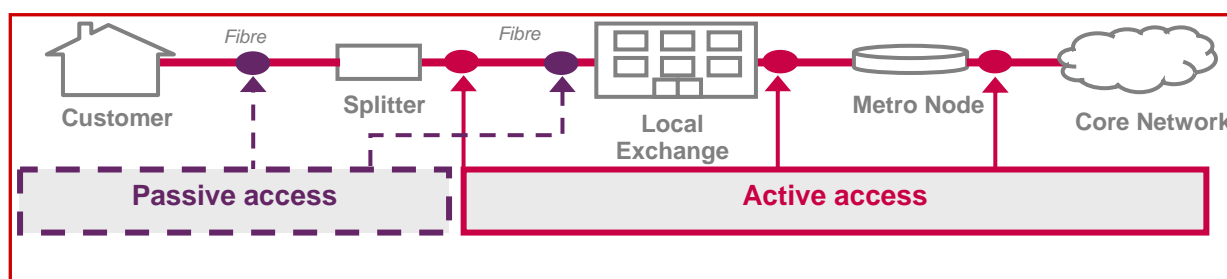
- The USO applies to designated USPs even in cases where they do not own the infrastructure. In current generation networks, USPs have obligations even where they are not the infrastructure owner, such as in cable-only areas. In the case of new build fibre deployments, the instances where the USP is not also the infrastructure owner will be more prevalent than currently, but the application of the obligations does not change.
- With regard to concerns raised about how USPs can fulfil their obligations over infrastructure owned by other providers, we have previously suggested that USPs can fulfil their obligation to provide connections by means of obtaining commercial contracts with a third party provider of local access infrastructure. During the discussion at a new build round table hosted by Ofcom on the 7th of August 2008, new build fibre infrastructure providers collectively recognised the importance of and expressed their willingness to provide standardised wholesale access products that would enable USPs to fulfil their obligations over their infrastructure on a reasonable basis.

3.32 Therefore, as it stands, we expect consumers in new build fibre developments to be able to access the same universally available services provided by either BT or KCOM in the Hull area, as customers can elsewhere.

Section 4

Wholesale access

- 4.1 Our *Delivering super-fast broadband in the UK* consultation sets out our approach of supporting multiple types of wholesale access products, both active and passive, to ensure contestability and competition in next generation access. The consultation sets out the relative advantages and disadvantages of active and passive wholesale access products. In new build these considerations are equally relevant. Competitive providers should have a choice of means of access to new build fibre networks.
- 4.2 Passive access products offer direct access to underlying passive infrastructure making up the network, such as fibre cables. The operator purchasing these products needs to install their own active electronics at either end of this infrastructure to send signals across it. In active access products the owner of the infrastructure also installs the active electronics and so other operators rely on higher level products allowing access to the signals these produce. Different points at which passive and active access may be used are illustrated below.



- 4.3 We discuss the details of both passive and active wholesale products in the context of new build fibre deployments below.

Passive infrastructure access

- 4.4 In *Delivering super-fast broadband in the UK* we discuss the opportunities presented by duct access and the challenges in realising them. Deploying the passive infrastructure – ducts, poles, etc. – is estimated to represent between 50 and 70% of the costs of building out next generation access infrastructure. Removing or reducing this cost would clearly facilitate competitive infrastructure ownership. However the challenges associated with duct access are also considerable at the operational and commercial level.
- 4.5 New build represents an opportunity to build in duct access from the start. Whilst the development is being built and the trenches are open, there is very little incremental cost associated with laying fibre or duct for more than one infrastructure provider. The incremental cost involved would be for the ducting material or the fibre itself and this is generally a small or even insignificant part of overall costs.
- 4.6 In our new build consultation we therefore aimed to further the debate on passive infrastructure, to help assess demand, viability and possible implementation as a means of promoting competition in new build deployments. We set out a possible framework for passive infrastructure access and sought views on whether duct access was attractive and, if so, how it might be implemented in practice. We also published the results of an international survey of best practice in fixed infrastructure access.

Views from consultation respondents – duct access

- 4.7 Consultation respondents had divergent views on duct access. Equipment vendors, industry groups and some communication providers believed that duct access would be a viable way to promote competition in new build fibre. However, a significant number of respondents raised concerns about the viability of multiple infrastructure investments in new build fibre, given the small scale of developments and potential customer bases. As a result they thought the areas in which duct access would be feasible are limited.
- 4.8 BT said that Ofcom should not mandate duct access as a remedy in new build, and instead leave the provision to commercial arrangements. In contrast, Thus believed that access to BT's ducts should be mandated.
- 4.9 Many respondents highlighted that there are likely to be practical difficulties associated with ducts and suggest issues such as interference, maintenance, access and security need to be considered. Utility providers in particular point to the potential difficulties associated with using non-telecoms duct for telecoms access.
- 4.10 From the perspective of developers, LandSecurities suggested that the costs of laying multiple ducts would fall on the developer, who is unlikely to recoup this investment until the duct is used.
- 4.11 A number of respondents suggested that passive access options in new build should not be limited to duct and that alternative options should be considered. For example both KCOM and Cable & Wireless suggested sub-loop unbundling.

Duct access in new build fibre deployments

- 4.12 We are keen to ensure that there is the prospect of passive infrastructure competition in new build developments, regardless of the network architecture. For the moment this would seem feasible only through duct access.
- 4.13 The divergent nature of the responses makes clear that there is no industry consensus with regard to duct access. The responses clearly demonstrate that there are real operational and commercial issues which, although much reduced in new build in comparison to existing duct, are still significant. Whilst it may not be practical to achieve consensus across the wide range of stakeholders concerned, we do not, at this stage, want to discount or eliminate duct access as a potential mechanism with which to foster competition as a result of this.
- 4.14 If a duct access requirement is imposed, it may be imposed on both existing duct and new build duct. We would expect all duct access to be designed and priced in ways to support competitive access. We would expect infrastructure providers to make use of sub-ducts that enable additional fibres to be easily deployed after the infrastructure is initially built. This will support building in additional capacity after initial deployment, if this is required, while also providing space for competing operators to deploy fibre.
- 4.15 We would also encourage developers to plan the inclusion of spare duct capacity in their developments. Where developers work with other organisations to provide telecoms infrastructure, we would encourage developers to require spare duct capacity to be included in the proposals from providers. Achieving spare capacity does not necessarily require multiple ducts to be installed, but can also be achieved by carefully managing how ducts and the space within them is used. Having spare duct capacity available will provide developers with the opportunity to offer a wider

choice of providers to home buyers and potentially with this make their developments more attractive.

Active Access

4.16 To date, active or 'bitstream' access products have traditionally been limited in their ability to support effective competition, offering little scope for innovation. However with the emergence of next generation access it is likely that a very 'raw' Ethernet bitstream product could be provided, which gives access to more of the capabilities of the physical layer of the network while simply adding the minimum functionality necessary for the support of competition. We refer to the set of characteristics and technical requirements necessary to deliver this type of active access as Ethernet 'Active Line Access' (ALA). In *Delivering super-fast broadband in the UK* we provide greater detail of our rationale for our focus on an Ethernet based technology.

Standardisation of ALA in new build fibre deployments

4.17 In *Delivering super-fast broadband in the UK* we describe the importance of good quality fit for purpose wholesale bitstream access if competition is to be maintained in next generation access, and the advantages of it being standardised. These arguments are even stronger in new build where the small size of each individual development creates an additional hurdle to market entry. We believe standardised Ethernet ALA would help achieve three very important objectives:

- Enable competition based on innovation and differentiation at the bitstream level.
- Reduce the risk of technology isolation. Next generation access is being rolled out in new build developments by a range of different infrastructure providers. We welcome diversity and competition in infrastructure provision. However, as each infrastructure provider chooses the technology most suited to their investment case, patchworks of different technologies and network architectures may emerge. New build fibre developments will have difficulty in attracting established communications providers, if they need to change systems, processes and products definitions in order to deliver service. Standardised wholesale access minimises the changes necessary.
- Standardised interfaces may also help Universal Service Providers to deliver their obligations across different infrastructures and technologies cost effectively, thus limiting the burden on consumers.

4.18 Standardised ALA might also reduce the barriers to entry for some communication providers as it could offer a means of delivering innovation and differentiation without investing in the infrastructure or standardising their own access technology. This might be very attractive to small communication providers or those with new and innovative business cases. By reducing the barriers to entry, standardised ALA would further help promote competition.

4.19 In our consultation we emphasised the importance of the development of appropriate standards for wholesale products and interfaces and our view that industry is best placed to deliver such standards. As a regulator our aim is to remain technologically neutral as far as possible.

4.20 We sought views as to **what** action we could take to encourage standards development and **which** standardisation bodies should be involved in the standardisation. We also asked what action we should take if the appropriate standards fail to materialise.

Views from consultation respondents – standardisation

- 4.21 Overall, there was consensus from respondents around the importance and desirability of standards for wholesale access products and interfaces. Most respondents emphasised that these standards need to be international if the UK is to benefit from scale economies and practical experiences in other markets.
- 4.22 The specific bodies suggested as potential leaders of standards development varied, but names such as the Broadband Forum¹⁰ and the NICC were mentioned by different respondents. The Broadband Forum itself recommended that Ofcom worked with it to achieve standardisation, and further suggests that it would be happy to work with NICC on UK specific requirements. Respondents also suggest that a new body could be created.
- 4.23 BT emphasised the importance of defining the interface between the network and the home, and promoting standards for customer premise equipment within the home.
- 4.24 Most stakeholders saw Ofcom's role in standards as one of supporting the developments and encouraging discussion, while at the same time adhering to a technology neutral approach and not directly specifying standards. Some respondents suggested that in order for standards to be developed and implemented effectively, Ofcom would need to be more proactively involved. A few wanted Ofcom to standardise the interfaces, but in the main there was confidence that the market would deliver this.

Progressing the standardisation of ALA

- 4.25 The consultation responses support our view that our role is to facilitate the debate and bring players together in order for industry itself to define the standards. We are aware that the standardisation process may be lengthy and can be difficult for small players to engage with and so we will continue to be involved.
- 4.26 Over the past year we have worked with operators, vendors and consumer groups in the UK to understand better the necessary characteristics of Ethernet ALA for it to support competition. Our *Delivering super-fast broadband in the UK* consultation describes these characteristics in more detail; they include flexible aggregation and interconnect and support for multicast, quality of service, security and a wide range of customer premise equipment.
- 4.27 It is important to distinguish between what we call the characteristics of ALA - capabilities which support competition – and the technical requirements necessary to implement them in a standardised way, the standards themselves and finally the products which will be developed by infrastructure providers to meet the standards – what we call 'ALA-based' products. We would expect the competitive characteristics to remain constant over time. However the technical requirements might evolve and the standards almost undoubtedly will. The infrastructure providers should be able to use the standard requirements as a core set of functionality around which they can offer many different products.
- 4.28 As in any emerging technology the environment will evolve and the products and services must evolve with it. We have seen this before. For example initially there was little choice for DSL customer premise equipment - the operator provided the consumer with a modem. Now there is a variety of DSL compatible customer premise

¹⁰ At the time of its response the body was known as the DSL Forum.

equipment and consumers can choose to install their own routers for example. It was not necessary to change the base DSL standard to allow this, but additional customer premise equipment management standards have been developed to support it. We would expect to see a similar evolution with Ethernet ALA. It is important that nothing in the standards prevent it.

- 4.29 There is industry consensus that the competitive characteristics we have identified encompass the right range of requirements. ALA-based wholesale products would enable communication providers to offer a wide range of retail services, including voice, broadband and audio visual services as well as newer more innovative services. An important part of ALA-based wholesale access would also be a good product development process to enable the product to evolve in accordance with technology and communication provider requirements. Discussions with the industry have also highlighted the importance of the processes and systems supporting wholesale access.
- 4.30 We see a role for Ofcom in ensuring that the characteristics which promote competition are supported by next generation wholesale access products, and in ensuring that they are supported in a standardised way where this is desirable. Supporting the standardisation of the right set of technical requirements achieves both these objectives and, as a consequence, supports competition, mitigates against technology isolation and supports the delivery of the USO. We will therefore continue to work with industry to help bring about standardisation.
- 4.31 Such standardisation must not be limited to the UK: the economics of next generation access require European if not global standardisation. Given the European framework, all European countries face similar challenges and many are looking at ALA type remedies to address them. We are therefore working with other national regulatory authorities and standardisation bodies to promote a global approach
- 4.32 To forward the standardisation process we are publishing on our website proposals for the technical requirements of Ethernet ALA¹¹. Over the coming months we will engage with the appropriate standards bodies to help ensure that the appropriate requirements are incorporated into their workplans.

Standardisation of processes and interfaces

- 4.33 The standardisation of wholesale products is an important part of supporting competitive access. However, as suggested above, the processes and systems which support these products are equally important to enabling competitive access. Standardised wholesale products need to be supported by the availability of standardised ordering, provisioning, management and migration processes and interfaces. Standardisation of these elements supports providers in operating over different infrastructure networks and also supports end-customers in switching providers.

¹¹ <http://www.ofcom.org.uk/telecoms/discussnga/eala/eas>

Section 5

Replication of existing regulatory products

Existing regulatory products in the transition from copper to fibre

- 5.1 One of the key questions surrounding the transition from copper to fibre is about what will happen to the existing products developed in response to regulatory obligations by existing SMP holder, BT and KCOM in Hull.
- 5.2 Our approach aims to achieve a balance between supporting competition and the objectives of regulation while at the same time also assisting the move from one generation of technologies to another. We acknowledge that the way competition and contestability was supported in a market based on a copper network may not always be the best way of supporting the same objectives in a market based on fibre networks. Our aim is to balance the risks to competition and consumer choice with the burden the provision of specific regulatory products may place on SMP operators.

Views from consultation respondents

- 5.3 In our consultation document we asked respondents for their views on whether existing regulatory obligations, including Wholesale Line Rental (WLR), Carrier Pre-selection (CPS), Indirect Access (IA), must be met by replicating the existing copper products or that an alternative approach could be satisfactory. The consultation also asked whether respondents thought that SMP operators rolling out fibre do not need to roll out a copper network in parallel solely to meet their local loop unbundling (LLU) obligations.
- 5.4 There was a clear consensus across all respondents that it would not make sense for SMP holders rolling out fibre to have to roll out a copper network in parallel solely to meet LLU obligations.
- 5.5 At the same time, however, there was also a clear split in views amongst respondents around whether or not it is necessary to replicate existing copper products in new build fibre.
- 5.6 The majority of respondents, including BT, KCOM, Sky, equipment vendors, industry bodies, and public interest organisations, believed that it is possible for existing regulatory obligations to be met by new products such as Active Line Access (ALA) based products in a fibre setting. One distinct group disagreeing with this view were alternative communications providers, namely Thus, Cable&Wireless, and Tiscali. These communication providers insisted that existing copper products should be replicated in new build, and highlighted that the small scale of new developments mean that the development of new interfaces, systems and processes to operate with new products would not be viable for them.

Regulatory products in new build fibre deployments

- 5.7 As we outlined in our regulatory approach, until we complete new market reviews that consider fibre deployments, any relevant existing regulatory obligations as set out in the latest market reviews will apply for those new build fibre services which fall under existing market definitions.

- 5.8 We are aware that there is significant uncertainty associated with the potential number and size of new build fibre deployments and the demand for both retail and wholesale products and services. As we have discussed in section 2, the current economic climate has led to a slowdown in the number of new build homes that are being planned, completed and sold. As a result it is unclear how many customers will be living in developments with new build fibre and when. This uncertainty over end-customer demand has knock-on effects on wholesale providers and resellers, creating uncertainty as to the likely demand for wholesale products.
- 5.9 There is also uncertainty surrounding the exact technical capabilities and functionality of wholesale products. At this time it is unclear exactly how systems will operate in practice, how systems from different operators will interact, and what functionality will be required to achieve this. This can only be learned over time.
- 5.10 We want to ensure that the regulatory environment provides a level of flexibility that will encourage the timely development of wholesale products in new build fibre, yet can not be used by operators as a means with which to prevent competition. We understand that there may be difficulties associated with providing fit for purpose wholesale products that will provide a long-term solution to competition from the first day new customers move into new build fibre premises. Wholesale products designed to meet regulatory obligations are likely to evolve over time as technologies, equipment, standards and competitive conditions change.
- 5.11 We know that competition in the current access networks evolved over time. Local loop unbundling, which has been a key driver of competition in today's market, was not available from day one. Wholesale products changed over time. We expect a similar evolution in next generation access.
- 5.12 Taking the evolving environment into account, we will be mindful of difficulties that may be associated with implementation of wholesale products and acknowledge that these may have to change over time.
- 5.13 We would not expect wholesale or retail services and products existing over copper to be replicated as a matter of course, as it may be uneconomic to replicate certain services or products. We recognise that if we were to require the exact replication of existing regulatory products, there is a risk that both consumers and communications providers would not be able to use the potential of new fibre technologies to their full effect, preventing innovation and limiting the choices available to consumers. It may also act as a disincentive to deploy fibre. Where existing services and products cannot be replicated or where the new build fibre network can support improved services and products the operator should agree alternatives or improvements with access seekers.

Existing regulatory obligations

- 5.14 Based on previous market reviews BT and KCOM have been found to have SMP in a number of different markets and following such findings Ofcom has imposed certain regulatory obligations on them. These markets cover both narrowband and broadband. In a new build fibre environment, not all of these obligations may apply, as we outline below.

Wholesale local access market

- 5.15 In current generation networks, local loop unbundling (LLU) is the primary regulatory product supporting competition in the wholesale local access market.

- 5.16 In the last wholesale local access market review¹², which specified LLU as a regulatory remedy (SMP Condition FA9), fibre was explicitly excluded from the market definition. The reason for this was that fibre in the home was considered unlikely to become a significant substitute for copper or cable within the timescale of the review. In order to consider fibre as part of the wholesale local access market, a new market review would need to be conducted.
- 5.17 For LLU to continue to be provided in new build developments, a copper network would have to be rolled out. However, in accordance with the views expressed by consultation respondents, where there is a fibre network, we will not require SMP holders to additionally roll out a parallel copper network solely to fulfil their LLU obligation. We would expect a parallel roll out of copper to have significant cost implications yet at the moment have no evidence that consumers would gain significant benefits from having LLU and wholesale products over fibre available.
- 5.18 Based on this, it is our view that existing regulatory obligations in the wholesale local access market do not apply for new build fibre deployments, until a new market review is completed.
- 5.19 Having said this, as we outlined in section 3, where there is only one access network, we expect the provider of this network, to make fit for purpose standardised wholesale products available that will enable competitive access. Where this is not provided, or the wholesale product fails to result effective service competition, we may conduct a market review and may introduce appropriate formal obligations following any SMP findings.

Fixed narrowband market

- 5.20 According to the last market review in this area, fixed narrowband markets currently include:
- retail markets for exchange line services and calls provided to residential and business customers; and
 - wholesale markets for exchange lines, call origination, call termination, transit and conveyance.
- 5.21 Ofcom has recently commenced a market review of the retail markets for fixed narrowband services, and the wholesale markets for exchange lines, call origination, transit and conveyance (though not call termination). These reviews will, where appropriate, consider the implications of fibre and next generation access deployments, and consider in greater technical detail how regulatory obligations may be met. Consultation documents are expected to be published in the first quarter of 2009.
- 5.22 For SMP providers in the current markets, namely BT and KCOM, existing regulatory obligations will continue to apply if relevant to next generation access products and services provided over fibre until the new market review is completed. However, where relevant it will be up to the SMP holder to determine how best to implement products which meet these obligations in agreement with prospective wholesale customers.
- 5.23 For infrastructure owners without SMP, as yet there will be no formal regulatory obligation in this market, although if the wholesale access products they supply do

¹² <http://www.ofcom.org.uk/consult/condocs/rwlam/statement/rwlam161204.pdf>

not result in effective competition, as already outlined above, we are likely to conduct a market review and introduce obligations as appropriate.

Wholesale broadband access market

- 5.24 Ofcom completed a review of the wholesale broadband access market in May 2008. The review concluded that four separate geographic markets existed; the Hull area, Market 1, Market 2 and Market 3. KCOM was found to hold a position of SMP in the Hull area and BT was found to hold a position of SMP in both Market 1 and Market 2. No SMP was found in Market 3.
- 5.25 The analysis in this review concentrated on the existence of competing providers. In particular the cable provider, Virgin Media, and a number of large scale providers using LLU. The geographic markets have thus, to a large extent, been defined around the existing copper access network and the constraint provided over this network by LLU. Given this, it would not be sensible to attempt to map new build fibre deployments onto these geographic market definitions. This is because a fibre access network architecture is likely to be fundamentally different to that of a copper access network and thus determining which of the existing 'copper' local serving exchanges should be considered to be the local serving exchange for the new fibre deployment will not be straightforward and unambiguous.
- 5.26 On this basis we do not believe that it would be sensible to attempt to map a new build fibre deployment onto the existing wholesale broadband access market definitions. We would therefore treat BT and KCOM like any other new build provider, i.e. there will be no formal obligations in this market. However, as we have already outlined, where the wholesale access products provided by infrastructure providers do not provide effective competition, we will conduct a market review and may introduce obligations as appropriate.

Evolution of regulatory products

- 5.27 As we have outlined in section 4, we support both active and passive products as means with which to promote competition and consumer choice in next generation access networks. In new build fibre deployments in particular we expect wholesale ALA-based and duct access products to play a role in providing a competitive market.
- 5.28 At the moment, in absence of formal market reviews considering fibre deployments, there is still uncertainty associated with the markets ALA-based products and duct access may fall into, and with this, what regulatory obligations they may be used to fulfil.
- 5.29 We believe that both ALA-based products and duct access may be used to provide functionality to fulfil any relevant existing regulatory obligations. How exactly this will be done in practice is up to the individual operator.

Section 6

Uninterrupted access to the emergency services

New build fibre provides new challenges around emergency access

- 6.1 One of the key differences between new build fibre deployments and next generation access deployments announced elsewhere is that in new build deployments the fibre connection will go directly into the consumer premises, while in overlay networks the final connection to the consumer premises is expected to remain as copper. One of the key difference between copper and fibre is that copper is able to support line powering, while there are currently no commercially available technologies that would enable this for fibre. In other words, in current generation networks, customers are able to make calls even when the domestic power supply fails, but customers in new build fibre developments will not automatically be able to do so.
- 6.2 This difference has a significant implication for the provision of access to the emergency services in the event of a power failure - a key consumer protection measure in the fixed telecoms market. From a regulatory perspective, our central concern is for the safety and protection of consumers in new build fibre developments.
- 6.3 Consumers moving to new build fibre developments will not automatically be aware that their fixed line service will be different and may not have the same features available as a copper line does. We believe all reasonable and practical measures need to be taken to ensure that consumers in new build developments are not put at a disadvantage and will have services available to them that provide uninterrupted access to the emergency services, including in the event of a power failure.
- 6.4 As this is generally the first time the challenges of providing uninterrupted access to emergency services over a fibre connection are being encountered in practice, we understand that it may be difficult to determine what solutions may be successful and how these may work in practice. As a result, the aim of the following discussion is to provide guidance and further clarity on how requirements and obligations of communications providers under the General Conditions may be fulfilled.

Voice over IP (VoIP)

- 6.5 The underlying technology supporting voice telephony in new build fibre deployments is likely to be VoIP. Next generation networks are IP-based multi-service networks. This means that in the case of a voice call over a new build fibre network speech from one end will be converted into a digital signal that travels over the Internet and then converts it back to speech at the other end.
- 6.6 We have previously considered the issue of access to emergency services in the context of VoIP¹³. It was acknowledged that VoIP providers cannot ensure network integrity and service reliability to the same extent as fixed Public Switched Telephone Network (PSTN) operators. In some cases, there are likely to be elements of the end-to-end network that VoIP service providers do not directly control. Since reliability of the service provided over the network depends on the integrity of the underlying

¹³ <http://www.ofcom.org.uk/consult/condocs/voip/voipstatement/voipstatement.pdf>

access and interconnected networks, this could present problems for VoIP service providers in complying with their obligations to provide uninterrupted access to emergency services under General Condition 3.

- 6.7 As a result it was outlined that VoIP providers qualifying as PATS providers subject to General Condition 3, must take all reasonably practicable steps to maintain, to the greatest extent possible, network integrity and service reliability but only for the aspects of the network that they control. We outlined our expectation that VoIP providers should carry out a formal risk assessment and suggested that service level agreements between VoIP service providers and infrastructure providers may help improve network integrity.
- 6.8 We went further to outline that we would not currently expect a VoIP service provider to provide line powering to VoIP customer premise equipment, but suggested that providers could provide battery back-up or uninterrupted power supply as part of a service offering if they wished.
- 6.9 This overall approach was supported further through a code of practice that ensured that consumers, at the point of signature for a new service, are made fully aware of the extent to which their VoIP services provides them with access to the emergency services and the circumstances under which this may not be the case.
- 6.10 Underlying the outlined regulatory position and guidelines was the assumption that consumers using VoIP generally also have at least the option to choose a traditional phone line using copper that remains powered even when the domestic power supply fails. The same assumption will not hold true in new build fibre deployments. Consumers in developments with these deployments will not have the choice of a traditional phone line with powering - the sole fixed telephony service will be based on fibre technology.
- 6.11 While new build fibre deployments face many of the same conditions as VoIP providers, the fact that consumers will not have a continuously powered line available is a key concern we need to address.

Views from consultation responses

- 6.12 In the consultation document we proposed that the requirements of General Condition 3.1(c), i.e. for providers of Publicly Available Telephone Services at fixed locations to take all reasonable practice steps to maintain to the greatest extent possible uninterrupted access to emergency organisations, could be interpreted as being met through the provision of a secure uninterrupted battery backup facility.
- 6.13 The majority of respondents acknowledged the importance of uninterrupted access to emergency services for consumers. However, there was no clear consensus amongst consultation respondents around whether the requirement to provide uninterrupted access to emergency services in new build fibre deployments should be fulfilled through the provision of a battery backup facility.
- 6.14 One view emerging from responses is that consumers should be given a choice as to whether they want battery backup or not, given the availability of alternatives such as mobile phones. Responses also suggested that the widespread usage of DECT phones mean that many consumers already have phones that do not work in the event of a power failure. Alongside this, respondents also mentioned that consumers need to be informed about exactly what their equipment and services are capable of and what this will mean for them in practice.

- 6.15 Other respondents, particularly industry groups highlighted the importance of battery backup in delivering customer safety, especially amongst the more vulnerable sections of the community and those that are less technically literate or connected
- 6.16 Communications providers suggested that it is necessary to balance the costs of provision with potential benefits. They also suggested that the economics of battery backup should be considered before this requirement is mandated and that further work needs to be done to specify details of requirements of the service, for example with respect to how long a battery would need to last and what parts of the customer premise equipment would need to be powered. Further questions were also raised about who would carry the costs and responsibility for installation and maintenance of batteries.

Aims of our approach

- 6.17 Having considered the concerns expressed in the responses to our consultation document and in further engagement with stakeholders, it has emerged that our proposed approach to fulfilling General Condition 3.1(c) in the new build consultation document may not be providing the flexibility necessary for communications providers to develop practical solutions for new build fibre deployments.
- 6.18 We see significant risks associated with not having access to emergency services at fixed locations available in the event of a power failure. Although Ofcom research from the 2008 Communications Market Report shows that in Q1 2008 the majority of households (88%) have access to an alternative means of contacting the emergency service other than their fixed line, the lives of consumers that rely solely on their fixed line for access to emergency services could be at risk in the event of power failure.
- 6.19 We agree with the view of some consultation respondents in that it is generally the most vulnerable consumers that are less likely to own a mobile phone and access to alternative means to contact the emergency services. Research from the Communications Market Report shows that 62% of adults aged 65 and over and 51% of adults aged 75 and over use a mobile phone, compared to 86% of all adults. Further, 99% of adults 65 and over and 100% of adults aged 75 and over have a fixed line at home, compared to 88% of all adults. This data shows the heavier reliance on fixed lines amongst older people compared to other consumers.
- 6.20 As our key concern is for the protection and safety of consumers, we will require that consumers in new build fibre deployments have a fixed telephony service available to them that can provide uninterrupted access to the emergency services. When a customer in a new build fibre development plugs a standard phone into their telephone socket, we would expect this to be operational just as in current generation networks.
- 6.21 At the same time, given the challenges in finding a solution to make this possible in new build fibre we wish to provide flexibility in how this requirement is met. Our aim is to support a pragmatic solution for the provision of access to emergency services that balances the cost with the benefits of protecting consumers and citizens.

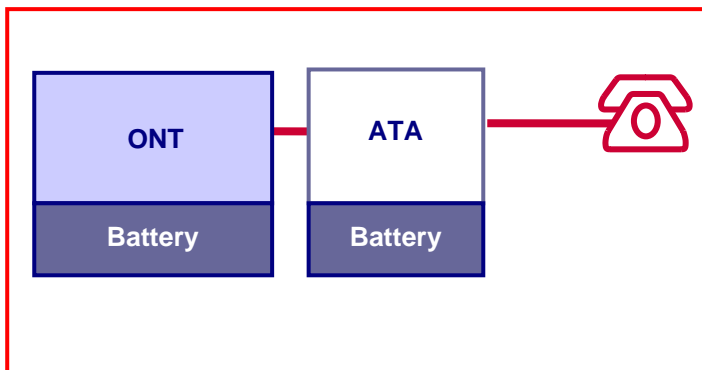
First experiences of implementation

- 6.22 Based on BT's first experiences in developing a solution for the provision of uninterrupted access to emergency services for the first homes in Ebbsfleet, it is clear that there are a number of challenges to be overcome, both in terms of the

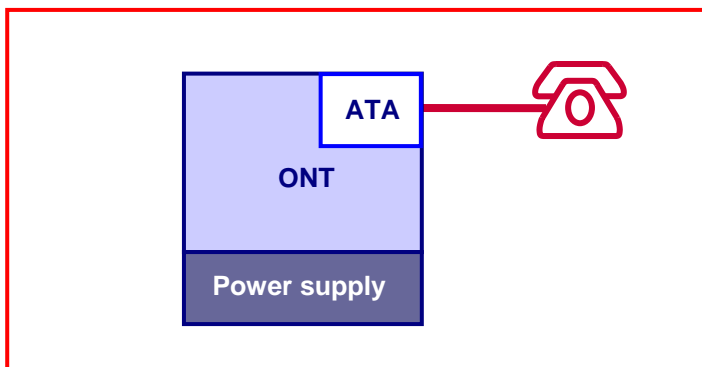
equipment being used, and the practical issues around how the equipment will be operated and maintained in the consumer premises.

- 6.23 In terms of equipment, Openreach proposes to provide an optical network termination (ONT) unit with battery backup, capable of providing backup for 4 hours. BT Retail will be providing a Home Gateway combining a broadband router and analogue telephone adapter (ATA), with backup in the event of a power failure provided by uninterrupted power supply (UPS) equipment, also lasting 4 hours.
- 6.24 In this structure, the key challenge stems from having to power two different parts of the customer premise equipment. BT has outlined to us that Home Gateways need to be powered from an AC powered source which requires a UPS as back-up, while the ONT has been designed to use DC power for which the market for battery backup is more established with the cost already stabilising at a lower level.
- 6.25 The first UPS equipment to be used in Ebbsfleet is a large and heavy box, which will be located in the hallway of the consumer's home. BT envisages that the consumer will be responsible for maintenance, ensuring that the equipment is powered and requesting replacement power supplies when relevant. To date, consumers have not had this responsibility and will need sufficient and effective information that will enable them to fulfill this responsibility and make effective choices.
- 6.26 BT outlines that it expects the solution implemented in Ebbsfleet from day one to evolve over time. In future BT expects to provide customer premise equipment that integrates the ONT and ATA onto a single unit that requires only one single rather than two separate power supplies.

Day 1 Ebbsfleet solution



Integrated ONT and ATA



- 6.27 We support BT's view around the evolution of a solution for uninterrupted emergency access. We believe of the technical solutions being developed today, integrating the

ONT with the ATA on customer premise equipment provided by the network provider and backing this up with a power supply looks as though it is likely to provide the currently most effective technical solution with which to fulfil General Condition 3.1(c). In our engagement with stakeholders an integrated ONT and ATA solution has been widely cited and supported.

- 6.28 Having said this, given the early level of development and so far limited deployments, it is likely that the way in which the requirements of the General Condition can be fulfilled most effectively will change over time. It is further possible that it will not only be technology that may change over time, but also consumer expectations and behaviour. As a result, while we use this section of the statement to provide guidance on an option of how the General Condition may effectively be fulfilled in new build fibre deployments, this is not the only option available and will be kept under review.

Guidelines for fulfilling General Condition 3.1(c)

- 6.29 General Condition 3.1(c) outlines that:

“The Communications Provider shall take all reasonably practicable steps to maintain, to the greatest extent possible...uninterrupted access to Emergency Organisations as part of any Publicly Available Telephone Services offered at fixed locations”

“For the purposes of this Condition, “Communications Provider” means a person who provides a Public Telephone Network at a fixed location and/or provides Publicly Available Telephone Services at a fixed location”

- 6.30 In current generation networks by the Public Telephone Network (PTN) provider, in the majority of cases BT, provides uninterrupted access to emergency services through continued power supply, usually by backing up the exchange with a battery and/or generator in the event of a power failure. As the customer’s copper line is powered from the exchange, as long as the exchange maintains power, the customer using traditional termination equipment will have uninterrupted access to their fixed line service even in the event of the customer’s domestic power supply failing. This situation means that although the General Condition falls on both the Public Telephone Network (PTN) and Publicly Available Telephone Services (PATS) provider, it is currently the PTN that provides the technical capability that enables continued power supply.
- 6.31 As we have outlined, in a new build fibre environment the same structure to provide power will not be available. This bears the question of how the requirements of the General Condition to “provide uninterrupted access to Emergency Organisations” can be met in practice and how the responsibility for compliance may be shared between PTN and PATS providers.
- 6.32 We would advise that the PTN provider initially supplies customer premise equipment with a backup power supply. However, the maintenance and replacement of this equipment after initial installation could, subject to relevant agreements between PTN and PATS provider, lie with the PATS provider and/or end customer.
- 6.33 For the PATS provider, a similar approach as outlined in our VoIP guidelines apply. Further details of these guidelines can be found in Ofcom’s VoIP Statement published in December 2007¹⁴. Where the PATS provider and the PTN provider are

¹⁴ <http://www.ofcom.org.uk/consult/condocs/voip/voipstatement/voipstatement.pdf>

not one and the same, the PATS provider does not control the underlying network that allows it to ensure network integrity and service reliability. In this case, as set out in our VoIP guidelines we would expect the PATS provider to take all reasonably practicable steps to maintain to the greatest extent possible, network integrity and service reliability but only for the aspects of the network it controls.

- 6.34 Such steps could include an additional battery back-up or alternative power supply for the equipment provided by the PATS provider, although it is our view, that the decision to provide such back-up for CPE should be left to the PATS provider. In addition, formal risk assessments should be carried out and service level agreements between the PATS provider and the PTN provider may be used as a means with which to ensure network integrity and continuity of service to enable compliance with General Condition 3.1(c). Any such service level agreements should clearly outline the details about the provision of service and outline the responsibilities carried by each party. In assessing the PATS provider's compliance with the General Condition, we would also consider the steps taken to secure service level agreements.
- 6.35 We expect that the PATS provider follows General Condition 14.8¹⁵, providing the end customer with clear information on both service reliability and emergency calls. In particular customers should know the detailed functionality of the service available to them, know how long any backup power supply will last, have details of how to monitor their equipment and a clear outline of the steps required to maintain or replace the backup facility when necessary. Customers should clearly be aware of their own responsibility and that of their service provider at the point of signature.
- 6.36 Where a consumer switches PATS providers, it should be the responsibility of the new PATS provider to liaise with the PTN to determine whether the backup in the customer premise equipment is present and functioning, potentially arrange for replacements from the PTN, and enter into new service level agreements with the PTN. Agreements between PATS and PTN providers could outline the responsibilities between different parties when end-customers switch providers
- 6.37 In terms of how long a backup power supply should last, what is important to us is that consumers are protected. We do not think that imposing an arbitrary time would support the flexibility needed to develop a solution that balances both benefits for consumers and costs for service providers. We believe that communication providers themselves are in a better position to determine what the best balance between these may be. We expect PTN and PATS providers to come to their own agreements about how long backup should last in order for them to feel comfortable that they have taken all reasonable practicable steps provide uninterrupted access to emergency services. However, to provide an indication of what level of time we would consider practicable and reasonable, we support the option chosen by new build fibre providers that are generally initially supplying backup lasting 4 hours. This is also in line with the options followed internationally, as are outlined below.

International case studies

- 6.38 The situation and challenges encountered in the case of providing uninterrupted access to the emergency services in the new build fibre deployments in the UK appear unique at the moment. Support for emergency access over fibre networks varies significantly from country to country.

¹⁵ Annex 1 of

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

- 6.39 CSMG completed an interview programme for us to develop a series of international case studies examining power backup for emergency calling in fibre to the home deployments around the world. CSMG examined:
- Fastweb in Italy
 - France Telecom in France
 - KPN in the Netherlands
 - Korea Telecom in South Korea
 - NTT Communications in Japan
 - Stokab in Sweden
 - Verizon in the US
- 6.40 Across the markets surveyed, it is only Verizon in the US that provides a battery backup solution lasting 8 hours as standard to all its customers using the FiOS fibre service. It does this to fulfil the regulatory requirement that interconnected VoIP providers must transmit *all* 911 calls. Battery replacement is Verizon's responsibility while under warranty. After the first 12 months, customers can either renew the warranty or replace the battery themselves.
- 6.41 Other operators do not provide backup as standard, however copper connectivity is generally retained:
- NTT in Japan will provide battery backup lasting 3 hours upon customer request. At the same time NTT fibre customers have the option of retaining their copper line which would allow them to maintain uninterrupted access to the emergency services.
 - Fastweb in Italy provides a backup facility to business customers but only upon request. Residential customers are not provided with this option.
 - France Telecom, KPN and Korea Telecom do not provide any form of backup. In each of these cases, the existing copper lines are not removed when fibre is deployed to the home and can be maintained to provide uninterrupted emergency access.
 - In Sweden, Stokab as a municipal network does not provide backup and leaves it up to the service provider employ a backup solution, although there is no requirement for power backup over fibre networks.