Intellect Concept Viability

Department for Business, Innovation & Skills

The Universal Service Commitment for Broadband at 2 Mb/s

FINAL REPORT

March 2010

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ABOUT INTELLECT

Intellect is the UK trade association for the technology industries, comprising the information and communications technology (ICT), electronics manufacturing and design consumer electronics and telecommunications sectors, including defence and space-related ICT. We are formed by 780 Small to Medium Sized Enterprises (SMEs) and multinational member companies with interests in these sectors, and are funded and operated by those member companies. Over the last 12 months, we have hosted 550 meetings attended by 3,486 people visiting our London offices and hosted 60 events for our member companies. 3,900 delegates have attended conferences we have organised in the past year. The industries that Intellect represents contribute at least 10% of the UK's GDP, employ approximately 5m people and contribute £120 billion to the UK economy.

1.0) Introduction

- The Intellect Concept Viability Service, supported by the Office of Government Commerce (OGC), enables government departments to use the companies and organisations represented by Intellect as a 'sounding board' on future procurement activity. It provides industry with an opportunity to provide input and feedback on potential procurements before a tender is written and within the confines of a technology and commercially neutral environment.

- On 18th February 2010, Intellect hosted a Concept Viability workshop with the Department for Business, Innovation & Skills (BIS) and sixty industry representatives. The full list of industry representatives that attended is shown in Annex One to this report. The workshop was convened to assist BIS in the development of its approach to implementing the 2 Mb/s Universal Service Commitment (USC), announced in the 2009 Digital Britain report. The workshop structure and questions were developed in agreement with BIS.

- During the workshop, attendees also provided input on the potential private and public value that might be generated through the implementation of the USC, in alignment with the Government's *New Industry, New Jobs* agenda, which aims to create "wider industrial opportunities through Government action".

- On 1st March 2010, an interim report, which detailed the proceedings of the workshop was submitted to Government. The written feedback of workshop attendees was invited on that interim report.

- This document is the final report on those proceedings. It highlights the key issues raised by industry representatives in answer to the questions that were posed at the workshop. Unlike the interim report, it also takes into account written submissions that were supplied by attendees in the three week period following 18th February. Information provided following-rather than during-the workshop is clearly indicated, as is the nature of commercial interest that has submitted it.

- This structure has been used in order to provide Government with a clear understanding of the sometimes contrasting perceptions that different commercial players have of the key determinants that should shape technology choice and procurement processes around the Universal Service Commitment as well as the policy choices affecting future broadband policy that may need to be made.

- It should be noted that any quantitative evidence or statistics that appear in the report, and which are not directly cited, were provided by workshop attendees[1] and have not been subject to substantiation by Intellect.

[1] Specifically Sections 2.1,3.1,4.1 & 5.1

2.0) Technology solutions for delivering the USC

Question 1a): What do you believe the most practical, effective and value-for-money option, would be to facilitate a 2 Mb/s USC?

- Almost universally, the attendees at the workshop argued that the technology choice would be largely dependent upon how a 2Mb/s USC is defined in practice. Without a clear definition of the service characteristics or end-user services and applications that are to be supported it is extremely difficult to make a clear judgement about which technologies might be most appropriate in any given circumstances. The development of a clear definition should therefore be the next key step in developing the USC.

- It was also universally agreed that a wide range of technology solutions will be required to implement the USC. There are a number of reasons why some premises have either no broadband or very poor broadband. These generally relate to geography, legacy network deployment issues, or in-home wiring/ interference issues. There is no single best-fit technology solution to address these problems. Different circumstances will require different solutions. It is therefore essential to leave technology choices open at this stage in the development of the USC.

- Given the importance of geography it should be possible to categorise most causes of poor or no broadband by geo-type. However, it is much more difficult to predict the incidence or geographic distribution of broadband problems caused by poor home wiring or other in-home interference issues.

- The availability of suitable radio spectrum is of critical importance when considering the potential role that a variety of wireless solutions could play in delivering the USC.

- There are some terrestrial wireless broadband providers operating in the UK that have spectrum available, on a near nation-wide basis, now. In that context, they would, depending on the specific circumstances of the procurement framework and the definition of what 2 Mb/s service should constitute, be able to satisfy a Universal Service Commitment before 2012.

- However, some other wireless platforms would require additional spectrum to be made available in order to deliver a USC service in rural areas.

2.1) Submissions Following the Interim Report

Fibre/Fixed Line Broadband Platforms

- The Government should be 'aspirational' in determining a technology solution provisioned under the USC, and should look to cater for the requirements that consumers might have in the future. It follows that a USC service should have the capacity to deliver more than a simple 2 Mb/s downlink speed.

- A 2 Mb/s USC service should be one that delivers a minimum of 2 Mb/s at 'peak hours'. The 2 Mb/s value should apply to the 'upstream'[2] rate. It follows that if the USC service was 'asymmetric'[3], the 'downstream'[4] rate would be in excess of 2 Mb/s. This would allow an element 'future proofing' to any new network capacity procured in the course of USC implementation.

[2] The speed at which data is sent over a broadband connection
[3] This is a broadband connection due were the rated upstream and downstream speeds are not equal
[4] The speed at which data is received over a broadband connection

Satellite Broadband Platforms

- A satellite broadband service that offers 'up to 4 Mb/s' to any location in the UK already exists. The same antenna included with a dish can deliver, with an added optional extra, *Sky* or *Freeview* services. In future, the same in-home equipment could be capable of delivering an 'up to' 10 Mb/s' service depending on the availability of new satellite capacity.

- More broadly, the UK already has access to a 2 Mb/s service today via 'Ku Band'[5] capacity on approximately 30 satellites already in orbit. Many of these satellites are used primarily to provide TV services to European customers.

- Today, these 'Ku Band' services can cost approximately £160 per month, per user, to provision and support around approximately 100 Gb/s in terms of capacity in total. This capacity is sufficient to support 2.5m individual satellite broadband connections at 2 Mb/s. Today, there are satellite broadband distributors offering a 2 Mb/s broadband connection for £32.50 per month at retail level.

- Within the timescale of USC provision (or before 2012), this situation will change. A number of satellites that use 'Ka Band'[6] capacity will be launched. These new satellites should provide additional coverage for approximately 200,000 connections at 2 Mb/s, but at lower whole-sale cost of approximately £15 per month per user.

- Conversely, 'Ka Band' Satellite capacity could be at the outset be more expensive to provision than 'Ku Band' services are, as the necessary consumer equipment would be produced on a smaller scale, thereby incurring additional unit cost. It is also possible that installations of satellite broadband that use 'Ka Band' capacity would, on an individual basis, take a longer period of time than 'Ku Band' installations do, as alignment of the antenna on the side of a customers home is more complex.

- 'Value for money', or 'cost-effectiveness' in terms of use of tax payers money, should be the primary determinant in determining USC technology choice.

- Cost effectiveness of a given USC solution could be determined by adding together the individual costs of provision on a 'per platform' basis[7]. This cost could then be divided by the number of homes being served in a given area to produce a 'cost per site' figure. If 'cost per site' is less than £300, satellite would not be the most cost-effective USC technology choice.

- If the 'cost per site' is more than £300, satellite would be most cost-effective USC solution to use. For example, if the cost to upgrade a small exchange around surrounding fixed line infrastructure that serves, 40 homes is determined at £1m, the cost-per-site would £25,000. For the same overall cost, satellite could serve 3000 homes. It should be noted that the £1m figure used in this example is completely hypothetical in nature, and that small local exchange upgrades are often not as expensive.

[5] "Ku Band" is a proportion of the electro-magnetic spectrum ranging from 12-18 GHz. It is primarily used for satellite communications on a global, in particular backhauls or to send data from a remote location to a central location. Satellite systems using the Ku-Band are used in the UK to provide connectivity for the National Lottery communications infrastructure, amongst others.

[6] "Ka Band" is a portion of the electro-magnetic spectrum between 26.5-40 GHz. It is commonly used by communications satellites.

[7] Different broadband technologies have different 'sunk' costs associated with them. The overall cost of a USC solution using fixed line technology might, for example, involve the cost of laying new cable and/or upgrading a local exchange. The overall cost of a USC solution based on mobile broadband might for example involve installation of a new base station and costs associated with that.

Mobile Broadband Platforms

- One mobile network operator[8] committed to delivering 2 Mb/s access to over 99% of the population within their homes or offices by 31st December 2012 "conditional only on the fair availability of sufficient and appropriate spectrum". That same operator currently provides outdoor HSDPA[9] capability to 91% of the UK population.

- The same mobile network operator stated that the provision of ubiquitous mobile broadband service at 2 Mb/s (or coverage that would facilitate 'indoor' access to 98% of UK homes) would be dependent on deployment of 13,500 new base stations operating in the 800 MHz band, as well as deployment of repeaters and femtocell devices in some premises.

- Both satellite and mobile broadband interests outlined that current availability of service should be a factor in determining USC technology choice. Making use of USC solutions available now would maximise consumer, industry and wider economic benefits, thereby directly influencing the value impact of Government intervention.

- A major infrastructure and service provider for mobile networks outlined that shortages of radio spectrum need not be a factor which detracts from the utility of 3G Mobile Network technologies in terms of USC technology choice. In many rural or remote areas, radio-spectrum allocated to mobile networks is used less intensively than is the case in urban areas. The opportunity exists for network operators to add capacity in a fringe or rural area by activating equipment that would make allocated frequencies that are not yet used in that area.

- A 'WiMax' Network operator noted that a USC service should deliver a 2 Mb/s downlink speed as an absolute minimum, and that if a given wireless-based technology cannot meet that requirement, it should not be eligible for use as part of a tender to provide a USC service. In that context, they outlined one view of the suitability/practicality of differing wireless network technologies:

    - *3G*- Can only deliver a downlink speed of between 768kb/s-1.5 Mb/s. Therefore, 3G should be excluded from the scope of a USC service.
    - *HSDPA*- Is capable of delivering a service with 2 Mb/s downlink in coverage areas, but would require additional spectrum to do so on a nationwide basis.
    - *WiMax*: Can and does deliver a 2 Mb/s downlink.
    - *LTE*: Will be able to deliver 2 Mb/s downlink, however the standard is not yet agreed and there is currently insufficient spectrum to support a network using LTE technologies in the UK.
    - *WiMax* Advanced: Will be able to deliver 2 Mb/s downlink, but the standard is not yet finalised and this is unlikely to be so before 2012.
    - *LTE Advanced*: It is unlikely that the LTE-Advanced standard will be agreed prior to 2012.

3.0) POTENTIAL DIRECT AND INDIRECT BENEFITS ARISING FROM THE USC

Question 1b: What would the benefits be to UK business, either direct (increased sales) or indirect (skills development, experience that is transferable to other markets)?

- Direct benefits from the deployment of the USC will accrue to those operators who successfully bid to deliver the USC, and the end users who consume the services. Which companies within the value chain will benefit is uncertain and will depend on the technology platform(s) chosen to meet the USC. The size of these benefits is also uncertain, and to an extent depends upon the definition of the service being delivered. Intellect's understanding of the supply chain for broadband services in the UK is shown in Annex Two to this report.

[8] In this report, the term 'mobile network operator' refers to an existing national mobile operator currently providing a voice and data service based on 2G, 3G or HSDPA (3.5G) service in either the 900 MHz, 1800 MHz or 2.1 GHz bands.
[9] High-Speed Downlink Packet Access (HSDPA) is an enhance 3G (third Generation) mobile technology. Is also referred to as "3.5G"

- Industry representatives considered that indirect benefits, or externalities, would accrue as a result of the USC; these could include various economic and social benefits. These would likely be small as the investment is small relative to the total investment in national-scale broadband and would impact on only a small percentage of the market. Further studies would need to be undertaken to understand the specific scale and exact nature of these externalities.

- Where upgrades to existing copper networks are required, it is likely that BT, and KCOM in Hull, would be the main beneficiary of the USC, with benefits flowing down to their contractors[10]. There would also be a further benefit to service providers, who would have a larger addressable market for their services.

- Where fibre upgrades are required, whether for backhaul or to upgrade the access network, a range of operators could deliver the USC and therefore benefit, ranging from incumbent access network operators such as BT and Virgin Media, through fibre providers such as Geo and Cable and Wireless, to community broadband organisations.

- Where wireless networks are used to meet the USC, mobile network operators and operators utilising other licensed and unlicensed spectrum would be the beneficiaries, along with their supporting supply chain. The use of these platforms may also create externalities through improved capacity and therefore service for users in the area of deployment that are not the intended recipient of the upgrade. For example, an additional base station would improve mobile coverage for all users within the cell site, and not just those unable to receive a 2Mb/s service.

- The satellite sector is a niche provider of broadband services at present, but has played a role in the delivery of universal service policies in both Scotland and Northern Ireland. If satellite plays a role in the delivery of the USC it will benefit the industry in providing scale for an investment the industry has made, and would support the space industry in the UK, which has a significant and growing role in the UK economy[11].

- Industry considered that resolving in-home issues should not be part of the procurement to deliver the USC: this should consider service capability only up to the point of entry to the home. However, they also suggested that government should ensure that consumers are aware of these issues, and how to resolve them should they wish. In turn, this may have benefits for the IT support industry and equipment manufacturers who provide in-home equipment.

3.1) SUBMISSIONS RECIEVED FOLLOWING INTERIM REPORT

Mobile Broadband Platforms

- One mobile network operator outlined that greater use of mobile broadband would allow transient populations (for example, students & short term tenants) the kind of flexibility of use of broadband that they often require. Mobile broadband also provides scope to provide broadband access to individuals with a low credit rating, and also allows for there to be no ongoing commitment to a monthly payment through of a ‘pre-pay’ option.

Satellite Broadband Platforms

- Satellite facilitates access to a broad range of services, including broadband. These include Television and ‘Video on Demand’. Use of satellite technology as part of the USC would have the

[10] Openreach is a division of the BT Group. Formed in 2006, Openreach was created to administer wholesale access to the “local loop” or the connection from a telephone exchange’s central office to a customer’s premises. Many UK Communications Providers, including Carphone Warehouse and BSkyB are in affect wholesale customers of Openreach.
[11] BIS Economics Report No.3 *The Space Economy in the UK: an economic analysis of the Sector and the role for policy*

dual benefit of making provision for switchover of analogue TV services in some areas, as the same equipment used to receive a broadband service could be used to receive Digital TV.

- The distribution model used for satellite broadband is often different to other broadband technologies. Services are often provided through a specialist network of local dealers, thereby directly benefiting local businesses. With other technology platforms, there is often less scope for local businesses to directly benefit from service uptake, as distribution often occurs on a national rather than local basis, either remotely or through 'high street' stores.

4.0) PRINCIPLES FOR PROCUREMENT

Question 2): What key principles do you believe should influence government procurement of these capabilities and services?

- It is currently unclear whether the USC is intended to be a one-off time-limited intervention or an on-going commitment to ensure the universal availability of a 2Mb/s broadband service from 2012 onwards. This needs to be clarified at the earliest stage as it is of fundamental importance to considering how the USC should be implemented.

- The procurement process needs to be based upon a robust but pragmatic definition of what a 2Mb/s service means in practice. Again this is fundamental to any further discussion.

- As outlined above lack of broadband or poor broadband connectivity can be caused by several factors and the most appropriate technology solution will vary depending on local circumstances. The procurement approach should not therefore preclude the use of any particular technology.

- In determining the right solution for any given location it will be necessary to find an appropriate balance between a number of factors: the cost per premise connected; the capability of the service to be provided; and the extent to which the solution is future proofed.

- It seems likely that the procurement approach will need at least three levels of granularity. Some issues, requiring a scale approach may need to be agreed at national level. However, it is likely that the best level at which to procure will be regional or sub-regional. In terms of actual implementation many decisions will need to be taken at a local level, with different solutions being deployed in different geotypes[12].

- In instances where the problem is poor broadband rather than no broadband availability, some mechanism will need to be developed to determine whether the cause is network related or home wiring/ interference related. Some commercial players may have some of this information but may consider it to be commercially sensitive and therefore be unwilling to put it in public domain. Thought needs to be given to whether such confidentially sensitive information can be made available to all parties interested in the provision of the USC.

- Government needs to obtain appropriate and specific information that outlines exactly where the 11% of homes that currently cannot get access to a 2 Mb/s broadband connection are located, and which of those homes cannot currently receive a 2 Mb/s connection purely because of 'in home' issues.

- More detailed work may be required to define, map and model relevant geotypes in advance of any procurement. The mix of geotypes is likely to vary by region or sub region, so that the balance of solutions could vary considerably on a region-by-region basis.

[12] In this context, the term "geotypes" refers to a hypothetical location with a range of physical characteristics. These could relate to geography (for example, a mountain range or river or on a small, isolated settlement) or location (on the edge of an urban area by suffering from random network effects such as poor cable routing). Even though they might be hypothetical in nature, geotypes would generally be reflective of a number of situations that currently prevent a given home or homes receiving either any broadband service at all or else a broadband service that is less than 2 Mb/s.

- Given the need to employ a variety of technologies in any given regional deployment, it is likely that a consortia approach will be more appropriate than a single supplier approach at a regional level. The procurement framework may need to take this into account.

- Any procurement approach needs to recognise the importance/ relevance of both Capex and Opex. The total costs of some solutions will be balanced more towards capital expenditure whilst the total cost of other technologies tend to be driven more by operating costs. If the procurement approach only takes account of Capex then this may have an impact on the viability of some technology solutions.

- It may be appropriate to use a reverse auction process to ensure best value solution. However, this process will need to evaluate potential solutions in terms of the cost per premise connected; capability being delivered; and the extent to which the solution is future-proofed.

- It is currently unclear as to whether any wholesale obligations may be imposed on service providers delivering the USC. This issue should be clarified as soon as possible.

4.1) SUBMISSIONS RECIEVED FOLLOWING INTERIM REPORT

Satellite Broadband Platforms

- Procurement should be conducted on an 'outside in' basis in order to mitigate potential for distortion of fixed network deployment plans. Using this approach, satellite solutions would provide access for communities that currently have no broadband service at all. As other solutions become available in such communities, consumers could make a decision either to switch to those alternatives, or to remain with a satellite broadband service provisioned under the USC according.

- Any procurement process should include an element of individual consumer choice, as is the case in other EU member states, which have implemented broadband support schemes that are accessible by the individual. Some use models that involve service providers, others enable the customer to directly choose the service that they feel is right for them.

- All proposed USC solutions should be evaluated on a cost-per-site basis (as outlined in section 2.1) and the appropriate solution to procure determined that way. This would ensure that any procurement had value-for-money of the solution procured as a key requirement.

Fixed-Line/Fibre Broadband Platforms

- Any procurement approach should seek to engage the public sector, businesses and local communities in demand stimulation and investment activities. This would highlight the demand for and value of using next generation solutions and maximise long term value for the tax-payer.

5.0) FUTURE IMPLICATIONS OF POLICY CHOICES

Question 3): How will the policy choices made now in procuring the USC affect future broadband delivery under your scenario? How should the value of future options be reflected in the procurement process?

- Although the USC has a clear aim of ensuring the universal availability of a 2Mb/s broadband service, there may be some instances where it makes sense to deploy a next generation broadband technology that technically exceeds the 2 Mb/s objectives. Clearly it will not be possible to do this in all instances, but where it can be achieved with at limited additional cost

then this should clearly be considered. Future proofing should therefore be included in the evaluation criteria for USC procurement.

5.1) SUBMISSIONS RECIEVED FOLLOWING INTERIM REPORT

Fibre/Fixed Line Broadband Platforms

- Use of next generation broadband technology should be seen as a means of saving tax-payers money over the long term. This consideration, rather than the fact that next NGA technology potentially "costs more" than other potential USC solutions in the short term, should be paramount in the Governments considerations. The long term of cost of using a solution based on '1st generation' broadband technology, and then in future having to return to that location again to upgrade that solution may be more than the short term additional cost of using a next generation solution in the first place.

Mobile Broadband Platforms

- Mobile network operators, as well as providers of the infrastructure behind those networks, focused on the need for long term policy around broadband provision to be linked to a strategic vision, centred on Government, for making suitable spectrum available to support the deployment of current and next generation mobile broadband technologies.

- In this context, it was noted that the *Wireless Spectrum Modernisation Programme*, and associated Government direction to Ofcom, appears to have no formal link to the USC commitment. Without such a link, key spectrum assets(in particular the 800 MHz and 2.6 GHz bands) that are ideally suited to delivery of a USC service would be brought to market without any obvious requirement on licensees to provide a USC service using them.

Satellite Broadband Platforms

- Satellite broadband solutions can be 'future-proofed'. There are only two points where any future technology needs to be applied in order to increase service performance: at the point of use, and at the relevant earth-station. Similarly, network and firmware upgrades (which facilitate upgrades in 'headline' speed) can and are being conducted remotely. On this basis, if the need to use a 'future proof' USC technology is paramount in the Government's considerations, satellite should not be discounted.

6) NEXT STEPS

- There are a number of questions that need to be addressed as soon as possible to enable further progress on the development of an approach to implement the USC. Most importantly there is an urgent need to develop a clear, and pragmatic definition for a 2Mb/s service.

- There was a clear need for further engagement with industry over the specific nature of the procurement framework once formulated in order to ensure that prior to tender, service providers are convinced of the business case behind their entering into any contract. Given the unprecedented nature of this procurement, and the need to ensure industry sees value in bidding for the contracts tended the Government should undertake such engagement on an ongoing basis.

END OF FINAL REPORT

ANNEX ONE

Attendance List for Concept Viability Workshop (18th February 2010)

Analysys Mason Limited	Paul Kennedy
Analysys Mason Limited	Patrick Kidney
Arqiva	Peter Couch
Arqiva	Jonathan Freeman
Astra (GB) Limited	Mike Chandler
Astrium Limited	Peter Aspden
Astrium Limited	Keith Smith
Atkins Management Consultants	Will Foster
Atkins Management Consultants	John Jennow
Avanti Communications Limited	Simon Barrett
Avanti Communications Limited	Kumar Singarajah
Viatec Associates	Peter Curnow-Ford
Broadband Stakeholder Group	Peter Shearman
Broadband Stakeholder Group	Antony Walker
BSkyB	Nina Howe
BT Group Plc	Dorothy Smith
Cisco Systems Ltd	Dominic Elliott
Community Broadband Network	Malcolm Corbett
Confederation of British Industry	Marta Costas
dc2light networks ltd	Mike Parkins
Department for Business, Innovation & Skills	Andy Carter
Department for Business, Innovation & Skills	Joanne Carter
Department for Business, Innovation & Skills	Francis Evans
Ericsson Limited	Philip Mart
Eurosat Distribution Ltd	Mike Locke
Eutelsat UK Ltd	Ian Martin
Eutelsat UK Ltd	Steve Petrie
Fell Systems Ltd	David Robson
Fibre Options	Neil Bradley
FibreSpeed Limited	Mike Johnston
Fibrestream	Mark Purdom
Freedom4	Graham Currier
Freedom4	Bill Maris
Fujitsu Telecommunications Europe Ltd	Ian Spiers
Geo Networks Limited	Joe Barrett
Geo Networks Limited	Rez Duncan
H2O Networks	Paul Jackson
Hughes Network Systems Ltd	John Owens
KCOM Group PLC	Huw Saunders
Motorola Ltd	Dave Chater-Lea
Nokia Siemens Networks UK Limited	Brian Shillinglaw
O² plc	David Owens
BT Openreach	Tom Brydon
BT Openreach	Craig Wilkie
Thales Information Systems Ltd	John Young
ThinkPLANK Limited	Ved Sen
Three	Erol Hepsaydir
Three	Shital Patel

T-Mobile (UK) Limited	Phi Gaskell
T-Mobile (UK) Limited	Xavier Mooyart
Towerhouse Consulting LLP (Regulatory Consultant, Orange UK)	Paul Brisby
UK Broadband Ltd	Martin Petheram
UK Broadband Ltd	Stephen Truelove
Virgin Media Limited	Andrew Wileman
Vtesse Networks	Richard Tinner
Zhone Technologies LTD	Colin Eagle
Zhone Technologies LTD	Charlie Hampson