

Digital Dividend Review

Executive summary

T-Mobile welcomes the opportunity to respond to Ofcom's preliminary consultation on the Digital Dividend Review ('the consultation').

T-Mobile has a number of comments related to Ofcom's proposals on the Digital Dividend Spectrum. These are listed here and then addressed in detail in Question 1 below.

1. Before proceeding with its next consultation, Ofcom should await the outcome of the ongoing international work on this band. Work is ongoing in a number of international fora on the possibility of making the Digital Dividend Spectrum more flexible to technologies other than terrestrial broadcasting and the World Radio Conference will take place in November 2007. To proceed with the consultation in July 2007 as proposed by Ofcom or in any case before November 2007 means that the WRC decisions will be not incorporated.
2. T-Mobile favours a long term use of the UHF band for mobile services: this could be achieved by harmonising a sub band of at least 100MHz for mobile services. We believe that Ofcom should support the designation of this band for mobile services at WRC-07 and work in Europe to support the development of a European harmonised band for mobile services within the DDR spectrum. Without such harmonisation T-Mobile does not foresee a high value for mobile services on this band. We believe that Ofcom in the consultation has underestimated the benefits that mobile communications could deliver if the UHF band were to be re-planned for harmonised allocation for mobile services.
3. If in the short term Ofcom decides to auction this spectrum, then T-Mobile would be interested in the UHF channels for mobile multimedia services (Mobile TV). Our views on mobile multimedia services on this band are set out in Annex 1, which is confidential.
4. Regarding the suggested packaging options, T-Mobile believes that Ofcom should wait for the international work to be concluded before addressing the appropriate packaging options. However, at this time T-Mobile believes that the spectrum should be packaged in single channels, i.e. 15 x 8MHz blocks of spectrum should be made available independently. These channels are expected to have different patterns of interference which is likely to lead to different value. The auction design should take this into account and the channels should therefore not be auctioned as generic blocks. In addition, Ofcom must clarify who ultimately is responsible for interference between newly auctioned blocks, e.g. between DVB-H and DVB-T.
5. Ofcom needs to be able to provide bidders with certainty around the date from which spectrum will become available. In particular, if the Digital Switch Over is delayed, the purchasers of the spectrum need to be compensated by Ofcom for the extra costs incurred and the revenues forgone until the moment they will effectively be able to use make use of the spectrum acquired.

Question 1: This executive summary sets out Ofcom's proposals for the release of the digital dividend. Do you agree with these proposals?

T-Mobile has a number of comments related to Ofcom's proposals on the Digital Dividend Spectrum.

1. Ongoing international work

We note that Ofcom intends to publish another consultation on the DDR in July 2007. At present there is an important international dimension to this work which Ofcom has not sufficiently considered. Work is ongoing in a number of international fora on the possibility of making the digital dividend spectrum more flexible to technologies other than terrestrial broadcasting including the use of the band for mobile systems including mobile uplinks.

In particular T-Mobile strongly suggests Ofcom should wait the outcome of the World Radio Conference 2007, which will take place in November 2007, before taking any further action on the Digital Dividend Review. For cellular mobile communications access to harmonised spectrum is extremely important to minimise interference, ensure ability of terminals to roam and provide the required economies of scale for terminal and infrastructure manufacturers. It is not viable for an operator to deploy a cellular mobile system designed for one country only. In this regard we note the recent consultation by Ofcom on candidate bands under consideration at WRC-07 for IMT; we support Ofcom in issuing that consultation and we will be responding to it in due course. We support the proposal to develop a European Common Proposal for a primary mobile service allocation in the band 470 to 862 MHz at WRC-07 and a Resolution for ITU-R to study the band for identification for IMT at WRC-11.

In addition to the WRC-07, international work is taking place in a number of other fora:

- RSC (which has produced an EC mandate calling for studies and possible harmonisation measures);
- RSPG (which has produced opinions on "The Introduction of Multimedia Services in particular in the frequency bands allocated to the broadcasting services" and "EU Spectrum Policy Implications of the Digital Dividend");
- CEPT SE42 (in response to WAPECS Mandate);
- CEPT TG4 (in response to the Digital Dividend Mandate);
- ITU-R WP8F (studies on the use of the band for IMT);
- ECC PT1/ CPG (formulation of European Common Proposals for the band for IMT);
- CPM/WRC-07 (possibility of band to be identified for Mobile/IMT).

We note the recent European Commission's Communication on "Rapid access to spectrum for wireless electronic communications services through more flexibility", (Brussels, 8.2.2007), which states:

"Existing and new operators interested in the use of the 470-862 MHz band currently used for broadcasting, in particular the "digital dividend" freed up by the transition from analogue

to digital broadcasting (which uses less spectrum). These frequencies are of high interest for new services such as mobile TV as well as for extending the reach of all types of wireless electronic communication services into rural areas."

T-Mobile believes that the responses to the Digital Dividend and WAPECS Mandates need to be completed and the outcome of WRC-07 known before Ofcom can develop and consult on proposals for packaging of this spectrum. Ofcom risks putting at risk the UK's competitiveness if the allocation of the Digital Dividend is not in line with harmonisation measures agreed with other European countries.

2. The Digital Dividend should be made available for mobile services in the long run

T-Mobile favours a long term use of the band for mobile services; this could be achieved by harmonising a sub band of at least 100MHz for mobile services. T-Mobile believes that Ofcom should support the designation of this band for mobile services at WRC 2007 (which Ofcom proposes to do in its recent consultation¹) and work in Europe to support the development of a European harmonised band for mobile services within the DDR spectrum.

We believe that in the consultation Ofcom has underestimated the benefits that mobile communications could deliver if the UHF band were to be re-planned for harmonised allocation for mobile services. In particular, the economic value associated with this band being utilised by the mobile industry to provide better mobile services have been considerably underestimated. T-Mobile is concerned that Ofcom has neither properly assessed the gains from rolling out a mobile network at low frequency, for services in rural areas and for indoor coverage, nor the gains from a global harmonised solution for this band.

2a) Network roll out

A key element in the analysis of the value delivered by mobile communications in this band is the impact of the propagation characteristics of the UHF spectrum on network infrastructure costs, in particular in relation to the UK's existing GSM spectrum allocations and to 2G liberalisation.

Ofcom are aware that spectrum above a frequency of 1GHz suffers significant disadvantage in particular in covering rural areas, let alone in extending current capacity in rural areas for mobile broadband. The issue is that of the number of sites required to provide coverage and extend mobile broadband capacity in rural areas. Deploying at higher frequency involves significantly higher costs, because of the well known propagation properties of spectrum, in particular cell size and to provide indoor coverage, whereby a greater number of sites are required to provide the same coverage quality. We submit that each mobile operator needs at least 2x10MHz additional low frequency spectrum to enhance performance in rural areas.

¹ <http://www.ofcom.org.uk/consult/condocs/wrc07/>

The UHF band is the best candidate for mobile broadband. The availability of spectrum at lower frequencies with inherently better propagation characteristics could facilitate the cost-effective introduction of cellular mobile services also to these remote and sparsely populated areas. The beneficial propagation characteristics of low frequency spectrum, including the ability for signals to travel further and be less sensitive to obstacles, are well documented. To this end, the Digital Dividend spectrum is particularly suited to terrestrial mobile use, including mobile TV which de facto demands wide area coverage. As identified by Commissioner Reding², wireless services offer “the best hope we have to bridge the digital divide”. We support the efforts to reach agreement on a harmonised band for Mobile TV across Europe.

Harmonising a sub band for mobile services therefore would deliver economic benefits (by massively reducing the network roll out costs) as well as social benefits as far fewer additional sites would be required, which would limit the concerns of local communities over site building. Since the issue of planning is extremely sensitive to communities, we believe that this effect should be properly captured in any evaluation analysis.

T-Mobile therefore believes that Ofcom should reconsider its economic analysis described in Annex 9 of this consultation and in particular should re-assess the suggested ranges of producer and consumer value associated with mobile services in the light of the responses to this consultation.

2b) A global harmonised solution

We believe Ofcom should include in its analysis the benefits that an international harmonised solution for this band solution would deliver to UK citizens and consumers and to the general economic competitiveness of the UK.

The experience of a global solution for the GSM band is a success story that has delivered massive economic benefits to consumers and to competitiveness all over the world. This is largely because a global solution allows:

- Enough spectrum for more than one operator, thus stimulating competition and a constant improvement in the level of the service.
- Economy of scale for equipment: this represents a significant concern that Ofcom has completely ignored in its analysis. We submit that scale economies for equipment could deliver the highest benefits. In particular, we believe that if the UK did not have a harmonised band and other countries did the costs would significantly damage the UK economy and the UK consumers.
- Global roaming and therefore enhanced mobility.
- Continuity and interoperability with existing 2G and 3G systems.

All of these translate directly into higher benefits for end users in terms of services and tariffs, and in higher benefits for the competitiveness of the economy.

² Commissioner Reding speech at ITU “Telecom World 2006”, 4 December 2006

3. In the short run, T-Mobile is interested in this band for mobile multimedia services

If in the short term Ofcom decides to auction this spectrum, then T-Mobile would be interested in the UHF channels for mobile multimedia services (Mobile TV). We agree that UHF channels are particularly suitable for broadcasting mobile multimedia services because the signal can travel relatively long distances, and is relatively robust, for example travelling through walls without noticeable degradation. Our views on mobile multimedia services on this band are reported in confidence in Annex 1 at the end of this document.

4. Packaging and auction design

T-Mobile believes that Ofcom should await the results of international studies on this band before ultimately deciding the packaging of this spectrum.

Packaging of the spectrum should be made efficient for the technology most likely to use the spectrum. If a harmonised sub band for mobile services is defined, spectrum packaging within that band should match mobile technologies allocations (5 MHz blocks).

However, at this time, T-Mobile's preference among packaging options proposed by Ofcom is that spectrum should be packaged in 15 x 8 MHz lots, being each of channels 31, 32, 33, 34, 35, 36, 37, 39, 40, 63, 64, 65, 66, 67 and 68. At present we regard this solution as the most efficient as it would accommodate the needs of the industry and at the same time guarantee a competitive and therefore beneficial solution to the use of this spectrum.

These channels are expected to have different patterns of interference which is likely to lead to different value. In an auction Ofcom should therefore use specific lots rather than generic lots, due to the differences in constraints (and hence usability) of the spectrum under consideration in the award. To auction them as generic blocks would create massive inefficiencies in the auction process as operators value them differently. In addition, we believe that the auction format should allow for package bidding similar to that proposed by Ofcom for the L-Band award. This should however be reviewed following completion of the international work.

In addition, one key point about packaging that Ofcom must clarify is who ultimately is responsible for interference between **newly auctioned** blocks, e.g. between a new DVB-H and new DVB-T system. This issue is extremely important for the auction's efficiency and it has not yet been clarified by Ofcom.

5. Risks of delay in the Digital Switch Over

Regarding the timing of the auction in connection with the Digital Switch Over (DSO) process, T-Mobile believes that the release of the UHF spectrum needs to take place when there is sufficient certainty about the usability of each package of spectrum on offer. Ofcom has not provided a clear

explanation of how a delay in the DSO affects the rights of spectrum owners. Ofcom's current view appears to be that a failure or a delay in the switch over in some or all regions of the country would result in the purchasers of the spectrum not being able to exert their legal rights in the spectrum. T-Mobile is concerned that the current view places all the risks that the DSO is delayed onto the purchasers of spectrum. This is unacceptable as the probability that such an event will occur distorts the incentives for the operators who wish to bid for the spectrum, and impairs their evaluation ability. This would have a disruptive effect on the efficiency of the auction process.

If the DSO is delayed, the purchasers of the spectrum need to be compensated by Ofcom for the extra costs incurred and the revenues forgone until the moment they will effectively be able to use make use of the spectrum acquired.

Question 2: Do you have any comments on our analysis of the essential constraints that will apply to the available UHF spectrum?

Question 3: Do you agree with the more detailed analysis and proposals regarding these technical constraints as set out in Annex 10?

In response to questions 2 and 3 we have comments relating to the issue of Cellular use/Mobile uplinks and to the issue of radio astronomy.

Cellular use/Mobile uplinks

T-Mobile favours a long term use of the UHF band for mobile services: this could be achieved by harmonising a sub band of at least 100MHz for mobile services. We therefore think Ofcom needs to address in more detail the technical issues involved in mobile service use of this band.

T-Mobile has the following comments on section 10.41– 10.52 - Use of the band for cellular services:

- The issue of introducing mobile uplinks needs to be clarified by further tests and the use of Monte Carlo simulations as a matter of urgency. We also note that the tests undertaken by ERA have not assumed power control. This is not realistic and hence we would recommend that further tests are carried out using power control
- We also believe the compatibility situation in the US, where there are broadcasting and mobile allocations in close proximity, needs to be further explored by Ofcom.
- The analysis assumes a 5MHz channel. With 3GPP LTE bandwidth could also be 10MHz, 2.5 MHz or even 1.25 MHz.
- The analysis assumes certain duplex separations based on band plans for current cellular bands (e.g. 45 MHz for GSM900). For the Digital Dividend spectrum a smaller duplex separation could be used to make better use of the Digital Dividend spectrum.
- T-Mobile believes that the operation of FDD based systems does not necessarily need to be the conventional direction and that operation in reverse duplex mode (base transmit in lower spectrum) presents a number of advantages in terms of compatibility.

- It is not necessary to restrict mobile use to frequencies below 750 MHz (as is generally the case with Mobile TV).
- The possibility of improving the next generation of DTT receivers should be explored to improve future compatibility of systems in this band.

Section 10.70 – 10.79 (Compatibility issues with 2-way systems) concludes that there is a risk that domestic reception of the existing DTT services could be affected by the use of uplink services operating on adjacent and image channel frequencies.

However Section 10.81 states that:

“The initial results from the ERA tests appear to show that the uplink signals cause less interference to the reception of DTT services than the initial modelling suggests. These results need to be fully verified via further tests before they can be fully utilised. However, they do suggest that there may be fewer problems in using mobile uplinks in the cleared spectrum than as has been thought to date”.

Section A11.65 states that:

“To investigate the actual statistical likelihood of interference, which takes into account the position of the mobile in the DTT service area, the power control mechanisms of the mobile and the transient nature of the moving mobile transmitter, this should be modelled with Monte Carlo software. It is important to note that, both 3G and WiMAX mobile transmitter are expected to use a power control mechanism to ensure that they do not use more power than is necessary and to limit the level of inter-system interference. The 3G and WiMAX mobile transmitter will only use its maximum transmit power when it is at the edge of its service area.”

T-Mobile believes that the issue of introducing mobile uplinks needs to be clarified by further tests including applying using power control for the mobile terminals and the use of Monte Carlo simulations as a matter of urgency.

Regarding paragraphs 10.109 and 10.110, T-Mobile believes that action is required internationally to provide protection to both mobile uplinks and receiving stations above 10m.

In conclusion, T-Mobile would urge Ofcom to take appropriate action at both a European level and at WRC-07 before this spectrum is auctioned.

Radioastronomy

Paragraph 10.155 describes the constraints on channels 37, 38 and 39 due to radioastronomy use of channel 38. It states that the current requirement is that any emissions into channel 38 from services operating on the adjacent channel are kept below 12dB, above the levels stated in ITU- R RA 769 , at locations close to the radio astronomy locations.

T-Mobile believes that this is a stringent constraint on the use of spectrum adjacent to radioastronomy service which has limited regulatory status in the UK in this band. According to the UK frequency allocation table this band only has a footnote allocation in the UK and secondary in the Radio Regulations (5.306 permits 608-614 MHz on a secondary basis.). It is also given category C protection.

T-Mobile has commented separately to Ofcom's 'Notice of Ofcom's proposal to make regulations in connection with Recognised Spectrum Access (RSA) for radio astronomy' in relation to the use of channel 38 and believes that sharing of this band could be feasible with systems such as PMSE.

Question 4 Do you have any comments on Ofcom's assessment of the potential uses of this spectrum? Are there any potential uses which should be considered that are not mentioned in this document?

Ofcom has identified a series of potential uses of the digital dividend. T-Mobile is pleased that Ofcom has included mobile television and mobile communications in the set of potential valuable uses. However, we disagree with the results on the estimation of the value that each potential use would bring to society.

Mobile communications

A key element in the analysis of the value delivered by mobile communications in this band is the impact of the propagation characteristics of the UHF spectrum on network infrastructure costs, in particular in relation to the UK's existing GSM spectrum allocations and to 2G liberalisation. Ofcom are aware that spectrum above a frequency of 1GHz suffers significant disadvantage in particular in covering rural areas, let alone in extending current capacity in rural areas for mobile broadband. The issue is that of the number of sites required to provide coverage and to extend mobile broadband capacity in rural areas. Deploying at higher frequency involves significantly higher costs, because of the well known propagation properties of spectrum and the need to provide indoor coverage, whereby a greater number of sites are required to provide the coverage quality. We submit that each mobile operator needs at least 2x10MHz additional low frequency spectrum to enhance performance in rural areas.

The UHF spectrum is the best candidate for this use. The availability of spectrum at lower frequencies with inherently better propagation characteristics could facilitate a cost-effective introduction of cellular services also to these remote and sparsely populated areas.

A harmonised band for mobile services would deliver economic benefits as well as social benefits as far fewer additional sites would be required, which would limit the concerns of local communities over site building. Since the issue of planning is extremely sensitive to communities, we believe that this effect should be properly captured in any evaluation analysis.

T-Mobile therefore believes Ofcom's economic analysis set out in annex 9 needs to better assess these issues. In particular T-Mobile disagrees with the suggested range of producer and consumer value and we question Ofcom's assumptions incorporated in the low value scenario (A9.56). Ofcom assumes that '900MHz spectrum becomes liberalised and meets the demands of existing operators for spectrum to roll out rural networks'. At present the issue of refarming is not solved and operators cannot incorporate such an outcome in their spectrum evaluation until it is certain. Ofcom too should refrain from doing so in its analysis until the issue is effectively resolved. Second, whilst the issue of refarming might lead to a reallocation of 900 MHz spectrum, the amount of 900 MHz spectrum reallocated to 1800 MHz operators might be small, and we believe that additional low-frequency spectrum could deliver high benefits. The low cost scenario has therefore been significantly underestimated.

In conclusion, the opportunity costs involved with mobile operators having access to the UHF spectrum have been underestimated in Ofcom's report, and so has the external value associated with these services.

Mobile multimedia

Ofcom needs to take into account the issue of cost savings also in relation to the value of mobile multimedia services. We believe the harmonisation of a sub band for these services would improve economies of scale in terminal production and foster a more efficient mobile broadcast environment in the UK, which would bring further benefits to consumers. Please see Annex 1 for additional comments.

In addition to the comments above on the relative value of mobile services, we submit that the relative value of each service will be affected by the outcome of the international ongoing discussion on how to harmonise the band. Once again the international dimension of this work is a key factor in the value that each service can generate. Ofcom should therefore wait for developments at European level before making any binding decision on packaging and auction format.

Question 5: Do you have any comments on our analysis of the choice between a market-led and an interventionist approach to the release of this spectrum? Do you agree with the analysis of different mechanisms for intervening to remedy potential market failures?

T-Mobile would welcome a long term approach that makes Digital Dividend Spectrum available for mobile services. However T-Mobile considers that the true market potential of the spectrum for mobile services cannot be realised without European harmonisation that identifies a distinct band for mobile services, allowing economies of scale in terminals as well as roaming and interference protection. T-Mobile therefore believes that Ofcom should support the designation of this band for mobile services at WRC-07 and work in Europe to support the development of a European harmonised band for mobile services within the DDR spectrum.

If in the short term Ofcom decides to auction all of this spectrum without such harmonisation, T-Mobile does not foresee a high market value for mobile services in this band because of the need to develop operator-specific terminals, and coexistence issues in supporting a mobile uplink. Therefore T-Mobile favours a market-led approach to the short-term release of this spectrum, subject to the outcome of the work currently undertaken in the international fora and at a European level.

A departure from a market-led approach to the short term release of spectrum would be highly inefficient. Any interventionist approach is driven by assumptions on which use maximises the benefits created by this spectrum. Ofcom has tried to estimate the value related to each service as well as the external benefits not accounted for by economic modelling. This analysis involves massive uncertainties in relation to the estimation of demand, the estimation of the costs and, perhaps most importantly, how demand and supply will vary in time. The communication market is extremely volatile and sensitive to innovation for a regulator to be able to predict demand and supply for next years. Therefore the biggest risk that Ofcom faces lays not so much in market failure, rather in regulatory failure.

The magnitude of the uncertainties as well as the risk of regulatory failure involved in departing from a market-led approach question the basis of Ofcom's process itself. Estimating the value that a service could bring to society is a difficult exercise which lies on extremely weak assumptions. T-Mobile believes that each operator is best placed to carry out studies, estimations and business plans to determine its own value to the spectrum. An efficiently designed auction is the best way to compare the values attributed to this band by the parties involved. Those who value the spectrum the most will win the auction, and the benefits to society will be maximised. This outcome is supported only if packaging and auction design are efficient, i.e. do not *a priori* exclude any of the uses the band can support.

Ofcom should therefore continue to embrace a market-led approach to spectrum release. This approach has been applied to mobile operators for many years, and we do not see why it should not be extended to broadcasters. If broadcasters attribute high value to the spectrum, they will be able to raise the funds necessary to win this spectrum. This process is the most efficient and transparent.

In conclusion, Ofcom's intervention in the short-term release of this spectrum should only deal with:

- The packaging mechanism; Ofcom should ensure its choice of packaging does not distort the incentives of the bidders and should not give any clear preference to one of the uses identified. See question 16 for T-Mobile's view on packaging options.
- An efficient auction design that takes into account that the different channels in the band exhibit different values. See question 14 for T-Mobile's comment on the auction format.
- Interference management, to make sure that this spectrum can be optimally used by whoever obtains it.

Question 6: Do you agree with our proposals to continue making available channel 69 for use by low power PMSE devices? Do you agree with our proposal to make some or all of the spectrum available for use on a licence-exempt basis?

T-Mobile believes that Channel 69 should be auctioned at the same time as the rest of the Digital Dividend.

We do not see the need for this channel to be reserved for low power. We believe overall utility could increase if the channel were not reserved. As recognised in the Sagentia study PMSE is very spectrally inefficient (paragraphs A11.46 and A11.47 of the consultation). PMSE should be encouraged to use more spectrally efficient technology. PMSE can use the interleaved spectrum and could use Channel 38 in areas away from Radio Astronomy Observatories.

Question 7: Do you agree that there should be transitional protection for professional PMSE users to ensure that they can continue to access interleaved capacity until at least the end of 2012? Do you have any views on the mechanism for providing future access to this spectrum?

T-Mobile does not have strong views on this question.

Question 8: Do you consider that additional spectrum from the digital dividend should be reserved for low power applications? If so, please provide as much evidence as possible about the nature of the application and its potential value to society.

T-Mobile does not believe that additional spectrum should be reserved for low power applications. We believe that there is sufficient spectrum outside these bands for these applications.

Question 9 : Do you consider that it would be desirable to hold back some spectrum from award with a view to its potential use for future innovation? If so, please provide comments on how much spectrum should be held back, and for how long

T-Mobile believes that in the long run the Digital Dividend Spectrum should be available for mobile services and that Ofcom should support the development of a harmonised band for mobile services within the DDR spectrum.

If in the short term Ofcom decides to release this spectrum then we strongly believe that it is not desirable to hold back some spectrum for future innovation. All of the spectrum available should be awarded once the current international work identified in our response to Question 1 has been completed.

Question 10: Do you agree with our proposal that we should package the interleaved spectrum in a way that would be suitable for use by local television services, but not reserve spectrum solely for this use?

We agree that spectrum should not be reserved for local television services. As regards the packaging, Ofcom needs to make sure that any proposed system does not technically preclude the possibility of different users making use of this spectrum.

T-Mobile notes that there is a report being produced in ECC TG4 in response to the EC Mandate on the use of the interleaved spectrum. This report addresses "the feasibility of fitting new/future applications/services into non-harmonised spectrum of the digital dividend (namely to so-called "white spots" between allotments)" and is due to be finalised by December 2007.

Question 11: Do you agree with our proposal to package the spectrum in a way which does not preclude mobile broadband use, but to take no further action in relation to this use?

As we explained in our response to Questions 1 and 4 we believe that the value associated with mobile services has been underestimated by Ofcom in its economic analysis. In particular, we believe that the UK economy would benefit if in the long term the UHF band were to be re-planned for harmonised allocation for mobile services. Such a harmonised solution would imply significant scale economies and deliver high benefits to citizens and consumers. T-Mobile holds the view that the UK might be at a long term disadvantage if mobile operators do not have long term access to this spectrum.

As Ofcom recognises in the consultation, the favourable propagation properties of this spectrum make it particularly suitable for services such as mobile communications and mobile broadband, in particular in rural areas. We therefore believe Ofcom should act such that the cost efficiencies incorporated in this solution can be exploited by mobile operators.

Question 12: Do you agree with our proposal that we should not intervene in the award of this spectrum to reserve spectrum for DTT? Do you agree that we should package the spectrum in a way which is suitable for DTT use?

T-Mobile strongly supports Ofcom's view that this spectrum should not be reserved for DTT services. We submit that if Ofcom reserved this spectrum for broadcasting it could damage the UK consumers and the UK economic competitiveness compared to countries that will use this band for other services.

Question 13: Do you consider that we have included in our analysis the most material risks in relation to market failure?

T-Mobile believes that the risks in relation to regulatory failure are higher to the risks relating to market failure. The pace of the developments in the communication market is such that risks in relation to market and regulatory failures keep changing.

Ofcom has not considered a long term solution whereby these channels are assigned to different services. The current proposal, besides being extremely unmanageable from an interference point of view, prevents the gains that a harmonised long term solution would present. We have presented our views on the gains associated with this outcome in Question 1. Ofcom needs to include a much more thorough analysis of the benefits of a harmonised solution for mobile services in its next consultation.

Question 14: Do you agree with our proposal to auction licences for the use of the available UHF spectrum?

T-Mobile agrees with the proposal to auction the UHF spectrum once the relevant international studies have been completed.

In addition, we submit that the issue of the auction timing and of the auction format are crucial to an efficient allocation of this spectrum. Please see our responses to Questions 15 and 17 for a detailed analysis of these issues.

Question 15: Do you agree with Ofcom's proposals as to the timing of any auction? If not, what alternative proposal would you make and why, and what evidence and analysis can you provide in support of your alternative proposal?

T-Mobile believes that Ofcom should await the outcome of international ongoing work on this band before further consulting on the Digital Dividend Review. We note that Ofcom is proposing to publish the next DDR consultation before summer 2007 while most international fora will present their conclusions on this band at the end of the summer. We urge Ofcom to wait and publish the next DDR consultation once the outcome of these working groups has been published. In particular, Ofcom should wait the outcome of the World Radio Conference in November 2007.

In addition, before auctioning the spectrum Ofcom should seek further clarification on whether the EC will introduce harmonisation measures before the spectrum is auctioned. We believe it important that Ofcom explore all the possibilities to support a long run use of this band for mobile services.

The Digital Switch Over

Regarding the timing of the auction in connection with the DSO process, T-Mobile believes that the release of the UHF spectrum needs to take place when there is sufficient certainty about the usability of each package of spectrum on offer.

T-Mobile has serious concerns over the uncertainty surrounding the DSO process. Ofcom's current view appears to be that a failure or a delay in the switch over in some or all regions of the country would result in the purchasers of the spectrum not being able to exert their legal rights in the spectrum. T-Mobile is concerned that the current view places all the risks that the DSO is delayed onto the purchasers of spectrum. This is unacceptable. If the DSO is delayed, the purchasers of the spectrum need to be compensated by Ofcom for the extra costs incurred and the revenues forgone until the moment they will effectively be able to use make use of the spectrum acquired.

The possibility of a delay in the DSO risks distorting the outcome of an auction process as it would distort the incentives for the operators who wish to bid for the spectrum, and impair their evaluation ability. This would have a disruptive effect on the efficiency of the auction process. This is because when assessing the value of this spectrum, operators would incorporate the risk that they will not be able to make use of the spectrum they legally acquired and to offer the services as in their business plans: this reduces the expected revenues and hence the evaluation of the spectrum.

In addition, the time over which the licensees will have certainty as to their rights in the spectrum is unknown at the time of the auction.

Since operators will always face a significant yet unknown probability that the spectrum acquired will generate lower value for a shorter time, they will not be in a position to correctly assess the value of the spectrum and to bid rationally for it. The whole auction would be impaired and the outcome necessarily inefficient.

T-Mobile urges Ofcom to recognise that there is no value in spectrum that cannot be used by its owners and to carefully reconsider the issue and find an acceptable way forward. Operators need to be compensated by Ofcom for the extra costs incurred and the revenues forgone if the spectrum does not become available.

Question 16: Do you have any views on which of the packaging options identified for the cleared spectrum would be most suitable?

T-Mobile believes that Ofcom should await the results of international studies on this band before ultimately deciding the packaging of this spectrum. We therefore expect Ofcom to postpone its next consultation until an international position on this band has emerged. Packaging of the spectrum should be made efficient for the technology most likely to use the spectrum. If a harmonised sub band for mobile services is defined, spectrum packaging within that band should match mobile technologies allocations (5 MHz blocks).

However, at this time, T-Mobile's preference among the packaging options listed by Ofcom is that spectrum should be packaged in 15 x 8 MHz lots, being each of channels 31, 32, 33, 34, 35, 36, 37, 39, 40, 63, 64, 65, 66, 67 and 68. We regard this solution as the most efficient as it would accommodate the needs of the industry and at the same time guarantee a competitive and therefore beneficial solution to the use of this spectrum.

These channels are expected to have different patterns of interference which is likely to lead to different value. This should however be reviewed following completion of the international work.

One key point about packaging that Ofcom must clarify is who ultimately is responsible for interference between **newly auctioned** blocks, e.g. between DVB-H and DVB-T. This issue is extremely important for the auction's efficiency and it has not yet been clarified by Ofcom. As Ofcom says³:

"Bidders would not know at the time of auction what services would be in the adjacent spectrum. As a result it would be difficult to assign a value to a spectrum block prior to the auction as the extent and the ways that block could be used would be unknown. This uncertainty would have to be reflected in their bids and therefore the spectrum would not be allocated efficiently in the primary market."

T-Mobile proposes that Ofcom should use the revenues from this auction to make this spectrum more efficient.

Question 17: Do you have any views on which of the packaging options identified for the interleaved spectrum would be most suitable?

T-Mobile notes that there is a report being produced in ECC TG4 in response to the EC Mandate on the use of the interleaved spectrum. This report addresses "the feasibility of fitting new/future applications/services into non-harmonised spectrum of the digital dividend (namely to so-called "white spots" between allotments)" and is due to be finalised by December 2007.

Question 18: Do you have any views on which of the auction design options would be most suitable?

T-Mobile believes an efficiently designed auction is the most efficient means to awarding the Digital Dividend spectrum. For an efficient outcome, Ofcom needs to clarify who ultimately is responsible for interference between **newly auctioned** blocks, e.g. between a new DVB-H and a new DVB-T (See Question 16).

T-Mobile has the following concern in relation to the auction format. The channels in the UHF band do not display similar value. The 15 channels that form the Digital Dividend are expected to have

³ Ofcom, ['Discussion document on the award of available spectrum 1452 – 1492 MHz: Technical aspects'](#) 15/02/07

different patterns of interference, which is likely to lead to each of them having a different value. The auction design should take this into account. Ofcom should therefore use specific lots rather than generic lots, due to the differences in constraints (and hence usability) of the spectrum under consideration in the award. To auction them as generic blocks would create massive inefficiencies as operators value them differently. We believe that Ofcom should consider a combinatorial auction that allowed package bidding, similar to that proposed for the L-Band.

Ofcom should also incorporate the lessons learnt from the most recent auctions before deciding what mechanism best suits this spectrum.

Question 19: Do you agree with Ofcom's proposals for the non-technical terms of the licences to be awarded for use of the UHF spectrum?

T-Mobile agrees with Ofcom's proposals for the non-technical terms of the licence.

However we are very concerned that Ofcom is proposing to auction this spectrum whilst critical aspects of the policy regime that will apply to the new licensees remain uncertain. T-Mobile has commented at length on the need to ensure that the property rights in spectrum are adequately defined prior to any auction. To be able to sell and obtain a certain, defined legal title to spectrum is far preferable than obtaining the legally unclear licence proposed. The failure to properly define rights means that disputes around interference and the question of liability relating to interference will remain unclear. Furthermore, it will prevent a secondary market in spectrum developing and therefore significantly undermine Ofcom's efforts to introduce spectrum trading.

Question 20: Do you agree with the analysis of the options as set out in this Impact Assessment?

T-Mobile has commented above on all options proposed by Ofcom in this consultation.

T-Mobile (UK) Limited
20 March 2007