CORNING

CORNING INCORPORATED
REPLY TO

Ofcom Consultation Document on Future Broadband

CORNING

Introduction

Corning welcomes the opportunity to respond to the Ofcom Consultation on Future Broadband - Policy Approach to Next Generation Access.

Corning Incorporated (www.corning.com) is the world leader in specialty glass and ceramics. Drawing on more than 150 years of materials science and process engineering knowledge, Corning creates and makes keystone components that enable high-technology systems for consumer electronics, mobile emissions control, telecommunications and life sciences.

Corning is the inventor of low-loss optical fibre and continues as a global leader in telecommunication products offering a broad range of end-to-end solutions for customers' telecommunications networks including cables, connectors, related hardware, and network services that include network design, project management, installation and maintenance and training programs.

As a result, Corning has substantial experience in the provisioning, implementation and economics of fibre optic telecommunications networks and FTTx networks in particular. Corning believes that in this respect we are able to offer valuable insight into the present consultation.

We believe that there is now a critical window of opportunity for the United Kingdom to put in place a regulatory framework for next generation access networks which will offer the right balance on one hand between appropriate regulation to maintain competitiveness and on the other a regime which will encourage the required investment in access networks which the UK urgently requires to maintain its global competitiveness. It is particularly vital that both aspects receive critical attention.

Ofcom's consultation is particularly timely in view of the recent publication by the European Commission of its proposals for the reform of the Regulatory Framework for Electronic Communications Networks. In this respect the commitment of the Commission to enhance legal certainty for stakeholders by issuing, by summer 2008, guidance on the application of the regulatory framework to aspects of new fibre investment in the local access network and also to examine the possibility of issuing guidance in other areas, in particular on sub-national geographic differentiation is of particular importance and this consultation should provide a valuable input into this process through Ofcom's membership of the European Regulators Group.

Response to Ofcom's Questions

In the remainder of the document we set out our responses to Ofcom's questions.

Question 1 When do you consider it would be timely and efficient for next generation access investment to take place in the UK?

Corning notes the analysis which indicates the reasons why the deployment of next generation access networks may be efficiently delayed in relation to other countries and in particular the role of satellite pay TV in the UK market. Nonetheless there is every indication that broadband end user speeds in the UK are broadly following those elsewhere and generally in line with Nielsen's Law which predicts a 50% increase in end user bandwidth per annum (see Fig 1), which would imply that end user bandwidths will grow to around 100Mbps symmetric by 2010, thereafter exceeding even optimistic scenarios for real world VDSL bandwidths. A simple discounted total investment analysis indicates that a VDSL deployment followed by an FTTH upgrade to achieve future speed demands is only efficient if the FTTH investment has to begin after year 9. It could therefore be argued that operators deploying VDSL are likely to be doing so for reasons of speed of deployment and uncertainty over future regulation and returns on investment and as argued by others because it is more difficult to replicate. In its consultation Ofcom already notes that FTTH may be the technology of choice for new entrants (§ 6.7). We believe that this warrants careful attention in the context of establishing whether regulatory policy is impacting on the choice of technology and efficiency of investments in NGA. We explore this further in our response to Question 4.

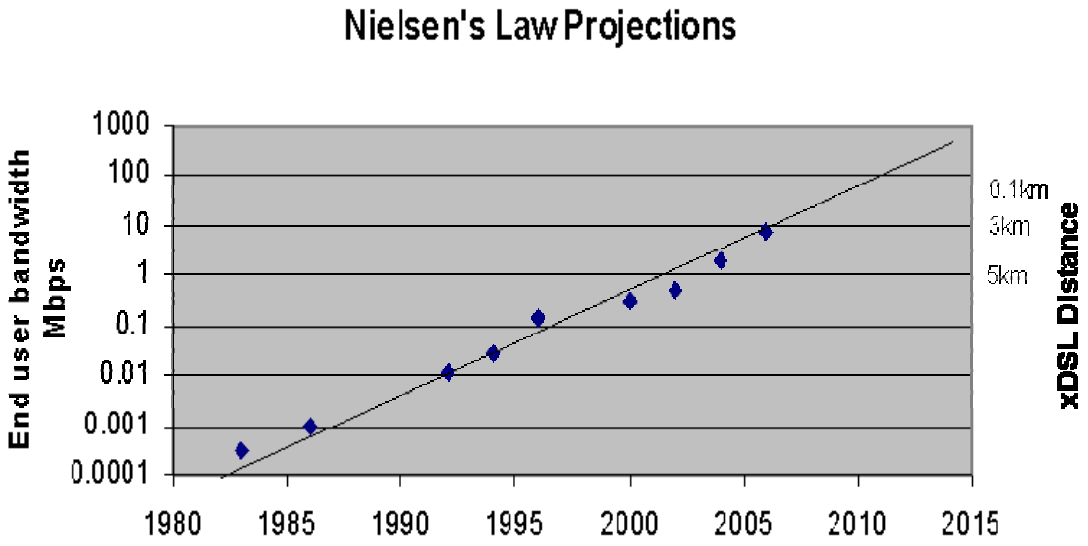

Fig 1 Nielsen's Law and VDSL capability

The UK cable industry has the potential to respond to this growth in demand and we understand limited trials of DOCSIS3 technology are underway which would support up to 100Mbit/s speeds.

We are concerned that the specifics of the UK market may lead to a position where UK business is unable to capture the economic benefit from high speed broadband which the consultation document identifies may come from this service being available to SMEs and to large businesses wishing to benefit from the advantages of distributed means of working. This could arise because in other countries revenue streams from consumer applications such as IPTV could support earlier deployment and deliver the economic benefit as a secondary impact earlier than may result in the UK. This may require further analysis and be a prompt for both regulatory and public policy intervention.

We believe that it is also useful to consider this Question 1 from a different point of view, that is do any bottlenecks exist which would prevent otherwise timely and efficient investment? By answering this question it should be possible to determine what regulatory steps need to be in place, or indeed whether regulation is required at all.

So firstly we need to address if bottlenecks or barriers to entry exist, and if so where they are.

In the case of *existing* networks the Ofcom Strategic Review has demonstrated that the major enduring bottleneck is the legacy copper access network. In the case of Next Generation Access, the civil works can represent more than 70% of the total cost of the network and therefore in analysing future deployments of next generation access it would appear logical to conclude that the enduring bottleneck is not a future fibre infrastructure as this would require investment by all market players but rather the bottleneck is the existing civil engineering infrastructure (irrespective of ownership) ie the ducts, poles, manholes etc which are required to deploy new fibre assets.

In some areas there may be alternate infrastructures available such as sewers which have been used elsewhere for FTTx deployments. In this case there may in fact be no enduring bottleneck for fibre deployment and for this and other reasons which we discuss later in our response to Question 4 we believe that a geographic analysis of the market will be essential to establishing appropriate regulation

We therefore believe that steps should be taken to open up this bottleneck, where it exists in the UK, to create a ‘level playing field’ for investments by all operators in NGA and to remove this key obstacle to effective infrastructure based competition.

We return to this question in our response to Questions 2 and 4.

Question 2 Do you agree with the principles outlined for regulating next generation access?

A key question which needs to be addressed at an early stage is whether the aim of NGA regulation should be to promote service based or infrastructure based competition.

The first edition of the European Commission Recommendation on relevant markets notes that[1]: "The aim of the new Regulatory Framework is ultimately to achieve a situation where there is full infrastructure competition between a number of different infrastructures. This can occur within or between platforms. Regulation mandating access to existing networks serves as a transitional measure to ensure services competition and consumer choice until such a time as sufficient infrastructural competition exists". The second edition adopted by the Commission on 13th November 2007 notes that[2]: "Competing network infrastructures are essential for achieving sustainable competition in networks and services in the long term. When there is effective competition, the framework requires ex-ante regulatory obligations to be lifted. Where competition is not yet effective granting others access to infrastructure in a way that levels the playing field but does not remove incentives for new infrastructure investment ensures that users enjoy choice and competition during the transition to a fully competitive market. Investment in new and competing infrastructure will bring forward the day when such transitional access obligations can be further relaxed."

We strongly support the view that in the case of new investments in NGA, regulation should aim primarily to promote infrastructure based competition wherever possible with access prices safeguarding investment incentives because this will lead to self-sustaining competition and has the potential to lead to a removal of sector specific ex-ante regulation. Furthermore these measures should promote the immediate and widescale NGA investment which is required. Services competition should only be relied upon when infrastructure-based competition is not possible or as a transitory step towards infrastructure-based competition. In other words, the ladder of investment concept should apply on a market basis and not on an operator basis. It is therefore important to be clear about what priority should be applied to regulatory remedies in each part of the network on a geographic basis.

As noted in the document up to 70% of the costs of deploying an NGA network are associated with civil works costs (trenching, ducts etc). By promoting access to this part of the infrastructure it should be possible, as noted by the Commission, to level the playing field and to promote the maximum level of infrastructure competition economically sustainable. We do not believe it is appropriate to foreclose on this opportunity to enable contestable investment by a range of operators. Therefore, we are concerned that the present consultation while recognising this as a key principle (§§ 4.7 and 4.21) and developing the concept further (§§ 4.18 to 4.20) seems to

[1] Explanatory Memorandum, p.25.
[2] Explanatory Note, p. 4.

conclude that other than sub-loop unbundling in the case of FTTC networks, which it is noted is likely to be of limited applicability, ex-ante regulation to promote access to the true bottleneck, ie the physical infrastructure, is impractical and not proposed other than potentially for new build duct. We return to this further in response to question 4.

It is also of particular importance to be clear about the relative roles of regulation and public policy aims and to ensure that both policies are in alignment. Regulation which conflicts with public policy drivers in the broadest sense (including public investment to ensure the availability of appropriate ubiquitous services and also the protection of consumer interests) needs to be avoided. This implies that public policy must be well delineated in order to enable appropriate regulatory responses. This is particularly important where issues around NGA such as the emerging digital divide and the possibility of future changes to the USO are still under debate.

Question 3 How should Ofcom reflect risk in regulated access terms?

Corning favours an approach which maximises the opportunity for infrastructure investment as this is most sustainable and maximises innovation in services.

By ensuring access to the key bottleneck which is the passive infrastructure then we can, as far as possible equalise required investments between operators with similar economic efficiency.

The linkage and the gradation of remedies between access to the passive infrastructure and the active elements of the networks will create an environment favourable for investment and the development of effective infrastructure based competition. In such an environment, the owner of the passive infrastructure has a strong incentive to open it in order to benefit from a deregulatory benefit or lighter regulatory approach on the active elements of the network. The competitors have an effective opportunity to build their own NGA without automatically following the deployment of the incumbents in a new and more holistic approach to the regulated return on investment. The Regulators have the insurance that the access network is protected against the risk of re-monopolisation while creating an environment that incentivises investments in infrastructure based competition.

We support the requirement that where required access prices to new infrastructure should reflect investment risk. The concept of anchor product regulation is interesting although we believe that the static definition is likely to be easier to implement. It is not immediately clear how this would link to the proposed ‘raw’ Ethernet WBA product which is being proposed.

We return to this question in our response to Question 4.

Question 4 Do you agree with the need for both passive and active access remedies to promote competition?

As we have set out above Corning believes that the UK regulatory framework should favour a policy encouraging investment in infrastructure at the lowest sustainable level starting from the physical infrastructure in order for customers to benefit from both effective long term competition and continuous innovation in services (infrastructure based competition rationale). The development of infrastructure based competition (as opposed to service competition) is also key to enabling the removal of ex-ante regulation at the earliest opportunity. As we have stated earlier, services competition should only be relied upon when infrastructure-based competition is not possible or as a transitory step towards infrastructure-based competition. In other words, the ladder of investment concept should apply on a market basis and not on an operator basis. It is therefore important to be clear about what priority should be applied to regulatory remedies in each part of the network on a geographic basis.

The Second Edition of the Recommendation on Relevant Product and Service Markets adopted by the Commission on the 13th November 2007 sets out two Markets relevant to NGA.

- Market 4 Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location.

- Market 5. Wholesale broadband access.

  This market comprises non-physical or virtual network access including 'bitstream' access at a fixed location. This market is situated downstream from the physical access covered by market 4 listed above, in that wholesale broadband access can be constructed using this input combined with other elements.

In its Explanatory Note[3] the Commission notes that it is logical for national authorities to undertake a single overall analysis of the broadband market which examines in sequence the impact that (a) regulated infrastructure-based access and (b) regulated (non-physical) network-based access could be expected to have on any significant market power that is identified.

We strongly agree with this approach but also believe that it will be absolutely necessary to be clear about the imposition of remedies both on a geographic basis and on a hierarchical approach which would ensure the development of the maximum amount of infrastructure based competition. This is illustrated in Figure 2. This aims to set out a geographically based hierarchy of remedies.

[3] Explanatory Note, p. 34.

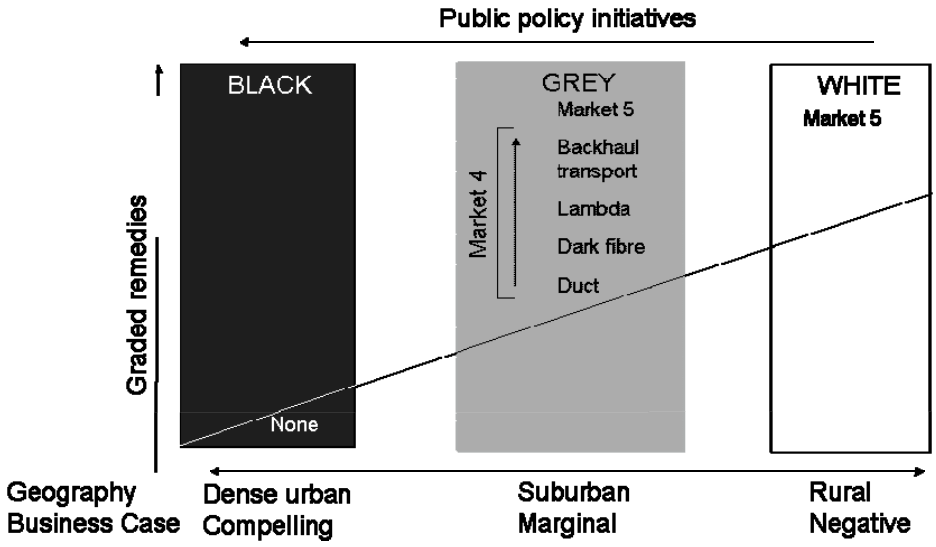

Fig 2 Model for establishing geographical hierarchy of remedies

In the so-called black areas with clear competition, for example as evidenced by the existence of an existing NGA capable network (such as a cable network with DOCSIS capability or an alternative FTTH network), it would not be appropriate to apply ex-ante regulation to NGA investments.

At the other extreme in the white areas, which could be defined as having no LLU operators, there would be no case for infrastructure based competition and regulation would be restricted to Market 5 and the provision of wholesale bitstream services.

In the intermediate grey areas, identified for example by the presence of at least one existing ULL operator, it would be appropriate to apply remedies in a tiered manner. If ducts were available (at a regulated price) then this would be the sole remedy (thus encouraging investment). If not then dark fibre could be mandated, then potentially a specific fibre wavelength, and finally electrical transport. Wholesale bitstream services (Market 5) could be mandated in these areas until such times as the remedies tending to develop an effective infrastructure based competition are effectively implemented. The pricing of the Wholesale bitstream service should not be cost oriented and should incentivise the investment in the lower rung of the ladder of investment starting at the duct level. This approach, as can be seen, also sets out a clear relationship between Markets 4 and 5 which we believe is required.

Public policy initiatives in the white and grey areas should have the aim of removing barriers to the development of infrastructure based competition. An example would be the creation of new duct networks which could be offered by a public authority on a non-discriminatory basis.

As we have set out earlier, we suggest that further consideration be given to opening up existing and future duct networks to competitive infrastructures (likely as a

symmetric remedy) as a means of maximising infrastructure competition and developing an essentially level playing field for all investors with similar efficiencies. It may be appropriate in assessing this option to undertake a study, similar to that recently undertaken by ARCEP in France to properly assess the availability and quality of existing duct networks including that of BT, Virgin Media, and municipal authorities and alternate infrastructure such as sewage networks. Para 6.36 of the document raises the question of whether significant duplication of network infrastructures is the most economically efficient way of delivering competition. We believe that infrastructure competition is clearly seen as delivering most benefit to consumers. However, treating the passive infrastructure and the network on the same level will result in the transfer of the current regulation without taking into account the necessary granularity. Regulation should focus on the bottlenecks (the passive infrastructure) while favouring the duplication of networks in order to ensure long term stable infrastructure based competition. We believe that the question of whether and where duplication of network infrastructure is economic should be left to the market. Undoubtedly infrastructure competition is probably unlikely to emerge throughout the full-length of the value chain and/or the entire geographical area since the business case related to the deployment of NGA networks varies considerably between the geographical areas. The regulatory response will vary taking into account the competitive regional landscape. In all scenarios, however, measures to promote access to passive infrastructure should be encouraged recognising that there will be geographies where it is not, such as rural areas (white areas) and here we would expect other approaches, including public policy intervention to be appropriate (see above). In the other areas, the regulatory intervention (remedies) should be gradated starting from the lowest physical element of the infrastructure (passive infrastructure). When lower elements of the network are available, upper remedies should not be applied or should be lighter. This approach would indicate that a combined analysis of Markets 4 and 5 should start at the duct level. When ducts are available, in compensation for such a strong remedy, the intervention in fibre should be relieved from regulation and bitstream left to commercial negotiation or eventually mandated but on a non-cost oriented price. When access to duct is not available (for any reason), access to fibre should be mandated on terms that allow a proper return on investment. This linkage and **gradation** of the remedies between access to duct, fibre and bitstream creates an environment favourable for investment and the development of effective infrastructure based competition.

Due to the importance of the investments, it is likely that competitors will need to decide if they prefer to deploy a parallel network alone, reduce the investment and the associated risks by sharing their investments with other competitors or simply rely on a bitstream offer.

In relation to this discussion we note the Commission's view as set out in page 17 of the Explanatory Note to the Recommendation on Relevant Product and Service Markets:

"Planned changes in the access network may potentially make it more difficult to continue to carry forward regulated remedies such as local loop unbundling (at

established access points), that are designed to address the lack of effective competition in the provision of broadband services. In applying remedies, regulators need to find ways to promote the deployment of new and more efficient network architectures while at the same time recognising the investments made by new entrants on the basis of current architectures. National authorities will need to carefully follow and evaluate developments in order to ensure that appropriate access remedies are maintained for the forward-looking periods for which competition is judged to be ineffective, and to avoid undermining or discouraging efficient entry. Remedies such as duct sharing, access to dark fibre, mandated backhaul from the street cabinet, and new forms of bitstream access, could be considered where these are appropriate, bearing in mind that, in line with Article 8 of the Framework Directive, remedies should aim, inter alia, at stimulating economically efficient investment in infrastructure. This may call for some transitional arrangements to be considered, to allow time for adaptation of existing business models."

We are concerned that the Ofcom proposals concludes that for FTTC deployments a WBA product based on Ethernet combined with sub-loop unbundling will be the most appropriate and that for PON based FTTH deployments a WBA product alone will appropriate . While the proposal to develop an Ethernet based product may be seen as a suitably pragmatic approach it would seem premature to come to this conclusion in advance of any specific deployments by any specific operator. It is also not immediately obvious that such a solution will drive significant levels of competition in services as there will always be some constraint on what can be delivered by any particular wholesale product. Furthermore sub-loop unbundling without the ability of an operator to deploy its own infrastructure to the cabinet is unlikely to offer significant opportunities for innovation as the operator must rely on the incumbent's wholesale back-haul product.

It is for this reason that we believe all reasonable steps should be taken to promote investment in infrastructure where appropriate. This supposes a regulatory intervention based on a gradation of remedies starting from the lowest physical elements of the infrastructure (true bottlenecks).

We are concerned that without access to physical infrastructure the likelihood of a competitor build is extremely low. This would leave the timing of NGA deployment and technology selection in the hands of the legacy passive infrastructure owner. Because Ofcom propose to keep upper levels of relief such as WBA available then the business case and interest of the legacy network owner is also weakened. There would therefore appear to be a risk that Ofcom's proposals may risk widespread NGA deployment not happening at all or with a significant delay.

Question 5 Do you consider there to be a role of direct regulatory or public policy intervention to create artificial incentives for earlier investment in next generation access?

The question of whether direct regulatory or public policy intervention has a role in creating 'artificial incentives' could perhaps be better put as whether it has a role in creating necessary additional incentives to investment in areas where without them the business case would result in a socially unacceptable level of digital divide. We note that the Broadband Stakeholders Group is undertaking a study on the public value of next generation broadband. We also note that in a number of other European countries (eg Sweden and the Netherlands) the role of municipal authorities has already been instrumental in promoting the deployment of high speed next generation broadband networks to their citizens and businesses. We believe that the question merits further careful consideration at an early stage.