

# T-Mobile (UK) response to the Digital Britain Interim Report

## 12 March 2009

### Executive summary

#### Overview

Today the telecoms and media industries stand at a pivotal juncture in their long-term evolution. As network technologies transit from narrowband to broadband, the range of services which may be offered to customers is undergoing a step change, delivering huge and growing benefits. T-Mobile welcomes the Digital Britain initiative as a timely far reaching review of UK capabilities, designed to ensure that consumers' needs continue to be met going forward. In responding to the Digital Britain interim report T-Mobile has tried not to adopt a partisan view, but rather has focused on what is in the long-term interests of consumers, believing that meeting their needs will ultimately best serve both our industry and T-Mobile.

T-Mobile is engaged with and supportive of Lord Carter's initiative. Based on the interim report T-Mobile has carefully considered Digital Britain's goals and aspirations. In our response to this we have suggested creative solutions to deliver against these goals and enhance the long-term welfare of the UK. T-Mobile would appreciate the opportunity to further discuss these proposals with the project team and the wider government.

T-Mobile's vision of Digital Britain is one founded on the belief that a range of access technologies are needed to deliver digital services and promote growth in the UK economy. Satellite, fixed and mobile all have unique qualities suited to meet different consumer needs. A rounded vision of a Digital Britain must embrace this plurality and ensure that a world-class access infrastructure is delivered in the UK on a sustainable basis.

In the last year 1.4 million UK citizens have chosen to buy mobile broadband dongles for their laptops and PCs<sup>1</sup>. About one third of these consumers were previously on the wrong side of the digital divide, having no fixed broadband at home. Two thirds wanted the ability to enjoy broadband services while away from home. Over the same time period there has been a surge in demand for broadband enabled smart phones, with 2 million sold in the UK last year<sup>1</sup>. T-Mobile believes that mobile is an intrinsic element in a rounded vision of Digital Britain, which while today is still in its infancy will become an evermore vital element in meeting future consumer needs. To deliver these mobile broadband capabilities, the UK mobile industry has had to undertake significant levels of investment. This investment has been driven by the infrastructure competition which exists between the network operators. Mobile infrastructure competition has historically delivered tangible benefits for UK consumers. Indeed infrastructure competition is a good mechanism which will reliably ensure that today's infrastructure evolves to deliver the mobile capabilities which will be needed by the UK economy tomorrow. T-Mobile therefore sees the maintenance of a competitive mobile infrastructure complimented by service competition, as being tightly coupled to Digital Britain's goal of ensuring that the UK continues to have a world class mobile infrastructure.

T-Mobile welcomes Digital Britain's support for network sharing; this is consistent with ongoing service competition in the UK. The positive benefits of network sharing have been tangibly demonstrated in the UK, by the reach and quality of T-Mobile's joint venture with H3G UK and their MBNL network. The creation of MBNL has enabled T-Mobile and H3G to deploy greater coverage, at a lower cost and with fewer masts than could otherwise have been achieved. This illustrates the benefits to both consumers and the mobile network operators and in the future could be an enabler to the realisation of the USC. The regulatory challenge is therefore to embrace network sharing while ensuring long-term infrastructure competition. To achieve this: first they need to have comparable spectrum assets, especially in terms of low frequency spectrum holdings; secondly none should have a decisive scale advantage. Within this framework network sharing enhances infrastructure competition.

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<sup>1</sup> Source : GfK Retail and Technology

The timing of the Digital Britain initiative is apt. Across Europe T-Mobile sees similar initiatives underway. The need for change here in the UK is pressing. This is especially true in regard to the spectrum liberalisation process, where if Ofcom's current proposals were to be implemented, the existing inequalities in spectrum allocation threaten to be not only perpetuated, but significantly exacerbated through the adoption of broadband technology over this spectrum. T-Mobile therefore welcomes the government's involvement, believing that free of the legal and regulatory constraints weighing on Ofcom, that it will be able to facilitate a fair and timely resolution to these issues.

### Spectrum liberalisation

This issue of spectrum liberalisation is one that has been under discussion with the RA and Ofcom for more than 5 years. T-Mobile recognises that this is a complex issue. It is also clear given the divergent views of the mobile operators and the legal framework under which Ofcom operates, that this is not an issue that can be resolved by Ofcom. Government resolution enables all public policy considerations to be taken into account, including issues relating to the structure of UK industry and ensuring continued investment in the UK communications sector, as well as the digital universal services commitment for the UK. A solution to Spectrum Liberalisation taking into account all these factors can only be delivered by government; it cannot be delivered by Ofcom. In the event that an industry agreed set of trades is not agreed and implemented, the only alternative is a government imposed solution.

The creation and maintenance of a healthy competitive landscape requires a level playing field. The competitive landscape in the mobile industry is, to a significant degree, shaped by the spectrum holdings of the network operators. To achieve a level playing field in terms of spectrum holdings, four dimensions must be considered;

1. Ability to deliver coverage
2. Ability to deliver capacity and speed
3. Timeliness of spectrum availability to deploy new technologies
4. The USC must not distort infrastructure competition

T-Mobile believes that a fair liberalisation settlement that is in the long-term interest of consumers must realise each of these principles independently if a competitive landscape is to be maintained as mobile broadband is increasingly adopted. For instance the absence of a level playing field in terms of spectrum for coverage cannot be compensated for by relative strengths along any of the other axes.

It follows from these principles that 900 MHz spectrum needs to be re-allocated in order to facilitate a continued competitive market in 3G services, and that the resolution of spectrum liberalisation needs to be considered in conjunction with the proposals for the USC and the planned releases of further spectrum. T-Mobile does not consider that Ofcom's February 2009 proposal to release one 2x5 MHz block of spectrum at 900 MHz and to auction this achieves this aim.

If 900 MHz spectrum is not reallocated at or around the time of liberalisation other measures would need to be taken to ensure that there was a level competitive playing field. However given the significant benefits that 900 MHz confers and the likely timing of its liberalisation, such other measures would need to be substantial.

T-Mobile welcomes government and Ofcom support for realignment of the DDR spectrum in order to release 2x30 MHz of spectrum in line with the proposed CEPT band plan.

The digital dividend spectrum is valuable spectrum for mobile services in the long term. It is not a substitute for 900MHz for a variety of reasons, however in the event that 900 MHz is not re-allocated then it would go some way to providing compensation to the non 900 MHz operators.

## 1. Spectrum for coverage:

Today, the UK mobile industry does not have a level playing field in terms of spectrum for coverage. Most unusually in a European context here in the UK only two mobile network operators have access to low frequency spectrum. Lower frequency carriers suffer less path loss than higher frequency carriers and so travel further in free space and deeper into buildings. In a narrowband voice centric world, this leads to the lower frequency operators needing fewer cells for a given in-building/rural coverage. To a degree the higher frequency operators can counter this by deploying more cells, albeit at additional cost. In a broadband centric world, the fact that lower frequency carriers suffer less path loss means that a higher data rate is achieved across the entire cell area. This further enhances the competitive advantage gained by the low frequency operators.

Consequently, T-Mobile believes that the result of allowing the re-farming of narrowband (2G) spectrum for broadband (3G) technology, without first addressing the historic inequalities in the operator's low frequency spectrum holdings, is that it will further exacerbate what is already an uneven playing field (as evidenced by the long-term preponderance of Vodafone and O2 in the UK market). With refarming, this distortion in the competitive landscape will be significantly increased and directly undermine and reduce the strength of the competitive forces in the market place. This in turn will have the effect of undermining the infrastructure competition upon which the UK depends to drive the development and evolution of its wireless infrastructure. The levelling of the historically distorted low frequency spectrum holdings of the UK network operators is therefore an essential element in the realisation of the Digital Britain vision on a sustainable basis.

## 2. Spectrum for capacity and speed:

The traffic volume generated by the average fixed line internet user typically increases by about 50%-60% per year<sup>2</sup>. In general mobile networks scale more efficiently if the network operator holds larger bandwidths of spectrum, since this increases the spectral capacity of the network.

Unfortunately, the practical benefit of greater bandwidths of spectrum is not so marked if the spectrum is at a higher frequency. T-Mobile estimates that over two thirds of the broadband traffic it carries originates from within buildings. Since the path loss into buildings is greater at the higher frequencies, this leads to a greater proportion of the cells resources being required to maintain an in-building signal. This in turn diminishes the cell's overall capacity. The net effect of this is that while the higher frequency operators enjoy somewhat more spectrum, this doesn't proportionally translate into a capacity advantage. T-Mobile believes that the capacity advantage that would be derived from re-farming its 2G (1800MHz) spectrum holdings for new technologies in no way compensates for the disproportionate advantage that would be derived by the low frequency network operators re-farming their 2G (900MHz) spectrum for 3G.

Turning to speed, today's HSPA mobile broadband networks are capable of typical<sup>3</sup> data speed of 4Mb/s in urban areas. Looking forward to post-2010 these networks may be upgraded to 4G technologies such as Long Term Evolution (LTE), which will be capable of delivering a typical speed of 40Mb/s in urban areas (the speeds will be significantly lower in rural areas because cells will cover larger areas). To deliver these speeds, wide bandwidths (2x20 MHz) of contiguous spectrum are needed. Initially these technologies are likely to be deployed in the 2.6GHz band, but they will be extended to embrace other spectral bands to increase the overall network capacity.

However, the full speed benefit offered by these technologies can only be realised if sufficient contiguous spectrum is available. From this two points emerge: First, creating a level playing field must take into account the ability of the network operators to have reasonable access to wide bandwidths of contiguous spectrum; and secondly, that an overly fragmented national portfolio of spectrum holdings is in no-one's interest.

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<sup>2</sup> Source: Minnesota Internet Traffic Studies <http://www.dtc.umn.edu/mints/home.php>

<sup>3</sup> the peak data rate averaged across all users in a cell in urban areas

### 3. Timeliness of spectrum availability:

Above T-Mobile has described the elements which need to be taken into account when considering a fair spectrum liberalisation settlement. In addition to these, timing is also an important consideration.

For instance 900 MHz and 800 MHz may have similar spectral characteristics, but the timeframe before which they will benefit competitors is very different. 900MHz 3G terminals will soon be available en-mass. By contrast 800 MHz spectrum will not be completely available nationwide until 2014. While T-Mobile expects consumer dongles using 800 MHz to be available from 2012, mobile handsets which drive the financial performance of a mobile business are not expected to be available until much later. Considerable technical difficulties exist in integrating so many operating frequencies into single handsets, which is required to achieve the economies of scale. It follows that there may be a significant difference in the timeframe in which 900 MHz and 800 MHz frequencies will benefit the operator's core business. Consequently T-Mobile believes that receiving 800 MHz spectrum is poor compensation for a failure to fairly redistribute 900 MHz spectrum among the network operators.

### 4. USC must not distort infrastructure competition:

"Universal Service Commitment" section that follows encompasses our response on this issue.

Overall T-Mobile believes the above four principles, taken together describe a fair spectrum liberalisation settlement. T-Mobile would like to emphasise that these principles cannot be traded against one another. Parity must be achieved on each principle independently to deliver a level playing field. A horse with three muscular legs cannot compete against one with four.

### Universal Service Commitment

T-Mobile believes that a digital Universal Service Commitment would benefit UK consumers by bridging the digital divide and promoting growth in underserved regions. Consequently T-Mobile is supportive of this central Digital Britain initiative, provided it is implemented in a way that does not distort market competition. In assessing the delivery of the USC there are number of principles that T-Mobile believes should be considered:

1. USC technology solution(s) should be simple
2. USC deployments and operation should be manageable and transparent
3. The solution should be the lowest cost possible
4. The solution should be not-for-profit and ideally non-funded.
5. USC deployment should avoid distorting competition of the provision of fixed and mobile services e.g. through a dependency on 900MHz
6. The performance (e.g. typical data rates) and capacity (GBytes per month) delivered by the USC network should be capable of exceeding the initial target of 2Mbps to meet evolving user needs, subject to cost constraints.

To deliver a "best fit" USC network a number of access technologies should be employed including wire line extension, wireless and satellite. These technologies should be blended together to best fit the characteristics of the USC area being served.

T-Mobile believes that a USC structure must be simple, pragmatic and low cost. Delivering a sustainable solution which is right for the UK in the long-term is more important than delivering a quick-fix solution. There are several mobile options to achieve this, utilising 800MHz or 900MHz spectrum. T-Mobile recommends that an interim step of deploying 3G at 900 MHz to meet the USC should be avoided, as this would only increase the cost and complexity. Instead 800 MHz should be used from the outset as it is released on a phased basis from the digital switchover process. To expedite this, the release of 800MHz spectrum should be accelerated.

The scope of the USC should be confined to regions that are clearly defined and would not be adequately served by future commercially driven rollout of access networks. T-Mobile has found it helpful to divide the potential USC regions into two groups. The first covers those regions which are genuinely rural and have no hope of adequate broadband coverage without a USC provision. The second are the areas at the edge of suburbia, which lie just outside the maximum distance from the local fixed line exchange.

T-Mobile believes that the vast majority of this second group will naturally be covered by commercial wireless and fixed broadband rollout over the coming few years. If following the in-depth analysis of the network operator's future coverage plans by the Digital Britain technical working stream, it is felt that a suburban coverage gap is likely to still exist; T-Mobile would suggest that a coverage obligation be associated with the 2.6GHz TDD licences. Delivering in-fill coverage using TDD would avoid any interference with the mainstream FDD spectrum being used in surrounding regions.

Turning to the first group (rural areas) T-Mobile believes that fixed line extension, through technologies such as remote DSLAMs, offers the greatest scalable capacity, where the local loop line structure makes them economic to deploy. However T-Mobile recognises that in many rural regions the population is too dispersed for this solution to be cost effective. In these locations we believe that mobile broadband offers the most scalable solution in terms of speed and capacity.

To cover these rural locations would require a significant cell deployment which would be complex and costly. To make it viable, simplicity and certainty in the USC regulatory structure is essential. For this reason T-Mobile believes piece meal tendering for USC coverage would be unnecessarily complex both organisationally and technically, leading to a slow realisation of the USC goal. Instead T-Mobile proposes that the USC regions are clearly defined as rural regions, which are allocated to a few of USC providers, each looking after a geographic area.

It follows that any implementation of a USC would therefore require that population areas not currently served are properly identified as rural/edge suburbia in order to ensure that customers in the latter area, which could be served through commercial services in the short to medium term, benefit from competition between providers that is not distorted by the local USC provision.

The USC providers may require USC funding to support this deployment. The USC design should minimise the level of funding required. However, T-Mobile would like to encourage the UK government to consider alternatives based on "in-kind" payments or trades. Such in-kind trades might include USC obligations being associated with new spectrum releases and the re-farming of spectrum. Such an approach may open the possibility of avoiding a complex telecoms tax for a USC fund.

As stated earlier T-Mobile believes that 800MHz is ideally suited to provide a durable and lowest cost USC in rural areas on a phased basis as the 800 MHz spectrum is released; however if a 900MHz solution was pursued then the historic spectrum allocations must not be allowed to distort participation in the provision of USC. Since the USC will primarily cover rural locations, network operators who hold 900 MHz spectrum will have a lower cost of coverage. Furthermore, unequal allocations of 900 MHz post-liberalisation would continue to favour incumbent 900 MHz operators, by virtue of their greater 900 MHz spectrum holdings, leading to a greater rural network capacity. It follows that, without the reallocation of the 900MHz spectrum, the USC will further distort competition by handing the current 900MHz spectrum holder's significant economies of scale and subscribers which are out of reach for their competitors. Such subscribers are not just living in rural areas, but also those visiting them and valuing mobility. Instead T-Mobile believes that a fair liberalisation settlement will act as a foundation upon which a USC structure can be built, which will benefit consumers and will not distort market competition.

It is essential that the deployment of mobile infrastructure for USC provision does not distort the competition in favour of any network operator or group of operators. T-Mobile is concerned that some network operators may seek to use the USC opportunity for commercial gain. Government must ensure that participation in the USC

deployment does not offer any commercial advantages to the participating network operators, due to greater economies of scale or improved performance of their commercial network. T-Mobile believes that the USC should be not-for-profit, and ideally non-funded.

### Digital Content Rights Agency and Media Literacy

T-Mobile would be supportive of the concept of a Rights Agency to act as a one-stop-shop to simplify the acquisition of rights. Indeed T-Mobile proposed such a body in our recent response to the Intellectual Property Office's consultation "Copyright the Future: developing a copyright agenda for the 21<sup>st</sup> Century". There is currently no single entity in the UK from which you can obtain a licence for all necessary rights. It is not clear which collecting society holds which rights and whether certain rights need clearance in all or part of the territories in which the works are to be used. Mobile operators are therefore required to individually negotiate and deal with numerous bodies if their customers require access to the full range of music available. As mobile operators commonly operate over a number of EU jurisdictions the problem is exacerbated by the numerous national collecting societies from which rights have to be obtained and rates negotiated.

However to the extent the Rights Agency is cast in the form of an enforcement agency, then T-Mobile would not see a role for itself within such an agency. T-Mobile would not expect to be involved with the policing of rights which are not owned by it. Furthermore, T-Mobile would be opposed to paying for a body which will be carrying out investigative/policing work on behalf of the rights holders. T-Mobile has to use its own resources to pursue defaulting customers in relation to its own products and services. It is therefore unclear why T-Mobile should be expected to pay for the investigation and pursuit of customers misusing the products of other rights holders. We would expect this to be a matter for the rights holders themselves.

In addition T-Mobile would like to point out the cost and difficulty of identifying customers who breach copyright laws, in the mobile environment. In a mobile broadband network heavy use is made of dynamic IP address allocation. To log and store every mapping between public and private IP addresses and between private IP address and mobile subscriber number is a very costly task which would involve significant development work and expense. T-Mobile would also like to highlight the fact that most of our customers are pre-paid and so there is no way in most cases to map IP addresses to an individual's identity or address. Clearly we do not support an unequal copyright enforcement regime, which treats post-pay and pre-pay customer differently.

Turning to Media Literacy, T-Mobile strongly supports Digital Britain's initiative to help encourage the adoption of digital services. This is an area in which T-Mobile is already actively engaged. T-Mobile would like to see the current raft of initiatives brought together within an over-arching government strategy. Again, we do not think Ofcom can do this and so government involvement is needed. Such a strategy should focus on providing access to the digitally disengaged and encompass the delivery of government services via the web to drive efficiencies in the public sector. This investment in media literacy could then be off-set against reduced governmental operating costs, while simultaneously driving broader growth in the UK digital economy. T-Mobile looks forward to Digital Britain's contribution to this important area.

## Introduction

✂.

T-Mobile welcomes this opportunity to comment on the Digital Britain interim report. This Digital Britain process aims to give solutions to some of the most important issues facing the communication sector and T-Mobile supports the resolution of BERR and DCMS to solve them. We are committed to this process and are available to engage with the Digital Britain project team in any way that is necessary.

T-Mobile agrees that broadband will become an essential component for the UK as a whole and as a country we need to find a way to ensure that it is a reality for all, rather than just for those in major city centres. We welcome the commitment of the Digital Britain project to make this provision available. We believe that the mobile sector will have a major part to play in this and are excited to work together with the Digital Britain team to make this happen.

The development of broadband across the UK will lead to a number of consumer benefits as detailed in the Digital Britain interim report. What has not been detailed to the same extent in this 'consumer centric' report is the equal importance of developing a strong communications sector and the benefits of the Digital Economy. One of the five objectives of Digital Britain is:

*"A dynamic investment climate for UK digital content, applications and services that makes the UK an attractive place for both domestic and inward investment in our digital economy"*

However the detail of the interim report focuses little on how this will be achieved and we hope that these issues have more prominence in the final report.

T-Mobile has undertaken a lot of work to consider all the issues that are raised in the report as we understand its significance for the future of our industry. We have attempted to look at the issues from an "external consultants" perspective, rather than only considering them through our own partisan viewpoint. This is because we believe that the best solution for T-Mobile should coincide with the best solution for the UK as a whole, as both will necessitate a fully engaged and efficient communications sector.

Given the breadth and depth of issues covered in this report, we have not been able to provide a comprehensive response on all the actions. Instead we have attempted to offer key principles and information which we feel will be useful for the Digital Britain team in resolving these issues. However we expect to engage further in the coming months, both through the technical groups and further written submissions.

## Comments on specific Digital Britain Action points

### Action 1: Maximising market led coverage of NGN broadband

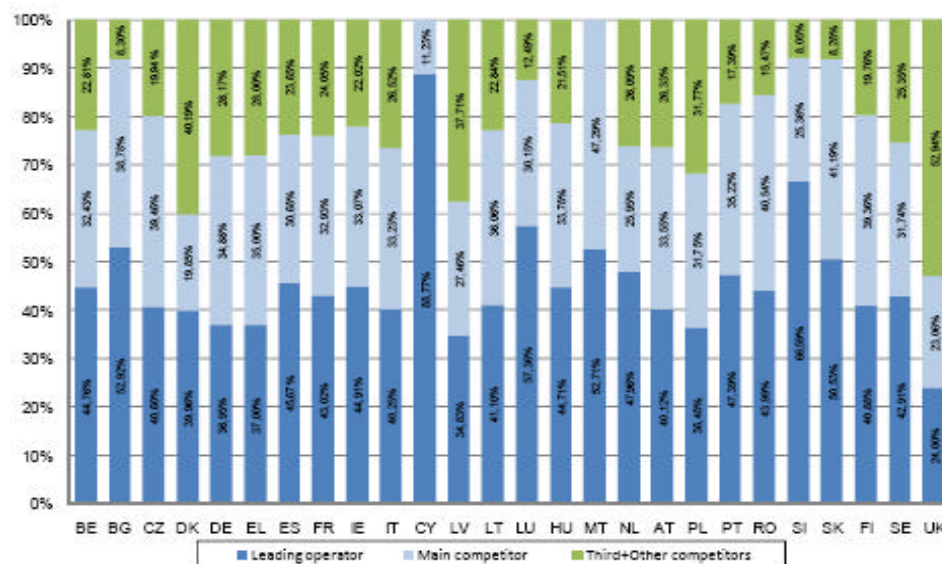
At the moment there is a high level of competition for broadband services across most areas of the country. Whilst historically this broadband was fixed in nature, in recent years it has been clear that mobile broadband brings something distinctive to offer to this competitive environment. It is evident that these distinct broadband offerings bring different types of benefits to the consumer. Digital Britain must encompass both offerings and develop an environment conducive to future investment.

The UK mobile broadband market is currently fiercely competitive, which has led to a rapid and widespread deployment of new mobile broadband technologies. T-Mobile has led the way with scale and scope of its 3G network sharing arrangement with H3G (operated through Mobile Broadband Network Limited (MBNL)). There are however only finite possibilities for broadband using 3G technology. In order to provide customers with faster “*next generation*” speeds, investment in 4G (LTE) technology is necessary. Any future investment in 4G technologies is ultimately underpinned by the financial health of the network providers. This in turn is directly impacted by the evolving regulatory regime.

It is therefore essential that any intervention arising from the Digital Britain project does not distort competition; whether between mobile and fixed broadband or between the separate mobile broadband providers. In particular an equitable re-alignment of spectrum holdings between mobile broadband providers is needed to promote competition and level the playing field in respect of in-building and rural coverage.

The UK mobile market is unique in Europe as unlike most countries, there is no distinctive market leader. As shown in Figure 1, the UK stands out in Europe as the country with the lowest market share for the leading operator. In addition, there are five major network operators in the UK, more than most countries in the EU. Ofcom and the UK Government should be congratulated for creating this vibrant market, and should work to ensure that this competitive market structure continues as we move forwards to a data-centric world.

Figure 1 : Mobile market share based on subscribers, October 2007<sup>4</sup>



<sup>4</sup> EC, 13<sup>th</sup> Implementation Report, 19 March 2008, p19

There are additional individual regulatory issues which will also impact on the future development of mobile broadband offerings. For example as mobile data traffic grows over time, an ever smaller portion of the network cost is allocated to voice call termination by Ofcom when calculating termination rates. This directly reduces network providers' income and this in turn could act as a disincentive to drive the increase in data traffic. The net effect is not aligned with the aspirations of Digital Britain and regulatory authorities should ensure that such perverse incentives are closed. There will be other examples of seemingly innocuous regulatory actions which could have undesirable impacts on the future growth of broadband services and these will also need to be considered. It is not in anyone's interests for particular regulations coming to hinder the 'bigger picture' aims and principles that have been outlined in the Digital Britain interim report.

## Action 4: The role of public funding in broadband deployment

T-Mobile appreciates the importance given by the Digital Britain team to enable further next generation broadband deployment across the country. There may indeed need to be some sort of further incentive, beyond that given by natural competition, to enable this deployment in some areas of the country. It is clear that no incentive is needed to drive the network evolution to NGN within the planned coverage footprint of the mobile networks, as natural competition is already providing enough of a financial incentive. Indeed any funding for additional build in these areas may in fact distort the competitive landscape, and would not be beneficial.

When looking at areas of the country beyond the current market-led initiatives of both the mobile and fixed operators, there is another distinction that can be made. In discussions within the Universal Broadband Design group, it has become clear that there are two dissimilar underserved areas within the UK. The first main area is predominantly rural and consists of pockets of villages and hamlets which do not have the necessary scale to make any investment cost-efficient. These areas are probably those that most would agree require further incentives, beyond natural competition, to ensure that broadband is available. T-Mobile anticipates that the mobile industry would have a part to play in bringing broadband services to these areas.

In addition there are secondary areas which are predominantly suburban and fall slightly beyond the current build plans of the fixed networks. In our view, natural competition should reach these areas, as they have the necessary scale to make it cost-effective to build out a broadband infrastructure. However it should be clear that these areas should not be considered with the same policy instruments as the other more outlying areas. Extending the same incentives to these suburban areas, where they are not necessary, would only act to water down the effect where it is needed, or make the whole scheme unsustainable and distort competition for consumers in these areas in the short-medium term.

Public funding is certainly an option for extending deployment to the truly underserved areas. There are also other options available to government in terms of funding such a scheme, which we will outline in our comments on Action 18. There is also the 'non-funding' option available to the government which involves the USC providers benefiting in kind, through spectrum holdings or other incentives. A clear example of non-monetary funding is the treatment of BT's current USO obligation and the associated benefits that they receive. This option would negate the importance for budgeting for this and could make the scheme more cost effective and realistic.

As detailed above in our response to Action 1, it is imperative that any incentives that are given to deploy further broadband do not lead to negative competitive impacts. There could be significant associated benefits for a single operator or subset of the operators building their networks far beyond that of the others. For these very reasons, participation in the USC build must not be implicitly restricted to Vodafone and O2 by virtue of their historical 900 MHz spectrum ownership. It would be counter-intuitive for any remedy for the underserved regions to actually result in reduced competition, and therefore a reduced level of broadband services being offered to consumers in the remainder of the country. Today's rumours of a network sharing agreement between the two companies add to this concern. In effect, the USC carries the danger of distorting services to the majority in order to extend services to a minority. While some form of cross subsidisation is inherent in any USC scheme, given that in any mobile broadband scheme cross subsidisation is likely to occur between operators as well as between consumers, the scope for anticompetitive outcomes is very significantly increased.

## Action 6a: Resolving the future of existing 2G radio spectrum through a structured framework

### Summary

- 2G spectrum liberalisation is a complex issue which Ofcom has not been able to resolve with any expedition and where litigation is likely.
- T-Mobile welcomes the Digital Britain initiative to resolve this issue and T-Mobile agrees that an industry-agreed set of trades could be an effective way to take this forward. T-Mobile is fully engaged with this process to take this forward, and has put forward specific proposals to address this issue. T-Mobile would also welcome the opportunity to discuss its and other proposal this further with the Digital Britain project team and across government
- The outcome of the Digital Britain process needs to be a solution that is consistent with both public policy objectives set out in the Digital Britain report and UK Spectrum Policy which will deliver benefits for consumers, competition and the UK economy.
- Such a solution can only be delivered by government; it cannot be delivered by Ofcom. In the event that an industry agreed set of trades is not agreed, the only alternative is a government imposed solution.
- The solution must fully take into account the competitive position in the UK mobile market and the benefits that 900 MHz spectrum confers on its owners. Consumers will be disadvantaged and competition in the UK will be significantly distorted if 900 MHz spectrum is not reallocated. Only Government can effectively take the market structure and other public policy considerations into account.
- If 900 MHz spectrum is not reallocated at or around the time of liberalisation other measures would need to be taken to ensure that there was a level competitive playing field. However given the significant benefits that 900 MHz confers and the likely timing of its liberalisation, such other measures would need to be substantial.

#### 1. Rationale for Government Action

This issue of spectrum liberalisation is one that has been under discussion with the RA and Ofcom for more than 5 years. T-Mobile recognises that this is a complex issue. It is also clear given the divergent views of the mobile operators and the legal and regulatory framework under which Ofcom operates, that this is not an issue that can be resolved speedily by Ofcom. Whatever proposals Ofcom were to make, they would inevitably be followed by protracted legal proceedings by parties dissatisfied with the outcome. This would inevitably create perverse incentives and further delay any release of spectrum and another operator getting access to 900 MHz spectrum.

T-Mobile therefore welcomes the Digital Britain initiative to take forward this issue. Given the costs of delay, it is clear that this issue must now be dealt with by the government, who are able to look at public policy, UK Spectrum Policy and industry structural matters and thus have greater power to bring this matter to a timely conclusion. Government resolution enables all public policy considerations to be taken into account which an independent regulator may not be able to do. This includes issues relating to UK industry and ensuring continued investment in the UK communications sector as well as the universal services commitment for the UK and the consequences that flow from Digital Britain initiatives such as planning. Indeed government involvement is the only way to achieve the overall Digital Britain aims.

A solution to Spectrum Liberalisation taking into account all these factors can only be delivered by Government; it cannot be delivered by Ofcom. In the event that an industry agreed set of trades is not agreed, the only alternative is a Government imposed solution.

Timely resolution of the refarming is needed to enable future spectrum releases and the development of services for consumers. However, any resolution should not rely solely on such future spectrum (800 MHz) releases since the necessary terminal equipment will not be available within sufficiently short timeframes to ensure that a competitive market is maintained in the interim.

Whilst an independent regulator could come up with proposals which address the economic and competition concerns, which T-Mobile believes Ofcom did in their September 2007 consultation, T-Mobile disagrees strongly with some of the assumptions in Ofcom's February 2009 consultation. In particular T-Mobile does not consider that Ofcom's preferred proposal, as set out in February 2009 consultation provides for a level competitive playing field for 3G services going forward.

## 2. Principles and public policy objectives

The 2G spectrum was allocated via beauty contests. 3G spectrum was however a new market, with the spectrum being awarded competitively, thus creating a level playing field in 3G services. However, as a consequence of the draft amendment to the GSM Directive, Member States are required to permit the refarming of 2G spectrum (900 MHz) for 3G services. This raises the danger that inequitable historic 2G spectrum allocations come to undermine competition in mobile broadband.

This is acknowledged in the draft amendment to the GSM Directive, which requires member states to examine the competitive position in their country. Most European countries have already made the necessary re-allocations to ensure that the level playing field for 3G services is retained by ensuring that all GSM operators additionally have 900 MHz spectrum. There are only six exceptions to this in Europe (Croatia, Greece, Iceland, Slovenia, Switzerland and the UK).

T-Mobile has developed high level principles which should be used to assess liberalisation options. These high level principles have been set out in more detail in the preceding section; They are:

1. Ability to deliver coverage
2. Ability to deliver capacity and speed
3. Timeliness of spectrum availability to deploy new technologies
4. The USC must not distort competition.

The solution to the liberalisation issue needs to ensure that the outcome will continue to provide a level playing field for 3G services once it is possible to use 900 MHz spectrum for 3G services. It needs to ensure that players who have invested significantly over the last ten or more years are not significantly advantaged or disadvantaged as a result of the liberalisation and that they are able to continue to deliver competitive services for consumers.

In addition, it is important that any spectrum solution is not reached in isolation from the wider public policy aims of Digital Britain and of UK spectrum policy.

T-Mobile has therefore developed additional high level principles, relating to the universal broadband service requirements. These are set out below and are discussed in more detail in response to Action 17.

1. USC technology solution(s) should be simple
2. USC deployments and operation should be manageable and transparent
3. The solution should be the lowest cost possible
4. The solution should be not-for-profit and ideally non-funded.
5. USC deployment should avoid distorting competition of the provision of fixed and mobile services e.g. through a dependency on 900MHz
6. The performance (e.g. typical data rates) and capacity (GBytes per month) delivered by the USC network should be capable of exceeding the initial target of 2Mbps to meet evolving user needs, subject to cost constraints.

Consequences of the above principles and our considerations of the technologies that could deliver universal services are that:

- There should be a pragmatic balance between liberalisation and Digital Britain's objectives around universal broadband services.
- Access to low frequency spectrum for 3G or 4G services must be achieved at the same time.

However, if we examine Ofcom's proposals in the light of these principles it is clear that the former do not provide for a level playing field. In particular Ofcom has not considered liberalisation in the wider context of UK public policy and UK spectrum policy objectives and their impacts on the wider economy. A coherent spectrum policy needs to be consistent with all of these objectives; this can be achieved by government, but has not been achieved by Ofcom.

### 3. T-Mobile's proposal to address liberalisation

Proposals to address liberalisation need to be evaluated in the context of the principles set out above. T-Mobile is engaged with the Digital Britain process to explore solutions and has put forward specific proposals to address this issue to the independent spectrum broker. T-Mobile would also welcome the opportunity to discuss this further with the Digital Britain project team and with wider government.

### 4. Why 900 MHz spectrum needs to be reallocated in order to protect consumer, competition and the UK economy

Currently only two network operators in the UK have access to 900 MHz spectrum. Competition in the mobile market will be distorted if 900 MHz spectrum is not reallocated. The much better propagation properties of 3G at 900 MHz compared with 3G at 2100 MHz (or 1800 MHz) would translate into a substantial competitive advantage if the current 900 MHz assignments are retained. These advantages stem from savings in site costs, much better indoor and outdoor coverage, faster rollout (as more coverage is added with each additional site), better call quality (from fewer call handovers), greater availability and lower costs of equipment and handsets.

Whilst all 3G services have been based on 2.1GHz spectrum these advantages have not been evident in the 3G market. However a consequence of liberalisation without reallocation would be that these advantages would be conferred on the 900MHz operators, and competition would become progressively more distorted over time. Without reallocation:

- In the short term, holders of 900 MHz spectrum would be able to provide better coverage more quickly, both in terms of geographic and in-building coverage, and at a fraction of the cost required to achieve similar (though necessarily inferior) coverage at higher frequencies.
- In the long term, this would lead to a substantial reduction in competition between operators, as holders of 900 MHz spectrum establish a significant advantage over their competitors. This would also limit incentives for 900 MHz operators to innovate and reduce prices and may also deter the non 900 MHz operators from believing that they will be able to generate a sufficient return to justify their own innovation.

No network sharing agreement between non 900MHz operators would effectively mitigate this result. Ensuring that the above distortion does not arise, and that all consumers can benefit from competition for 3G services, it is necessary to reallocate more than a single block (2x5 MHz) of 900 MHz spectrum, as Ofcom have proposed in their most recent consultation; instead the principles outlined above require all 5 network operators to have a block of 900 MHz.

This is clear from the precedent set in other European countries, where competition considerations have been taken into account and 900 MHz has been made available to all GSM operators across Europe. The only exceptions to this are Croatia, Greece, Iceland, Slovenia, Switzerland and the UK.

Table 1: GSM operators in Europe who do not have access to 900 MHz spectrum

Country	Operator
Croatia	Tele2
Greece	Cosmote
Iceland	IMC
Slovenia	Western Wireless
Switzerland	Tele2 and IN&Phone
UK	Orange, T-Mobile

Source: ERO Information Document on GSM Frequency Utilisation within Europe<sup>5</sup>

Without a reallocation of 900 MHz the impacts are expected to be:

(i) Impact on UK Mobile market

Unequal access to 900MHz spectrum would have a negative impact on the UK mobile market through:

- A reduction in the level of competition between mobile operators, which would lead to a return to the dominance of the 900 MHz operators. The 900 MHz operators, faced with less competition, would be expected to innovate more slowly and reduce investment in data services.
- Cheaper roll-out of 3G services using refarmed 900 MHz spectrum would allow the 900 MHz operators to provide significantly better coverage. This would reinforce the ability of the 900 MHz operators to deliver the universal service commitment, further exacerbating the inability of non-900 MHz operators to compete.
- The non-900 MHz operators would become relatively unattractive to consumers who want 3G services for a number of reasons. The non-900 MHz operators would have poorer coverage footprints and their costs would be higher as they would have fewer scale economies in relation to their network and non-network costs. This would be expected to lead to them having a reduced ability to compete, both for new services such as premium content rights, as well as basic subscriptions for voice/data.
- Refarming without reallocation between existing operators would therefore damage competition and hence damage consumer welfare.

(ii) Impact on UK consumers

Unequal access to 900MHz spectrum would have a negative impact on UK consumers through;

- Poorer coverage by the non-900 MHz operators for data services, relative to the 900 MHz operators, would lead to reduced competition and so reduced consumer choice, lower levels of service and innovation, and higher prices.
- With reduced innovation in the UK mobile market, new services will take longer to develop and the non 900 MHz networks would be unlikely to be able to offer a full choice of services.
- Additional mobile masts as non-900 MHz operators seek to match the coverage of 900 MHz operators.

(iii) Impact on UK competitiveness and the UK economy

- The 900 MHz operators would face weaker competitive constraints and so would innovate more slowly and reduce investment. The sustainability of investment in the UK mobile market would therefore be at risk.

<sup>5</sup> [www.ero.dk/fc2e8966-1db9-445b-a8d5-e5c7cf825cc2?mid=97605DCA-E7D9-4E5A-84B7-1E84586C7205&frames=no](http://www.ero.dk/fc2e8966-1db9-445b-a8d5-e5c7cf825cc2?mid=97605DCA-E7D9-4E5A-84B7-1E84586C7205&frames=no)

- Reduced innovation in e.g. data services would have an impact on UK productivity and UK growth. The UK market would therefore be less attractive to new potential entrants (including MVNOs) and shareholder confidence in non-900MHz operators would also be expected to weaken.

(iv) Impact on operators without access to 900 MHz spectrum

- Without access to 900 MHz spectrum following refarming the non 900 MHz spectrum operators cannot be effective competitors. In particular for data services, they would have a reduced coverage footprint and lower levels of in-building coverage than their 900 MHz competitors.
- Ofcom has estimated it would cost the non 900 MHz operators £2.2bn to provide the same level of coverage as Vodafone and O2 using 2.1GHz spectrum.<sup>6</sup> However this calculation is prefaced by the assumption that the operator would be able to physically build the large number of sites that would be needed.
- The mobile operators in the UK are all major international or European telecommunications players. As such, decisions are made as to where across their respective groups investment funds are directed. A level playing field in the UK broadband market is needed to ensure that investment funds continue to be allocated to the UK.

5. Why Ofcom's solution does not provide for a level competitive playing field

Ofcom in their consultation explain that operators with access to 900 MHz spectrum will have a significant competitive advantage as compared to operators who only have access to higher frequency spectrum. They note that if a UK mobile operator does not have access to 900 MHz spectrum to develop a broadband service, there will be a significant welfare cost either in terms of competition or in terms of uneconomical site rollout at 2.1GHz.

Against this, Ofcom has estimated it would cost the non 900 MHz operators £2.2bn to provide the same level of coverage as Vodafone and O2 using 2.1GHz spectrum.<sup>7</sup> However this calculation is prefaced by the assumption that the operator would be able to physically build the large number of sites that would be needed. This is unquestionably a false assumption.

However Ofcom's proposed remedy relies on unjustifiable assumptions and does not require every operator to have access to 900 MHz spectrum as they had originally proposed in September 2007. Instead they suggest that only releasing a single block (2 x 5 MHz) of 900 MHz spectrum will suffice. There are two main assumptions behind Ofcom's new reasoning, which T-Mobile does not think are valid:

- i. Two network sharing operators would share one block of 2 x 5 MHz of 900 MHz spectrum<sup>8</sup>
- ii. Operator(s) without access to 900 MHz spectrum can get access to comparable spectrum at 800 MHz after a short interim period of approximately 3 years<sup>9</sup>.

As a result of the faults in these assumptions, which we will respond to detail below, the only way to avoid the problem of the welfare cost of operators not having access to low frequency spectrum is to ensure that every operator gets access to at least 2 x 5MHz of 900 MHz spectrum.

- a. Two network sharing operators could share one block of 2 x 5 MHz of 900 MHz spectrum

There is not enough bandwidth for two operators to use this small channel for mobile broadband. Mobile broadband is a bandwidth hungry application and it would be extremely difficult for two operators to use a single

<sup>6</sup> Ofcom, Application of Spectrum liberalisation and trading to the mobile sector, 13 February 2009, 4.44

<sup>7</sup> Ofcom, Application of Spectrum liberalisation and trading to the mobile sector, 13 February 2009, 4.44

<sup>8</sup> ibid 5.67

<sup>9</sup> ibid 5.39 and A7.10

channel without it becoming capacity constrained very quickly. Ofcom itself has acknowledged this, noting that a single carrier would not give enough capacity if there is high demand for mobile broadband services, and they would still need to use their 2.1 GHz spectrum.<sup>10</sup>

Furthermore, Ofcom has not correctly assessed the basis on which such spectrum sharing could be achieved. The arrangement for two operators to share a single carrier, as described by Ofcom, would require a Multi Operator Core Network (MOCN) solution, with common interface and a common RNC to help traffic steering. Ofcom appear to have misunderstood our network sharing agreement if they think that sharing spectrum (particularly sharing substantially less spectrum) would be the natural progression.

- b. Operator(s) without access to 900 MHz spectrum can get access to comparable spectrum at 800 MHz after a short interim period of approximately 3 years.

There is still tremendous uncertainty in mass market equipment availability, particularly terminals, for 800 MHz. Even under the most optimistic scenarios, the 800 MHz spectrum is not expected to achieve the levels of worldwide harmonisation that has already been achieved for 900 MHz spectrum. Ofcom has explicitly rejected the extent of harmonisation which has led to worldwide use of 900 MHz spectrum for GSM. As a result of this lack of scale, the costs of terminals and market equipment at 800 MHz will always be higher than at 900 MHz. In addition there will not be the same amount of flexibility of use of 800 MHz spectrum given the requirement to protect broadcast receivers below 790 MHz from interference caused by mobile base station transmissions. As a result of these differences and the implicit risk with this spectrum, whilst 800 MHz spectrum is expected to become the closest alternative to 900 MHz spectrum, it will never be an exact substitute, and will therefore always be less valuable to operators.

Furthermore, Ofcom's assumption that the interim period between refarming 900MHz spectrum and the availability of 800MHz spectrum is inconsistent with what they have said in the separate DDR consultation<sup>11</sup>. The base case in the Ofcom February 2009 Spectrum Liberalisation consultation is that the DDR spectrum, including channels 61 and 62, would be released by 2012. However Ofcom's own DDR consultation suggests that the spectrum will only be available at the beginning of 2014. Further, at a recent stakeholder event (on 25/02/09), Ofcom admitted that this timetable is highly optimistic. A more realistic date for the spectrum being available nationally is mid-2015, which would imply an interim period of over 4 years (potentially stretching to 6 years). The fact that 900 MHz UMTS handsets are already in use in the UK illustrates this point.

Ofcom's analysis also relies on mobile operators successfully acquiring 800 MHz spectrum at auction and then having sufficient funds to roll out a network over which to compete with networks already operating 3G services over 900 MHz spectrum. However, given that the 800 MHz spectrum has yet to be allocated and Ofcom has proposed to do this through a competitive auction, there is no guarantee that these assumptions will be realised.

Last there will be an issue of reputational inertia as during any interim period, as non-900MHz operators develop a public perception of not being able to deliver the same quality of high speed mobile broadband offerings. Consumers are likely to remember this beyond the interim period and brand perception commonly persists for some time following a change in the underlying quality of service. It follows that any competition issues would stretch well beyond the interim period as brand/reputation would not be immediately addressed by the acquisition of spectrum, but will have to be built from a position of considerable competitive disadvantage.

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<sup>10</sup> See A7.27 and associated footnote 7

<sup>11</sup> <http://www.ofcom.org.uk/consult/condocs/800mhz/>

## Action 6b: Making more spectrum available for next generation mobile services

### Summary

2.6 GHz spectrum should be made available by auction for next generation services once the liberalisation issue is resolved. The spectrum should be awarded in line with the CEPT bandplan to deliver certainty to the market.

T-Mobile welcomes government and Ofcom support for realignment of the DDR spectrum in order to release 2x30 MHz of spectrum in line with the proposed CEPT bandplan.

The digital dividend spectrum is valuable spectrum for mobile services in the long term. It is not a good substitute for 900 MHz for a variety of reasons, however in the event that 900 MHz is not re-allocated then it would go some way to providing compensation to the non-900 MHz operators.

The reasons for 800 MHz spectrum being a poor substitute to 900 MHz spectrum include the following:

- There are significant uncertainties regarding the costing and availability of equipment and consumer terminals (whilst momentum across Europe is growing there are still only a limited number of European countries that have announced that they plan to follow the CEPT bandplan). Also unlike the 900 MHz band it is far from clear whether countries outside Europe will adopt the European band plan being developed.
- Whilst consumer dongles for the 800 MHz band are expected by 2012, handsets for this band are not expected until significantly later.  
Ofcom does not expect a large portion of the DDR spectrum to be available until 2014 at the earliest.
- The technical constraints on the 790 – 862 MHz band have not yet been defined by Ofcom, which could impact on the costs and timescales for equipment in the UK.

It follows that DDR spectrum cannot be relied on in the very short term as a means to resolve historic spectrum allocations, however it is clearly spectrum that will be used to deliver mobile broadband services and as such needs to be considered when addressing the liberalisation issue and also the universal service commitment. .

#### 1. 2.6 GHz spectrum should be awarded as part of a wider spectrum programme

The 2.6 GHz spectrum should be awarded in line with the CEPT band plan. This will provide certainty for the players involved regarding the amounts of spectrum available as paired and unpaired spectrum and result in a much more efficient auction.

We also discuss in section 17 that the unpaired spectrum could play a role in delivering the universal service commitment.

#### 2. Pan-European alignment of Digital Dividend Spectrum for mobile

T-Mobile welcomes the government's support of Ofcom's proposal to play a key role in the pan-European alignment of the digital dividend review spectrum.

Ofcom are currently consulting on alignment of the DDR with the proposed European (CEPT – the group of European regulators) bandplan. This aims to provide 2 x 30 MHz of spectrum for paired FDD use. The use of TDD (unpaired use) is also under consideration in CEPT however we expect vendors to only produce FDD equipment for the band.

CEPT aims to finalise their band plan by July 2009. This will be used by 3GPP (the global standards body) to provide specifications which should be available by mid to late 2010.

### 3. DDR spectrum is not a substitute for 900 MHz spectrum for mobile operators

There are a number of reasons why DDR spectrum is not a good substitute for 900 MHz spectrum.

#### a) The 790 – 862 MHz band will not be available for at least 5 years

A large portion (expected to be 2x20 MHz) of the 790 – 862 MHz band will not be available until at the earliest 2014. Part of the spectrum (possibly 2x10 MHz) could be available by the end of 2012 and in some areas of the UK where digital switchover has already occurred, this spectrum could be available earlier. We understand that Ofcom's proposal is that the spectrum will be cleared by 2014; although it was highlighted at the recent Ofcom workshop (on 25/2/09) by Ofcom and the broadcasters that this timescale is optimistic.

Therefore even assuming that there were no equipment issues, the large portion of the DDR spectrum would not be expected to be usable at least 4 years after competitors using 900 MHz spectrum. This delay is very significant in a fast moving market such as mobile.

#### b) The scale of European harmonisation is unclear

The scale of harmonisation is extremely important to allow the cost effective production of terminals.

Finland, France, Sweden and Switzerland are the only countries to announce allocations in accordance with this plan. It is expected that Germany and Ireland will follow. It is understood Russia, Portugal, Spain and Italy currently have problems with broadcasters and/or military use although these may eventually be resolved. There are therefore great uncertainties in the scale of European harmonisation. Also unlike the 900 MHz band, which is available across most of the world, it is far from clear whether countries outside Europe will adopt the European bandplan.

#### c) Network equipment availability and costs at 800 MHz are very unclear

In addition to the timing issues discussed above, the interference issues for this spectrum are still uncertain. Ofcom have yet to determine the constraints needed to protect Broadcasting usage below 790 MHz. These costs could be significant since there are thought to be around 2.5 million households that use channel 60 (the band below 790 MHz) in UK. The interference constraints could limit the usefulness of the band.

Equipment for the band will only be developed in scale once there is a sufficiently large market. If specialised equipment is required for the UK market then this will cause further delays, increasing handset costs and will result in a limited set of terminals being available to consumers.

#### d) 800 MHz spectrum cannot be used effectively in place of a 3G substitute like 900 MHz until a population of handsets becomes available

Whilst it is anticipated that consumer dongles will be available reasonably quickly for the 800 MHz spectrum band, there is tremendous uncertainty in mass market equipment availability, particularly terminals<sup>12</sup>. There are two reasons for this. First there are insufficient countries harmonising spectrum to be valuable to mainstream terminal vendors and there are limitations on the number of frequencies that can be used by a handset. The limit is currently four, which will be used for the four harmonised bands (900 MHz, 1800 MHz, 2.1GHz and 2.6 GHz) although it is anticipated that this will be increased in due course.

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<sup>12</sup> See analysis undertaken by GSMA which that there are significant economies of scale to be achieved in the production of terminals with internationally identified common frequency bands. Without the identification of common bands, handset costs would be prohibitively high, and the effect will be a significant reduction in the takeup of any mobile service.  
[http://www.gsmworld.com/documents/gsma\\_white\\_tech\\_note.pdf](http://www.gsmworld.com/documents/gsma_white_tech_note.pdf)

Consumer handsets at 800 MHz will therefore follow significantly behind 900/1800 MHz. Handsets with UMTS 900 MHz capability are already available and being used by consumers in the UK. We understand that 27 handsets and 19 USB dongles already have UMTS 900 MHz capabilities<sup>13</sup>. These are some of today's popular handsets and are not more expensive than the general 3G handsets on the market. Given the natural seamless progression to handsets with this capability installed, it should be significantly easier for a 900 MHz operator to migrate customers over to their UMTS 900 MHz Network. This migration of customers to new handsets is one of the most costly and timely aspects of investing in a new network – ✂. Nevertheless, devices are already being shipped that support UMTS at 900 MHz. It follows that the existing 900 MHz networks will derive significant benefits immediately following refarming of their 2G networks

#### 4. DDR could play a significant role in USC

DDR spectrum is well suited for developing broadband universal services in rural areas, and hence is a good option for the USC. It will be available less populated areas first, following the digital switchover plans, although it is expected that only 2x10 MHz would be available consistent with the CEPT FDD (paired) band plan.

Nevertheless this could be used in rural areas on a phased basis (in line with the switchover timetable) to offer a mobile broadband services using LTE technology and a consumer dongle/consumer premises equipment (CPE) once the spectrum is available. Once the full 2x30 MHz of spectrum was available (in 2014) additional capacity would then be available to support more users.

800 MHz has advantages over 900 MHz for USC. First, the amount of spectrum available and therefore the ability to deliver speeds in the longer term in excess of 2Mb/s for many users in a cell and also to support greater data usage. Secondly, there are no existing consumers using the spectrum so that it would not be necessary to develop guard zones in the short term.

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<sup>13</sup> Global suppliers association, [www.gsacom.com](http://www.gsacom.com)

## Action 6c: Making time limited licences indefinite and subject instead to AIP beyond the end of the current term

The 2.1 GHz spectrum was auctioned competitively in 2000 and the winning operators purchased the right to use that spectrum until 2021. By contrast 900 MHz and 1800 MHz spectrum was in effect allocated to individual operators depending on their date of entry in the UK market. The prices for these spectrum holdings are set in order to reflect a range of spectrum management objectives in a process known as Administered Incentive Pricing (AIP). AIP fees are not market prices and the methodology for setting them is not perfect. At present, O2 and Vodafone pay annual AIP fees for 2G spectrum of £15.6 million each and Orange and T-Mobile pay £16.6 million each. In this process, the charge for 1 MHz of 1800 MHz spectrum is set to be equal to 0.7 of the charge for 1 MHz of 900 MHz operators to reflect the higher value of 900 MHz spectrum, which Vodafone and O2 have access to.

These AIPs are designed for a specific purpose, i.e. to provide some additional encouragement (in the form of an annual charge) for operators to relinquish any additional spectrum that they hold beyond what they need, while not being set too high as to run the risk of valuable spectrum being left idle because no one values the spectrum at the level of the AIP. There is considerable uncertainty and subjectivity involved in the process and Ofcom has chosen to set them conservatively. In its 2004 consultation, Ofcom noted:

*"In line with the policy to set AIP fees conservatively so as not to create disincentives for trading, Ofcom intends initially to set AIP fees towards the bottom of the range defined by the value of spectrum in existing uses and its value in alternative uses."<sup>14</sup>*

It is clear that after the Wireless Radio Spectrum Modernisation Programme, proposed in this interim report, is implemented, the current AIP system will need to change:

- Given the intention to allow operators to re-align spectrum holdings, it is likely that spectrum allocations will be different in the future. The associated AIP payments for spectrum will in turn need to change as a result.
- The ability to refarm existing spectrum for uses other than 2G will lead to this spectrum being more valuable and it is likely that the associated charges will need to increase as a result. It is clear from Ofcom's analysis that there is a much greater potential to utilise 900 MHz spectrum for 3G services, than for 1800 MHz spectrum. The conversion factor of 0.7 that is currently used to determine the appropriate fees would therefore need to be changed appropriately.
- Another additional element to the AIP system is the potential conversion of 3G licences to indefinite licences beyond their current term. These will then also need to be priced through the AIP system. We would expect in due course 2.1GHz licences were made indefinite, subject to payment of AIP after 2021

Another area to consider when reviewing the AIP system is the further costly obligations that operators may be taking on to provide universal broadband coverage. It may be appropriate that the AIP for this spectrum is reduced to reflect the additional costs that the operators would bear. Therefore if the 800 MHz spectrum is specifically allocated to operators in return for them fulfilling this objective, then it would be counter-intuitive for the spectrum to also come with a separate AIP fee. Clearly all the costs associated with the spectrum would need to be considered together.

Even if the 800 MHz spectrum was auctioned competitively with no associated universal service commitments, the AIP levels that were payable after the initial licence period would need to be less than those paid for 900 MHz spectrum. This is due to the fact that 800 MHz spectrum will never be an exact substitute for 900 MHz spectrum and will always be less valuable to operators, as described above in our response to Action 6a and 6b.

A final consideration for setting the appropriate future AIP going forward is consistency with other regulatory measures. The mobile operators and BT are in the process of concluding a lengthy appeals process, concerning

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<sup>14</sup> Ofcom, Spectrum Pricing: A consultation on proposals for setting wireless telegraphy act licence fees, 29 September 2004.

Ofcom's price control for Mobile Call Termination. The Competition Commission has determined that it would be incorrect to use the price paid in the 2000 auctions to determine the value of 2.1 GHz spectrum. It is imperative therefore that there is consistency between the valuation of spectrum for AIP purposes and inputs for mobile termination rates. If the mobile termination rates going forward are not based on the actual price paid at auction, then it is logical that the AIP is not set on that basis either.

## Action 6d: Mobile Network Sharing

T-Mobile welcomes the Government's support for network sharing.

T-Mobile believes that the positive benefits of network sharing have been tangibly demonstrated in the UK, by the reach and quality of our joint venture with H3G UK to form the MBNL network. The creation of MBNL has enabled T-Mobile and H3G to deploy a greater coverage, at a lower cost and with fewer masts than could otherwise have been achieved. This illustrates the benefits to both consumers and the mobile network operators.

Furthermore, the UK has a vibrant MVNO market, which T-Mobile plays a leading role in enabling. This further amplifies the benefits which flow from network sharing as there are greater opportunities for the service layer competition, both through a larger addressable market and greater network capabilities for the service layer players to exploit in their service creation (T-Mobile and H3G continue to compete as independent providers of wholesale airtime to MVNOs).

At the highest level, there are three types of network sharing;

1. Sharing sites, but not electronic infrastructure or spectrum
2. Sharing sites and electronic infrastructure, but not spectrum
3. Sharing sites, electronic infrastructure and spectrum

Each offers its own benefits. 1) Is the simplest form of network share, allowing operators to quickly reap benefits from the sharing; 2) Enables great cost savings, but binds the network operators more tightly together; 3) Offers the additional benefit of more efficient spectrum usage, but it tends to require the joint venture to be based on a profit centre model rather than as cost centre model as in options 1) and 2).

Given the success of MBNL it is very possible that another pair of UK operators may create another network share vehicle in the near future. Naturally this will provoke thoughts about how mobile network infrastructure competition will evolve.

In rural areas most cell sites do not directly make a profit, but rather justify their existence through delivering ubiquity of coverage. These cells are very lightly loaded in terms of traffic. While sharing these cells between two operators reduces the cost of this coverage for each, sharing them between more operators would reduce this cost further. This would also directly benefit the USC as a lower cost of coverage will extend the coverage footprint.

In cities mobile cell sites are heavily loaded with traffic, many to the maximum configuration achievable within the constraints of the operators' spectrum holdings. When such a situation is reached, the only way to expand the capacity of the network to keep pace with the traffic growth is to build more cells within the relevant area ("cell splitting"). However, urban cell build is very expensive and additional sites are often not available. Potentially this could motivate network operators to share cell sites in urban areas too. The larger the number of network operators who contribute cells, the greater the overall capacity which is achievable for a given quantity of spectrum.

Through this network sharing process, a tension emerges. On the one hand it improves the network coverage and capacity available to consumers and so will directly contribute to the USC. On the other hand, it tends to lessen the infrastructure competition upon which the UK dependent to deliver a world class infrastructure on an ongoing basis. The regulatory challenge is therefore to embrace network sharing while ensuring long-term infrastructure competition. To achieve this: first they need to have comparable spectrum assets, especially in terms of low frequency spectrum holdings; secondly none should have a decisive scale advantage. Within this framework network sharing enhances infrastructure competition.

## Action 6e: Supporting the USC by extending mobile broadband to the 2G footprint

In December 2007 T-Mobile and H3G signed a 3G RAN Network sharing contract with a view to utilising MORAN (Multi-Operator Radio Access Network) functionality to fully integrate network infrastructure.<sup>15</sup> The parties have committed to extend the coverage of their 3G mobile broadband network to replicate 2G coverage – as such, mobile networks are able to make a significant contribution to the broadband universal service commitment.

T-Mobile's unique network sharing agreement has enabled it to roll out a wide area data network with lower cost and environmental impact. T-Mobile has committed to deploy 3G and HSPA data services to 13,000 sites (c29,000 cells) by mid 2010 giving 99% of the UK population outdoor 3G coverage. See the figure on the following page showing a map of the country with T-Mobile data coverage in mid-2010.

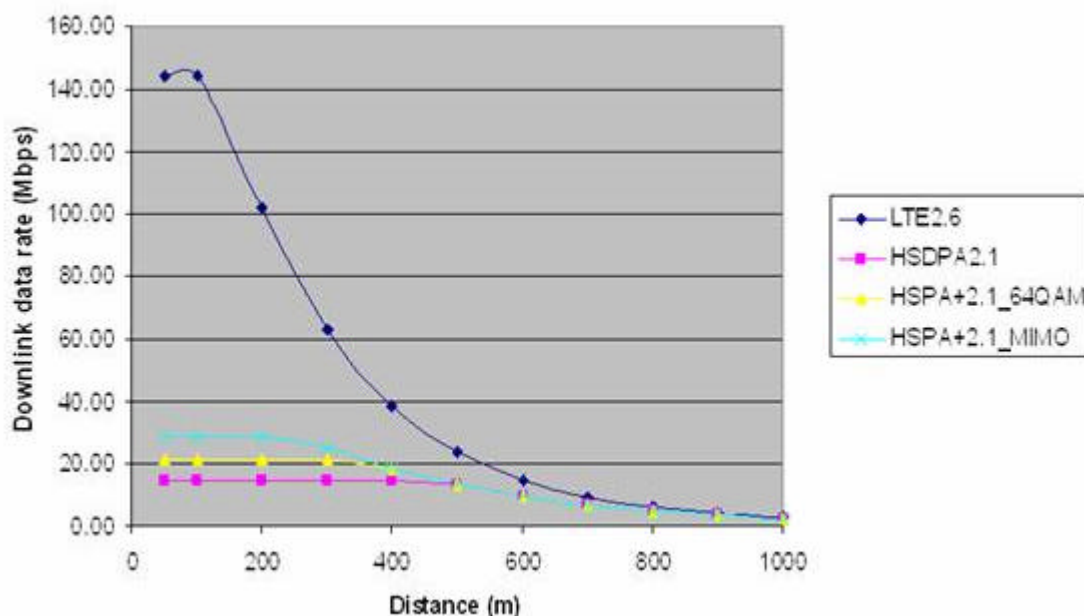
The extent to which T-Mobile's data coverage overlaps the USC areas is currently being modelled, but this is challenging without the geographic data on fixed broadband 'not spots'.

Figure 2: T-Mobile estimate coverage map mid 2010

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New technologies such as HSPA+ and LTE will further enhance the mobile data speeds available. The theoretical single user data rates in a coverage limited network are shown in the figure below. LTE/HSPA+ offers higher speed close to the site, although at larger distances the performance converges to that of existing terminals.

Figure 3: Illustration of speed versus distance for mobile technologies



However in urban and suburban areas data rates are typically interference-limited and the benefits of LTE verses HSPA in this case tend to scale with bandwidth. It's important to note that if T-Mobile were to gain access to 900 MHz spectrum it would significantly uplift the percentage population covered by mobile broadband and reduce the limitations on rural and in-building coverage.

<sup>15</sup> Where insufficient spectrum is available to allow independent carriers for each operator, MOCN (Multi Operator Core Network (MOCN)) can be implemented as an alternative to Network Sharing using the MORAN technology implemented by MBNL. MOCN allows Multiple Core Network connections to the same RNC's and for Rel 6 UE's the individual Operator logos would be visible as in the MORAN solution. The RAN is however a shared resource so cannot be individually parameterised at cell level as in the case of MORAN.

The current shared network is a scalable vehicle to deliver nationwide broadband services. Indeed, the infrastructure and governance T-Mobile has already set up within MBNL make it ideally placed to provide a mobile broadband USC although to provide maximum benefit to the UK the current spectrum issues need resolving. Low frequencies are essential to provide cost effective mobile coverage in rural areas and it's important that there is a level playing field in access to this spectrum.

## Action 11: The creation of a Rights Agency

There are a number of different forms that a "Rights Agency" could take, each of which we discuss briefly below. However in order to respond fully to the substance of this proposal, T-Mobile would need to better understand the exact nature of the proposed 'Rights Agency' and its proposed remit. We look forward to a more detailed plan of the role and structure of the agency which Lord Carter has indicated will be available shortly.

*1. An educational and enforcement agency for upholding the legal use of copyright material* - there are currently a number of bodies which already carry out an educational and enforcement function in relation to copyright material, such as the BPI, and therefore it would be useful to understand what additional benefits this agency would provide.

T-Mobile would not necessarily see a role for mobile operators within such an agency in any event since it would seem to be aimed at protecting the interests of the rights holders rather than distributors. T-Mobile would not expect to be responsible for funding and administering an agency with the policing of rights which are not owned by T-Mobile.

*2. A central collecting society licensing body* – if it is intended that the 'Rights Agency' will carry out the function of a 'one stop shop' collecting society so that all rights can be cleared through this agency then this is something that would be fully supported by T-Mobile. This was a proposal which was suggested by T-Mobile in our recent response to the Intellectual Property Office's consultation "Copyright the Future: developing a copyright agenda for the 21<sup>st</sup> Century".

Our experience in negotiating with collecting societies is that the current system is cumbersome and time consuming. There is also a lack of willingness on the part of the collecting societies to entertain commercial discussions particularly regarding an appropriate price point and payment terms. This hinders the growth of legitimate online music services and makes it harder to compete with pirate sites. This week Google has blocked all music videos on YouTube to UK viewers after it failed to agree economically sustainable fees with PRS, the body representing composers and publishers.

Since there is currently no single entity in the UK from which you can obtain a licence for all necessary music rights it is not clear which collecting society holds which rights and whether certain rights need clearances in all or part of the territories. Operators are therefore required to individually negotiate and deal with numerous bodies if they require the full range of music available. Also as mobile operators operate over a number of EU jurisdictions the problem is exacerbated by the numerous national collecting societies from which rights have to be obtained and rates negotiated if intra-group services are provided.

The models proposed by the current collecting societies are also tailored to the traditional forms of music sales and therefore fail to reflect the fast moving and increasingly innovative forms of mobile and online music distribution models. These again have to be individually negotiated with the various collecting societies and others. This often leads to the delay and the blocking of innovative music propositions which would be beneficial to consumers. For example the current collecting society models envisage the sale of tracks and albums as individual downloads but do not envisage any sort of unlimited or bundled proposition which are now becoming increasingly common.

We would therefore strongly support a "one stop shop" for purchasing rights on an international basis or at least within the EU, and, at worst, one for the UK. Within this context we note that this is closely aligned to the EU's current actions to encourage the development of EU wide content rights.

## Action 12: Funding the Rights Agency

As noted above, T-Mobile is opposed to paying for a body that would carry out investigative/policing work on behalf of other companies (i.e. the rights holders). Since this agency would ultimately only benefit the rights holders, it is difficult to understand how T-Mobile would gain from any funding it may be required to make. T-Mobile has to use its own resources to pursue defaulting customers in relation to its own products and services. It is therefore unclear why T-Mobile should be expected to pay for the investigation and pursuit of customers misusing the rights holders' products. We would expect this to be a matter for the rights holders themselves.

By way of background, the sale of digital copyright material is currently carried out with very small margins and therefore to introduce an additional cost to network operators, such as a funded rights agency, may render the sale of digital content commercially unviable and undermine the already fragile model for legitimate online sales. Accordingly any payment T-Mobile is required to make to a rights agency should be reciprocated in a reduction in the revenue payable by distributors (such as mobile operators) to rights holder to reflect the fact that such an agency will only benefit the rights holders and to ensure the continued viability of online sales.

## Action 13: Enforcement of content rights

T-Mobile believes that the emphasis of any proposals must be proportionate and focus on information and education. Customers are reasonable and will be responsive to customer education and alternative models for buying content, providing they offer value for money. T-Mobile believes that the effectiveness of the less intrusive measures such as education must be assessed before considering more drastic measures that could have unintended consequences.

T-Mobile welcomes the clarification provided in the government's response to its consultation on illegal peer-to-peer file sharing that it does not require ISPs to monitor customers' traffic or cut off the accounts of repeat infringers. As set out in Action 13 of the interim report the modified proposal is for ISPs to notify alleged infringers and collect anonymised information which will be made available to rights-holders on receipt of a court order. T-Mobile believes that an enforcement process such as this should not be used to perpetuate business models that may be outmoded, when customers are leading the market towards new ways of paying for content. Rights holders must be flexible in their approach to negotiations in order to allow these new models to develop.

### Practicalities of user identification in a mobile environment

T-Mobile notes that there are serious practical reasons why the measures proposed in the interim report that work for fixed ISPs will not readily apply in a mobile environment. In particular mobile operators cannot identify individual rights infringers from public IP addresses alone with sufficient degree of confidence to support taking action against customers.

#### Public to private IP address mapping

In contrast to fixed line broadband providers, mobile operators do not have sufficient public IP addresses to allocate one public IP address for each mobile device. As a result mobile operators must use a network port address translation function which converts many thousand private IP addresses into few public IP addresses. As far as nodes in the Internet are concerned, hundreds of customers will all appear as a single public IP address as a single customer.

A new Public-Private IP mapping is generated each time a user uses a new application, or connects to a new web page, or new destination. The unique identifier here is the TCP or UDP port number which indicates the application used and is generated by the source and destination systems to manage the transfer of data. This contrasts to the fixed line environment, where the IP is static for the duration of the connection to the internet, generating one record, which does not require the TCP or UDP port number.

Mobile operators do not typically store the mapping of private to public IP address for any length of time. This mapping would require on a per connection basis, every destination IP address, every source IP address, the timestamp, TCP or UCP source and destination port numbers for each connection, which would quickly generates enormous volumes of data. This would be tens or hundreds of GBytes of data per day for each operator today and will increase with the usage of mobile broadband which is growing by over 100% per annum. Therefore is it impractical and expensive to store and use this sort of data to identify customer private IP addresses, and link to MSISDN to identify the subscriber information. In addition, this will record information about the customer's web browsing behaviour, which may have data protection implications. This information in any event is not obtained on a URL basis but on a destination IP host (the host of the web site). However it would enable a picture to be built up of a customer's behaviour.

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### Identification of customers

Prepaid customers are not obliged to provide customer address details and, often exercise their right not to register their name and address. It follows that it would not be possible to send such customers a letter in the post, notifying them of rights holders' allegations or to send them a text message as the majority of such customers neither register their address nor have a handset as most connections are via a dongle...

T-Mobile has two offerings, web'n'walk, which is designed for handset usage, and mobile broadband, for laptops. Mobile Broadband may be provided via dedicated devices such as the USB "dongle", embedded mobile devices, or using a handset as a modem. On an IP address level T-Mobile makes no distinction within the network between the different types of users. Furthermore a single customer account may have several devices with internet access.

To be 100% confident of the identification of the customer who has downloaded the illegal file, the Mobile Operator would require the TCP or UDP port number and an accurate timestamp which is known to the Mobile Operator and the two parties involved in file sharing.

## Action 17. Universal Service Commitment of up to 2Mb/s by 2012.

### Key points

- A set of guiding principles and targets for USC should be established as early as possible to inform the selection of the best technologies that meet the USC targets.
- T-Mobile believes that in rural areas, mobile networks provide a viable, rapid and cost effective means of realising USC objectives.
- 800 MHz or 900 MHz would both be suitable spectrum bands for covering rural areas (owing to better propagation characteristics),
- However, T-Mobile's recommends that the interim step of deploying USC with 3G at 900 MHz should be avoided to save costs, and instead implement LTE at 800 MHz from the outset to support the longer term demand and needs of users.
- USC network deployments in the DDR band should not prevent the use of this band in the core competitive areas by other operators.
- Many of the technology solutions for rural broadband will require cellular or microwave masts which could have a major impact on the environment. The extent and severity of this issue needs to be addressed as a priority.

### Principles

To evaluate potential technology options for realising the USC objective, a set of guiding principles should be established. T-Mobile proposes that the following principles are relevant:

1. USC technology solution(s) should be simple
2. USC deployments and operation should be manageable and transparent
3. The solution should be the lowest cost possible
4. The solution should be not-for-profit and ideally non-funded
5. USC deployment should avoid distorting competition of the provision of fixed and mobile services e.g. through a dependency on 900MHz
6. The performance (e.g. typical data rates) and capacity (GBytes per month) delivered by the USC network should be capable of exceeding the initial target of 2Mbps to meet evolving user needs, subject to cost constraints.

### USC targets

A clear picture is needed of the USC aspirations and targets in terms of:

- % population covered;
- performance: bit rates (peak, average, uplink, downlink), contention ratio, usage (GB/month);
- ability to improve performance levels over time;
- criteria triggering USC deployments e.g. level and geographic concentration of demand for broadband;
- cost per household; and
- timing and availability

While the figure set by BERR of 2Mbps is a reasonable initial target for peak data rates, it is unlikely to be achievable for all the population by 2012 in all areas. Targets will have to be tempered as results from the technical and financial evaluations become available.

## Technology options

Assessing the effectiveness of alternative technologies for USC will demand detailed evaluations with reliable input data. This will take time to undertake and benefit from the pooling of information and ideas from different parts of the industry. T-Mobile welcomes the opportunity to support the Broadband USC Technical Group in this process. The following is an outline of T-Mobile's initial views of the options.

A critical consideration influencing the choice of technology is the location of users currently not served with broadband. Without a detailed understanding of where these users are located, a proper assessment is not possible. T-Mobile would welcome the release of data to the Digital Britain Broadband UCS Technical Group to facilitate this assessment. T-Mobile has had to rely on high level regional information so far.

We believe underserved users are widely distributed and located not only in remote rural areas but also on the "fringes of suburbia". In the latter case, these areas could be well served by a combination of extensions of the existing fixed or mobile networks and prevailing infrastructure competition. An alternative option is to use 2.6GHz TDD spectrum for this purpose as a condition of its use. These approaches would obviate the need for USC intervention in suburban areas. Indeed, an overly expansive USC implementation would undermine services to such fringe customers in the long term, by removing commercial drivers.

The rural areas are more challenging. The principal candidate technologies are

1. Extension of fixed networks. Locate a low cost remote DSLAM at copper physical concentration points close to the clusters of households (i.e. villages or small towns). Reconnect the copper local loop to the DSLAM on demand from households for broadband access. The DSLAM is linked back to the local exchange and this can be achieved using fibre pulled through the existing ducts or alternatively by microwave.

This solution should provide performance levels equivalent to ADSL2+, far exceeding the initial target of 2Mbps. Moreover, fixed broadband is capable of supporting very high traffic levels probably unattainable by other options.

The feasibility of this approach depends on the physical distribution of the copper local loop in rural areas and no doubt other factors best known to the fixed operators.

2. Fixed Wireless Access. Fixed wireless is an effective solution for providing high speed links. This involves the installation of a fixed antenna on the household. To be cost effective, a point-to-multi-point solution is needed to enable multiple users to be served by one base site. Since FWA requires line-of-sight, this could present a significant limitation where users are distributed over a wide area. There are two broad categories of FWA:

- Standardised cellular technology e.g. 3G, WiMax. These are designed for multiple users and should be low cost. However, it will need a significant allocation of mobile spectrum;
- Microwave technology. Commercial microwave solutions are available for point-to-point or point-to-multi-point configurations but with only low number of users per sector. Since this operates at higher frequencies, line-of-sight is usually needed and this could present a limitation where users are distributed over a wide area. This needs further investigation.

3. Mobile. Cellular networks are capable of providing broadband access to large geographic areas. However, the levels of coverage, performance and capacity depend on the technology, spectrum band and spectrum bandwidth available:

- To cover all inhabited areas of the country, a very large number of sites could be needed. ✕
- The maximum number of broadband users that can be supported by a cellular site depends on the typical usage (i.e. GBytes downloaded per month per user). As the underlying usage is expected to grow

at rates of at least 50% per annum, the number of supportable users falls over time. ✂. Beyond this, additional sites or spectrum would be required;

- The performance and capacity of the USC service offered should be capable of being evolved with time, consistent with prevailing broadband usage in more populous areas. To achieve this, the mobile solution should migrate to a 20 MHz 4G carrier capable of higher peak data rates for some users and capacity increase of 8 times that of a single 3G/HSPA carrier; and this implies allocating a significant tranche of 900 MHz or 800MHz for a rural USC.
- In suburban areas, existing mobile solutions at higher frequencies may be deployed but fixed solutions may offer the best prospect for long term capacity and performance,

4. Satellite. This is a further valid solution that can be considered as part of the mix of technologies for meeting USC. It has the maximum reach and may be appropriate in some locations but may be restricted in some cases e.g. as a result of shadowing by mountains.

A challenge common to many of the approaches (with the exception of satellite) is the need to link the serving base-station back to the local exchange or nearest, mobile switch site etc. While fixed DSL extensions may be able to use existing ducts, many rural locations will require high capacity, potentially multi-hop, microwave links which will need their own dedicated spectrum allocation. These will add to the costs of deployment.

A major factor to be considered for options is the environmental impact of deploying large numbers of masts in rural locations. These would be needed for both cellular and microwave links and could face major planning obstacles. The severity and extent of this problem is not yet clear but should be addressed as a priority.

At this stage of the evaluations, it is too early to say which technology or combination of technologies are the most cost effective. Our current belief is that the technologies most capable of meeting the USC objectives mapped out above are:

- Mobile at 900MHz or 800MHz, initially with 2x5 MHz spectrum allocation but moving rapidly to larger allocations of at least 2x20 MHz combined with 4G.
- Fixed network extension using remote DSLAMs.

Both will also need significant microwave spectrum to realise the backhaul.

### Spectrum

A key factor determining the ability of specific operators to deploy and operate USC will be the spectrum allocation.

1. There is a risk that an overly aggressive USC timetable may force its realisation through a combination of 900 MHz and 3G 5MHz carriers.
2. A more cost effective solution, avoiding the deployment of multiple technologies and frequency bands, would be wait for 800MHz as the preferred USC band and combine it with a 20 MHz 4G carrier.
3. USC network deployments in the 800MHz must not prevent the use of this band in core competitive areas.

Operators holding 900 MHz spectrum are therefore uniquely positioned to benefit from the market distortion caused by an overly aggressive USC timetable. This has the potential to bestow on these operators unique advantages allowing them to achieve a dominant position in network provision. To avoid these risks, the following steps are needed:

- Re-allocate the 900 MHz spectrum; and
- use a single technology (LTE) and frequency band (800 MHz) for USC from the outset. This minimises costs although the implantation would need to be phased as spectrum is released as a result of Digital Switchover; and

- clearly define designated USC areas to allow MNOs to operate competitive 800 MHz networks efficiently in the core areas.

#### Terminal/Handset availability

USC solutions reliant on cellular technology can take advantage of the availability of chips set, devices and economies of scale of the mobile industry. For USC, the emphasis will be on wireless dongles, USB sticks or laptops with integrated wireless access.

UMTS 900 is already appearing on a number of handsets and USB dongles today, as detailed in our response to Action 6b.

For LTE, first devices will be mobile broadband (rather than handsets) with commercial devices expected in 2011 at 2.6GHz. The availability of LTE dongles at 800 MHz will depend on how early UK and other countries e.g. Germany and France clear out this band and deploy 800 MHz networks and a significant market for these devices is established. With appropriate industry stimulus, 800 MHz LTE dongles should be available from 2012.

LTE chip sets are expected to support a maximum of four frequency bands in early implementations. If priority is given to 2.6 GHz, 2.1 GHz, 1800 MHz and 900 MHz this could create an obstacle to the widespread availability of 800 MHz devices. However, in principle, it should be possible to procure dongles at 800 MHz albeit at a premium.

#### USC network identity

A further requirement to avoid distorting infrastructure competition is that any USC network should have its own unique identity i.e. it should have its own network PLMN code. This would avoid a monopoly USC mobile operator in a given area from using the USC obligation to distort the market by claiming the biggest UK network and take undue competitive advantage.

To further level the playing field, customers of all the MNOs should be able to roam onto the USC network i.e. National Roaming and be charged at fair and reasonable rates.

#### Cell site planning policy

T-Mobile UK considers that all forms of base station development work undertaken by mobile telecommunications operators to support their network deployment strategies in fulfilling obligations under the Digital Britain initiatives should receive positive support from the planning systems adopted across the Nations of the UK. In fulfilling Digital Britain objectives, the mobile operators would be responsible for developing key communications infrastructure and would be developing exactly the type of infrastructure and network architecture that the Initiative is intended to facilitate.

We firmly believe that given the Government's UK wide priority for mobile broadband connectivity, the planning framework for telecommunications development must be supportive for future rollout demands.

The infrastructure needed to support mobile broadband should be viewed as an essential national infrastructure and classified as such in the Planning Act. This would give it the classification as other economic arteries including transport, utility and power generation developments.

We would also request that Government ensures future alignment of planning policy across the UK, and that it become a non devolved competence. With planning guidance for telecommunications now a devolved administration issue, there exists pressure for some revision. We therefore strongly suggest that UK Government seeks to limit these pressures to review and tighten planning guidance towards all forms of telecommunications development, as to do so would limit the timely rollout of new infrastructure to fulfil mobile broadband.

In addition, plans that could capture telecommunications development within the Community Levy proposals and Planning Gain Supplements, would inhibit the timely and cost effective rollout of additional network capacity across the UK.

Arrangements for the development of mobile communications infrastructure must support a co-operative position between the need to develop the networks to support customer demand for new services and the responsibility of network operators to manage the rollout of network infrastructure that supports co-operation with local government and other stakeholders. The existing practices through industry best practice (the Code of Best Practice on Mobile Phone Network Development) strikes the right balance stakeholder engagement and ensuring network infrastructure meets increasing public demand and drives economic performance.

Our suggestions on how planning policy for future telecommunications development should be classified do not change our commitment to the industry best practice policies discussed above.

#### Next steps

To arrive at considered and properly informed conclusions on the right mix of technologies, some key steps must be achieved:

- agreeing the target USC requirements and how they should evolve over time
- understanding where the underserved users are located;
- understanding where the reach of existing and planned fixed and mobile networks; and
- understanding the capabilities, supply and costs of alternative technologies

In order to assist in the attainment of these objectives, T-Mobile is actively participating in the Broadband USC Technical Group.

## Action 18: Structure and organisation of the USC

T-Mobile supports the concept of a broader scheme to deliver broadband services under the USC in the UK, including funding if necessary, to achieve the aims of the fully digital age. From the Interim Report, T-Mobile has identified the following underlying drivers: .

- there is no requirement to deliver such a broadband service under the current Universal Service Obligation. Accordingly, broadband services are only available to customers where it is commercially viable for a particular operator to make available and market broadband connectivity. It follows that broadband connectivity is not available to a significant number of homes and locations.
- a USC arrangement is the best method to extend broadband coverage beyond market led availability to homes and locations where no broadband connectivity exists.
- there are a variety of different current and future technologies (and companies) which can successfully deliver the targeted 2Mbps broadband service under a USC in a cost effective manner. Accordingly to the particular environment of a home or location different technologies will have a role to play in broadband delivery. It follows that mobile can provide a key role in delivering broadband services to the rural homes and locations.
- funding of the USC will be via a levy on media and communications companies

The means by which such drivers are reflected in the implementation of a particular USC scheme varies. Indeed, a variety of overseas schemes provide possible alternatives or precedents. For example:

Country	USC attributes
Ireland	Separate broadband scheme for identified areas independent of exiting USO (fixed voice). No fund used – appears to be straight government funding to USC provider H3G, who won through reverse auction. Coverage commitment of 92% of homes/locations with Satellite providing the remainder. Technology used by H3G is a combination of 3G HSPA and fixed wireless (using 3.5GHz spectrum provided for this purpose by the government). H3G are required to provide wholesale access and are committed to provide 1.2Mbps initially rising to 2.3Mbps by 2012.
India	Existing USO fund (funded by a specific financial levy on telecom operators) extended to include broadband provision, with some support for mobile provision. BSNL has been contracted to supply an agreed level of DSLAM installations and wire-line connections by 2014 to provide at least 512kbps.
France	Expressions of interest phase. Plan to deliver broadband to 100% population by 2012. Not part of existing universal service arrangements. No USO fund proposed. Operators certified to deliver USC service provision if they can meet criteria including minimum 512kbps and maximum €35 retail per month including equipment. No restriction on technology.
Germany	Consultation phase currently. Plans to deliver broadband access to all homes/locations by 2010, using best technologies. Wireless delivery able to utilise the DDR 800MHz band.
USA	Existing USO fund (funded by Telecom operators) has already been extended to include broadband provision, but only to schools, libraries and healthcare sites. Government has issued a consultation covering the further extension of broadband to homes/locations. Incumbent operators in their geographic areas will have first right of refusal to deliver USC in their area, at the same level of funding as they already receive. Where they conclude they can't then USC provision will be offered via a reverse auction. Operators required to deliver at least 768kbps, but can use any technology, except Satellite.

Similarly, at a technology level, there are a number of potential options for network organisations for the delivery of the USC broadband services:

- Fixed wireline operator – using xDSL, Cable, etc. to expand the existing fixed line broadband network.

- Fixed wireless operator – FWA, Wimax to provide an extension to the existing fixed line broadband network.
- Wireless mobile – HSPA, LTE
  - Primary Mobile operator – Single operator providing USC provision offering National roaming to other mobile operators
  - Regional Mobile operators – Grouping of mobile operators providing coverage on a county, or individual cell basis.
  - Multi-netco Mobile operator – Use of a joint venture, which includes a subset of mobile operators, to combine networks offering National Roaming
  - Independent Mobile operator – New separate entity formed to provide USC provision where all mobile operators roam onto the network.
- Satellite operator – Fixed and possible mobile

T-Mobile notes that USC delivery is likely to be a combination of fixed wireline, fixed wireless, mobile and satellite.

It follows that there are a wide range of alternatives in terms of the both the overall nature of a UK scheme and the detailed implementation. In coming to its conclusions the UK can draw on the thinking and experience overseas in considering how best to implement a national scheme. Indeed, such approaches should be fully evaluated and considered on their merits. Nevertheless, in doing so it is important to consider the particularities of the UK. For example, the geography and population densities of the UK are particular to it and will significantly bear on the nature of the solution implemented in a particular area. At a wider level, the makeup of the UK market and the array of competitors means that any implementation of the USC must be particularly alive to the danger of the USC playing in to particular operator's hands and distorting the market for all consumers.

In considering the above alternatives and their potential effects, T-Mobile believes that the following principles are helpful in framing implementation in the UK.

First, the remit and scope of the broadband USC scheme should be clear and simple. Any USC service trigger needs to strike a balance between incentive to deliver USC (cost recovery) and the cost to deploy. This cannot be assessed on a case by case basis for particular premises and it follows that in order to avoid an ad-hoc approach to service provision to customers there needs to be a clear definition of what constitutes a USC situation i.e. in what circumstances does a home or location become USC applicable. This is mostly clearly served in rural areas by designating specific geographic areas with clear boundaries (i.e. as per the Irish scheme). USC providers then would have a requirement to deliver coverage to these areas against an agreed timeline and service level.

Second, in order to ensure the USC is delivered using the most appropriate and cost effective technology solution, the selection of USC providers should be transparent and accountable. Provider selection for a particular area should be based on existing and planned network development and capabilities and an independent procurement process. Delivery by USC providers should be technology neutral.

Third, implementation of the USC must avoid that one particular operator gains a material advantage over its competitors in the wider market.

- In particular, the USC scheme must not further distort competition by creating an uneven playing field. To achieve this, any USC provider in a particular area should offer wholesale national roaming on an equitable basis, regardless of the technology solution used. This would ensure that companies not involved in broadband delivery to a particular area would not have branding issues when its customers roam on to a USC mobile network.
- To accelerate implementation and ensure the benefits of participation are distributed, any primary USC provider would be able to utilise other telecom companies to deliver USC where required, through a sub-contract basis, on the condition that the sub-contractor met the same obligations made by the primary USC provider.

Fourth, the USC scheme should be administered and governed by an independent body. In particular, this would be responsible for the designation of USC areas, delivery requirements, technology choice, and manage and monitor cost recovery from telecoms operators.

Fifth, the USC should be 'not for profit' and ideally non-funded. However, to the extent that funding was required, the funding should be simple and transparent from a single central fund, with clarity on the basis and timing of all contributions required to be made to the fund (including who is required to make the contributions) and the basis for which funds can be withdrawn for USC provider investments. Contributions in-kind provided by USC providers should be incorporated into the USC scheme, with the value for the in-kind contributions assessed on a fair and equitable basis. Furthermore:

- Where the fund contributors include telecoms companies only, then these telecom companies must be able to contribute to the fund in equitable manner to avoid contributions made with no resultant USC-related benefit. T-Mobile believes this is especially important where contributions are made by mobile operators to fund a fixed USC solution.
- Contributions to the fund should be made at a level which enables USC providers to deliver target level requirements only. The USC fund should not be used to fund enhancements to a provider's network beyond the requirements of the USC.
- Appropriate incentives should be agreed with USC providers to ensure successful delivery of USC requirements. T-Mobile believes that it is important to ensure that companies granted the USC provision deliver against the agreed mandate.
- The amount of contributions collected within the USC fund should at any point in time never be significantly higher than that required to be withdrawn for USC provider investment. For example, in India the Universal Service Obligation fund holds a very significant surplus of funds.
- There should be timetable covering the end of the agreed USC arrangements so as to allow open access to the USC areas. Any such timetable would need to be subject to ongoing review.

T-Mobile recognises that the above principles are by no means exhaustive. Nevertheless, while there are many and varied approaches, structures, funding and service delivery organisations possible, T-Mobile considers that the points set out above should serve as a basic framework in the consideration of implementation in the UK .

## Action 22: National media literacy plan

### Introduction

The idea of media literacy traditionally encompasses:

- education and the facilitation of access to the Internet for the digitally disengaged; and
- appropriate safeguards where necessary.

However, as should be immediately clear these two issues are separate. While T-Mobile strongly supports Digital Britain's initiative to help encourage the adoption of digital services, it should be noted that a very significant amount of work has been undertaken in the UK, very recently, on safeguards for the vulnerable and the appropriate labelling of content. In mobile specifically, users are typically automatically protected from such content through filters, watersheds etc.

T-Mobile would therefore encourage the Digital Britain team to concentrate on those areas where resources are most acutely required, rather than to cover ground that has already been the focus of significant recent expert review. Given the recent focus on content, and the provisions already in place, it is media literacy in the narrower form of education and the facilitation of access where consumers individually, and the economy as a whole, would benefit from greater focus, coordination and resources.

The remainder of T-Mobile's response in this section provides more detailed information on the work already done in each of the above areas in turn. As will be clear from a review of the following, content regulation is well advanced and coordinated at a national level. However, there are a large number of initiatives in the education and the facilitation of access, many of which are disjointed and fragmented. Although each of them is to be applauded, significant value could be added by the definition of a properly resourced and coordinated UK-wide strategy.

### Education and the facilitation of access

T-Mobile is already actively engaged in the development of media literacy in the UK. T-Mobile currently participates in, the DCSF's "Computers for pupils" programme, the "Universal Home Access" programme, the "Teachtoday" initiative and the "UK Council for Children's Online Safety", amongst others. In addition,, our products, such as mobile broadband (available on PAYG), are already narrowing the digital divide. Indeed, one third of our mobile broadband dongles are being used by people who are often not in a position to take on a fixed line broadband contract as the sole means of accessing the internet from the home,.

The Digital Britain initiative is an opportunity for the myriad Government initiatives to be brought together within an over-arching and coherent government strategy.

The core aims of a media literacy strategy should be to:

- encourage and facilitate access through education and increased connectivity; and
- ensure the delivery of Government services via the web to drive efficiencies in the public sector.

In turn, this investment would lead to reduced governmental operating costs, while simultaneously driving broader growth in the UK digital economy.

It follows that a National Media literacy plan needs to encompass the following strands;

- Education
- Facilitation of access

Current initiatives in each of these areas are summarised in turn below. However, what is really needed is a third aspect: coordination and “joined up” initiatives.

### Education

The government already has a number of objectives to ensure that all children and young people have access to the right level of learning and technical resource to enable them to develop the vital first steps of digital life skills and digital work skills.

For example, the Computer’s for Pupils project was launched in January 2007 aimed at helping some of the most disadvantaged secondary children improve their education and life skills by putting a computer into their home. T-Mobile actively participates in the DCSF’s Computers for Pupils program and the Home for Access project by providing mobile broadband connectivity and has 27,000 data connections as part of the project. A significant number of local authorities are seeking to renew these schemes as they have proved valuable for children (and their families) on low incomes who benefit from affordable computers and internet connectivity.

### Facilitation of access

There are a wide range of schemes and initiatives currently in place (see further below), perhaps the most recent and significant of which is the Universal Home Access Programme, a follow on programme to the Computers for Pupils project. This was recently launched by the Prime Minister. The aim of the £300m programme is to provide every secondary school pupil with a computer, connectivity, support package and educational software to enable them to engage fully in their education. Grants are provided directly to families who qualify. T-Mobile is a member of the DCSF’s Advisory Home Access Stakeholders Group and works with interested industry and public sector parties to provide guidance and support for the project. The aims of the group are to encourage and maximise education and wider family benefits to all families, improve perception of the benefits of home access and remove the barriers of cost for low income families. Also, to introduce measures to refine the specification and simplify administration procedures to encourage entry in the use of home based technology. Promoting access to the internet provides a variety of domestic and personal uses in addition to educational - a low income family could benefit from savings made through exclusive discounted offers: e.g. energy bills. T-Mobile believes this scheme is pivotal to providing internet access to the remaining 40% of UK households. The scheme should be closely monitored and evaluated and consideration should be given to extending the scheme to more families.

In respect of mobile specifically, Ofcom’s Communications Market Report 2008 highlighted the fast growing uptake of mobile broadband services which allow consumers to connect to the internet using high speed mobile networks. Indeed, for a third of our broadband customers, mobile broadband is their primary gateway to the internet as they do not have access to a fixed line ISP. There are many reasons why customers choose mobile broadband as a replacement for their fixed line ISP:

- fixed phone connections are often not available in flats (notably in London)
- those regularly changing address who wish to take their broadband with them rather than have the hassle of continuously cancelling contracts
- lack of a credit rating required to obtain a fixed line contract – particularly in the case of immigrants or lower social classes
- ad hoc internet access is frequently cheaper using mobile broadband than via fixed line services
- mobile can serve remote locations with a lack of cable coverage

It follows that mobile broadband already makes a significant contribution to bridging the digital divide and facilitating internet access for all members of the community. However, any national media literacy plan should actively embrace and build on these foundations, not just in terms of the technologies deployed by operators (such as mobile discussed above) but also the schemes already in place..

### Joining up the initiatives

However, for any approach to work – whether adopted by government, or promoted by industry – the current raft of Government initiatives including “Delivering Digital Inclusion Action Plan” by the Communities and Local Government, Home Access project by the Department of Children, Schools and Families and Ofcom’s National Media literacy plan must be brought together within an over-arching government strategy.

Only in this way will it be possible to put in place an effective strategy for tackling those 17 million households who have yet to benefit from accessing the internet. Such a strategy should focus on identifying through research the barriers to adoption by the digitally disadvantaged and then providing them with the tools they need to benefit from the internet. We believe Mobile Broadband has a significant role to play as it is simple to use, available for those on low credit ratings, cheap and portable.

Such a National Media Literacy strategy should also encompass the delivery of Government services via the web. An investment in such a strategy would simultaneously drive both efficiencies in the public sector and broader growth in the UK digital economy.

### Online Safeguards

As noted above, while “media literacy” typically encompasses the protection of the vulnerable, in T-Mobile’s opinion this aspect has already been comprehensively reviewed very recently and there is therefore a danger that i) Digital Britain proposes further measures before existing initiatives have been given time to take effect, or which are difficult to justify absent evidence that existing measures have failed; ii) Digital Britain distracts from the core aim of ensuring greater and improved connectivity.

The UK mobile operators have been extremely proactive in addressing the risks associated with using mobile including those relating to privacy and viewing inappropriate content and contact services. Existing measures in each respect are summarised below.

### Content

In 2004 the UK published the first Code of Practice for the self-regulation of new forms of content on mobiles. All customers have to go through a process of age verification before being able to access 18 rated commercial content. In addition all providers have to provide an internet filter. These measures have been extremely effective in preventing children from obtaining inappropriate adult content via the mobile network. The Code has subsequently been used as the basis for the EU’s framework for the safer use of mobiles by teenagers and young children.

As part of this, T-Mobile applies a number of measures to prevent the distribution/availability of inappropriate content. For example:

- T-Mobile has implemented “Content Lock”, which applies to 18 rated visual services and unmoderated chatrooms for commercial content (hosted on our T-Zones portal and third party services accessed via shortcodes) as well as all internet content. This uses Rulespace’s categorisation database to filter out adult and inappropriate content on the internet.
- T-Mobile also places appropriate warnings in front of content that is rated as under 18 but may cause offence due to bad language or nudity.
- We operate a 9 o’clock watershed for advertising adult material on our T-Zones and Web n’ Walk portals.

All UK mobile operators are members of the Internet Watch Foundation and abide by its Code of Practice and use the IWF’s database of illegal child sexual abuse images to block customer access to the listed sites.

The combination of access controls, warnings and signposting of content on mobile phones means that customers can make informed choices of the content they wish to access and it is very difficult to stumble across offensive content on phones. Access to specific items of content take four or five key presses and on portal content is clearly grouped under appropriate headings such as comedy, film, TV, social networking.

This approach aligns with the Broadband Stakeholders Group's "Good Practice Principles on Audiovisual Content Information" as it is based on the provision of clear and transparent information to consumers rather than on a prescriptive common labelling system across all media platforms.

Most recently, the new UK Council for Online Child Safety has been formed. We urge the support of the Council as the single forum for addressing child protection issues.

### Contact

Children can also be at risk of cyberbullying and other forms of stranger danger. In collaboration with TimeBank and The Diana Award, T-Mobile has created the "txtup standup" website that gives young people a space to share their tips on how to tackle mobile and online bullying. The website includes animations, telling powerful, real life stories of young peoples' experiences. T-Mobile is also a member of the DCSF's Cyberbullying Taskforce.

### Commerce

The mobile device is increasingly a platform on which economic transactions can be executed. For example wallpaper, ringtone or music track bought through a premium rate charge. Mobiles are also used for direct marketing campaigns. We are very aware of the need to protect children from inappropriate commercial activity.

The Mobile Broadband Group (MBG), has recently joined the Committee for Advertising Practice. Mobile has the potential to become a significant channel for the distribution of advertising. The mobile operators realise the importance of having this channel properly regulated and will support the Advertising Standards Authority in its independent administration of the CAP Code.

Other risk areas presented by the Internet are: viruses, fraud and privacy. For many of these risks, customers of mobile networks are better protected than customers using a fixed connection. For example it is very rare for mobile devices to be attacked by viruses. This is partly because far fewer viruses are written for mobiles and partly because mobile operators devote considerable resources to keeping the networks secure. Likewise with Spam, mobile operators have been successful in combating Spam and thus ensuring that their customers' services remain relatively Spam free. The consequence is that mobile customers are also less exposed to fraud activities such as phishing and invasions of privacy. Nevertheless, we will persist in our efforts to protect the whole customer base, including children, from these risks.