Ofcom Consultation – Delivering super-fast broadband in the UK

Sky's response

1. Summary and Introduction

1.1. Sky welcomes Ofcom's consultation on Next Generation Access (NGA). We are excited about NGA and the many advanced capabilities that it could bring for our customers.

1.2. The issues Ofcom raises are important ones. Over a number of years, NGA networks will become *the* access networks in the UK. Therefore the regulatory decisions made now about competition in NGA are important. They can help address concerns of market power and barriers to entry, and help eliminate enduring economic bottlenecks caused by assets (such as ducts, cabinets and dark fibre) which themselves provide little scope for innovation and which have extremely long asset lives. This will, in turn, determine how much competition there will be in fixed telecoms, and how effective it is in delivering benefits to customers.

1.3. There are important lessons to be learned from LLU. For as long as broadband competition took the form of service providers all reselling the same wholesale product, at a purely variable cost, the UK fell to the bottom of international league tables. This type of artificial competition based on simple resale, which required no real investment from CPs, brought consumers no added value and was nothing more than an artificial arbitrage opportunity. However, when LLU was made to work, CPs invested in their own infrastructure and customers benefited in terms of choice, innovation, pricing and coverage from one of the most vibrant broadband markets in the world. In 2001, few believed that LLU could work for anything except niche business applications. We are now at the same point with NGA, and we discard the prospect for infrastructure-based competition in future at our peril.

1.4. The success of LLU has been to create ISPs with different business models, and therefore it is a symptom of that success that they will want to have different business models in NGA. In addition, just as competition in broadband takes different forms in different geographic locations today, so it can under NGA – only more so. We know that in some places, various competitors will invest in FTTH networks. In others, we believe from our modelling that competing electronics in the cabinet can be viable, so long as these providers can share the cost of the cabinet and backhaul to the exchange. In other areas, competition is likely to need to take place based on an Active Line Access (ALA)–type product.

1.5. Regulation needs to anticipate these different levels of investment rather than simply being applied at the lowest level, which is ALA, so as to help best further the interests of consumers through the promotion of competition. For this reason, it is essential that

o key obstacles, which currently diminish the incentives of anyone wishing to build a FTTH network, are removed. At the moment there are plenty of these: for example, lack of access to existing ducts and poles, and a lack of long term clarity around the UK's business rating system.

o   a structure is put in place to allow alternative operators to participate in BT's roll-out of FTTC, helping BT with the cost of roll-out and having their electronics hosted in BT's cabinets thereafter. At stake is an opportunity for effective and sustainable competition for decades to come. Because of this prize, if a commercial agreement with BT cannot be forthcoming, a solution supported by regulation may be required, otherwise the opportunity for efficient investment may be lost.

o   ALA products, such as BT's GEA product, need to be flexible enough to allow service providers to differentiate their services and innovate for their customers. It is right that the development of BT's GEA product is a commercial issue between BT and its wholesale customers. But we note that at the moment, despite useful progress between Openreach and CPs, this product is still some way away from Ofcom's concept of an ALA product delivering flexibility to CPs.

1.6.   We recognise that the challenge is to achieve all of this without inappropriately distorting incentives for investment now, or in the future. This is primarily a concern for BT. We should not forget that powerful incentives to invest arise from Virgin Media's upgrade plans, and from the prospect of rival FTTH builds. But nonetheless, we believe that proper investment incentives can co-exist with appropriate regulatory and commercial structures to deliver vibrant competition, and we set out our proposals below.

2.   Structure of this consultation response

2.1.   We have structured our response in the following way:

o   Ensuring effective and sustainable competition for the future
o   Migration products
o   Anchor product regulation
o   Transition from copper
o   Consumer demand for future broadband services
o   Role of the public sector
o   Voice services

3.   Ensuring effective and sustainable competition for the future

3.1.   Sky shares Ofcom's view that competition between networks is essential to create a vibrant, innovative market which delivers benefits to consumers. Specifically, we consider that the following principles are of critical importance as we start the transition to the next generation of access networks.

3.2.   Competition is vital to bringing benefits to consumers. There is no better example of this than current generation broadband. Competition in current generation broadband has brought cheaper prices (for example Sky's or Carphone's free broadband products), innovation (for example Sky's truly unlimited usage Broadband Max, or BT Vision), and faster speeds (for example Sky, O2 and others can offer faster speeds today than BT).

3.3.   The principle will continue to apply that competition will operate at different levels in different places. Today, different CPs compete vigorously at different levels in the value chain in different places; for example:

o   using their own physical infrastructure (e.g. cable);
o   various forms of LLU;
o   using BT's wholesale bitstream products (e.g. IPStream).

3.4.   Experience in broadband to date demonstrates that competition based on infrastructure has delivered consumer benefits, not least through the ability to innovate.. For example, Virgin Media is upgrading its network for faster speeds. LLU operators were the first to offer IPTV, free broadband and many other innovations. This is because of the control they have over costs (with higher fixed costs, and lower ongoing costs), and over the technical capability of their service.

3.5.   The extent of competition possible in NGA networks in different locations may vary even more than in existing access networks. It is critical that where competition is sustainable and based on infrastructure that allows operators to differentiate their products, rather than on simple resale, it is allowed to take root. The alternative – relying on competition at the least effective level – risks denying customers any real benefits of competition for potentially decades to come.

3.6.   In order to ensure that economic bottlenecks are not allowed inappropriately to endure, to seek to avoid the exploitation of SMP, and learning the lessons from LLU, we believe that structures should be put in place to facilitate competition at the following levels:

o   competing end-to-end networks;
o   competing electronics in the cabinet;
o   competition based upon reselling an active line access product.

3.7.   The right incentives need to be in place for those investing in NGA networks. Even though barriers to entry exist, it is important to bear in mind that commercial incentives to invest in NGA are getting stronger and stronger. BT has announced a substantial roll-out. Virgin Media is investing in upgrading its network. H2O networks is investing in a FTTH network in Bournemouth and elsewhere. And public sector projects such as the South Yorkshire Digital Region represent a further investment in NGA.

3.8.   Clearly it is important that any regulation does not dampen these existing incentives for investment. We believe that competition and investment incentives go hand-in-hand. For example, regulated access, at prices which reflect costs, to existing ducts and poles lowers barriers to entry to competing operators, and creates incentives to invest first. Joint investment models between BT and its wholesale customers, with competing electronics in the cabinet, can help de-risk an NGA roll-out for BT by reducing its initial outlay.

3.9.   Below we discuss the structures that could be put in place to facilitate competition at each of the levels where it is possible, and how the right incentives can be put in place for investment.

Competing end-to-end networks

3.10. Competing end-to-end networks are very likely to play a part in NGA competition in the UK in future. H2O networks' investment is one example. In other countries, this is the predominant mode of competition. In the UK, the commercial deployment of an end-to-end NGA network is constrained by four factors which dampen the business case for investment; we discuss each in turn:

  o   duct and poles access;
  o   street works;
  o   network rating; and
  o   increasingly outdated and burdensome voice regulations.

Duct and Poles Access

3.11. It has long been recognised that investment in civil infrastructure is the main cost involved in rolling out NGA networks for both FTTC and FTTH architectures. Telecoms civil infrastructure typically has a very long asset life with no commercial opportunities during that time for competitive entry, and the infrastructure itself delivers little scope for innovation. It therefore represents a significant enduring economic bottleneck.

3.12. The BSG in its recent report on NGA costing looked at the impact of duct reuse (including BT's and Virgin Media's) and concluded that total costs for NGA in the UK could be reduced from £32.3billion where there is low duct re-use down to £18.3billion where there is high duct reuse. Duct access allows more cost effective access for backhaul networks for both FTTC and FTTH architectures, and can also be used, where available, to provision fibre to the customer's home.

3.13. The UK has not defined telecommunications ducts as a separate market. It would be a complex thing to do, not least because there are various types of ducts available for telecoms networks (BT's, Virgin Media's, and perhaps others such as sewers). Nonetheless, in the provision of ducts which are eminently suitable for telecommunications infrastructure, BT and Virgin Media would be likely to have SMP in their respective footprints.

3.14. Of course, access to these ducts for BT and for Virgin Media represents a reward for previous investment (though in BT's case, investment that took place under public ownership). Any regulated access to duct infrastructure in the light of SMP would need to be priced to recognise this. However, access to existing duct and pole infrastructure may have a significant role in facilitating competition.

3.15. At present, the extent and capacity of ducts is not well known, nor are the practical issues associated with duct access. We therefore strongly support Ofcom's review of the feasibility of allowing access to BT's existing ducts and await its findings with interest. If it was an appropriate remedy, duct access would be a complex product, and therefore would need to be appropriately industrialised from a product perspective. However, the lack of understanding of the practicalities of competition at this level is holding back a potentially significantly beneficial and sustainable source of competition.

3.16. The arguments for pole access are similar. The use of poles substantially reduces the cost of FTTH in many suburban locations where poles are used for the last drop to the consumer's premises.

It removes the need to dig across the consumer's boundary and would significantly reduce the consumer disruption that occurs if their garden or drive way has to be excavated to deliver a service. We understand there has been some work following the Caio Review which may allow local authorities more flexibility regarding new poles. However, at present it is highly unlikely that authorities would allow a second set of poles to be built alongside existing ones; it would also be costly, wasteful and unsightly. Yet, though we understand that BT would be permitted to replace its aerial copper with aerial fibre, no other operator has access to this opportunity. Because of these barriers, the arguments about market power are similar to those regarding duct access. We therefore suggest that Ofcom also investigate the practicalities of BT providing third party access to its aerial infrastructure.

3.17. Access to these infrastructures by alternative operators is not far-fetched. In other countries, such as France, it has delivered emerging vibrant competition between FTTH operators. The Commission's draft recommendation on regulated access to NGA networks focuses strongly on duct access:

> *"In the roll-out of fibre access networks, the cost of civil works and especially trenching and ducting constitutes a major factor and consequently an enduring economic bottleneck. Also, NGA roll-out is expected to rely to a larger extent on the SMP operator's legacy network infrastructure. This is therefore a major entry barrier for other operators wishing to invest. As most operators have not yet started to invest in NGA there is a unique opportunity for NRAs to lower this entry barrier by imposing duct access obligations on the SMP operators' existing and new ducts, civil engineering works and elements which are not active to ensure a level playing field for incumbents and new entrants. This objective can in principle be achieved as long as equivalent access is provided by the SMP operator to the relevant passive elements of its legacy network, and as long as there is a viable business case for the roll-out of alternative networks."* [1]

Street works

3.18. Where infrastructure works are required there can be significant costs in dealing with the bureaucracy of local authorities. In particular we have experienced a lack of consistency between different local authorities in how they have implemented legislation in this area. A lack of consistency makes programme planning across different areas difficult and adds unnecessary extra costs to network builds. Sky recommends that Ofcom raises with Government the need to provide top down direction on how rules should be practically implemented to ensure there is a consistency of approach nationally.

Network Rating

3.19. The current network rating system acts as a major disincentive to investment in NGA due to the level of the charge and the lack of certainty of how it would be calculated in different scenarios.

3.20. The lack of certainty around how rates are calculated for FTTH networks means that operators are not able to calculate accurately the costs of operating such networks. We welcome the Valuation Office Agency's decision to publish guidance notes on how it would approach valuations, but we

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[1] Commission Recommendation on regulated access to Next Generation Access Networks, paragraph 3.3.1.

fear this will still not provide the level of certainty investors need as the system is inherently complicated as it was not originally designed to take account of telecoms networks. Also, the guidance notes will not be able to state confidently how the rating regime may evolve beyond 2015 at best. Since NGA investments will require long payback times, the level of uncertainty over the future rates obligation becomes significant.

3.21. Another important principle which needs to be central to any taxation scheme is that it disadvantages particular types of operator. For historical reasons, BT is rated on a national basis and faces no incremental rating cost when it rolls out NGA networks, whilst Virgin Media is rated on a per-homes-passed basis, so also faces no additional rating charge if it upgrades to NGA within its current footprint. Any other operator building NGA networks will face an incremental rating charge for their access network. The framework should ensure that it does not set a higher charge for new entrants than it does for the established operators without objective justification, given the distortion of competition that could result from significant differences in rates. We understand that the VOA attempts to rate equivalent networks in the same way, but there is still concern that they could be rated differently.

3.22. Further, we are urging Government through the Digital Britain review to look at the overall rates burden on telecoms access networks. If telecoms is seen as a major enabler of economic growth then it makes sense to consider a lower tax burden as a means of supporting rather than stifling investment.

3.23. Government taxation policy in this area, together with a serious lack of transparency around how the rules are applied, does not help facilitate competition (and in fact could be considered to lead to the converse). We are arguing to government that this needs to be an important consideration in the Digital Britain work; it will be important that Ofcom also communicates to government the urgency of this issue.

Outdated and burdensome voice regulations

3.24. Telephony may remain an important part of any NGA service as customers are likely to expect to receive voice services alongside their broadband service, as they move from the legacy copper network to an NGA network. From the provider's point of view, voice revenues may still be a significant (though declining) part of their NGA business case.

3.25. The deployment of NGA networks gives a good opportunity to undertake a widespread review of the PATS obligations, particularly around those related to lifeline services. As time goes on, these seem increasingly anachronistic. Since they were designed:

o   near universal mobile coverage and near-universal mobile penetration have developed which allow alternative network access to emergency services in a power fail situation;

o   a high proportion of customers rely on DECT phones which will stop working in a power outage. These were sold with no warning at point of sale that this would be the case. Yet, there have been no public safety issues widely reported;

o   the copper network, which by happy coincidence allows power to be distributed as well as phone signals, is prospectively to be replaced with a superior communications transport technology which does not have this property. Battery backup can be provided for any

amount of time – half an hour, four hours, eight hours – but longer backup requires bulky batteries which are unattractive to consumers, and CPE costs which can be so significantly higher as to make the investment unprofitable.

3.26. For all of those reasons, now is an appropriate for time for review of these obligations. We recognise Ofcom has competing objectives in this area: wanting to facilitate NGA investment by reducing unnecessary burdens on operators whilst ensuring the public have effective access to emergency services in power fail scenarios. It would be useful if this trade-off could be considered more explicitly and transparently.

Competing electronics in the cabinet

3.27. In a FTTC architecture, just as for DSL, a key source of potential innovation comes from control of the electronics. It is this which allows true flexibility of CPE, and innovation in line parameters such as speed. It is this that has led to the vibrancy of competition based upon LLU, and it must not simply be discarded for the next generation of networks.

3.28. BT's current sub-loop unbundling product is unlikely to provide an adequate basis for this kind of competition, nor can it be made to be. The product is simply access to the D-side copper. CPs must put in their own cabinet, power supply and backhaul. But such duplication of investment in the civils and undifferentiated elements, which have very long asset lives and where value cannot be added by other CPs, makes the proposition inefficient and uneconomic. Co-location, supported by an appropriate level of regulation, removes the need to duplicate non-differentiable elements, such as power and cabinets, whilst supporting infrastructure competition in the electronics housed within the cabinets. This is analogous to today's LLU products which are reliant on standard equipment housing and power provision within the BT exchange, but allow CPs to innovate through their DSLAM. Sub-loop co-location would therefore be a sensible solution to overcoming this barrier to entry.

3.29. The recent draft Commission recommendation on regulated access to NGA made the following recommendations: [2]

> "(18) NRAs should ensure that co-location can take place either at the street cabinet itself or near the street cabinet (distant co-location), and that access seekers have adequate access to power supply and other necessary enablers of colocation. NRAs should take, where necessary, measures pertaining to the adequate size of street cabinets in advance of the NGA deployment as well as appropriate cost-sharing arrangements.
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> (19) Access measures, such as sub-loop unbundling, should be supplemented by appropriate ancillary remedies ensuring their effectiveness and viability, such as non-discriminatory access to facilities for co-location, or in their absence virtual co-location.
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> (20) NRAs should ensure that access to sub-loops is supplemented by appropriate backhaul measures. NRAs should enable mandatory access to ducts and street cabinets and sharing of civil works to enable infrastructure-based competition. Such

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[2] Commission Recommendation on regulated access to Next Generation Access Networks, paragraph 3.3.1.

access should be provided according to the principle of equivalence as set out in Annex II."

3.30. Sky's proposal for competing electronics in the cabinet is consistent with these draft recommendations and would work as follows:

- o   Openreach would consult CPs and agree its roll-out each year. CPs would indicate for which cabinets, if any, they want to participate as set out below;

- o   Openreach would upgrade the cabinet as it was intending to for its own roll-out: installing the power supply, the backhaul link, air-conditioning, rejumpering, etc. At the same time that Openreach installs its own DSLAM into the cabinet, participating CPs' equipment would also be installed. The cabinet would be appropriately dimensioned to support the DSLAM equipment of the number of CPs interested in that particular cabinet, providing they had declared their interest in a timely fashion;

- o   Openreach would own the fibre link back to the exchange, the cabinet and everything in it except for other CPs' electronics. On an on-going basis, Openreach would provide space in the cabinet, access to the power supply, and backhaul to the exchange;

- o   Participating CPs would pay Openreach an up-front charge, which would contribute to the capital expenditure for Openreach's roll-out and significantly reduce Openreach's upfront investment. Thereafter, participating CPs would pay a cost-oriented annual charge to reflect the cost of access to the fibre link and maintenance of the cabinet that houses their equipment;

- o   Should a CP not wish to place its electronics in a cabinet at the relevant time, it would instead be able to buy the GEA product from Openreach.

3.31. There is significantly greater risk in BT's initial investment in FTTC than for a CP who adopts a wait and see approach, and chooses to place its equipment in BT's cabinets only once the investment has been proven successful. To do so would not be fair on BT. For this reason, we suggest that CPs should have a one-off opportunity to participate on these terms. If they decided not to, a subsequent move to placing their own electronics in the cabinet would be significantly more expensive. There might, at this later time, be no space in existing cabinets and so a subsequent investment would have to reflect the costs of a further cabinet needing to be built just for that CP. Alternatively, the current SLU products would still be available.

3.32. Sky's modelling shows that, for larger cabinets with expected high penetration, this model makes the inclusion of competing electronics in the cabinet on the above basis viable; it also helps de-risk BT's roll-out by reducing the up-front cost.

3.33. We think that a commercially agreed solution between Openreach and participating CPs is the best approach to enacting this model. However, if such a commercial arrangement cannot be agreed, we think there will be a case for regulatory intervention. The benefits for customers of competition at the level of electronics are too great to give this opportunity up. BT has been found to have SMP in the wholesale local access market; for NGA, LLU is not a relevant remedy. Sub-loop access, a current remedy in that market, is not a sustainable basis for competition.

3.34. A remedy like this would need to be based upon Equivalence of Input (EoI) principles. However, this is complicated by the fact that the EoI boundary will be inside Openreach, since the product would also be used by Openreach to feed in to its own downstream GEA product. For LLU, the EoI boundary is between BT business units (Openreach and BT Wholesale) making it relatively easy to monitor Openreach's delivery against its EoI requirements. The shared cabinet remedy above is therefore quite challenging to provide on an EoI basis, and some elements of the product may also need to be monitored on an Equivalence of Output basis, comparing performance statistics for third party CPs against BT's own downstream operations to ensure that the product was offered on an equivalent basis. This would certainly require significant attention from the OTA to ensure that the product was fair and was usable.

Active Line Access (ALA)

3.35. Sky favours passive solutions wherever possible, but we recognise that in many locations active remedies will be the only viable option. Suitable Active Line Access products are therefore essential to allow CPs to offer attractive retail products on a national basis.

3.36. Sky considers that a commercial discussion between Openreach and its customers is the right way to finalise the parameters of this product. In principle, there should be no need for Ofcom to become involved; the incentives on Openreach to make the ALA product a commercial success should be well aligned with those of its customers. In the short-to-medium term, this should apply to pricing too: too high a price, and the product may simply be out of consumers' reach.

3.37. Openreach has engaged in an extensive consultation exercise, which has so far resulted in materially improved product proposals. Nonetheless, the GEA product currently proposed is in Sky's view still some way from the Active Line Access concept contemplated by Ofcom. We will continue to engage with Openreach on the development of this product, and we will shortly decide whether to participate in Openreach's pilot. In our view, the features that must be in place before we would consider using a GEA product for our customers are:

o   the option of a pricing structure that allows a fixed up-front payment by CPs, in exchange for a lower variable cost thereafter;

o   the ability to control various aspects of the ports assigned to our customers, allowing us flexibility over line management;

o   a service offering which gives CPs the ability to control the speed of the line, rather than a tiered service offering with the need to re-sell a small number of pre-determined products;

o   parallel development of migration products which will allow all aspects of the service experience to be satisfactory from the start (see below);

o   the ability for CPs to develop their own CPE; and

o   the ability for installation either to be by customers themselves, or for CPs' engineers to carry out the installation for their customers.

3.38. The early signs are that the UK market for NGA may evolve with a number of small NGA operators building their networks in diverse geographic areas, alongside larger operators. These include

community broadband operators, and specialist utility infrastructure providers for new build developments. At some point in the future, current generation broadband are likely no longer acts as a constraint on NGA, and these operators' market share in their particular geography may be very high. Were Ofcom to conduct market reviews of these very specific local markets, it would be likely to find that these operators had SMP. However, because many of these operators' footprints may be very small, this would be a highly burdensome and method of regulation.

3.39. In the meantime, there is a significant danger that a patchwork quilt of different NGA access suppliers will each offer slightly different Active Line Access products, each with a different interface. This would be to everyone's detriment; it would be uneconomic for service providers to adapt their systems for a few thousand homes, and service providers would be unable to market consistent national propositions.

3.40. For both of these reasons, Sky supports the idea of an industry-brokered standardised approached to ALA products provided by different operators. We also note that the independent NGA networks, through the BSG and CBN, are actively seeking a standardised solution already to maximise the likelihood of ISPs offering services to consumers over their networks. The incentives are therefore in place to push forward with an appropriate level of standardisation.

3.41. It is important that Openreach is not able to influence overly the standardised approach and the current GEA product should not become the *de facto* standard. The standardised approach should take account of more than just the technical architecture of the NGA network and should also include OSS and BSS standards. Nonetheless, we think there is no need for regulatory standardisation here – the appropriate approach is industry-led.

4. Migration Products

4.1. One consequence of competition between different operators at different parts of the value chain is that it can make migration between different products challenging.

4.2. This has certainly been the case for current generation broadband where migrations are technically complicated and expensive for operators, and often unnecessarily disruptive and confusing for consumers.

4.3. This may be even more so for next generation broadband where migration products will be needed to move customers between the current and next generation access networks in a particular location.

4.4. The right way to address migrations would be a solution determined by Openreach together with its wholesale customers. We will continue to engage with Openreach to ensure that there is equal focus on migration products as well as the core GEA product. As for existing migrations products, the OTA may have a role to play in ensuring appropriate migrations products are available.

4.5. These migration products should be symmetric, that is they should allow customers to move both to, and from, next generation access networks so as to allow customers maximum flexibility to switch between competing broadband products, including those based on existing LLU based investments. Without this symmetric migration capability, LLU investments will be undermined.

4.6. There have been examples in the UK where BT has launched wholesale broadband products without a complete suite of migration products. In these cases BT prioritised development on a subset of migration options which it believed were the most important to customers. Unfortunately this sometimes meant that CPs who used products (for example, MPF) that were not part of the initial migrations options faced more difficult or costly migrations. Consumers became aware of the difficulties with these ISPs and for some this influenced their choice of service providers as they wished to avoid disruption if they wished to change ISP in future.

4.7. Ofcom should be aware that the lack of availability of particular migration options can inadvertently favour particular network architectures and for BT in particular this could mean other ISPs are penalised compared to BT's own downstream businesses.

4.8. Much industry effort has been spent in attempting to improve and adapt existing processes to ensure migrations are as seamless as possible from the end customer's perspective. However, it is far easier and much more cost effective to build all the necessary migration processes in to the product when it is built rather than attempting to retro-fit them later.

4.9. Sky therefore believes that it is an important principle that Openreach should make a suitable set of migration products available at the same time that it launches any new NGA product, as a means of assisting customer switching. These migrations products must allow bulk/wholesale migrations as well as singleton migrations, and be symmetric to allow customers to migrate back to, as well as from, competing networks. Migrations processes should also allow for the scenario where the customer wishes to switch between CPs on the same network.

4.10. For NGA, migration processes must also take account of the migration of voice as well as data services. This increases the complexity significantly (not least because of the variety of different voice options possible), and only goes to show how complex and important it is to ensure efficient, seamless migration products are available from launch.

5. Anchor Product Regulation

5.1. Sky supports the concept of anchor product pricing for NGA for SMP providers. We recognise that incumbents' incentives to move their customers on to new networks should not be distorted either to favour or to discourage investment. Anchor product pricing applying to the SMP provider gives the prospect of delivering this through a relatively light piece of regulation. It can protect customers on entry-level, baseline products and ensure they are not penalised by having to move to higher priced products before they wish. There are, however, still questions over how anchor product pricing will work in practice.

5.2. Ofcom proposes that the price of the anchor product is related to the baseline product's legacy wholesale cost. The challenge of anchor product pricing is the need to choose between the costs of alternative possible wholesale inputs in determining the baseline product. It would be most straightforward to use the cost of IPStream. That does not, however, reflect the underlying LLU product that the majority of major ISPs' customers rely on today. That means that if IPStream pricing were used as the basis for the anchor, probably the majority of today's broadband customers would face a substantial price increase if they moved to the equivalent baseline product on an NGA network. In effect, those customers who did not want services using NGA capability would subsidise roll-out for those that did.

5.3. We therefore believe that LLU represents the proper basis for calculating the anchor. This is complex. The LLU product has a high fixed cost element as well as a variable cost, and it relies on significant capital expenditure by the CP. It has two variants; SMPF and MPF. In spite of this complexity, we believe that the anchor price concept will only work properly if LLU costs form the basis of the anchor.

5.4. The second difficulty is what should happen when the anchor no longer poses an effective constraint on NGA pricing. We think this point is likely to be a long way off. Anchor products only start to have effect at the point that copper products become unavailable; until that point, the copper products themselves represent the anchor. Anchor product regulation will continue to work for as long as the chain of substitution from low to higher speed broadband continues. During this time the anchor product should not need to change. However at some point the chain of substitution may break down as the lower speed product no longer constrains the price of the higher speed products.

5.5. It is important that we understand now how the regulation of the anchor product may change at this point, and how Ofcom will test whether the chain of substitution is broken. In our view, it would be appropriate at that point to return to cost-oriented wholesale inputs where SMP exists. That cost-orientation could include a risk premium to reflect risk at the time of investment. However, it is very likely that for the anchor product no longer to be a constraint, much higher speed NGA products would be being consumed by the significant majority of the market. Therefore, the SMP operator would know that it would be subject to cost-oriented pricing only once its investment had reached a certain threshold.

6. The transition from copper

6.1. It is worth noting that Openreach's FTTC architecture technically only offers *broadband* from the street cabinet, with the customer's voice services still being exchange-based. This suggests that Openreach does not see any urgency in removing exchanges from its network. We also note that BT Wholesale's 21CN upgrade is an exchange-based programme.

6.2. We accept, however, that it may not make sense to run two parallel networks indefinitely, though given BT's market power in relation to local access, it is important that BT does not design and implement its NGA network in such a way as to undermine the potential for competition in the future. The number and location of interconnect points for the ALA product will be an important part of this discussion as it should be possible for LLU operators to reuse their existing backhaul facilities from the exchange if they so wish.

6.3. LLU investments were made with the intention of making an appropriate return on investment based on certain expectations about the availability of wholesale inputs (LLU). Turning off the copper network is not a short term option and will require thorough consultation with affected operators.

6.4. From a customer's perspective the migration from existing exchange-based services to NGA services should be as seamless as possible with bulk migrations products available to allow the CP to coordinate the impact on its customer base.

6.5. We recognise that BT has to have the right incentive to turn off its old network but it must not be permitted to load common costs associated with its legacy network on to those operators who chose to remain on this network during the early transition, especially if other downstream parts of BT's business have already migrated. The incentives are difficult to balance as Openreach should not be unduly able to force CPs to move from the legacy network, but nor should Openreach be unduly penalised if CPs refuse to move. Anchor Product regulation may form an important part of this.

6.6. We therefore propose some principles that Openreach should be required to follow when it proposes to close an exchange:

   o CPs must be able to continue to offer the same end-services to their customers as they do today, at the same on-going cost to the CP as the wholesale product that they consume today, even if the underlying technology changes;

   o The replacement network on to which they are migrated should offer at least the same opportunities for innovation that CPs enjoyed with LLU; and

   o There must be an agreed period of notice on an exchange by exchange basis before the exchange is decommissioned. This time would be agreed by industry.

7. Consumer demand for future broadband services

7.1. We currently do not know the future demand for NGA services in the UK. Even international comparisons with other countries where NGA is available are not helpful as they simply reveal that demand for NGA service is highly dependent on the national situation, including such factors as the widespread availability of current generation broadband, the level of competition, state subsidies and housing density. One of the factors dampening the demand for NGA networks in the UK is in fact the relative success of existing multichannel platforms (DTH, cable and DTT), including the delivery of High Definition services over these platforms.

7.2. Initial NGA business cases take conservative assumptions about consumer demand for NGA based on the range of services they plan to offer over their networks. Once these initial networks are rolled out, either in pilot or full launch phase we will begin to get a feel for the level of consumer demand for NGA services, especially as CPs start to experiment with different pricing and service models. This may show there is little demand for NGA services, in which case future investors will wait until demand starts to materialise, or there may be large demand in which case future investments are de-risked and further investment encouraged.

7.3. We note Ofcom's questions on what role it should take to stimulate demand. Since there is no obvious immediate market failure, Ofcom does not need to take a view on the nature of applications and services that will be supported by NGA networks. Nor should it attempt artificially to stimulate demand which will only lead to market distortions and arbitrage opportunities.

8. Role of the public sector

8.1. As mentioned earlier, the signs are that the market itself is likely to deliver next generation access covering a significant proportion of the population with BT and Virgin Media both announcing

intentions to invest in NGA networks. Both these investments are planned to cover a significant proportion of the population.

8.2. In the Government's independent review of the barriers to investment in next generation broadband, Francesco Caio noted these market developments and suggested that Government and Ofcom, as the two principal entities involved in determining the efficient and effective deployment of NGA, need to play an active leadership role in shaping broadband policies. However he commented that:

> *"This does not translate into subsidies or structural changes in regulation, but rather a set of initiatives that could support and inform the activity of regulators and industry players in their journey to NGA. The government should seek to remove obstacles that could potentially delay or compromise the development of the new network."* [3]

8.3. We believe it is the role of Government, and Ofcom, to address supply-side such issues as duct and poles access, street works, network rating and voice regulations.

8.4. Ofcom raises a number of issues in its consultation document which, although of interest to potential NGA investors, are not uniquely NGA issues. Francesco Caio noted that *"some consumers, particularly at peak times, experience a reduced level of service, suggesting stress on the [current generation] network, but this is more likely evidence of a bottleneck in the backhaul, rather than access."*

8.5. Issues such as targeted advertising and network neutrality surround the issues of how ISPs can extract additional revenue from their networks. These are not NGA-specific questions, nor should they attract regulation except inasmuch as they relate to abuse of SMP, or relate to protection of personal privacy.

9. Voice services

9.1. As stated earlier, we think voice services may be an important part of NGA services. This raises a number of important issues:

- o Bundling of voice and broadband
- o Infrastructure competition
- o Migration products
- o Legacy copper costs
- o Voice anchor products

Bundling of voice and broadband

9.2. At the retail level, consumers are increasingly taking broadband and voice products from the same provider. At the wholesale level, today's LLU operators are able to exploit static and dynamic efficiencies through the deployment of voice and broadband through full unbundling (MPF) and we expect, given the right competitive conditions, similar incentives to be present in NGA networks.

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[3] Caio Report: *The Next Phase of Broadband UK: Action now for long term competitiveness* (September 2008), page 9.

9.3. For Openreach's wholesale NGA products this means CPs should be able to offer their own voice services using the GEA products. For BT's GEA FTTC product this means there should be much more flexibility around how voice services can be offered than was originally proposed by Openreach to allow CPs to use their own voice equipment.

Infrastructure competition

9.4. As for broadband services, the deeper the level of competition in the network, the more innovation is possible. There are a number of different ways of providing voice services and access to the underlying infrastructure gives greater freedom to CPs to choose the most appropriate solution for their network architecture. It is important that Ofcom includes voice benefits when assessing the point in the network at which it wishes to facilitate competition.

Migration products

9.5. As discussed in the section on migration above, voice requirements should be integral to migration products and be fully open and symmetric, allowing customers to move between current and next generation networks during the period where these different networks co-exist.

Legacy copper costs

9.6. As for broadband services, voice services still served from the legacy network should not be unduly penalised by BT sharing its legacy common costs between a smaller number of subscribers (leading to price rises). This may be helped by appropriate anchor products which allow a seamless movement to the NGA equivalent products.

Voice anchor products

9.7. Voice is likely to be on the of the base-line consumer products and therefore should be included within the scope of the Anchor Products.

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