

Vodafone comments on Digital Dividend Review
The proposed approach to the award of the digital dividend spectrum (470-862MHz)

Introduction

Vodafone welcomes the Digital Dividend Review. We agree that oversight of the Digital Dividend raises some of the most important (and difficult) issues that Ofcom has ever had to tackle. The consequences of these decisions are likely to affect almost every British citizen in one way or another and will have profound implications for the future of some of this country's most important sectors in which the UK is today a world leader.

Ofcom is right to start early given the size and nature of the challenges which the Digital Dividend presents. Vodafone supports the conclusions which Ofcom has come to on many issues; these are consistent with the general approach to spectrum management which Ofcom has adopted in recent years. If the UK could be isolated from European and international considerations then we would find little to disagree with Ofcom's approach. To date the UK has been able to move ahead of the rest of Europe, both in taking decisions earlier and in providing for greater flexibility in spectrum use. However, Vodafone believes that this approach will not work well with the Digital Dividend.

Ofcom cannot ignore or discount Europe in developing spectrum policy for the Digital Dividend, however inconvenient this may be to other UK objectives. This is because many of the competing technologies which Ofcom rightly identifies as strong candidates for using the Digital Dividend bands will require pan-European scale to be viable and the current proposals for the bands will not allow such technologies to be developed. The UK market is simply not large enough to support major new technologies if there is no market elsewhere. If Ofcom ignores this critical fact then many of the other merits of its proposals will be devalued and the UK will not fully achieve its objectives.

This does not mean that Vodafone supports arguments for spectrum management on a pan-European basis in general or that we think the European Commission or other bodies should assume responsibility for the UK Digital Dividend. Nor should the UK necessarily wait for Europe. But it does mean that Ofcom's proposed approach for the Digital Dividend is too parochial. We identify in this submission the steps which Ofcom needs to take to ensure that the flexibility they seek for the UK is actually realised in practice. This requires action in Europe (and at the ITU) to benefit the UK.

Future uses (question 4)

Vodafone supports Ofcom's careful analysis of the prospective uses to which the Digital Dividend might be put. This analysis demonstrates more convincingly than any other we have seen to date that there is currently no strong or obvious a priori case for any particular set of technologies or applications for the Digital Dividend.

There are two particularly important conclusions here. First, Ofcom's consumer research confirms that the claims of High Definition television may be less seductive

than is sometimes argued¹. It also shows that the claims of mobile broadband platforms are relatively undeveloped. Neither can be discounted at this stage. Ofcom's own analysis shows that mobile services generate more economic value per MHz of spectrum than any other industry in history (and around seven times more total surplus from each MHz of spectrum than today's terrestrial broadcasting industry²). Economic considerations may not be the only basis for adjudicating between claims for the Digital Dividend, but the strength of the mobile industry's claim based upon past performance cannot be ignored either.

Second, Ofcom's research confirms that the claims from mobile broadband services are at least if not more compelling than those from mobile television or other uni-directional broadcasting applications. Much of the debate in Europe has associated the UHF frequencies with DVB-H and other mobile broadcast applications rather than with mobile broadband³. Vodafone believes that although DVB-H clearly represents one potential candidate technology for these frequencies, it should not be considered the best or the only mobile application at this stage⁴. To licence the Digital Dividend in a way which in practice meant DVB-H but no other mobile technology was feasible would represent an important opportunity missed for the UK.

Constraints on use of spectrum

Vodafone supports Ofcom's conclusion that the licensing of the Digital Dividend should allow for as much flexibility as possible⁵ - including use for mobile broadband services. In this context, Ofcom then makes reference to two types of constraints, but omits a third.

The first constraint which Ofcom rightly identifies concerns interference between mobile broadband systems and DTT services. These issues are particularly significant for

¹ It is not clear to us whether consumers in the survey thought that such services would be provided 'free' (i.e. as part of the PSB or advertising funded) or on a subscription basis. We note also that even if HDTV were a compelling proposition for customers, there may be more efficient non-terrestrial means of delivering such a service (such as the BBC's plans to launch a free HD satellite service in 2008, reported in the UK press on 28 February 2007)

² Calculated from figures in 'Economic impact of the use of radio spectrum in the UK: A report by London Economics' 16 Nov 2006 which suggests the mobile industry generates £21bn total surplus p.a. and terrestrial TV is less than £9 bn. The former uses around 70 MHz of spectrum below 1GHz (and generates at least 50% of the total surplus from these frequencies with the remaining being generated at 1800 MHz, 2.1 GHz etc), whilst the latter has around 450 Mhz.

³ This appeared to be the position first advanced by Commissioner Reding last year: "This means we should start serious discussions now about the use of the digital dividend for spectrum: including further harmonization at EU level of frequency bands for potential use by services such as mobile TV. I am more and more convinced that we cannot wait until 2012 to deploy new services such as mobile TV on a large scale." (whereas a speech on mobile broadband in the same month made only passing reference to UHF) see

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/157&format=HTML&aged=0&language=EN&guiLanguage=en>. More recently the Commissioner has been more balanced in her emphasis on other potential mobile uses for UHF spectrum, including broadband.

⁴ We note that Ofcom's scenarios place valuations of £0.3-3bn for mobile TV/multimedia and £0-2.5bn for mobile broadband (but with potentially larger externalities) from similar spectrum requirements in each case (see p.53/4). Both valuations are (a) large and comparable to those for DTT (b) similar, confirming that neither option should be excluded by the auction

⁵ With the possible exception of reservations for low power applications (which we remain sceptical about) and PSME

mobile uplinks (which all mobile broadband systems must have). Ofcom rightly identifies this as a concern for systems which might co-exist within the UK and notes that further work on this issue will need to be undertaken by their consultants (A10.81)⁶. Vodafone notes that EEC TG4 held its first meeting in January (under a mandate issued by the European Commission and recently supported by the RSPG⁷) to consider, amongst other things, these issues on a European basis. We assume and hope that Ofcom will engage actively in the work of this Working Group.

Second, there is a cross-border element to interference management between mobile broadband systems and DTT services which Vodafone believes should also be explicitly addressed by EEC TG4. Ofcom notes that, irrespective of other technical issues that may arise from mobile broadband/DTT co-existence, the UK is also already subject to the Geneva 2006 Agreement and that this does not provide any cross-border protection for uplinks of any kind and provides only limited protection for mobile receiving stations (see A10.109/10). This must be resolved by seeking co-primary status for mobile applications at the WRC in 2007. Again, steps are already under way in Europe to pursue such an additional allocation and we welcome Ofcom's very recent proposals to pursue a mobile allocation at WRC 07⁸.

Resolving technical and legal concerns about DTT/mobile broadband co-existence, including cross-border obligations, are two necessary conditions for the efficient use of the Digital Dividend. They are conditions to which Ofcom should commit and which require work within European institutions and beyond. But they are not sufficient in themselves.

The third condition, which Ofcom does not address in any detail in its proposals, concerns the lack of viability of mobile broadband in non-UK markets under Ofcom's proposals and the consequent lack of scale for such technologies within the UK as well as outside it. The reason for this is that the UK is unique, so far as Vodafone is aware, in having obtained rights at the RRC 06 which resulted in a significant allocation of cleared spectrum which could accommodate mobile broadband systems. Most if not all other European administrations have agreed to Digital Plans which do not release any cleared sub-bands of spectrum and which therefore consist principally of interleaved spectrum suitable only for broadcast applications. There is therefore no immediate prospect of spectrum that is in any sense harmonized across the EU being made available (whether it is harmonized with the cleared spectrum which Ofcom proposes to make available in the UK or with some other sub-band).

⁶ We are not sure how the work of ERA relates to previous studies undertaken by Autonomy to support the Aegis report for Ofcom on spectrum harmonization which appeared less cautious on these co-existence issues between TDD and UMTS TDD systems (see fn 9)

⁷ RSPG advocates 'pursue within CEPT the studies required to consider and possibly identify sub-band(s) with the objective of developing a non-mandatory decision at European level to facilitate the use of fixed/mobile applications (including uplinks)' p.12

⁸ See RSPG 'Opinion on the EU Spectrum Policy Implications of the Digital Dividend', 'The RSPG considers that there may be EU-wide benefits to the use of the digital dividend by fixed/mobile applications (including uplinks)...and that this would be facilitated by ..seeking an additional allocation to the fixed/mobile service in the entire UHF band at WRC-07 or WRC-11' (p.11). See also Ofcom consultation on candidate bands under consideration at WRC-07 for IMT: <http://www.ofcom.org.uk/consult/condocs/wrc07/wrc07.pdf>

Ofcom is right to suppose that this does not impose a legal constraint directly upon the UK. Nor does it prevent the development of a UK-only mobile broadband system. But in practice the absence of any harmonized sub-band on an EU-wide basis represents a formidable obstacle to mobile broadband within the UK and therefore to Ofcom's plans for the Digital Dividend.

Many bodies have recognised that such a minimum degree of harmonization – at least in terms of ensuring that spectrum that is similarly flexible across a number of markets is made available within similar timescales – is important for technologies with significant scale economies. In this context, Vodafone believes that this is likely to require identification of a band for TDD technologies which is at least 100 MHz of contiguous spectrum and which as closely aligned as possible (i.e. within the same frequency range) across all Member States⁹.

The European Commission's proposals for the WAPECs concept (which Ofcom and the UK has generally supported¹⁰) explicitly recognise this need for 'harmonized flexibility' and the most recent Communication on this subject – issued after Ofcom published their consultation document - identifies the Digital Dividend as a key priority (alongside proposals to allow reuse of GSM spectrum for UMTS which are now largely concluded). Ofcom's own studies of the costs and benefits of harmonization have come to similar conclusions in relation to technologies which do not exhaust economies of scale nationally¹¹. Ofcom's very recent and helpful paper on WRC 07 includes a proposal to support an ITU-R study for identification for IMT in the UHF band explicitly on the grounds that:

Although identification for an application does not elevate an application's regulatory status, there is merit in this process for particular applications. In the case of mass-market public cellular networks, the frequency bands identified become the bands that administrations around the world are most likely to make available for that application. These are the bands where high volumes of equipment are developed and the benefits of economies of scale flow from this.¹²

⁹ Experience of antenna efficiency in the UHF band for DVB-H shows that the frequencies to be covered need to be narrowed down significantly if terminals are to perform well. Filters to avoid interferences between TV sets and mobile base stations could also be developed on a pan-European scale if the frequencies are closely aligned. Vodafone suggests that a TDD sub-band is considered both because the challenges in identifying a harmonized FDD band are even greater and because TDD spectrum could be released (and used) in a more flexible fashion and thereby accommodate the different switchover plans in different Member States.

¹⁰ And recently confirmed in the Commission's Communication
http://ec.europa.eu/information_society/policy/radio_spectrum/docs/ref_docs/com/com_50_en.pdf

¹¹ Aegis proposed: 'a half way position where countries would agree to allocate frequencies in a common band for a common purpose, but would also allow other applications to be considered where it can be demonstrated that other applications have a higher value than the harmonised use. Harmonisation could thereby provide sufficient focus and certainty for the achievement of economies of scale in manufacturing, without entirely precluding alternative uses in particular circumstances'. see
<http://www.ofcom.org.uk/research/radiocomms/reports/framework/harmonisation/summary.pdf>

¹² Ofcom consultation on candidate bands under consideration at WRC-07 for IMT:
<http://www.ofcom.org.uk/consult/condocs/wrc07/wrc07.pdf> para 1.4

The Digital Dividend therefore provides the first major test for Ofcom and for Europe of this new approach.

Ofcom finds itself in an unusual position where action on a European basis will not constrain or frustrate the UK but is needed instead to assist Ofcom in reaching its own objectives¹³. Vodafone notes that Ofcom appears to have accepted this argument recently when it decided to defer decisions on the award of the 'L Band' (1452-1492 MHz) because work is now underway within CEPT which may result in an EC Decision which would be intended to improve flexibility across Europe. In that case, Ofcom appeared to recognise that the benefits of greater flexibility on a pan-European basis may outweigh the costs of some delay in the UK¹⁴.

In this case, a similar argument can be made, although it is not necessary for Ofcom's work on the UK Digital Dividend to stop – simply for European work to start in earnest and for the UK to take a leading role within it. Aside from the recent Commission Communication cited above, the recent RSPG report on the digital dividend, also published after Ofcom issued its consultation document, suggests that there is already widespread recognition that:

'there may be EU-wide benefits to the use of the digital dividend by fixed/mobile applications (including uplinks) in a harmonized sub-band of the UHF band'

Vodafone believes that these EU-wide benefits will extend to the UK market and that Ofcom should seek to ensure that they are fully captured. Further, we believe that Ofcom cannot simply proceed unilaterally and hope the UK will capture the gains later if Europe decides to catch up. The outcome of the auction could be fundamentally different depending upon whether or not a pan-European opportunity for mobile broadband exists at the time it is held, and it would be extremely difficult and costly for the UK to reconfigure the entire band through the secondary market if such an opportunity were to emerge after the auction. Moreover, Ofcom itself notes that there is a degree of potential substitutability between other spectrum (for example at 2.6 GHz) and UHF spectrum for mobile broadband applications. This substitutability is also in part determined by the extent to which either band can be exploited on a pan-European as opposed to UK-specific basis. Early recognition of these issues and a clear plan for their resolution is therefore important for the efficient conduct of other auctions as well as for the Digital Dividend itself.

Ofcom should therefore seek as much flexibility as possible prior to the conduct of the auction itself – and do this by actively pursuing the identification of a pan-European UHF sub band (or 'cleared spectrum') which could support mobile broadband (i.e. bi-directional systems). It is unclear at this stage whether this would require Ofcom to adjust its Digital Plan to align with those of other Member States, whether other Member States could be persuaded to align with the UK, or whether all would need to implement some changes to (or within) the Geneva Agreement. No option should be explicitly excluded by Ofcom at this stage. As the RSPG notes, whatever changes or adjustments

¹³ Ofcom identify (at para 8.29) a binding European regulatory decision as being one which might 'significantly constrain the potential use of the spectrum'. However, Vodafone believes a European decision is needed to reduce the constraints which currently apply to the UK Digital Dividend

¹⁴ See www.ofcom.org.uk/radiocomms/spectrumawards/awardspending/award_1452

are required would also require some agreement as to how they were to be funded – an issue which is also likely to need addressing in the auction rules but on which Ofcom are silent at this stage.

Given the fundamental nature of our concerns about scalability of mobile broadband at this stage, Vodafone has not addressed all aspects of the consultation in this note. More detailed answers to the other questions in the consultation are attached.

Question 1: Do you agree with these proposals?

Vodafone strongly supports Ofcom's overall objective of releasing spectrum for the Digital Dividend in as flexible manner as possible, thereby giving market participants the widest range of options as to how they wish to utilise the spectrum. Vodafone has identified one major constraint – the lack of a harmonized sub-band capable of supporting bi-directional systems on a pan-European basis – which currently threatens to prevent Ofcom from realizing this objective and which is not given adequate emphasis in the document. We suggest additional steps which will need to be taken if Ofcom is to achieve its aims.

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

Vodafone considers that Ofcom has properly identified most but not all of the constraints that apply to the available UHF spectrum. The most critical additional constraint that currently exists arises from the lack of any alignment between the UK Digital Plan and those of other Member States in Europe. This does not represent an additional legal constraint upon the UK, but it does mean that the UK's cleared spectrum will be of little or no value for mobile broadband systems if they are not scalable to anywhere else in Europe. The flexibility which Ofcom rightly holds as a key objective is in fact very limited without the development of a harmonized sub band. This constraint needs to be explicitly recognised by Ofcom as a key factor and a plan of action developed to remove or at the very least reduce it.

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

There is clearly more technical work to be undertaken by Vodafone, Ofcom, EEC TG4 and CEPT on co-existence and cross-border issues. Ofcom's preliminary analysis at this stage appears reasonable.

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?

We comment in our main submission on the conclusions we think should be drawn from Ofcom's careful and comprehensive assessment of potential uses, which broadly accord with those which Ofcom itself makes. We have yet to identify other potential uses not mentioned in the document.

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

Vodafone has been a long standing supporter of a more market-led approach to spectrum management and supports Ofcom's position. The inefficiencies of 'command and control' systems are well known. The demand uncertainty and wide range of candidate technologies associated with the Digital Dividend makes it particularly important that Ofcom adopts a market-led approach.

We believe that the risks of market failure associated with a failure to capture externalities or inefficient transaction costs are relatively low. The proper assessment and valuation of externalities is extremely difficult and unsubstantiated claims should generally be approached with caution¹⁵. We note that Ofcom is (rightly) more confident in their discussion of transaction costs than externalities in their consideration of particular cases which might merit intervention.

Question 6: Do you agree with our proposals to continue making available channel 69 for low power PMSE devices?

We are unable to comment in detail on the issues to be addressed here. Generally, we would expect that aggregators or intermediaries (Ofcom refer to them as 'band managers') would emerge to overcome the difficulties of high transaction costs in most markets (just as mobile operators obtain spectrum which is then shared amongst millions of individual users) and there is no reason to suppose that this would not also happen in the case of PSME¹⁶. There may be a case for a transitional period, as proposed for professional PMSE devices (although it may be longer this case).

Question 7: Do you agree that there should be transitional protection for professional PMSE users?

See answer to 6 above

Question 8: Do you consider that additional spectrum from the digital dividend should be reserved for low power applications?

Vodafone agrees that the case for reservation for low power devices has not been made.

Question 9: Do you consider that it would be desirable to hold back some spectrum for award with a view to its potential cause for future innovation?

No. Many of the candidate technologies identified by Ofcom require that a significant amount of spectrum is available, suggesting a high opportunity cost if the Digital Dividend is further constrained at this stage. As Ofcom notes, secondary markets in

¹⁵ In particular, there is often a confusion between private interests which can be internalised and captured through auctions and public interests which cannot

¹⁶ Professor Gerry Faulhaber has written extensively on this subject for Vodafone in 'Reforming Spectrum Policy', Vodafone Public Policy Series5, October 2006. He addresses issues such as transaction costs.

both spectrum and technology should be sufficient to ensure that spectrum finds its best use. We do not consider that Ofcom should have a separate 'innovation' objective in spectrum policy – most experience of 'pioneers allowances' and other mechanisms which attempt to do so have been fraught with difficulty (and ineffective).

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

Yes, for the reasons explained by Ofcom.

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?

We do not seek a specific reservation for mobile broadband services, but we do not agree that Ofcom needs to take no further action on this point or that the current proposed package should necessarily be the basis for the auction. We explain in our main submission the steps which we believe that Ofcom needs to take in order to ensure that mobile broadband is a feasible option for the UK. This requires that a pan-European sub-band is identified, which may or may not involve adjustment to the UK Digital Plan.

Question 12: Do you agree with our proposal that we should not intervene in the award of this spectrum to reserve spectrum for DTT?

We strongly agree. The Government has already intervened to award 256 MHz of the UHF band to terrestrial broadcasting, so the question is really about whether there is a case for even more spectrum to be reserved for this application. Vodafone sees no credible argument for doing so – and certainly none that has any greater merit than many other potential applications of great economic and social merit.

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

Yes, although we believe many transactions costs can be addressed by market mechanisms in the longer term.

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

Yes

Question 15: do you agree with Ofcom's proposals as to the timing of any auction?

Vodafone believes that a serious attempt must be made to identify a sub-band for bi-directional systems on a pan-European basis if Ofcom is to fulfill its objectives for the Digital Dividend. There is already broad agreement within the RSPG and at the Commission that such an undertaking should be considered, but it is uncertain at this

stage whether and when these efforts might be concluded. It is not necessary for Ofcom to delay or otherwise change its plans for the Digital Dividend at this stage, but nor should this be excluded if it becomes clear at a later date that the UK would benefit from some delay in order to allow other negotiations to be concluded. We have already noted that Ofcom took this view in relation to the L Band and they should not exclude doing so in this case.

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

Given the other issues which Vodafone considers need to be addressed –including the identification of harmonized EU-wide sub-bands, we have not developed clear views on packaging options for a UK auction at this stage (although the single lot option looks unattractive). The harmonization and interference issues for mobile broadband in particular mean that it is likely that there will not be simple substitutability between cleared channels, but it is not clear to us at this stage how Ofcom might best address this. We note that the current consultation on auction design for the 2.6 GHz spectrum attempts to address very similar issues (in that case with multiple single lots in the first stage of the auction). We may have further comments on these issues once the 2.6 GHz auctions have concluded and we strongly advise Ofcom not to come to final conclusions until then.

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

No

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

See our answer to question 16 – we think that other issues need to be resolved before auction designs can be concluded.

Questions 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?

Yes, these appear reasonable

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

Yes