

The Digital Television Group: Response to Ofcom's Digital Dividend Review Consultation – March 2007

Introduction

The Digital TV Group (DTG) comprises a membership drawn from broadcasters, transmission providers, manufacturers of both equipment and the underlying technologies and the retail sector. Its Spectrum groups also include representatives of mobile operators, who are working together with broadcast spectrum experts to highlight the requirements for a successful introduction of mobile multimedia services alongside Digital Terrestrial Television (DTT).

UK DTT is dependent on bands IV and V, 470-862MHz (UHF) to provide universal access to free to air television using existing roof-top antennas. UHF was chosen because of its favourable propagation characteristics and the availability of effective roof-top aerials specifically designed for UHF reception. There is now an established large user base and it would not be practicable to migrate these to any other frequency.

The DTT platform will have to increase efficiency of spectrum usage to maintain its place as the largest consumer TV platform and meet foreseen broadcast requirements for new services. Digital television brings with it new methods of increasing efficiency in the use of spectrum and the DTG is supporting developments that, taken together, can be expected to increase the carrying capacity of the DTT network significantly and allow it to grow in competition with other platforms.

The DTT system in use in the UK today, launched in 1998, implements a DVB-T transmission protocol and MPEG2 data compression system. Since then technology has advanced significantly and for example MPEG4 coding is already being used in Europe as the de facto standard for DTT broadcasts and is already deployed in the UK on DSAT. HD tests at Crystal Palace over the last year have revealed no risk to the existing STB base. In order to realise the benefits that the improved coding brings, such as richer and more diverse services, it is important that MPEG 4 is deployed sooner rather than later with a possible aim being that a significant proportion of STBs and iDTVs will be MPEG 4 compatible at DSO. Thus a plan to migrate the UK to a more modern system would significantly increase spectrum efficiency (See our answer to Question 4 for further information).

This DTG response is based on a technical evaluation of the Ofcom Digital Dividend Review (DDR) Consultation. Detailed arguments are given below in the form of answers to selected questions raised in the Ofcom document.

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

Examination of the DDR consultation documents has highlighted a number of issues over the possible introduction of alternative technologies into this same spectrum. These include the impact that new services would have on existing DTT services [Further information is provided in our later responses] and the ability of all players to transition to this new environment at the same pace and in the timescales required by the current proposals. These may have an adverse affect on the large viewing population's ability to view existing services.

For parties considering the acquisition of dividend spectrum it is essential that any legal obligations to protect other services are set out clearly and in their final detail in order that proposed deployments can be risk assessed and fully costed.

Historically regulation has included obligations on incoming licensees to deal with real or potential interference to existing services. There is precedence in both the Channel 5 analogue license and the original Digital Terrestrial Multiplexing licenses requiring the licensees to deal with real and predicted interference. This obligation included detail on changes to transmission requirements and/ or reception equipment. These requirements in the case of the original introduction of DTT were based on the Independent Television Commission(ITC) [now Ofcom] - managed Joint Planning Project (JPP) producing predictions for the number of viewing households and their regional location likely to be affected by new services in UHF Band IV and V.

This raises a number of questions:

- In the auction process for released and interleaved spectrum what will be the requirements be to protect existing services against the effect of interference from any new licensees?
- Who will be responsible for predicting any likely interference?
- Will the digital terrestrial multiplex licensees at DSO have the same protection as they provided to existing services in the obligation through the ITC Code of Practice on Changes to Existing Transmission and Reception Arrangements included as part of multiplex licenses?

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

The information in regard to technical constraints, particularly the Aegis report, does identify some of the main issues associated with interference between systems but does not provide a set of rules which parties can work to in confidence. More detailed information is required in some areas, for example to allow a test of practicability. DTG would urge Ofcom to provide a clear timetable for any planned further work in this area, set out the aims of this planned work and the timetable for the results of this work to be made available. With respect to allowing an assessing of spectrum value, Ofcom should provide clear guidelines (rules) as to the measures that will need to be taken to protect existing services (the six main DTT multiplexes).

A well documented example of a likely impact where dense network and non co-sited transmitters are introduced into released channels, is 'hole punching' i.e. the loss of service on DTT services within a certain radius of introduced transmitters. It is possible to counter such loss of service by installing additional repeaters for the existing services. The decision to do this may take into account the number of affected users and the costs.

Expectations of CE receiver performance are very important in this context. Clearly if any receivers entering the market in future were to have a worse performance than the majority of those existing today [e.g. in terms of selectivity and interference rejection], then it is possible that the number of affected consumers could increase in future even after new services are introduced. Clearly it is not in the interests of the DTT platform that such problems should occur. DTG would suggest that Ofcom make known a benchmark expectation for receiver performance, the UK 'D-Book' specifications as they are at the point of DSO completion for example, such that only receivers meeting this benchmark would be entitled to protection through whatever process was agreed set out in the license awards. It will clearly be necessary to understand, in advance, who is responsible for mitigating any such problems.

In terms of the use of existing [i.e. retained] spectrum for the existing six DTT multiplexes Ofcom should note before finalising its technical studies on the DDR that the detailed planning of these networks is still in progress – and frequencies, powers and modulation modes are due to be changed.

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

As stated in our response to Q2, DTG acknowledges the high quality of the Ofcom-commissioned technical research. Although the work done thus far provides a framework for consideration, both questions of spectrum management and technical questions remain, particularly in relation to the likely impacts resulting from the changes and the process and responsibilities associated with their resolution.

We would also make the following comments:

Although Paragraph A10.158 only refers to interleaved not retained spectrum, new services in released spectrum could impact, and therefore require co-ordination for, services in both retained and interleaved spectrum.

Protection ratios supplied in Annex 10 are purely for the case where the adjacent service is the only source of interference. As DTT services are already working in an interference limited environment the introduction of new services will result in an increase in the potential interference and a reduction in the reliability of a service. Ofcom needs to provide agreed levels by which the protected field strength of a service can be increased. This agreed level needs to apply to new users in both interleaved and released spectrum and should include a mechanism where the interference for all new users is summed.

With respect to the released packages access to the spectrum will be on a UK wide basis subject to the GE-06 agreement. However, GE-06 has spectrum assigned to particular areas, use outside these areas would be subject to negotiation and agreement with our neighbours. Equally interleaved spectrum is a new requirement and would also require coordination. As Ofcom is responsible for international negotiations the use of spectrum across the country is dependant on Ofcom's ability to agree new and / or alternative uses. With respect to released spectrum there is no indication of the level of support that Ofcom will provide to assist prospective licensees in achieving their desired network configuration.

With respect to Interleaved spectrum it is unclear whether packages will be released prior to or post agreement with our international neighbours. Ofcom will need to define if the award packages are prescriptive, i.e. whether locations, effective radiated power (ERP), pattern etc, are specific or simply indicative.

In regard to the issue of 'Hole Punching' referred to earlier, this applies not only to the first adjacent and 'N+9' channels, but experience from enhanced Digital Audio Broadcasting (DAB) network build is that 2nd and 3rd etc adjacent can cause problems too. These need to be mentioned so that in the event of a problem the interferer is obliged to repair the damage. Unlike the situation with DAB where the problems were all related to DAB networks and involved a number of parties with a common interest in the success of DAB, in the case of UHF there is a possibility of cumulative interference from multiple operators with quite divergent interests, and so that the resolution of difficulties needs to be properly managed.

Any restoration of DTT signals should be on an area basis to ensure future reception throughout the affected area. It is also necessary to identify the level of DTT reception that will be protected, i.e. roof top or indoor aerials. An estimate of the likely number of households that are likely to be affected by hole-punching should be identified and published. A constraint that needs to be considered is the practicability of providing low-power transmissions to restore the services. These would normally require the reception of clean off air signals at the input to the repeater station. These off air signals may themselves be subject to the interference that they are trying to overcome.

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?

Part 1: The potential uses of most interest to DTG membership are DTT, specifically the expansion of the DTT platform [beyond the first 6 Multiplexes] to include HD delivery and other services, and the development of mobile broadcast multimedia services.

Industry players are now actively considering the future of the DTT platform given the very significant increase in sales of large flat screens on which SD content can provide a relatively poor user experience under certain conditions. Technical developments are underway to allow more efficient use of existing spectrum. The first of these developments is a new transmission protocol, 'DVB-T2', currently under development and with a target of a 30% increase in capacity.

A second element of development is to move all audio and video coding on DTT away from MPEG2 to a modern coding algorithm such as MPEG4 which would also be used for High Definition (HD) content. As stated in the Introduction, this process has already started with MPEG4 coding already being used in Europe where some countries are starting their DTT services using MPEG4 coding. HD tests at Crystal Palace over the last year have revealed no risk to the UK's existing STB base.

Thus a plan to migrate the UK to a more modern system would significantly increase spectrum efficiency and, while not a short-term project due to a large and growing number of what might become in the future 'legacy' MPEG2-only sets in the market, it is important that MPEG 4 is deployed sooner rather than later with a possible aim being that a significant proportion of STBs and iDTVs will be MPEG 4 compatible at DSO.

Receivers would also be capable of receiving existing MPEG2 transmissions, so their introduction does not involve any loss of services. The key then is to 'seed' the market as soon as possible with MPEG4/MPEG2 capable receivers that can be used for the reception of new services.

Although there are serious migration issues with DVB-T2, the carrying capacity of a multiplex might increase from 24 Mbps to 31 Mbps. Using MPEG4 coding; this could carry say 13-14 SD channels or 2 HD channels and 3 or 4 SD channels with current coders. If it were possible to agree and manage the migration of all existing transmissions to DVB-T2, the available bit rate over 6 multiplexes might increase to a total of 187Mbps from the present post DSO capacity of 144 Mbps. Taken together, these developments should deliver a considerable capacity increase or increase in efficiency.

The fact that the UK has achieved national coverage of analogue channels using only UHF is a tribute to the skills of the planners. Other European countries use Band III as well as UHF for the provision of similar services. The same transmitter sites are in use for DTT, so that the advantages of co-siting remain. The technical protection of the DTT network in retained spectrum and the service provided by several million receivers is at the heart of the DTG concern.

The DTG is currently looking at the possible deployment of dense, relatively low-power networks for mobile multimedia or other services where co-siting with DTT transmitters is not possible for the majority of sites. As described in the Ofcom document a full national roll-out may require several thousand sites to be deployed and this may have a serious effect on DTT without co-ordination by a single party acting on Ofcom's behalf. The risk of interference may increase as the new low power transmitters may produce a higher UHF signal strength than the received DTT signal at the edges of the DTT coverage areas. These 'edge of coverage' areas can include significant populations. The likelihood of this occurring is not fully understood because the rejection of interference partly depends on receiver design. It is thought that a small percentage of receivers would be affected in a small number of areas. Research by Vodafone indicates that mobile operators need to allow for a degree of interference and recommends that tests should be carried out. In an

area of low DTT signal strength, it is likely that DTT receiver aerials will be roof mounted. An interfering local transmitter aerial is also likely to be high in order to get good coverage, so that free space reception of both DTT and interfering signals are likely in DTT homes. This is likely to exacerbate any interference problem.

Such risks which will be of interest to DVB-T and DVB-H network operators alike and have been avoided in the past through joint planning activities and the co-siting of transmitters as Ofcom have acknowledged. If industry co-ordination is the method of control, then the process should be clearly defined in detail, with clear planning guidelines. Similar issues have been encountered with recent enhancements to national DAB networks and it may be that industry can learn from the success in managing this scenario in the case of UHF – although there are several important differences between the two cases.

We also agree on the need for continued use of UHF spectrum for Programme Making and Special Events (PMSE).

Part 2: DTG does not have any potential uses to add to the list contained in the DDR documents but any process going forward needs to take account of the possibility of new uses being added.

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?

Part 1: DTG is generally able to accept the principle of a market-led approach, subject to the resolution of the market failures identified by Ofcom and the concerns contained in this response. DTG's concerns about the ability of all players to transition to this new environment – particularly given that different issues will arise in each case – apply particularly to the ability of current broadcasters, multiplex operators and others to consider options for the introduction of High Definition content on to the DTT platform and for the introduction of networks for mobile multimedia or other services. This will require a high degree of certainty about technical parameters.

One important issue is that the packaging options do determine the viability, or at least the overall cost, of the deployment of certain technologies for particular applications. Taking the example of the expansion of DTT, there is in addition to the transmission costs, the considerable public investment in equipment and receiving aerials which is related to the frequencies in use. See our answer to Q16 & Q17 for further information.

Part 2: We agree that Ofcom has identified the alternative remedies.

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?

DTG supports the proposals as PMSE services are a critically important part of the television, film and theatre production industries. The future availability of Channel 69 for these services is supported by DTG. We would urge that Ofcom continues to consult the relevant industry organisations, particularly JFMG Ltd, in regard to this question. An important consideration, given this channel's position in the overall band-plan, is that it will be adjacent to a released channel [Channel 68].

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?

DTG agrees that there should be transitional protection for professional users to ensure access to digital interleaved capacity until at least 2012.

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.

DTG does not currently see sufficient evidence for this proposal. It is inherent in Ofcom's overall spectrum management proposals that low power applications could be accommodated in future through the acquisition of rights through trading – as will be the case for any future proposals not available or successful in the initial release.

Unregulated low power use could impact reception of existing services in a manner similar to bidirectional 3G or WiMAX usage within the band. As such the proposal is not supported.

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

DTG does not currently see sufficient evidence for this proposal. It is inherent in Ofcom's overall spectrum management proposals that future applications, innovative or otherwise, could be accommodated through the acquisition of rights through trading – and that the incentive for innovation, as it creates efficient use, is one intended aspect. It is not clear from the question whether the existing process for the occasional allocation of 'Test & Development' licences for experimental purposes is planned to continue.

DTG understands that the parties involved have requested that some released spectrum be held back for possible use to assist the DSO operation. In order to protect existing services both in the UK and internationally, the DSO programme needs the flexibility to call upon a range of possible solutions which include power variations, channel changes and so-called 'parking' channels and this may necessitate, on occasions, access for a temporary period to 'released' spectrum. This is important in order to meet one of the prime objectives of the DSO programme, i.e. to replicate analogue coverage as far as possible by transitioning from the existing analogue and lower power DTT networks while minimising the impact on viewers during that transition. DTG would support consideration of such a request.

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?

From a spectrum management perspective DTG sees value in packaging interleaved spectrum on the basis of Main Transmitter Site areas and, where suitable frequencies can be identified, the larger DTT relay stations. Whether such geographic boundaries have value to Local TV is not commented on. Proper management of interference between DTT and new services [local TV or any other] in interleaved spectrum is important and the proposal allows, encourages even, deployment strategies [e.g. co-siting of transmitters and the use of local Single Frequency Networks (SFNs)] which are likely to be efficient and minimise interference to DTT services in retained spectrum. This involves suitable limits on ERP and noting the value to all of co-siting local and DTT transmitters where possible. It is important that interleaved assignments include suitable protection rights to be viable for DTT.

Please also see our response to question 17.

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?

Ofcom's documents discuss the difficulties of co-existence with broadcast use for mobile broadband, suggesting that the use of released spectrum for uplink for mobile broadband may not be possible.

Whilst we accept that minimising the constraints on the use of spectrum is a requirement of the European regulatory framework, if mobile uplinks are to be an option, they should be made subject to appropriate interference management tests.

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?

Part 1 No Comment

Part 2. We agree that packaging should allow for DTT use as well as for the other uses identified in Ofcom's documents. However the packaging options outlined do in some cases tend to prevent or mitigate against either DTT or other uses. Technically, note should be taken of the suitability of certain specific channels that can meet the requirements of DTT transmissions to match existing receiver aerial configurations

For example, Options ii, iii, iv & v do not allow the option of acquiring a single 8MHz channel, while Options iv & v do meet the above requirements for DTT expansion.

Other than stations using channels 41, 44, 47 & 51 all broadcast stations have at least one of the existing analogue channels in released spectrum. Because of the banded nature of both receive and transmit broadcast antennas, i.e. they only work over specified frequency ranges, there is technical and economic merit in packaging spectrum in a manner that ensures the maximum number of in group channels are made available to DTT.

Under the present DTT usage bidders for released spectrum are aware of where adjacent and N+9 issues may occur. If spectrum is to be used for DTT it may be advantageous to indicate which spectrum this is as the adjacent channel and N+9 issues map will change.

To be viable any released spectrum to be used for DTT would need the same protection as existing DTT.

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

No comment

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

No Comment

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?

DTG supports the earliest possible award of spectrum but we note that the timing for the use of different parts of the spectrum to be awarded, and therefore any auction dates, may vary. One example, as noted above, is the potential need to retain part of the released spectrum in the short term to minimise risk to DSO. Another example is the potential for channel 36 to be used on a national basis much earlier than the released spectrum. We note that this channel is not considered in any of the potential Multi Frequency Networks

(MFN) DTT spectrum configurations identified by Ofcom, nor our preferred option described in our answer to Question 16 below. Provided that appropriate technical licence conditions are applied to channel 36, to ensure the fullest flexibility of use for both channel 36 and the released spectrum (in particular channels 35 and 37), we would support a separate award of channel 36.

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

Yes. Packaging options should affect the viability of using the spectrum to implement certain networks. For example – further DTT use for SD or HD – would benefit from options IV & V which result in blocks 31 ~33 and 63 ~ 65. These blocks are ideally suited for further DTT as they are generally based on the 4th analogue conversion at each site. As such this block release pattern provides the greatest number of channels that are within the existing antenna group for both transmit and receive antennas in the area they serve. As high power DTT, of all the technologies and uses being considered for released spectrum, is the most difficult to co-ordinate, options IV & V as they include the 4th analogue conversion mean that in general the required channels are already in the GE-06 plan. As such these two release patterns not only match existing receive and transmit antenna use, but also minimise the requirement to coordinate new channels. See also our response to Q12 (Part 2). In addition, as noted above, we consider that channel 36 could be separated out from spectrum cleared by DSO.

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

DTG supports the proposal to offer a large number of packages consisting of a single interleaved spectrum channel although Ofcom should note that the proposals as they stand may result in fragmentation of the spectrum with bidders ‘cherry picking’ the high value areas such as London and Birmingham.

The proposals therefore make one option, namely the introduction of at least one low power DTT layer whose coverage, depending on modulation scheme and power adopted, could be comparable to the existing DTT services in our present mixed analogue & digital world, very difficult to achieve. Such a layer would only use one of the interleaved channels in an area leaving the others free for further services.

DTG would propose that Ofcom seek to integrate planning of the interleaved spectrum into the final stages of detailed DSO planning if possible, with a view to maximising the number of in group frequencies that can be made available (at least at the 80 commercial multiplex stations) for a seventh layer of DTT.

The value of interleaved spectrum and to an extent how it is packaged will depend very much on the rules put in place to protect existing DTT services. Interleaved spectrum, because of the need to protect existing DTT services, is probably best suited to low power DTT services, co-sited with the main DTT services, or very low power applications such as PMSE. Depending on the decisions made i.e. with careful choice of rules, it may be possible to balance the need to protect the main DTT services whilst allowing valuable use of interleaved spectrum.

The LS Telecom study, based on a 3dB increase in interference to the main DTT multiplexes, may have presented an over optimistic picture as to what could be achieved with respect to the operating powers and coverage in interleaved spectrum. As the study was carried out prior to the Regional Radio Conference (RRC) and the decision by the commercial operators to only use 80 stations, assumptions about channel availability will be incorrect. It is recommended that Ofcom revisit their proposals for interleaved spectrum.

See also our response to Q5 & Q16.

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

No comment.

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?

No comment

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

No comment

This response has been drawn up by the Digital TV Group in consultation with its members and represents a consensus of the views expressed. Individual members may, of course, have particular objectives and may submit their own responses to this consultation which may differ in detail to this collective response.
