

## BBC'S RESPONSE TO OFCOM'S CONSULTATION ON THE DIGITAL DIVIDEND

The BBC welcomes Ofcom's extensive work on spectrum management and its desire to ensure that the spectrum released by digital switchover is reused as early as possible and in a way which maximises the benefits for society and the economy.

The BBC is aware of Government's general policy to use technology-neutral auctions as the means of allocating spectrum, but would like to express its concern that the application of pure market mechanisms to the whole Digital Dividend will jeopardise the success of another key public policy objective, universal access to high quality public service broadcasting, free-to-air on all main platforms, and lead to an erosion of the digital terrestrial platform and its ability to compete.

Whilst the BBC recognises that part of this spectrum can be auctioned as proposed by Ofcom, it will argue that:

- consumers want high definition quality and are buying equipment in order to receive high definition services;
- to ensure it is sustainable and competitive with other platforms, Freeview must offer a critical mass of High Definition (HD) services;
- there will not be enough capacity on the six existing multiplexes, even after switchover, to carry this critical mass without removing existing services, and there is no business model for free-to-air HD on the Digital Terrestrial Television platform (DTT) at this stage that could enable it to sustain likely auction prices;
- a part of the Digital Dividend (DD) should be allocated to Public Service Broadcasters (PSBs) to help them launch a strong free-to-air HD offer;
- this would kick-start a migration to the most efficient technology, MPEG4<sup>1</sup>, which could also, over time, be used by standard definition services and greatly improve spectrum efficiency on DTT (by around a third).

The BBC recognises that Ofcom has to consider that there are many potential uses of this spectrum and that some of them, such as local television services, are also likely to generate significant social value. But these could either be accommodated within the rest of the DD spectrum— both clear and interleaved, or met by other spectrum bands (e.g. wireless broadband in rural areas). It understands Ofcom's current view is that deciding which use should prevail is so difficult that it is better to let the market decide by itself.

However, this response will set out why HD on DTT is a special case, and why, despite these real difficulties, the allocation of spectrum to PSBs to develop a free-to-air HD offer on DTT is appropriate and necessary. Unlike other candidates for the UHF band, terrestrial TV, uniquely, can only be accommodated in that spectrum. Not only that, the allocation of some of the DD spectrum is the only way free-to-air HD can be developed on

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<sup>1</sup> MPEG: Moving Pictures Expert Group – the originators of the standards agreed by the ISO (International Standards Organisation) for encoding audio-visual information in a digitally compressed format. MPEG2 is the standard on which products such as digital television set-top boxes and DVDs are based. MPEG4 is a newer, more efficient standard. Simply put, it will allow, over time, information to be transmitted in 2/3 of the capacity required in MPEG2 – and further improvements might be expected. MPEG4 is a pre-requisite for transmission in HD. Even though HD in MPEG2 is perfectly possible in theory, not only would one service require around 20-22 Mbps, or close to a full multiplex, but the existing MPEG2 boxes cannot handle the high resolution necessary for HD in any case. Transmitting HD in MPEG2 offers no advantage if consumers must still obtain new set top boxes to view it

DTT. It is the only way to enable the PSBs to do so. **The BBC asked Indepen to estimate the loss of social value if PSBs are not able to develop HD FTA services on DTT. Their report estimates value lost through unavailability of HD services on DTT could range from £5.4-15.6bn.**

The BBC will also respond to other points of Ofcom's consultation, and will in particular explain that:

- it agrees with Ofcom that absolute priority must be given to ensuring the success of the switchover process, and to protecting, both before and after switchover, the coverage of the existing DTT multiplexes;
- it welcomes Ofcom's desire to protect spectrum for programme-making and special events (PMSE) but would like to ensure that long-term solutions are found.
- It agrees that spectrum should be auctioned in a way which is suitable for mobile television but urges Ofcom to consider the timing of the different spectrum auctions which are relevant for mobile television; the BBC would prefer these auctions to happen simultaneously – in particular L-Band and channel 36, and in any case, would like Ofcom to set out auction rules maximising the likelihood that a competitive market for mobile media services emerges.
- Whilst the BBC is satisfied that, subject to the caveats above, market mechanisms will, at this stage, allow PSBs to make their services available to viewers of mobile platforms, there could be circumstances later on where it could become necessary to apply the existing “must carry” rules in order to correct potential market failures.

The BBC will develop all these points in the course of its response but would like specifically, to make the case below for the allocation of spectrum to PSBs in order to help develop free-to-air HD services on DTT.

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## **The case for the allocation of spectrum for HD on DTT**

The Digital Dividend is the result of complex planning and major investments made by broadcasters, by industry at large, and, of course, by consumers. The vast majority of consumers has invested or will have to invest in new receivers and possibly upgrade their aerials at their own expense, for a total amount estimated at around £5bn. All will fund, through the Licence Fee, the assistance schemes for the most vulnerable consumers, the switchover communications campaign and the BBC's new digital transmission network. This totals well over £2bn. They will inevitably expect a return on their investment, in terms of additional services, improved quality and a durable DTT platform, commensurate with the costs and inconvenience they have had to bear. It is also worth stating the obvious; that the digital dividend will only be released if and when switchover is successfully completed. Hence, the first priority must be to ensure switchover happens as smoothly as possible and suffers no disruption, whether through technical issues – such as interference with new services - or because of consumer dissatisfaction.

The outcome of Ofcom's current review, which considers how best to award 128 MHz of very valuable spectrum in the prime UHF band, will shape the UK communications market for the next two decades and have a profound impact on consumers. This is a great opportunity for the UK, but one that carries significant risks. It is essential to get it right.

Ofcom is therefore right to take great care in considering all the possible mechanisms which could be used to award the released spectrum, together with their potential outcomes.

In its consultation, Ofcom asks the right questions: can the market alone deliver the best outcome for the UK and its citizens? Are there, in this area, specific risks of market failure which require some intervention?

The BBC believes there are indeed such risks. For a viable future, the DTT platform must provide television of the highest quality, including picture quality. This is a public policy objective which carries social value beyond and above its private value and which will not be achieved by market mechanisms. The BBC believes the prospect of this market failure should prompt either Ofcom or the Government (using its powers of direction conferred by the Communications Act) to intervene to make sure that every consumer in the UK can continue to access the highest quality Public Service Broadcasting including the latest innovations. Ofcom and Government should reconsider whether their approach to spectrum will allow HDTV in the UK to develop at a similar pace to other leading economies. Addressing this latter question will help inform the decision on spectrum.

The BBC response to Ofcom's consultation will therefore argue that

- (a) a well-managed planning strategy could facilitate many more uses within the DD spectrum and other spectrum bands which are also available at this time, than
- (b) Technology-and service-neutral auctions, and
- (c) that there are strong arguments to intervene and reserve capacity for High Definition on the DTT platform, which
- (d) Should lead Ofcom to intervene or Government to use its powers of direction.

### (a) The benefits of a managed approach

Ofcom has identified a number of potential uses of the DD spectrum. The BBC believes that, in considering whether to adopt a managed approach, it would be useful to consider each of them against a **set of criteria**:

- Are there any other spectrum bands which these services could use? Would they deliver similar benefits?
- Has the spectrum been harmonised at European level for this use, or is there some certainty that this can happen in a reasonable time, since harmonisation brings significant benefits due to economies of scale and roaming capability?
- Can equipment for use in these bands be readily available?
- If existing services have to be moved to other bands or use new technologies, what will be the impact on consumers, in terms of costs of new equipment or installation for instance?

The application of these criteria to the potential uses identified by Ofcom shows (see 1.2) that:

(1) Uniquely, digital terrestrial TV broadcasting cannot be delivered in non UHF spectrum: there is no effective substitute. So great care must be taken in allowing access to this spectrum for other uses if it is at the cost of a strong free-to-air DTT television platform - the fastest growing platform in the UK and one which is the foundation of the Government's switchover policy. In particular, the regulator must ensure that it does not prevent investment and innovation in the terrestrial TV platform, causing the platform to wither on the vine in the longer-term with considerable consumer disillusion.

(2) With well-managed and considered technical planning, it should be possible to accommodate a number of these other uses within the DD spectrum. In this response, we present scenarios demonstrating that multiple use of this spectrum is technically possible. But the BBC also believes that it would be more appropriate for some uses to be accommodated in other available bands.

(b) There are good reasons why, in this case, service and technology neutral auctions will not deliver an optimal outcome.

- It is widely recognised that not all the spectrum bands coming up for auction are equally appropriate for all services or technologies. This could compromise the benefits of a neutral approach. Indeed, Ofcom recognises this point in their approach to other bands where they have identified specific uses, such as Band II for FM radio, or Band III which they have specifically tendered for DAB.
- The future extent of European harmonization will constrain the way spectrum is used and prevent consumers and manufacturers benefiting from economies of scale.
- In order to avoid harmful interference between services, some spectrum has to be sterilized (usually referred to as “guard bands”, which will vary in size according to the types of adjacent services). If there is no co-ordinated planning, these bands will have to be designed around the use with the highest potential interference level, which is potentially very wasteful in spectrum utilisation terms.
- More importantly, although they could bring significant benefits to society, some services might not be delivered by the market, since their social value cannot be fully captured by their private value. We recognise this might also apply to several uses, but explain below why we believe this is certainly the case for HD services on DTT.

(c) There are strong arguments for Government to intervene and reserve capacity for High Definition on the DTT platform.

The BBC believes that those same principles which led Government and Ofcom to intervene massively in the market to promote digital switchover and require PSBs to replicate the analogue coverage in DTT also apply to ensuring that HD is available on DTT.

These principles are the following:

- Providing universal free to air coverage – at least for the PSB services
- Ensuring that all consumers get an enhanced experience from new technologies.
- Allocating some additional spectrum in order to generate spectrum efficiency gains, through the transition to digital, and allow for further spectrum to be released
- Managing spectrum to ensure that viewers are not deprived of their existing services as new services becomes available.

**Universal free to air coverage.** It is because DTT is necessary to deliver universal access to television that Government and Ofcom required PSBs to convert all the existing analogue transmitters, so that DTT coverage can be extended to 98.5% of the population. Though satellite is very widely available, Ofcom predicts<sup>2</sup> that around 4 to 6% of the population has no access to it for a variety of reasons. Only a mix of platforms, including terrestrial, can deliver universal access. This applies to additional SD as well as to HD services.

**Enhanced experience from the new technology for all.** HDTV will be the new technology of the next decade. It is already a service which people want and value, and soon it will be no more a luxury than colour television was a few decades ago. At January 2007, prices of HD screens had fallen by around 30% on the previous year. To date around 3.8m “HD ready” television sets have been sold in the UK, and by 2010, UK HD-ready households<sup>3</sup> are forecast<sup>4</sup> to reach 11 m.

**Improved spectrum efficiency through a “Spend to Save strategy”.** HD can also contribute to increased spectrum efficiency in the medium term. In the short term HD requires more bandwidth than SD. But because broadcasting in HD requires the use of the more spectrum efficient MPEG4<sup>5</sup> technology, the launch of an attractive free-to-air HD offer, using both existing and new capacity, will drive a gradual adoption of MPEG4 receivers and, therefore open up the prospect of greatly increased efficiency on the DTT platform, as it will become possible to migrate some or all of the SD services to MPEG4, allowing for long-term spectrum efficiency gains.

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<sup>2</sup> Ofcom. June 2005. “Planning options for digital switchover – statement”. Paragraph 1.4.

<sup>3</sup> An HD-ready household has an HD-ready set but is not necessarily receiving an HD broadcast.

<sup>4</sup> ‘High Definition Television - Global uptake and assessment to 2010’, Screen Digest, March 2006

<sup>5</sup> MPEG: Moving Pictures Expert Group – the originators of the standards agreed by the ISO (International Standards Organisation) for encoding audio-visual information in a digitally compressed format. MPEG2 is the standard on which products such as digital television set-top boxes and DVDs are based. MPEG4 is a newer, more efficient standard. To make it simple, MPEG4 will allow, over time, the same amount of information to be transmitted using 2/3 of the capacity which would be necessary with MPEG2 – and further improvements are expected. MPEG4 is a pre-requisite for transmission in HD: even if in theory, HD in MPEG2 is perfectly possible, not only would it require around 20-22 Mbps, that is close to a full multiplex, for one service, but the existing MPEG2 boxes will not cope with the high resolution necessary for HD. Transmitting HD in MPEG2 has definitely no interest as it does not even avoid the “box swap”.

**A managed strategy, protective of consumers.** A managed strategy will ensure that viewers are not deprived of their existing services as new services become available. A viable HD offer cannot be established within existing DTT capacity and would have to be accommodated within some DD capacity. In theory, it might be possible to remove sufficient existing services from the current DTT offer to carry five HD channels in MPEG4. But this solution would impose a huge cost on all consumers in the shape of lost existing MPEG2 services and/or deterioration in quality and diversity. Moreover, it would impose a wholly unacceptable burden on the majority who will not at that time have HD MPEG4 equipment, because they would get no benefit in return. A more appropriate approach would be that used for DTT, where, rather than removing existing analogue channels or degrading their transmission quality, DTT services were introduced in new spectrum, as a complement, not as a substitute for existing channels. The only spectrum suitable for broadcasting, in terms of compatibility with the existing installed base of aerials, would come from within the DD.

There are therefore very strong arguments to allocate some additional capacity from the DD for HD to be developed on the terrestrial platform in the same way that digital services were introduced. Some might argue that the market alone can deliver the same outcome: if HD is the usage which has the greatest value for consumers, then, it should emerge from the mere exercise of market mechanisms. This is not the case, because there is a clear market failure (as will be demonstrated in sections 5.3 to 5.9). The BBC accepts that strong arguments are necessary to justify an intervention to support HD on DTT, above and over other usages such as wireless broadband in rural areas, and will develop them in this response.

**In summary, there are three such arguments.**

1. A terrestrial HD service cannot be provided in the existing multiplexes: the BBC disagrees with Ofcom's belief that it would be possible to develop 5 HD channels – each requiring at least 8mbps - in the existing six multiplexes following switchover. The transmission mode change will only generate an extra 24 Mbps of capacity.

From 2008 onwards, in fully digital regions, it would, in theory, be possible to accommodate two to three - depending on the progress in compression technology - , but not five, HD channels within the 24 Mbps generated by the change of transmission mode. But in practice the capacity is scattered across five different multiplexes (the four muxes which move from 16 to 64 QAM and SDN, on which capacity is made available by the fact that Five and S4C/S4C2 move to mux B). Even if it were completely clear – the Secretary of State has the power to allocate some of the capacity controlled by the BBC to other public service broadcasting channels - some complex redistribution between multiplexes would be necessary to ensure three blocks of 8 Mbps are available for three HD services, to be run by PSBs. In addition, more than half of these 24Mbps are on commercial multiplexes and will presumably be auctioned to the highest bidder, not allocated to PSBs for HD services. Finally, this capacity will not have universal coverage, making it unsuitable to deliver the PSB's universality remit. In any case, such a scenario is likely to require significant intervention by Ofcom, and might raise serious practical and legal issues. Could Ofcom explain whether and how it intends to intervene?

Accommodating three HD services within the six multiplexes would therefore be very difficult, if not impossible. To accommodate **five** HD services, it would be necessary to deprive audiences of a range of existing services and erode picture quality. This would

compromise the attractiveness of the platform at a crucial time for switchover while not offering a sufficient incentive to drive adoption of MPEG4 technology. This scenario might generate discontent from viewers forced to switch to digital on the basis that they would get more services against a small one-off cost. They would discover that the promised new services are being taken away to accommodate others which require a new box and a new TV.

Therefore, to ensure the development of an HD offer which includes all the PSBs, meets the universality principle and continues to give to all viewers the same level of service they have now, at least one multiplex must be assigned to HD. In the detailed response to question 12, the BBC explains why none of the other options identified by Ofcom as an alternative to provide HD services on DTT actually works.

2. The value to society of the availability of HD on the DTT platform exceeds the private value: There is citizen value in preserving and developing the existing DTT platform by enabling viewers to receive HD services free to air. The public policy benefits of 'future-proofing' the DTT platform include universal, free-to-air access to PSB, sustained platform competition and efficient use of spectrum. The value to society of maintaining the DTT platform as an attractive, universal, free-to-air offer outweighs the ability of the PSBs to pay in an auction for additional spectrum to launch HD services. Just as digital television was not to be restricted to pay-TV, HD should not equate subscription TV. **The BBC has asked Indepen to estimate this loss of social value. Their report estimates that the value lost if PSBs are not able to develop HD FTA services on DTT ranges from £5.4-15.6bn.** This is developed in the response to question 5.

3. Auctions will not deliver outcomes meeting the public interest: This is because the free to air PSBs, whether licence-fee funded or advertising funded, cannot recoup the costs of an auction through incremental revenue. PSBs will find it very hard to build a business case now for an auction for the period from 2012 onwards, when they have fixed or declining incomes and where there is no firm evidence that HD will deliver higher revenues to advertising financed broadcasters. Moreover, PSBs may place different values on the move to HD and would face major co-ordination problems in acquiring sufficient capacity to provide a 'critical mass' of HD services.

Without some intervention, DTT viewers will be deprived of free-to-air access to HDTV; in the mid-term, this will jeopardise the sustainability of the DTT platform which is recognised by Government and Ofcom as the prime means of ensuring universal access to the PSBs, free at the point of delivery.

(d) The BBC is therefore requesting that at least one DTT multiplex be allocated to PSBs to develop HD services.

**The BBC is not asking for the whole digital dividend to be allocated to the BBC or to PSBs, is not suggesting it should be without obligations in return and it is not even asking for a decision to be taken now.** Rather it proposes that at least one, or if possible two, multiplexes be allocated to PSBs in return for a commitment to fund a terrestrial network which would allow viewers across the UK to receive free-to-air HD on DTT, on their main or secondary set and to promote a migration to MPEG4 for all SD services. This would ensure both adequate protection of consumers and increased spectrum efficiency. It would be

preferable to take that decision now, so that the transmission network can be built during the switchover process. But as a minimum, there should be no action now which forecloses any future options, which would be the case if the entire DD spectrum is auctioned in 2008 for 18 years. The ‘opportunity costs’ (in terms of the value to society that is foregone) of either the immediate allocation or of a “wait and see” approach are far from disproportionate: well-managed planning could accommodate a very wide range of uses – including ones with potential significant social value such as local television, emergency services or wireless broadband, both within the DD spectrum, and within alternative bands, where this is more appropriate.

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As confirmed by Indepen’s analysis, private decisions by PSBs will not result in socially efficient outcomes. Further, under current funding and institutional arrangements (e.g. the Public Value Test applied to the BBC) it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum. Indepen estimates that the value lost if PSBs are not able to acquire spectrum through auction ranges from £5.4bn to £15.6bn. Using Ofcom’s estimates of the value of spectrum to other potential uses of the spectrum and assuming 48 MHz will be required to support a multiplex providing HD PSB services, the opportunity cost of reserving spectrum for HD PSB services is around £2-3bn. There is therefore a good case for reserving UHF spectrum for HD PSB services. As a general matter, Ofcom argues that reserving spectrum for a particular purpose that generates social value is not appropriate - rather changes should be made to financial and institutional frameworks to ensure that social value is taken into account.<sup>6</sup> While this may be correct in principle, it is far from certain that such financial and institutional frameworks will be put in place in advance of the UHF auction.

Without some intervention in favour of HD - at least to reserve some spectrum for later decisions, we will rule out a viable HD portfolio on DTT for the next generation. The risks of this policy are considerable. Current consumers – especially the 3.8 million who have already bought ‘HD ready sets’ and all those who will buy such sets between 2008 and 2012 - will be frustrated. Moreover, by the time of switchover in 2012 they may be seriously disappointed when they realise that British DTT viewers could be the only residents of developed countries unable to watch the London Olympics in HD free to air. If a market auction proceeds in 2008, there is a serious risk that by then it will be too late to act.

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<sup>6</sup> Paras 6.69-6.72 op. cit.

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

*The BBC welcomes a great deal of Ofcom's extensive analysis of this issue, but disputes aspects of Ofcom's audience research, and fundamentally rejects Ofcom's assertion that uncertainty about future uses & their respective social value justifies proceeding with a market auction in 2008 and that this can be counted on to produce the optimum outcome. A pure market auction in 2008 for the post switchover world, after 2012, will inadequately reflect future social value and could risk creating significant obstacles to the future development of the DTT platform, with consequent serious risks, both to consumers who are still switching over to digital and to inter-platform competition.*

### ***1.1 Scope of the study***

The BBC welcomes Ofcom's very extensive work to identify spectrum that might be released and to ensure it is released but believes more could be made out of this wide-ranging analysis.

The Digital Dividend (DD) should not be looked at in isolation; it would be more efficient to consider together the DD and other spectrum bands (amounting to 660Mhz on top of the 128MHz of the DD) to be made available by Ofcom over the next few years. For instance, there is a strong desire, in the market, to have an overall view of the spectrum which is suitable for mobile television and will be released between 2007 and 2012, in order to make well-informed decisions on future plans in the UK and globally.

### ***1.2 Matching uses and spectrum available***

In the consultation document, Ofcom identified a number of potential uses of the DD spectrum:

- Digital Terrestrial Television (DTT) for a national market in standard definition (SD) and/or high definition (HD)
- Digital Terrestrial Television (DTT) for local markets
- Mobile television (DVB-H or other technologies)
- Wireless microphones (Programme Making and Special Events – PMSE)
- Broadband wireless applications (BWA)
- Mobile communications (3G)
- Low power applications
- Satellite communication services
- Public safety services

It is essential when looking at the main uses of the DD to consider which other bands might also be appropriate for a particular usage, and which services can only realistically use UHF. Alongside the DDR spectrum, during the same period, a further 660 MHz will be auctioned by Ofcom. Any remaining spectrum scarcity could best be solved by a more coherent approach to spectrum, which would also contribute to the spectrum efficiency which Ofcom is, quite rightly, so keen to promote.

- Terrestrial TV broadcasting is **the only service** for which UHF spectrum is the sole option. Though alternative platforms (satellite, cable and broadband internet) can also carry television, they are insufficient to deliver essential objectives: universality, free to view access, on all existing TV sets (including portables), using existing aerials and infrastructure. As no other country is planning to move terrestrial broadcasting outside UHF – or VHF –, it is also very unlikely television equipment specific to the UK would be developed at affordable prices for consumers.
- Digital TV for local markets can be accommodated efficiently in the interleaved spectrum (as happens in analogue) and/or on alternative localised platforms (internet).
- PMSE requirements could in theory be met by other bands. However, existing equipment is only able to operate over narrow tuning ranges in the UHF band. Its needs should continue to be met within interleaved spectrum, though this might not be sufficient if it is to be shared with other uses.
- For mobile TV, alternative frequency bands (in particular Band III, L band and 2.5 GHz) are available. Nevertheless, a coordinated planning approach would allow meeting the likely needs of both mobile and traditional terrestrial broadcasting.
- International coordination issues make it difficult to use UHF for 3G/4G mobile, and alternative frequency bands around 2.5GHz are more appropriate
- For BWA, there are again more attractive harmonised frequencies in higher bands and the most likely requirement for UHF spectrum is to meet demands in rural locations.
- To be of real value (and for equipment to be available and benefit from economies of scale), any licence exempt allocation will need to be internationally harmonised, which seems unlikely to occur on a European basis.
- The emergency services uses may be able to be met by other frequency bands (e.g. the Airwave network) where coexistence issues are much less likely to have any effect on the reliability of such services.

Use	Criterion	Alternative bands available	European Harmonisation	Equipment available for UHF	Impact of moves to other bands
	<b>Nation-wide Digital Terrestrial TV (DTT)</b>	No	Yes	Yes	Very High for consumers
	<b>Local DTT multiplexes</b>	No	Yes	Yes	Very High for consumers
	<b>PMSE</b>	Not currently. Can use interleaved – if in sufficient quantity- but already very constrained, and some are being cleared of PMSE uses	No	Yes	Medium cost
	<b>Mobile TV</b>	Yes but timing and cost issues	No - but allowed as a substitute for DVB-T	Yes	Higher network costs
	<b>3 and 4 G</b>	Yes	Need bilateral case by case agreement for uplink services		Higher network costs but greater spectrum availability
	<b>Broadband Wireless Access</b>	Yes	No	Not currently	Lower coverage
	<b>Licence exempt</b>	Yes	No	No	N/A
	<b>Emergency services</b>	Yes	No	No	Risk for reliability of services on UHF

The fact that (uniquely) non-UHF spectrum is not an effective substitute for terrestrial TV broadcasting in the UK means that great care must be taken in allowing access to this

spectrum for other uses to an extent which might prevent investment and innovation in the terrestrial TV platform, causing the platform to wither on the vine in the longer-term.

Well-managed technical planning of the 128MHz of DD spectrum has the advantage that it could both protect terrestrial broadcasting and accommodate a number of other uses (e.g. mobile TV), whilst alternative bands would be more appropriate for other usages, such as BWA or emergency services. In our response, we present scenarios demonstrating that multiple use of the spectrum is technically possible. A “reasoned approach” would look not only at this spectrum released at digital switchover, but more generally at all the spectrum bands that Ofcom plans to award in different auctions (660 MHz on top of the 128 MHz of the DD auctioned over the next two years). It is essential, when looking at the main uses of the DD spectrum, to consider which other bands might also be appropriate for such usage, and which services can only use the UHF spectrum.

We will thus also argue that, in this area, a completely service and technology neutral approach will not deliver the optimal outcome, because:

- The spectrum bands that are coming up for auction are not equally appropriate for all services or technologies.
- This would not be compatible with current European harmonization, and would therefore prevent gains from economies of scale for consumer equipment – the UK market alone might even be too small for manufacturers to invest in innovative products.
- In order to avoid harmful interference between services, some spectrum has to be sterilized (usually referred to as “guard bands”, the sizes of which vary according to the types of adjacent services). If there is no co-ordinated planning, these bands will have to be as large as needed for the use creating the highest level of interference, which is inefficient in spectrum usage terms. The co-adjacent channels planning criteria might also become very difficult to determine and control if channels are shared between several different uses.
- A “reasoned approach” would look not only at this spectrum released at digital switchover, but more generally at all the spectrum bands that Ofcom plans to award in different auctions. When looking at the main uses of the DD spectrum, it is important to consider which other bands might also be appropriate for such usage, and which services can only use the UHF spectrum.

A purely market-based auction in isolation will not address these issues. It is therefore far from certain that it will deliver the most efficient use of spectrum from a technical point of view in this case.

### ***1.3 Is terrestrial broadcasting an efficient use of UHF spectrum and what is its future?***

Efficiency must always be assessed against the objectives that are sought. In the case of terrestrial broadcasting, universality has always been – and continues to be within the DSO programme – a key Government objective. Increasing ‘efficiency’ through abandoning universality may appear an easy option but cannot be seen as a real efficiency gain unless it is accompanied by public agreement that universality is no longer a key objective for the terrestrial platform. Some of Ofcom’s analysis in the Digital Dividend Review (DDR) suggests that this might be their preferred approach to terrestrial broadcasting in the medium

term. But this is an issue which requires widespread political discussion and debate as well as a regulatory process around the DDR.

Some have argued that:

(1) terrestrial broadcasting is an “illegitimate” or “wasteful” use of the valuable UHF spectrum, as alternative delivery routes, satellite, cable or broadband distribution would be more efficient;

(2) in ten years, there will be a minimal need for traditional linear broadcasting, as the major part of the consumption of audiovisual content will be through a mix of on-demand downloads/streaming of entire programmes and short-forms via very high capacity fixed and mobile networks to devices with a high storage capacity;

(3) providing HD on DTT will only delay this necessary move, by leading consumers to continue to invest in a dying technology and recreating a legacy issue:

### 1.3.1

On the first point, we would maintain that the four arguments which informed Ofcom’s and Government’s decision to require PSBs to deliver full universal DTT coverage, are still valid; they were the following :

- Providing universal free to air coverage – at least for the PSB services
- Ensuring that all consumers get an enhanced experience from the new technology
- Using more spectrum in the first place, in order to generate, through the transition to digital, spectrum efficiency gains, allowing for spectrum to be released

Ensuring, through a managed strategy, that as new services become available, viewers are not deprived of their existing services.

**Universal free to air coverage.** It is because DTT is necessary to deliver universal access to television that Government and Ofcom required PSBs to convert all the existing analogue transmitters in order to extend DTT coverage to 98.5% of the UK population. Though satellite is very widely available, Ofcom predicts<sup>7</sup> that around 4 to 6% of the population has no access to satellite, for a variety of reasons (geographic, planning, restrictive covenants, etc...): only a mix of platforms, including terrestrial can deliver universal access. This applies to the case for additional SD as well as to HD services.

**Enhanced experience from the new technology for all.** Just as, at the end of the last millennium, digital television was the technology of the future, so HDTV is the new technology of the next decade. It is already a service which people want and value, and will be no more a premium service and a luxury than colour television was a few decades ago. By end January 2007, prices of HD screens had fallen by around 30% in the previous year, with around 3.8 m HD-ready television sets already sold in the UK; by 2010, UK HD-ready households<sup>8</sup> are forecast<sup>9</sup> to reach 11 m. This might well be an underestimate as HD is a service people need to see to be convinced. Once they can experience it, they appreciate the difference. (See below 1.7). Overall, research shows that 92 % rated improvement in picture quality at 8 out of 10, and 79% very strongly disagreed that there is only a small difference between HD and SD.<sup>10</sup>

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<sup>7</sup> Ofcom consultation of the digital replacement licences, regulatory impact assessment paragraph 182. 14/09/2004

<sup>8</sup> An HD-ready household has an HD-ready set but is not necessarily receiving an HD broadcast.

<sup>9</sup> ‘High Definition Television - Global uptake and assessment to 2010’, Screen Digest, March 2006

<sup>10</sup> HD DTT trial research, TNS, June-December 2006

**Improved spectrum efficiency** through a “Spend to Save” strategy. HD can also contribute to increased spectrum efficiency in the medium term. Whilst in the short term HD requires more bandwidth than SD, because its delivery requires the adoption of the more spectrum efficient technology called MPEG4<sup>11</sup>, it will drive a gradual adoption of receivers coping with this MPEG4 technology. Just as in order to release 112 MHz of valuable UHF spectrum by 2012, it was first necessary to use extra capacity to simulcast digital and analogue services from 1998, the launch of an attractive HDTV offer, using both existing and new capacity, will drive a managed migration to MPEG4. It will then become possible to migrate some or all of the SD services to MPEG4. This will therefore open up the prospect of greatly increased efficiency across the whole DTT platform, for HD as well as for SD services. If Ofcom allocates part of the released spectrum now to HDTV and MPEG4 broadcasting, it will greatly increase spectrum efficiency across the whole platform, and will be able to get back at least as much spectrum as allocated, in the mid-term (a 12 year licence period). This “Spend to save Strategy” is developed in our response to question 12.

**A managed strategy, protective of consumers:** ensuring that as new services become available, viewers are not deprived of their existing services. It might be possible, in theory to remove sufficient existing services from the current DTT offer to carry at least five HD channels in MPEG4, which is commonly recognised as the “critical mass” for a viable offer. But the cost in terms of lost existing MPEG2 services (many of the current services would need to be withdrawn) and of deterioration in their quality and diversity would be huge, imposing an unacceptable burden on consumers, whilst the majority of them have not yet acquired the necessary equipment. A more appropriate approach would be that used for the introduction of DTT in 1998, where rather than removing existing analogue channels or degrading their transmission quality, DTT services were introduced on new spectrum, as a complement rather than a substitute for the existing analogue channels.

The BBC believes these arguments are still as strong now as they were in September 2005, when Tessa Jowell announced the Government’s policy towards switchover. It will also argue that if there is no longer any policy imperative of ensuring the long-term sustainability of the DTT platform, then consumers should be told about this as soon as possible, both by Government, Ofcom and Digital UK, so that they can make well-informed purchase decisions as they get ready for switchover.

### 1.3.2

On the second point, the BBC does not share the belief that broadband distribution and on-demand access to content will, in the near future, entirely replace linear broadcasting via existing TV platforms. On-demand media reflects structural changes in the market and usage is likely to be substitutional rather than additive. However, modelling undertaken for the BBC’s i-Player Public Value Test suggests that on-demand will exist alongside linear broadcasting – which will remain the primary source of access to PSB for the majority of

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<sup>11</sup> MPEG: Moving Pictures Expert Group – the originators of the standards agreed by the ISO (International Standards Organisation) for encoding audio-visual information in a digitally compressed format. MPEG2 is the standard on which products such as digital television set-top boxes and DVDs are based. MPEG4 is a newer, more efficient standard. To make it simple, it will allow, over time, the same amount of information to be transmitted using 2/3 of the capacity which would be necessary with MPEG2 – and further improvements are expected. MPEG4 is a pre-requisite for transmission in HD: even if in theory, HD in MPEG2 is perfectly possible, not only would it require around 20-22 Mbps, that is close to a full multiplex for one service, but the existing MPEG2 boxes will not cope with the high resolution necessary for HD. Transmitting in MPEG2 has definitely no interest if it does not avoid the “box swap”.

viewers for the foreseeable future<sup>12</sup>. The analysis in Ofcom's Market Impact Assessment of BBC's i-Player is consistent with this overall conclusion. Though alternative platforms such as fixed and mobile broadband internet will increasingly offer video services, they are insufficient to deliver the objective of universal access to PSB, free at the point of delivery.

### 1.3.3

The response to the third point, that having HDTV on DTT will only delay this necessary move, by leading consumers to continue to invest in a dying technology and recreating a legacy issue flows from the rebuttal of the first two. DTT is not a dying platform – it is the most popular and fast-growing TV platform in the UK because it meets the needs of a significant proportion of the population. The success of Freeview, in terms of the rapid pace of consumer adoption, the increased demand for channel slots, and the recent decision by BSkyB to invest more heavily in DTT, all lend credence to this analysis.

However, the DDR provides a one-off opportunity to ensure that the DTT platform 1) keeps pace with increased consumer expectations and 2) delivers increased spectrum efficiency. The allocation of some DDR capacity for HD would deliver on both these objectives, for the reasons outlined above.

## ***1.4 Timing of the release of the digital dividend spectrum and of the auctions***

Ofcom is consulting on the timing of the auctions and of the release of the spectrum. In responding to this, four considerations should prevail:

- (a) the need to protect the switchover process and the DTT platform: it is not right to believe that the analogue frequencies to be cleared will all be fully available at the time of switch-off in any region because of the possible need for parking channels to enable the switchover process or to minimise interference into regions still to switch. Because of the uncertainties of the coverage forecasts, it would also be wise to allow multiplex operators, both PSBs and commercial, some flexibility.
- (b) An auction in 2008/9 will set the pattern of spectrum use until 2026/7 despite the rapid pace of technological progress and there being considerable uncertainty about the nature of demand. It is far from certain that the best way of dealing with uncertainty is to auction the entire DD spectrum for such long periods as proposed by Ofcom. It is extremely risky to trust any secondary market to 'sort things out' given that, once initial allocation has occurred, spectrum is in non-neutral hands: firms will have little incentive to sell to or trade with potential competitors. For nascent services and businesses, it might also be very difficult to assemble the "right" spectrum bands in a secondary market – especially where a critical mass might be needed to offer a viable scenario. Some rules allowing Ofcom to take back the spectrum under certain circumstances might be useful.
- (c) Operators will have to decide in 2008 their needs for spectrum, which will not be completely free or commercially viable across the UK until end 2012, or beginning 2013, therefore bearing high uncertainty costs.
- (d) On a specific issue, there might be value in allowing an early and separate release of channel 36, possibly alongside the auction of L-band. Whether or not such decision is made, it is essential that Ofcom makes it very clear, at the time of the L-band auction

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<sup>12</sup> The Trust's Public Value Assessment (PVA) forecast that the BBC's three new video on-demand services would account for 7% of all BBC TV consumption by 2011.

which spectrum will be potentially available for mobile television in the following few years. It would be helpful if Ofcom could also indicate what progress they have made in getting approval for a non-radar use of channel 36 from our neighbours?

These points are developed in our response to question 15.

### ***1.5 Regulation-intervention versus market mechanisms***

The BBC fundamentally disagrees with Ofcom's conclusion that a purely market-led approach would deliver, in this specific area, more benefits to citizens and consumers than a policy which permits carefully designed government intervention.

#### ***1.5.1 Spectrum regulation can often lead to positive outcomes.***

It is important to note that it is not a market approach, but an interventionist policy that has led to the development of key innovations such as digital television (and digital radio) and promoted the efficient use of spectrum, such as the release of this DD spectrum, while simultaneously promoting competition. We believe that this can continue to be the case, and that a well-thought out approach based on public policy objectives can both ensure efficient use of a public resource whilst promoting the interests of citizens and consumers.

#### ***1.5.2 Auctions can deliver sub-optimal outcomes***

This is particularly the case when demand is highly uncertain. For instance, the auction of spectrum for 3G services in 2000 resulted in bidders paying significantly more than the actual value of the spectrum.

#### ***1.5.3 Our position against auctions is a very specific one***

The BBC is not saying that no spectrum should be auctioned, but that there are good arguments to reserve, or allocate with a different mechanism, a portion of it.

In particular, the BBC has considered the prospects for developing mobile television, and is satisfied that, at this stage, the market mechanisms will allow PSBs to make their services available to viewers of the mobile platforms, whether through commercial deals, or through ownership of capacity bought on the market. Later, under certain circumstances, there could be a case for applying the existing "must carry" regulation to correct market failures. At this stage, we do not see the need for ex-ante intervention to enable the availability of public service content on mobile television platforms, but as we will show later, this is not the case for HD on the DTT platform.

### ***1.6 Social value is very difficult to estimate, particularly in advance, and hence extreme care needs to be taken in basing irreversible policy decisions on these estimates***

The BBC agrees with Ofcom that measuring the social value of any service is inherently difficult, in particular in advance of its deployment, for four main reasons.

- First, it is generally difficult to identify all the social benefits ('externalities') accruing from providing certain services. This is because, unlike private benefits, social benefits are not fully captured by service providers, but rather spread across a wide range of actors.
- Second, there may be a considerable time lag before certain benefits are realised.

- Third, even if the total social benefits can be identified, these may be difficult to quantify. Estimates of “value” are estimates of the *economic* value of goods or services produced by markets, and hence will be unable capture the value of non-market activity. How does one estimate the value of greater participation in democratic processes, greater cross-cultural understanding, or promotion of a positive image of the UK abroad?
- Fourth, consumers are likely to find it more difficult to assess the broader social value of new goods and services, of which they have no experience.

The BBC recognises the difficulties in quantifying these effects but these difficulties should not lead to dismiss the role they play. This should lead to a very cautious approach to early auctions in cases when social value can be identified, even if it is not easy to quantify.

### 1.7 The specific case of HD

This is clearly the case for HD, where there is both strong evidence of its value for consumers and clear likelihood that there might be market failures preventing the social value coming from its being universally available, free-to-air, on DTT to be realised.

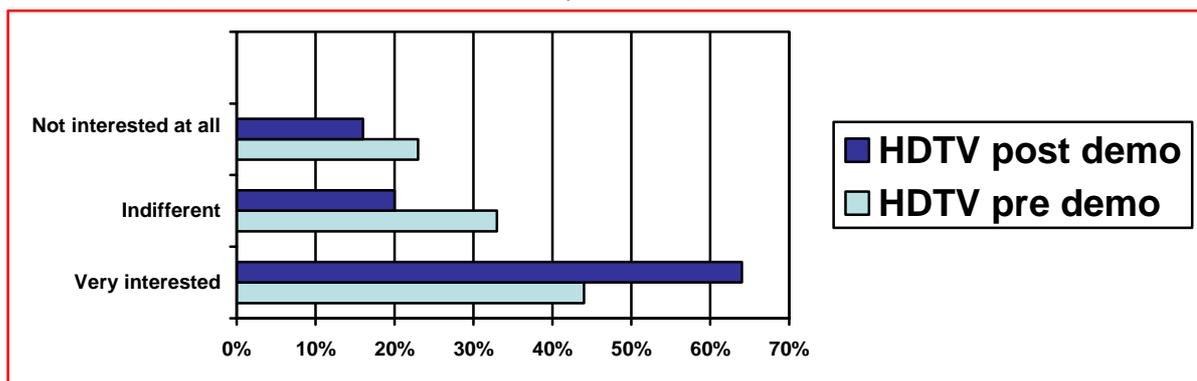
The response to question 5 will show that consumers want to receive the BBC services free-to-air, in DTT as well as other platforms. Amongst other evidence, BBC/ Gfk research conducted in the autumn 2006 found that, of those who were aware of HD,

**87% expected that the BBC would provide its content in HD in the future,**

**93% expected BBC HD content to be FTV (84% of all respondents) and**

**95% expected HD to be available on all digital platforms.** Deliberative research commissioned from Human Capital)<sup>13</sup> also shows that people are more interested by HD after it has been demonstrated to them, tending to demonstrate HD is an ‘experience good’.

Figure 1.1 (below) shows responses to two questions: “How interested would you be in being able to use HDTV services?” (before demonstration) and “Having seen it in action how interested would you be?” (post demonstration) (0 = not at all interested and 10 = very interested)



<sup>13</sup> Deliberative research on HD and spectrum allocation

- Focus: Assess audience views on the availability of HDTV by platform and the trade-offs between HD and other potential uses of the released DTT spectrum
- Recruitment methodology and selection criteria: 100 respondents in 5 groups held in M25 area, representative spread of gender, age and SEG.
- Research method: Extended group discussion with stimulus.
- Deliverables: Report delivered in July 2006.
- Research agency: Human Capital

As an ‘experience good’, the value of HD is very difficult to assess through descriptions, especially when significant aspects, such as size and price, are changing very rapidly. As will be demonstrated later, HD on DTT is not a "premium" service, but rather has substantial social value, beyond its private value, and hence needs to be available universally at reasonable cost. Indeed, it is likely that (had it been in existence at the time), if Ofcom had undertaken similar analysis several decades ago, it would have concluded that there is little social value associated with moving from black-and-white to colour television. It is also very important to stress that the people who currently buy HD-ready sets are not only the “technology-savvy”, early adopters or the wealthiest groups. They are just everybody. The current trend (see figure 5.4.5) still shows a slight over representation of the AB social group and under representation of the DE group but this is already changing as prices fall.

The BBC will also develop arguments – outlined in 1.3.1. – why there is very strong social value in having HD, free-to-air, on DTT, in order to sustain the DTT platform as a competitive and attractive offer. The BBC understands that Ofcom can only intervene when the social value of a service cannot be fully captured by its private value, and when this would lead to significant market failures. It is the Corporation’s view that we are in such a situation: consumer and broader social value will be impacted negatively if sufficient capacity is not made available for HD on the DTT platform. Indepen estimates this loss could range from £5.4bn to 15.6bn.

This response will also explain that precisely because of difficulties and uncertainties related to the calculation of social value, and because auctions lead to irreversible outcomes (see 1.8.5), a decision to proceed with a market based auction in 2008 should be taken with great caution.

The BBC would therefore argue that there is already a strong rationale for intervention, but that, at the least, there is already enough evidence of a risk of market failure to lead to consider the precautionary principle and to reserve part of the spectrum for future decisions.

### ***1.8 Ofcom can and should intervene in spectrum matters under certain circumstances***

The BBC will argue that there are very strong economic arguments, which could lead Ofcom to intervene. There are also very strong grounds to justify an intervention to protect citizens’ interest. If, however, Ofcom felt that this is more a matter for Government than for regulatory intervention, the BBC will stress that Government can and should do so where there are such issues of great public interest. Indeed, it is precisely to deal with such cases that Parliament introduced powers of direction for spectrum matters.<sup>14</sup> The BBC believes that in the case of the DDR, where there are issues of public interest that could not be addressed through a pure market mechanism, it would be perfectly legitimate for Ofcom to intervene. Indeed, if Ofcom did not take suitable action, it would be necessary for Government to use

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<sup>14</sup> Cf Joint Committee on Draft Communications Bill Report 1 79. “Patricia Hewitt reaffirmed the importance of strategic decisions on spectrum use, including those relating to analogue switch-off, being taken by Ministers. With regard to Professor Cave’s concerns, she drew attention to “the difficulty in drawing a dividing line between strategic and specific issues. There is a wider public interest in the allocation, assignment and management of spectrum that Ofcom, even with its duty to further the interests of all citizens in its optimal use, may not be best placed to judge.”

such powers to protect the interests of consumers and ensure the successful implementation of digital switchover (DSO) and the long-term future viability of the DTT platform.

Ofcom argues that using spectrum as a policy instrument is no longer appropriate on the basis that it would...

1. distort incentives to use spectrum in the most efficient way
2. reduce flexibility
3. risk distorting competition
4. risk reducing innovation
5. risk getting it wrong

The BBC disagrees with each of these points in this case, for the reasons developed below:

#### 1.8.1 ...Distort incentives to use spectrum in the most efficient way:

This is not the case for the PSBs, and in particular for the BBC, as they have alternative but equally strong incentives towards efficiency:

- If PSBs are allocated spectrum, they will have every incentive to make the best use of it; the price of spectrum is only a part of the overall cost of terrestrial transmission, as broadcasters would also have to pay the high costs of bringing services to the whole population. It would be in their direct financial interest to implement technological changes, which would allow capacity efficiency gains.
- Even with an extra mux, DTT spectrum will remain very scarce and broadcasters will continue to have to review constantly - and improve wherever possible – how they use spectrum in order to meet their increasing demands.
- The broadcasters have a financial incentive to sublease any unused capacity, and in the case of the BBC, are subject to both (a) the Trust's control, and (b) Secretary of State's power to allocate some of the BBC's capacity to other public service broadcasters.
- In the case of the BBC, any new service will have to undergo a full public value test, and
- the Trust has a duty to ensure that the BBC makes the most efficient use of its spectrum.
- In the "Spend to Save" strategy proposed (see section 5.6.4), PSBs would be committed to drive a migration to MPEG4, and therefore generate very significant efficiency gains.

#### 1.8.2 ....Reduce flexibility

The BBC argues that a market-based allocation would in fact reduce flexibility to a much wider extent than a well-designed spectrum plan, because:

(a) under a completely neutral framework, there could be a need to plan for guard bands of 10 MHz or more to avoid interference between uplinks and broadcasting applications using nearby adjacent channels, which would mean a suboptimal use of spectrum.

(b) In the absence of such guard bands and of a fully co-ordinated frequency plan for adjacent, unaligned services, the Spectrum Usage Rights necessary to ensure adequate protection of existing services are likely to need to be so onerous that the cost of implementation of new services would be too high and/or the coverage achieved would be unacceptably constrained. Co-ordination in the frequency plan e.g. by sharing transmission sites would significantly reduce these problems and increase the efficiency of spectrum usage, and therefore the value that can be extracted from the use of the spectrum.

(c) Market based spectrum allocation may be difficult to reverse because the (secondary) trading environment is likely to be thin and potential sellers of spectrum may therefore "hold out" for a strategic gain..

(d) On the contrary, spectrum allocated by a regulator to meet certain public policy objectives could always be taken back either if the objectives were no longer deemed necessary or if there were better ways of achieving them.

### 1.8.3 ...Risk distorting competition

All intervention in the allocation of spectrum poses this risk, but equally the largest intervention to date has been the move to digital switchover (DSO), which, as pointed out above, is on course to generate substantial benefits to the UK, including increased competition.

Adopting a purely market-based approach to allocating spectrum, on the other hand, is likely to have a detrimental effect on competition in the digital television market. This is because either PSBs will be outbid at auction and hence unable to invest in the terrestrial TV platform in the short- to medium-term (as they are unable to access additional UHF capacity that they need short-term access to), or, in the unlikely case that they prevail, the costs of obtaining access will prevent them from investing significantly in the platform. Either way, the ability of the terrestrial TV platform to compete will be substantially reduced.

Allocating more spectrum to the DTT platform will ensure it continues to compete effectively with other platforms that have already benefited from the spectrum released on those platforms by switching off their analogue services and creating the possibility of providing enhanced services.

The impact of DTT on competition in the provision of digital TV services has been assessed at a high level by Ofcom who found that Freeview has had a beneficial impact on competition in the relevant markets by expanding the number of ways of accessing channels, which include:

- Placing a competitive constraint on the Sky platform, as is evidenced by Sky's decision to set up a free-to-view satellite service
- Placing a competitive constraint on suppliers of pay-TV packages by offering an alternative way for consumers to access thematic channels. Top-up TV provides direct competition to basic tier pay-TV packages on cable and satellite.

This assessment was undertaken in 2004, when adoption of DTT was much lower, and the number and range of services offered more constrained, than at present. It would seem likely that DTT now offers even stronger competitive benefits than in 2004.

In the short to medium term, platform competition for HD is likely to be mainly provided by satellite transmission and some cable and broadband services. Allocation of spectrum for PSB HD on DTT would serve to promote competition in what might otherwise be a highly concentrated market, and would also help sustain the DTT platform and thereby provide competition in SD television.

Ofcom states that the fact that viewers switch platforms is unlikely to result in a net loss of efficiency. However, consumers switching from DTT will need to pay more than they did previously. The price will be greater to the extent to which DTT becomes less competitive over time.

Ofcom says there is no evidence that the DTT platform would be less able to deliver PSB content universally: but, as will be shown later, without extra capacity, PSB content in

HD will be very limited, restricted to what can be done within the existing capacity, i.e. a very weak offer, unlikely to be sustainable. These points are developed in sections 5.7 and 5.8.

#### 1.8.4 ....Risk reducing innovation

The BBC and other PSBs have helped generate continuous innovation despite being allocated spectrum; digital switchover (DSO) would not have been enabled without these developments. Here are some examples:

- Improvements in coding efficiency
- Development of digital text services to replace analogue Teletext
- Development of greater visibility digital subtitles
- Development of bandwidth-efficient audio description services
- Signalling systems, which greatly enhance the consumer, experience of digital recorders, such as the provision of content for a seven day Electronic Programme Guide (EPG) and to support accurate recording of content
- Improvements to the interactive middleware (MHEG 1.06) to give a more consistent user experience

On the other hand, a high price paid in spectrum auctions could limit winners' ability to innovate and require them to continue with existing technologies until they achieve a sufficient return on investment.

Another consideration is that should HD on DTT be only a premium pay service, using conditional access and proprietary systems, there would be very limited scope for technical innovation benefiting every consumer. In practice, there would be very little prospect of ever getting a managed migration to MPEG4 for the standard free television services, and that would be the end of spectrum efficiency gains.

All these innovations happened in an open market and benefited all consumers and all parts of the industry. Restricting the ability to innovate to proprietary systems would be counterproductive and risks recreating on the DTT platform the anomalous situation which exists today on satellite in the UK.

#### 1.8.5 ...Risk getting it wrong

At a time when the risk of a divide linked to inequitable access to communications has never been as high, the BBC agrees with Ofcom that very strong consideration must be given to potential consequences of any actions.

There is indeed some uncertainty as to the social value associated with HDTV services, but any wrong decisions are much more likely to be set in stone if spectrum is awarded through pure market mechanisms than allocated through carefully designed public policy mechanisms.

This is because auctions are largely irreversible, for the following reasons:

- First, a market based spectrum allocation may be difficult to reverse because the (secondary) trading environment is likely to be thin and potential sellers of spectrum may therefore "hold out" for a strategic gain<sup>15</sup>. As stated above, Ofcom noted in the spectrum

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<sup>15</sup> Under particular assumptions, it has been demonstrated that 25 per cent of otherwise efficient trades would be foregone under a bilateral setting. An administrative approach would not overcome this source of inefficiency, since the same

trading consultation<sup>16</sup> that markets may be thin and that trading alone may be insufficient to ensure the greatest efficiency of spectrum use<sup>17</sup>. In addition, once initial allocation has occurred, spectrum is in non-neutral hands: firms will have little incentive to sell to or trade with potential competitors.

- Second, once the released spectrum is awarded, investors will begin to sink capital into developing and marketing the associated services and would expect to recoup this investment plus the price they paid for the spectrum as soon as possible. The cost of reversing the decision therefore rises over time. Regulatory reversal also creates substantial uncertainty, increasing the costs associated with investment and hence reducing the amount of investment that will occur, to the detriment of the UK economy.

- Third, spectrum is also likely to have been packaged for the original allocation in ways that are not necessarily ideal for alternative applications. Repackaging could involve substantial transaction costs and take some time, if it happens at all.

- Fourth, there are likely to be financial and institutional constraints (for example, “State Aid” rules) on funding the re-purchase of spectrum that has already been allocated by auction.

The BBC is therefore urging that, if neither Ofcom nor Government wish to make a decision now on the allocation of spectrum to public service broadcasters, they should at least keep all options open. Auctioning off the whole released spectrum at the end of 2008, as proposed by Ofcom, forecloses options and is not the best way of dealing with the current high level of uncertainty. At least, one third of it (5 or 6 frequency channels, the amount required for one DTT multiplex) should be kept in reserve until there is more certainty and a decision can be made.

#### 1.8.6 ...Risk of “hiding” the level of public support given to PSBs

Another argument used by Ofcom is that gifting spectrum does not allow public authorities and citizens to take full responsibility, as they are unaware of the value of what is being allocated. It is at best a non-transparent, possibly a disguised public aid.

The BBC fully understands this point and believes it would be appropriate for Ofcom to calculate the value of the spectrum allocated to public service broadcasting and report it to Government for publication. Such a measure would ensure transparency and give the necessary information in order to calculate the total support given to PSB.

### ***1.9 The BBC therefore argues that spectrum should be allocated to PSBs for broadcasting their services in HD on the DTT platform.***

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information asymmetries would arise. See: Robert B Myerson and Mark A Satterthwaite. 1983, “Efficient mechanisms for bilateral trading”. *Journal of Economic Theory*, 28:265—281.

<sup>16</sup> Spectrum trading consultation, Ofcom xxx

<sup>17</sup> Ofcom. November 2003. “Spectrum trading consultation.” Paragraph 8.6.4.

[http://www.Ofcom.org.uk/consult/condocs/spec\\_trad/spectrum\\_trading/pdf\\_version.pdf](http://www.Ofcom.org.uk/consult/condocs/spec_trad/spectrum_trading/pdf_version.pdf) . This point was also used to justify applying AIP to broadcasting in “Future pricing of spectrum used for terrestrial broadcasting”, Ofcom, July 2006.

As developed above, the policy chosen by Government to implement DSO has been such as to deliver the following four benefits:

- improved spectrum efficiency from the transition to digital
- ensuring that consumers get an enhanced experience from the new technology
- universal free to air coverage – at least for the PSB services
- a managed transition – to ensure that, as new services become available, existing viewers are not deprived of their existing services

We believe the same principles should apply to the next generation of digital technology – HD – which, if managed in the right way, can deliver those same benefits:

- through the gradual adoption of MPEG4 receivers, the prospect of greatly increased efficiency on the DTT platform,
- the move to improved functionality with clearer pictures
- ensuring that new HD viewers have free-to-air access to the PSB channels
- a managed transition – to ensure that existing viewers, using MPEG2 receivers are not deprived of access to their existing services.

Only through the allocation of some additional capacity is HD likely to happen on the DTT platform and happen in a way that meets these principles. A deliberate policy decision to allocate sufficient spectrum to allow for a critical mass of HD services would both help kick start the market for MPEG4 receivers, which is the precondition for HD becoming widespread on DTT, and allow for a managed transition to the new format, while not depriving viewers of existing services or degrading the quality of those existing services. In time, such a managed transition will open up the possibility of a widespread conversion to MPEG4 receivers that will deliver much greater spectrum efficiency than is possible today.

In order to develop a free-to-air HD offer which delivers universal access to all the PSBs, and represents the minimum “critical mass”, up to two multiplexes are necessary. This would help continue to give to all viewers the same level of service as now, maintain the competitiveness of the DTT platform over time, and drive the switch to MPEG4 receivers.

This approach would be completely consistent with the transition to DTT, where rather than removing existing analogue channels or degrading their transmission quality, DTT was introduced on new spectrum, interleaved within the frequencies used for analogue.

So, a strong HD offer would require up to 2/3 of the DD in the short-term, but would create a very good consumer proposition, and a strong incentive for consumers to buy MPEG4 boxes. It would be followed by a period when the SD service could also move to MPEG4, thereby releasing capacity over the medium- to longer-term.

We recognise however that building two multiplexes with universal coverage level could be very costly, both in terms of spectrum use and transmission costs for the PSBs.

One alternative option would be to allocate only one multiplex for HD broadcasting. The offer would not be so strong, and there would be hard choices to decide which 3 channels would benefit from HD transmission.

However, these three HD channels on additional capacity could represent a sufficient offer for the first years; then, as MPEG4 technology improves and the number of viewers equipped with MPEG4 compatible sets increases, up to two additional HD services, on a part-time basis first, might be transmitted on the existing multiplexes.

This managed transition could work whilst the option of squeezing two HD services now onto the existing multiplexes, without any extra offer, does not appear realistic. Of course, it might be possible, in theory, to squeeze two - or even more- HD channels into existing capacity; but it would require taking down many existing services and degrading the picture quality of some other channels. Clearly, the costs for consumers would be unacceptably high, and the implementation of the principles underpinning DTT policy objectives, severely compromised. First, the new HD services might not even have universal coverage if they could not be carried on the PSB muxes. Additionally, at the start of the service, only the small - though increasing - number of fully HD-MPEG4 viewers would be able to watch these two channels, whilst the vast majority of viewers with the existing MPEG 2 receivers will lose services and get worse reception than before.

Therefore, to ensure all consumers are protected whilst organising the UK's move to more efficient and improved technology, one multiplex (at least, and preferably two, should be allocated for HD transmission (i.e. either 1/3 or 2/3 of the frequency channels of the DD).

It would be reasonable to expect specific commitments in return, such as:

- Coverage obligations / using the existing network, with the exact figure dependent on the exact set of frequencies allocated and international negotiations
- Use of the MPEG4 standard on new multiplexes to develop free to air HD services
- Close collaboration with the industry to promote the adoption of dual MPEG2-MPEG4 technology in all new DTT receiving equipment
- Inclusion of relevant messages about HD in their own and Digital UK's switchover information campaigns as part of their current obligations
- The managed migration of their SD channels to MPEG4 on existing multiplexes in order to generate, over a licence term period improved spectrum efficiency ; the spectrum "loaned" will be given back and the use of the six terrestrial multiplexes made much more efficient.

### ***1.10 Spectrum allocation for PMSE***

The BBC welcomes Ofcom's willingness to protect PMSE, a vital component of the entertainment industry, and believes long-term solutions should be found, beyond switchover.

The BBC would also like to insist on the absolute need of ensuring enough spectrum for PMSE is made available during the Olympic and Paralympic games in 2012. The BBC also understands that the UK is committed to making the spectrum available free of charge, and is seeking reassurance on both points.

This is developed in the response to questions 6 and 7.

### ***1.11 Spectrum allocation for mobile television***

The BBC believes that the mobile platform will be an important means of engaging with audiences in the future, particularly those who are currently hardest to serve by Public Service Broadcasting, such as young people. It also potentially offers new ways of engaging

audiences, such as providing them with immediate, personalised, location-specific news and information.

The BBC agrees that spectrum should be auctioned in a way that is suitable for mobile television but urges Ofcom to consider the timing of the different spectrum auctions that are relevant for mobile television. The BBC would prefer these auctions to happen simultaneously – in particular L-Band and Channel 36, and in any case, would like Ofcom to set out auction rules that maximise the likelihood that a competitive market for mobile media services emerges.

Whilst the BBC believes that, at this stage, market mechanisms will allow PSBs to make their services available to mobile platform viewers, there could be a case later, if the market were to evolve towards a monopoly, or if the PSBs were not able to negotiate FRND deals on a key platform, for applying the existing “must carry” regulation to correct market failures.

This is developed in the response to question 11.

### ***1.12 Auction rules***

The BBC has outlined earlier why it believes at least one third of the DD spectrum should not be auctioned but allocated to PSBs to develop free-to-air HD services on DD>. However, if and where auctions are used, the BBC strongly agrees that some rules are necessary to ensure fair play and welcomes Ofcom’s willingness to consider what might be done.

Beyond promoting “fair play”, it is essential to ensure that the outcome of the DDR promotes and does not reduce competition. The BBC would welcome a detailed explanation of how Ofcom plans to promote competition and guard against speculative behaviour and anti-competitive hoarding.

At this stage, the BBC has doubts as to whether the auction promotes effective competition, and is concerned that the auction may actually help operators create or reinforce a dominant position.

The BBC is also concerned that some operators might decide to bid for spectrum only to prevent potential competitors from using it, and would therefore prefer “use it or lose it” rules to be set out. The BBC is aware of Ofcom’s reservations on the practical implementation of such rules. However, it should be possible for the spectrum regulator to determine whether an operator is effectively using spectrum or just “hoarding” it. Having backstop powers in place will help ensure that auction winners effectively use their spectrum: like all backstop powers, their existence is as effective as their implementation, if not more. We see no reason why Ofcom should not give itself such powers.

### ***1.13 Usage rights and obligations***

Technology neutrality does not mean the absence of all technical constraints: in particular, the licences should contain technical conditions preventing interference with existing services and existing receivers.

This is developed in the response to question 2, 3 and 19.

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*The BBC welcomes Ofcom's consultation and is very grateful to its staff for the extensive work and efforts put in the Digital Dividend Review. This is a unique opportunity to shape the communications landscape for the next decades. As such, it should be the subject of very thorough analysis and detailed planning, but it should not be limited to a technical debate. Above all, there should be an extensive public debate on the future of communications in the UK: how to ensure that the Digital Dividend, which has been made possible by the efforts and investments of every citizen, benefits all of them, through new and better services, and through a competitive Communications economy.*

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

*The BBC broadly agrees with the analysis of the constraints, but would like (a) to stress some uncertainties related to international decisions of spectrum use, and to understand how Ofcom proposes to negotiate with neighbouring countries to get approval for its plans, and (b) to comment on the level of protection necessary for existing DTT services.*

### 2.1 International constraints

The BBC is aware of the work undertaken by the European Commission on the reuse of the digital dividend and its possible impact on future decisions by national administrations. In particular, the BBC has responded to the draft consultation of the Radio Policy Spectrum Group (RPSG) on the matter. Two of the points the BBC made in this response are relevant here:

- There is a proposal to promulgate decisions, which would not be binding for Member States) to make one or two layers available for high field strength downlink services in a sub-band of the UHF band, and for use by fixed/mobile services (including uplinks) in a sub-band of the UHF band. The determination of such bands might be very difficult, as part of this spectrum is already used in some countries, and therefore would require a very complex and lengthy re-planning task.

- The BBC also drew the RPSG's attention to the risk of interference from fixed/mobile applications (including uplinks), which the RPSG considers could be non-broadcasting candidates for the digital dividend in the UHF band. The BBC strongly supports the EBU point that compatibility studies between the broadcasting service and the fixed/mobile services (including uplinks) should be carried out to assess the feasibility of sharing the bands, and emphasises the need to protect broadcasting services from harmful interference. The need for adequate protection is paramount given the rapid failure characteristic of digital broadcast reception.

The BBC would also appreciate some information on Ofcom's plans and timetable to negotiate any necessary agreements with neighbouring countries. The BBC understands that access to spectrum will be **on a UK wide basis subject to the GE-06 agreement. However, as GE-06 assigns spectrum 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 require coordination.**

On the specific issue of the use of UHF for 3G or 4G-type services, the BBC would also like to understand how and when Ofcom plans to negotiate with neighbouring countries for approval for uplink services in the UHF band. Though the Geneva RRC O6 agreement does not prevent the use of the UHF band for mobile communications, it does not give any right to it: such uses must be negotiated on a case-by-case basis with neighbouring countries.

Have these coordination negotiations begun, and are there good prospects of getting agreement in time for the auction?

## 2.2 *Domestic constraints*

The BBC welcomes Ofcom's emphasis on protecting existing DTT services, but is still concerned that the right processes need to be in place to ensure that existing DTT services are adequately protected from services using the cleared spectrum.

The BBC would like to make the following comments on Ofcom's interference minimising strategies set out in paragraph 3.47 of their consultation:

1. Appropriate siting of new transmitters can reduce adjacent and multi-adjacent channel interference between new services and existing DTT. However, the BBC does not believe that the proposed separation of 600m between the interfering transmitter and population centres will necessarily guarantee protection. Each situation will need a case-by-case response, through a coordinated planning approach. In addition, the BBC agrees with Ofcom's analysis that mobile handsets are particularly problematic and that this may rule out many bidirectional uses of the spectrum. Indeed, maintaining the proposed 300m separation for mobile handsets may be insufficient as well as impractical for any genuine service requiring such uplinks.
2. Building "remedial transmitters" to repair the holes punched in existing DTT multiplexes will be very expensive, potentially so costly as to make uses which require such remedies entirely cost-ineffective.
3. The use of guard bands may well be effective in minimising interference, but it is spectrally very inefficient.

All these interference issues point very strongly to the ongoing need for a coordinated planning approach to the future use of UHF spectrum, as the best way to ensure maximum efficiency in spectrum usage and minimise interference. This coordination could be done by industry, but Ofcom needs to consider if it has a role to play.

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

*The BBC is very grateful for Ofcom's extensive work on these technical but essential issues, which largely confirms and reinforces initial BBC studies. The BBC therefore broadly agrees with the analysis and results of the studies summarised in annex 10, but would like to develop five points.*

(a) It strongly agrees with the recommendation to use both upper and lower sub-bands of released spectrum to support additional DVB-T (HD).

(b) As explained in 2.2, the BBC believes "hole-punching" is a significant issue worth further consideration. Experience from the deployment of DAB shows that such effect can also occur with 2nd and 3rd adjacent channels. "Hole-punching" can best be minimised by a co-ordinated planning approach and the BBC would argue that this should be the responsibility of a single broadcasting planning group.

Strategies that can be used in spectrum planning to minimise the effects of "hole punching" include:

1. Co-siting transmitters
2. Avoiding siting non co-sited transmitters in major population centres
3. Mitigating the effects of non co-sited transmitters in major population centres by the use of remedial repeaters
4. Controlling specifications of receivers to improve their performance in rejecting adjacent and multi adjacent channel interference. This requires an industry group to work together to agree realistic and achievable receiver performances and to plan networks accordingly, to an overall co-ordinated plan which takes account of the receiver performances for the different types of coexisting services. In order to do so, the industry needs prior clarity on the different types of service that have to coexist in adjacent blocks. Ofcom may have a role to play in this process.

(c) The LS Telecom study, which looked at the potential use of the interleaved spectrum, could not use (for intellectual property reasons) the UK Planning Model. Though their overall conclusion on a limited availability of interleaved low power muxes seems right, it might be necessary for the BBC, Arqiva and NGW – who jointly own the model's rights – to run the UKPM, before allocating any interleaved spectrum packages, in order to prevent potential negative impact of extra high and low capacity multiplexes on the coverage of the existing multiplexes.

(d) The BBC has more doubts about the findings of the Sagentia study on PMSE services in interleaved spectrum. In particular, it would like to stress that the move to different analogue or digital radio microphones and talkback equipment is not as straight forward as suggested by Sagentia, because initial European and UK studies of such equipment have not come up with any agreed practical specifications, nor have any practical implementations of such equipment ever been demonstrated. The potential benefits for the UK industry are at this stage purely speculative. However, on another point, the BBC fully

agrees that better management would enable more needs to be met, and is therefore in favour of retaining the principle of a band manager.

(e) On the issue of guard bands, the BBC would like more clarity from Ofcom in advance of any auction, on who will “pay” their opportunity cost, and on who will decide their size and location, and how.

**4 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?**

*The BBC broadly agrees with Ofcom's assessment of the potential uses of the spectrum. However, it would like to summarise here a few points, which are developed elsewhere in the document.*

1. Digital terrestrial broadcasting is unique in that it can only use UHF, as explained in our response to question 1 (1.2)

2. The BBC understands that there are serious doubts about the use of the UHF spectrum for wireless broadband or other bi-directional services, and would welcome more information from Ofcom on this point.

3. The BBC has examined the international assignments at each site and concluded that six channels would be necessary for one DTT multiplex with quasi-universal coverage. However, two DTT multiplexes would only need ten channels, because significant efficiency gains could be generated by sharing frequencies throughout the UK. This model would also produce significant amounts of interleaved spectrum which could be used by other services such as local television services and PMSE. This study is summarised in the note inserted before the responses to questions 10, 11 and 12.

**5 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?**

*The BBC recognises that the choice between a market-led approach and an interventionist one must be very carefully balanced by Ofcom in the light of its statutory duties, but argues that there is strong evidence of a potential market failure, related to the availability of HD services on DTT and to the sustainability of the DTT platform which should lead to some tightly focused intervention.*

**5.1 Application by Ofcom of its statutory duties**

The BBC recognises that Ofcom has a wide range of duties, sometimes concurrent, and that finding the balance between those is not easy, and often a matter of interpretation. The BBC however wonders whether, in this case, Ofcom has found the right equilibrium and in particular, has taken full account of:

- (a) the risks for competition
- (b) the risks for consumers
- (c) the risks for Public Service Broadcasting.

**5.1.1 The risks for competition**

Ofcom claims that there is not clear evidence that auctions might lead to reduced competition. The BBC argues that this will be the case: as recognised by Ofcom, competition between platforms is essential. DTT is now a competitive and attractive platform but must continue to develop at the same pace as satellite and cable, including through the launch of HD services, if it wants to remain so. For the reasons developed in 5.2, PSBs will struggle to develop free to-air universal HD services on DTT unless they are allocated spectrum.

The impact of DTT on competition in the provision of digital TV services has been assessed at a high level by Ofcom who found that Freeview has had a beneficial impact on competition in the relevant markets by expanding the number of ways of accessing channels, which include:

- Placing a competitive constraint on the Sky platform, for instance, leading Sky to set up a free-to-view satellite service.
- Placing a competitive constraint on suppliers of pay-TV packages by offering an alternative way for consumers to access thematic channels. Top-up TV provides direct competition to basic tier pay-TV packages on cable and satellite.

This assessment, which was undertaken in 2004, is still valid today. The existence of a strong DTT platform reinforces competition and innovation in the television sector and should continue: just as other platforms do, DTT must provide HD services. It could for example be argued that were HD not to become available on DTT, Sky would be able to restrict the satellite HD services to those on subscription where it does not currently face effective competition from cable.

The BBC agrees that, generally, any intervention in the market must be thoroughly analysed to ensure the benefits outweigh the disadvantages. All intervention in the allocation

of spectrum poses some risk, but equally the largest intervention to date has been the move to digital switchover (DSO), which as pointed out above, is on course to generate substantial benefits to the UK, including increased competition. At the same time, as set out by Ofcom, the potential risks/benefits of non-intervention (the “wait and see” approach) must be assessed, in particular in a context when there is both uncertainty on the future and little prospect that the decisions taken now could be easily reversed.

#### 5.1.2 The risk for consumers

Ofcom states that viewers switching platforms is unlikely to result in a net loss of efficiency. The BBC disagrees with this analysis, and argues that there will be a significant loss of efficiency arising from the fact that some viewers will be forced to switch platforms, and pay more than they would have done on a voluntary basis. There is a loss of net efficiency in the fact that there would be extra compulsory costs for consumers for no extra benefit to them. The BBC would like to know whether Ofcom has done any cost-benefit analysis of this forced migration, and, if so, when they will publish the results.

#### 5.1.3 The risks for the fulfilment of the purposes of PSB in the UK

Above and beyond the value to individuals, Ofcom also recognises that universal access to television services has very clear citizen value; however they claim that; even if no more spectrum were available, there is no evidence that the DTT platform would be less able to deliver PSB content universally. The BBC will however argue that, without additional spectrum, it will have either to take down some of its existing services or to degrade their technical quality in order to show some content in HD. In any case, this will be very limited – a few hours a day-, might constitute too weak an offer to generate take-up of the necessary equipment, and might be unsustainable.

Therefore the BBC argues that there is a risk that the PSBs cannot secure the spectrum they need through auctions; and if they cannot achieve universality, they will not be able to deliver on their obligations. The BBC believes this is one of the cases where Ofcom should develop what it calls a “Citizen related policy”, defined as “changing the outcome delivered by the market in order to meet a broader social, cultural or economic objective or interest.”

#### 5.1.4 Should Government use its power of direction?

Whilst the BBC believes that Ofcom has the power, under its general duties to reserve spectrum for PSB, it understands the regulator might feel obliged to leave this decision with Government. This is a case where Government’s use of its powers of direction for spectrum matters would be perfectly legitimate and appropriate.

### ***5.2 Comparison of a market-led approach with an interventionist approach***

According to Ofcom, market mechanisms will

- promote efficient use of the radio spectrum by allowing it to be transferred to and used by the user who values it most highly

- promote competition by increasing the availability of spectrum for use in the most valuable services
- facilitate economically valuable innovation as new providers enter the market to offer new services.

These are the benefits usually expected by the application of market mechanisms, and the BBC agrees that they are very likely to be achieved by spectrum auctions as far, for instance, as mobile communications are concerned. But the BBC thinks there are serious grounds to believe this will not be the case for the development of HD on the DTT platform.

First, even if free-to-air HDTV is the use which brings the highest total value, including private and social values, there is a strong risk it is not the one which is able to generate the highest bid in an auction. This is because of the specific situation of public service broadcasters. The BBC, which has a fixed income from the licence fee cannot bid as much as would be necessary to reflect the full extent of consumers' and citizens' benefits, as it would get no extra funding associated to these extra benefits, and the BBC cannot recoup auction costs and cannot even borrow as much it would need (because of its borrowing limit). A similar argument applies for advertising-funded broadcasters, as there is no direct relationship between the willingness to pay of advertisers and the total consumer and citizen value generated by the programmes distributed in a given amount of spectrum. Public service broadcasters would also have to bear the very significant cost of a new transmission network delivering quasi-universal coverage, which could be in the region of £50 million a year. A provider looking to deliver a subscription HD package to up to some 80-90% of the UK population will therefore be able to pay far more in an auction than a free-to-air HD or SD broadcaster.

Second, it is far from certain that the proposed auctions will generate increased competition in the provision of television services, unless sufficient rules are set out before the auction, whether to limit the ability of some bidders to enter the auction, to restrict the number of packages anyone bidder could apply to, or to impose some licence conditions.

Third, if prices paid in auctions are too high, innovation could be hampered rather than facilitated: the "winner's curse" might prohibit the highest bidder to invest in better technologies or in this case, in high-quality content.

These points are developed in the section below. The BBC would also like to stress that the relevant question is not whether a market-led approach is perfectly efficient (i.e. if it leaves room for any market failure), but whether it is better than the alternative of an interventionist approach. The strategic choice between a market-led approach and an interventionist approach can be characterised as the question of whether the chance of market failure or regulatory failure is likely to be greater.

### ***5.3 Evidence for a market failure***

Ofcom, in its previous document on the Digital Dividend Review (DDR) had acknowledged that a market allocation process may not be optimal<sup>18</sup>. *"This aspect of the*

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<sup>18</sup> Ofcom. January 2006. "Terms of reference for the Digital Dividend Review." [http://www.Ofcom.org.uk/radiocomms/ddr/documents/ddr\\_tor/ddrtor.pdf](http://www.Ofcom.org.uk/radiocomms/ddr/documents/ddr_tor/ddrtor.pdf)

*study will include the assessment of the strength of evidence for possible market failures, research into the different forms of intervention, including the potential for intervention to lead to regulatory failure, and assessment of the treatment of social and public values.”*

A straightforward auction of released spectrum would be an optimal allocation mechanism if there were no material divergence between the social and private value of spectrum in alternative uses. There is a range of possible reasons why a market allocation might not be optimal in relation to different uses of the released spectrum.

We first identify three situations in which there may appear to be a divergence between social and private value, but where intervention in the spectrum award process is not justified – except through auction rules maximising the likelihood of the development of a competitive market (5.3.1). We then develop arguments why there will be a market failure (5.3.2 sqq), and finally analyse which of the possible options identified by Ofcom might solve it (5.6).

### 5.3.1 Divergences between social and private value in general

The following criteria must be met for a divergence between social and private costs to be sufficient for policy makers to consider a change to the optimal spectrum award mechanism:

- First, the divergence must involve a genuine divergence between social and private value and not simply a reallocation of costs and benefits between individuals/organisations.
- Second, the divergence must be relevant to the allocation process, since other policy interventions may be more efficient than modifying a market allocation.
- Third, the divergence must be material and related to the additional spectrum under consideration.

In addition, possible unintended consequences of either a market allocation or an associated policy intervention and their costs need to be taken into account given that an initial spectrum allocation may be difficult to reverse, and given the uncertainties involved.

There are three situations in which there may appear to be a divergence between social and private value, but where intervention in the spectrum award process is not justified. These situations are those involving:

- spillover effects from the use of the spectrum to other parts of the economy
- interference, safety and health and environmental effects arising from different uses of the spectrum
- bidders for spectrum with market power where this market power does not derive from the use of spectrum *per se*.

They are examined in detail in the report<sup>19</sup> commissioned from Indepen by the PSBs, which has already been submitted to Ofcom. This report concludes that whilst the considerations related to spillovers do not apply here, those related to interference can be addressed adequately in the technical conditions attached to spectrum licences and those related to health, safety and environmental concerns, through a combination of technical standards, environmental charges and the planning process; they do not affect the decision about whether to use a market based allocation.

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<sup>19</sup> Indepen, Using the digital dividend wisely August 2006

The report concludes that the issue related to market power is more serious. Ofcom's consultants have stated that auctions are efficient "if willingness to pay (WTP) for spectrum of bidders (based on producer surplus) correlates to total economic value created by spectrum use" and they note, among three reasons why this might not be the true that "some bidders capture disproportionately large amounts of private value because of market power"<sup>20</sup>. They also point to price discrimination effects as a possible source of divergence between private and social value<sup>21</sup>. However, the BBC is sceptical about the importance of this effect as this potential distortion would, if material, potentially impact on all input markets (i.e. land, oil, other resources as well as spectrum) and we do not observe policy interventions to address this issue in other input markets.

Monopoly or market power can result in an inefficient allocation of resources with reduced output and higher prices (absent regulation) relative to a competitive market outcome. However, the usual response to monopoly is to constrain the exercise of monopoly power directly, rather than to intervene in input markets such as the market for spectrum. A special case is the circumstance in which dominance of a single input, say spectrum, gives the user monopoly power in the final good or service market. In this instance, the appropriate response may be to design the spectrum auction so that no single bidder can acquire the entire relevant spectrum, as was the case with the auction of spectrum for 3G mobile services in the UK. **This might be something Ofcom wants to consider when setting out its auction rules.**

### 5.3.2 Evidence of a market failure for HD PSB services on DTT

- HD is fast becoming part of consumer expectations for TV and other video services
- HD must be made available on DTT
- PSBs do not have sufficient capacity within their current spectrum/multiplex allocations to provide universal HD services
- Consumers will migrate from the DTT platform to other platforms if HD is not provided
- This migration will result in a loss of private and social value
- PSBs will not bid for spectrum in an auction (or in a market for multiplex capacity) in a way that reflects this loss of private and social value

Hence, there will be a market failure. The BBC has asked Indepen to test this analysis and to estimate any loss of private and social value (sections 5.8 to 5.10)

Each of these elements of the argument is developed in the sections below.

## ***5.4 HD is fast becoming part of consumer expectations for TV and other video services***

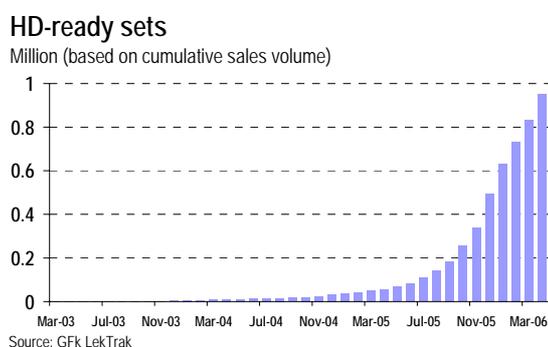
HD is a service that consumers value and want. There are strong reasons to believe that it will become a technology with widespread appeal, rather than a niche product.

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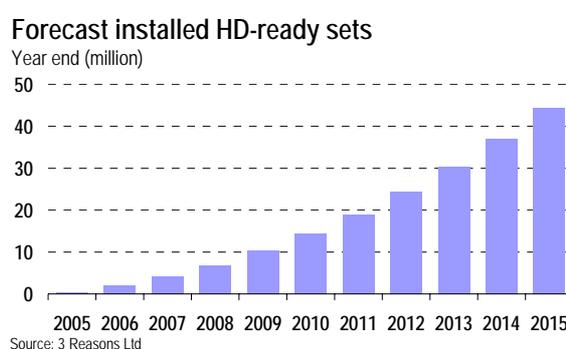
<sup>20</sup> Analysys, Aegis, econ and Mason. 29 June 2006. "DDR consultancy study." Second stakeholder event.

<sup>21</sup> Price discrimination can be beneficial in terms of overall welfare, and a widely applied rule of thumb is that it is likely to be beneficial when it results in increased overall output. The aim of price discrimination by producers is to extract infra-marginal consumer surplus, and this need not necessarily involve a distortion of the marginal product of a factor input at the margin, which determines willingness to pay for the input. John Vickers. 1998. "When is discrimination undue?" *Regulating Utilities: Understanding the Issues*. IEA, Reading 48.

- Awareness of HD in the UK rose from 73% to 92% in the 6 months to October 2006<sup>22</sup>.
- Over five times as many HD-ready sets were sold in 2006 as in 2005 (2,377,000)<sup>23</sup>. In January 2007 only, sales of HD-ready sets reached 409,000 (25% more than expected); if this trend continues, nearly 5 m HD-ready sets could be sold in 2007.
- DSGI reported that it had sold 600,000 flat screens in the eight weeks to Christmas 2006, with 37” being the average size. Comet said it was selling fifty screens of 40” and over per hour, outselling smaller screens<sup>24</sup>.
- It is forecast that between 2005 and 2010, HD-ready households<sup>25</sup> will increase from 410,000 to 11 million<sup>26</sup>, and that, by 2010, 12% of homes will subscribe to premium HD services.
- By November 2006, an HD-ready 26” set was sold for £399<sup>27</sup>. Prices are continuing to fall. So, for instance, on Argos.co.uk, an HD-ready 26” set can now be bought for £299 and a 31”/32” screen (the most popular size of HD-ready set sold, by volume<sup>28</sup>), for less than £500.
- From 2007, all LCD screens larger than 26” sold in the UK will be HD-ready<sup>29</sup>. On Argos.co.uk now the price difference between a 15 inch non HD ready LCD TV and a 19 inch HD ready version is now only £29 (£199 versus £229).
- On 3 November 2006, BSkyB’s stated that HD subscribers had more than doubled to 96,000 – the fastest take-up of a Sky product, representing three times the sales levels achieved by Sky+ in its first year. On 31 January 2007, they announced that their HD subscribers had almost doubled again by the end of 2006, covering 184,000 homes<sup>30</sup>.
- DTT trial respondents considered HD as the future of television: 71% believe it is inevitable that HD will become standard for all TV in the future<sup>31</sup>.



**Figure 5.4. 1**



**Figure 5.4.2**

The market should continue to develop at an accelerated pace. The BBC’s evidence of the relative values of a range of communications services (deliberative research commissioned from Human Capital)<sup>32</sup> confirms that people are more interested by HDTV after the services have been demonstrated to them.

<sup>22</sup> BBC/GfK, HDTV survey; November 2006

<sup>23</sup> GfK research; January 2007

<sup>24</sup> Comet and DSG International (Currys, Dixons, PC World group); January 2007

<sup>25</sup> An HD-ready household has an HD-ready set but is not necessarily receiving HD broadcasts.

<sup>26</sup> Screen Digest, High Definition Television: Global uptake and assessment to 2010; March 2006

<sup>27</sup> Argos and Empire Direct data; 22 November 2006

<sup>28</sup> 31”/32” screens represent 24.4% of total LCD sales. (GfK; 2007)

<sup>29</sup> GfK presentation, ‘The Market for HD’, 3<sup>rd</sup> European HDTV Summit; 31 October 2006

<sup>30</sup> BSkyB, <http://phx.corporate-ir.net/phoenix.zhtml?c=104016&p=irol-newsArticle>; 31 January 2007

<sup>31</sup> TNS (DTT trial), op. cit.

<sup>32</sup> Deliberative research on HD and spectrum allocation

Figure 5.4.3 (below) shows responses to two questions: “How interested would you be in being able to use HDTV services?” (before demonstration) and “Having seen it in action how interested would you be?” (post demonstration) (0 = not at all interested and 10 = very interested)

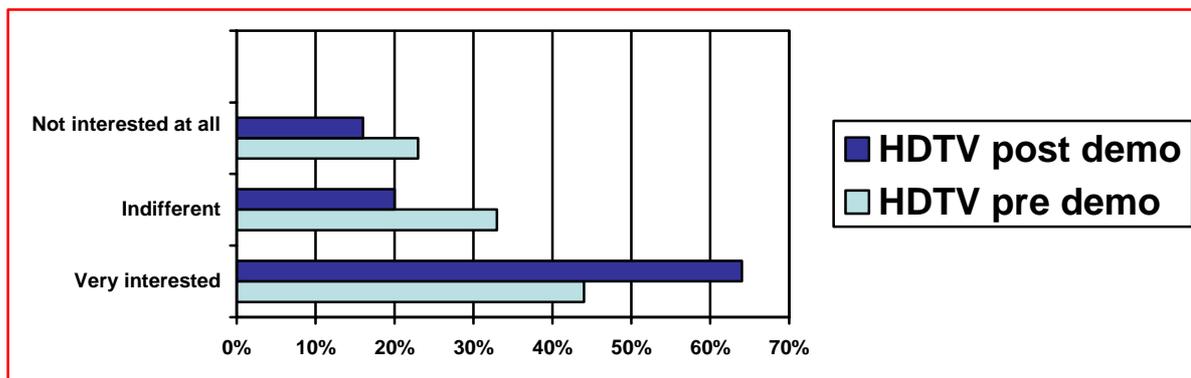


Figure 5.4 1

The BBC is therefore surprised by the methodology chosen by Ofcom and Holden Pearmain/ORC international; this thorough piece of work might have given much more credible results had the researchers allowed their sample panel to see what programmes in HD looked like. In the light of the above, it is highly probable that the full value of HD is not reflected in Ofcom's estimates of social value.

Ofcom explained at their February stakeholders' event that the reason why they did not demonstrate HD to their panellists was that they feared results of research undertaken straight after a demonstration of HD would be biased because of a so-called “wow” factor!

First, the existence of this factor in itself is the recognition that HD immediately appears as bringing very significant benefits to viewers: the picture is so much better. Second, this very high appreciation of HD by people who have experienced it may be partly due to the novelty factor, but appears, more fundamentally, to be related to the superior experience, to the intrinsic benefits of HD. An examination of the results of the different waves of research undertaken by the PSBs during their DTT trial shows that, indeed, there is a difference between appreciation at the beginning of the trial, - when triallists experience HD for the first time, and towards the end, nine months later, but overall feelings still remain very high : whilst at the beginning of the trial 92% of the panellists give high marks (7 to 10 out of 10) to their overall appreciation of HD, they are still 81% who do so when the novelty factor has disappeared.

All the evidence, summarised in this section, from market data and audience research, shows that HD on DTT is not a "premium" offer, but rather a standard service, which has substantial social value, beyond its private value, and hence, needs to be available universally at reasonable cost. Indeed, it is likely that if Ofcom (had it been in existence at the time) had undertaken several decades ago similar analysis to that used now in the DDR, it would have

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- Focus: Assess audience views on the availability of HDTV by platform and the trade-offs between HD and other potential uses of the released DTT spectrum
  - Recruitment methodology and selection criteria: 100 respondents in 5 groups held in M25 area, representative spread of gender, age and SEG.
  - Research method: Extended group discussion with stimulus.
  - Deliverables: Report delivered in July 2006.
  - Research agency: Human Capital

concluded that there was little social value associated with moving from black-and-white to colour television.

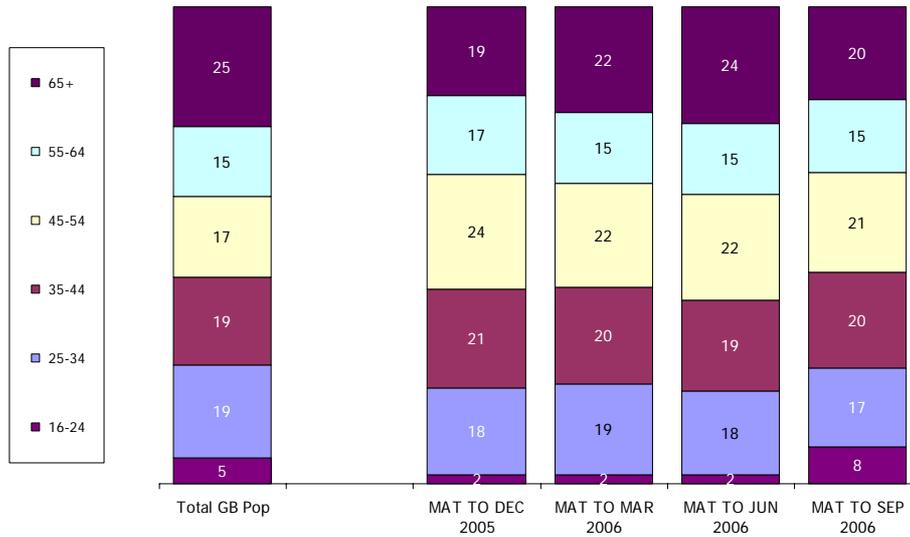


Figure 5.4.4 Age Profile by HD-ready TV sets - GB Sales<sup>33</sup>

45-54yrs olds are consistently over indexed amongst HD purchasers, however, as volume has steeply climbed they are falling in significance. Most interestingly, the representation of the 55+, traditionally late adopters of new technologies is nearly similar to their distribution in the population. (source GfK)

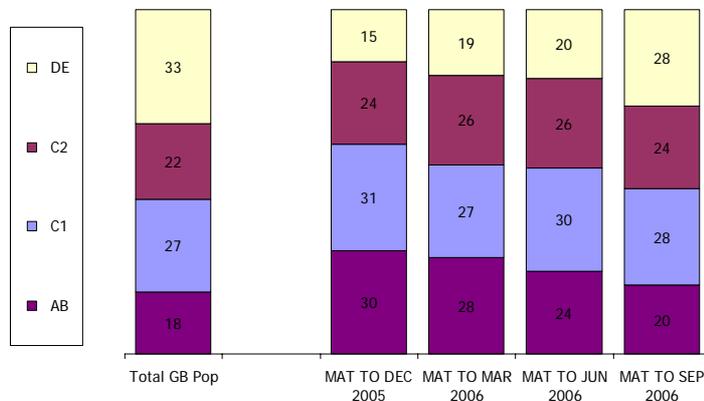


Figure 5.4.5 Social Class HD-ready TV sets - GB Sales –

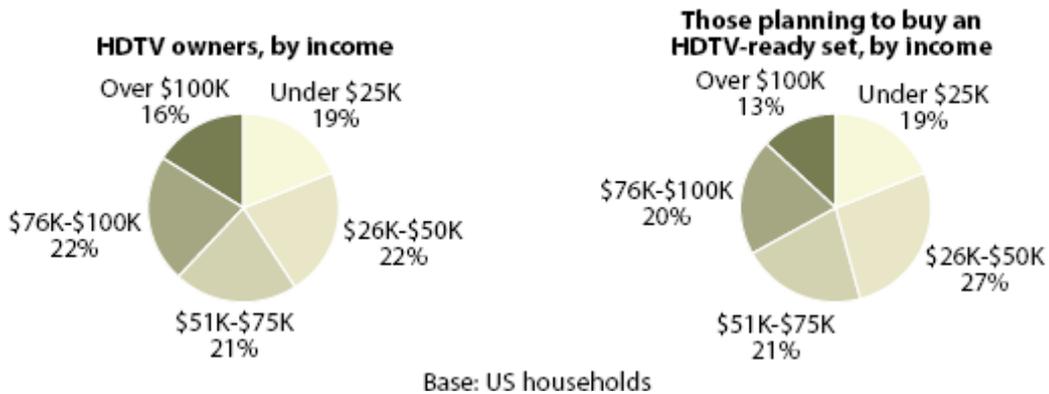
The people who currently buy HD-ready sets are not the “technology-savvy”, early adopters or the wealthiest. The current trend still shows certain over representation of the AB group and under representation of the DE one, but this is changing: as prices continue to fall, the share of DEs buying HD-ready sets is getting closer to their distribution in the population. Similar results were already found in the US in 2005. According to Forrester research<sup>34</sup>, HD appeals to both high and low incomes. Seven percent of households report owning an HD set. Amazingly, 41% of those HD sets are owned by households making less than \$50,000 per

<sup>33</sup> MAT : "Moving Annual Total" it refers to twelve months sales to the date of publishing

<sup>34</sup> HDTV and the coming bandwidth crunch, 17/02/2005, Josh Bernoff. Forrester.

year, and 19% are in households making less than \$25,000 (see Figure 1). Of those planning to buy an HD-ready set on their next purchase, 46% earn less than \$50,000 per year.

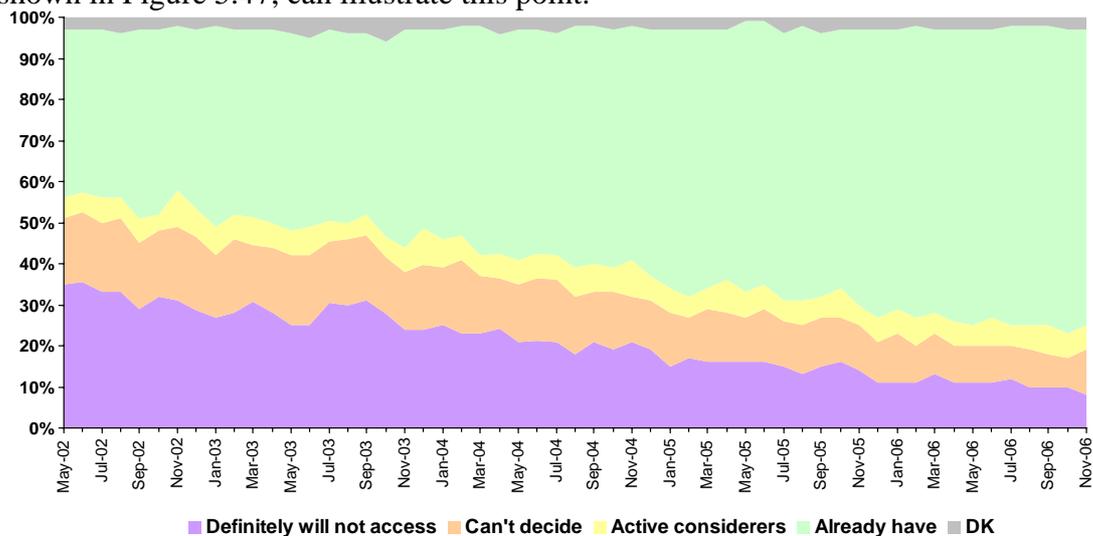
**HDTV owners have mainstream income profiles**



**Figure 5.4.6 HD reaches all demographics**

The BBC agrees with Ofcom that it is difficult to take a firm view of future consumer expectations of HD at this stage, but believes that this should lead to a cautious approach, ensuring maximum flexibility for the future. A decision taken in the near term over the allocation of the released spectrum will have long-term irreversible consequences in terms of the development of PSB over the terrestrial platform. This introduces the potential for “regret” should the wrong decision be made at the outset. It will be easier to take spectrum back from PSBs should HD fail to attract consumers that getting it back from private operators having acquired it through auctions.

Additionally, one must consider that it takes time for new technologies to convince all consumers, but that there comes a point where something which was resisted by later adopters becomes something they really want. The change of behaviour related to Digital television, shown in Figure 5.4.7, can illustrate this point.



**Figure 5.4.7 responses to the question “will you get digital television?” over time.**

HD is fast becoming a part of consumer expectations of TV services, and will soon become standard television, through the production of HD content, the launch of commercial satellite and cable HD services and the widespread availability of “HD Ready” televisions in the UK. HDTV services have also been launched internationally. The non-broadcast HD

market is also growing with HD formats appearing for DVDs and games consoles. In short, everything is moving to HD except currently the terrestrial platform.

### 5.5 *HD must be available on DTT*

There would be negative impact on social value if sufficient capacity is not made available on the DTT platform for HD, for the following reasons:

- DTT is the centrepiece of the Government's strategy for achieving switchover and universal free-to-air delivery of public service broadcasting in an all digital world. Government has made a public policy commitment to the continuation of the DTT platform as the main way to ensure delivery of PSB and, in return, industry and consumers have invested significant sums – over £5 billion – in DTT transmission infrastructure and DTT receivers. When planning the transition to digital switchover, the Government and Ofcom recognised that there were: “...*compelling arguments in support of the extension of DTT such that, as far as practicable, everyone who currently has access to analogue terrestrial TV would be covered by DTT post-switchover. These arguments reflect Ofcom's statutory duties and take into account, in particular, the equity, affordability and communications advantages of seeking to ensure that DTT is available to all TV households*”<sup>35</sup>. The same should apply today to HD on DTT.
- The introduction of the MPEG4 technology on DTT could lead to significant improvements in the efficiency with which spectrum is used by DTT but will involve a further migration of consumer equipment as new set top boxes will be required to receive services in MPEG4 format. Therefore, consumers need a good incentive to make this additional investment. A critical mass of HD services could be this incentive. HD would then be the means by which to start an orderly migration to more efficient spectrum use and could lead to a second release of spectrum when most boxes/TV sets are compatible with MPEG4. At this point, it could be possible to “reverse” the allocation of spectrum for HD PSB services, and give back the “loaned” frequencies.
- Standard definition (SD) DTT should not be the end of the road for the evolution of the terrestrial platform. The public policy commitment to the DTT platform needs to take this into account, as the terrestrial platform has done in the past, in order to remain relevant to consumers. After switchover, the majority of households will receive some or all of their TV (i.e. TV on the main or other sets in the house) via DTT. The presence of a strong DTT platform will help foster inter-platform competition and thereby benefit consumers. It will also continue to be the main delivery platform for meeting PSB objectives (including universality, diversity and plurality).
- BBC research shows a strong expectation that FTV television should not become ‘inferior’, with 78% of participants in deliberative research disapproving of the five main PSB channels being available in HD only on a subscription basis<sup>36</sup>.
- HD is required for the continued success of the DTT platform, in terms of retaining viewers, maintaining advertising revenues and providing a serious competitor to other

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<sup>35</sup> Ofcom, Planning Options for Digital Switchover; June 2005, p.4

<sup>36</sup> Human Capital, op. cit.

platforms (i.e. satellite, cable and broadband). This means that, at the very least, DTT should offer the main PSB channels in HD as these services account for three quarters of viewing on DTT. Autumn 2006 research<sup>37</sup> found that, of those who were aware of HD,

- **86% expected that the BBC would provide its content in HD in the future**
- **93% expected BBC HD content to be FTV (84% of all respondents)**
- **95% expected HD to be available on all digital platforms.**

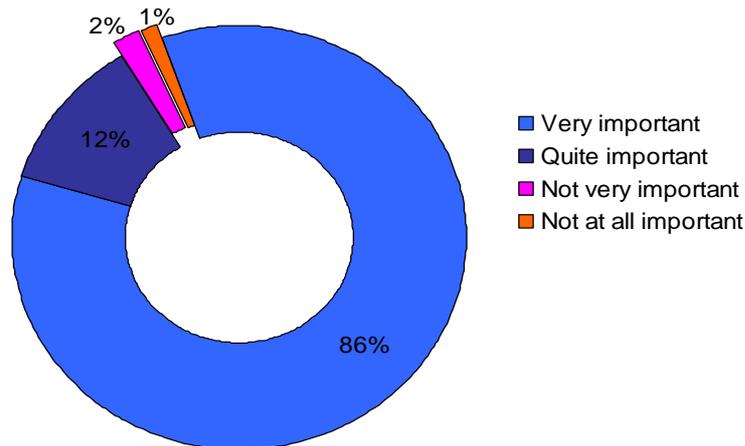


Figure 5.5.1: Importance of HD availability on Freeview

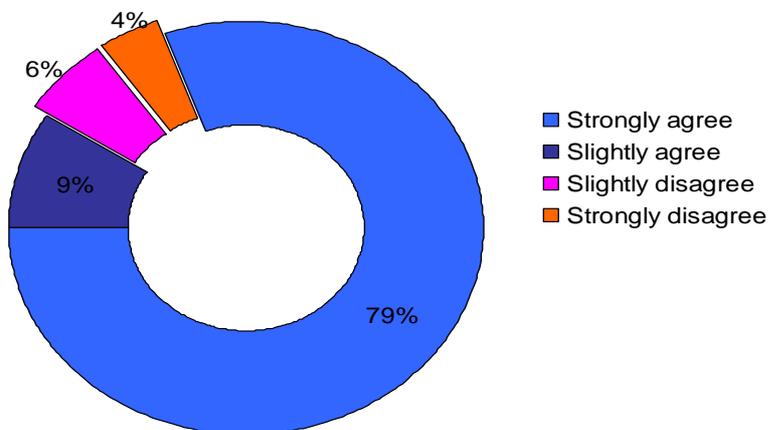
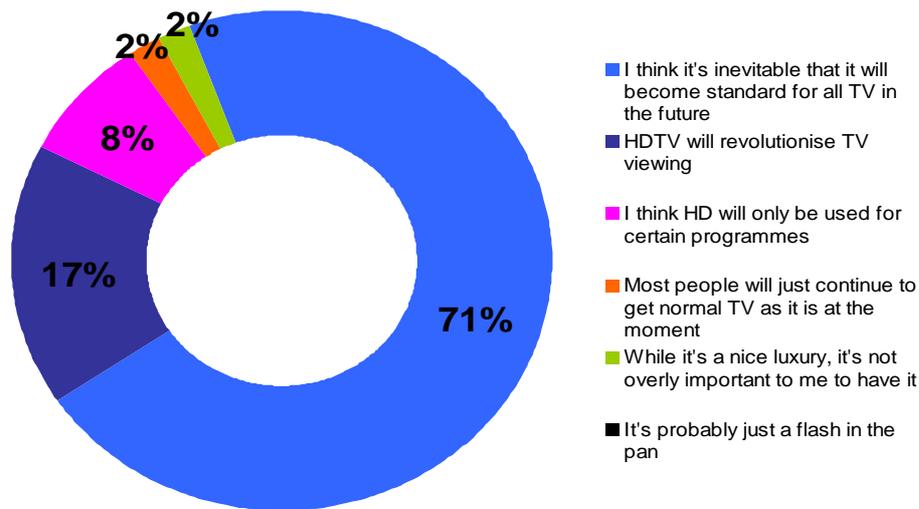


Figure 5.5.2: Expectation that all programmes from the BBC, ITV, Channel 4 and Five will be shown for free in HD on Freeview in the future

DTT trial respondents considered HD as the future of television: 71% believe it is inevitable that HD will become standard for all TV in the future<sup>38</sup>, as shown in Figure 5.5.3.

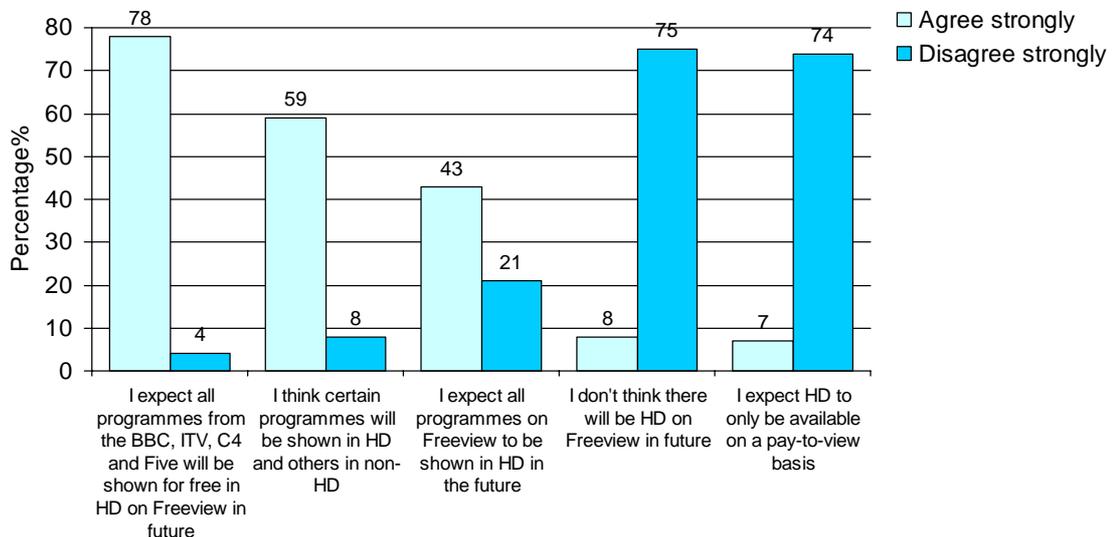
<sup>37</sup> BBC/GfK, op. cit

<sup>38</sup> TNS (DTT trial), op. cit.



**Figure 5.5.3: HD and the future of TV**

Deliberative research also revealed a strong support for the universal availability of PSB HD channels<sup>39</sup>. Half of the HD DTT trial respondents said that they would not want to pay extra to access their favourite channels in HD<sup>40</sup>. 67% disapproved of HD versions of the main public service channels being available only on free satellite and not on Freeview. 78% of respondents expected all programmes from the BBC, ITV, Channel 4 and Five to be shown in HD on Freeview in the future. Figure 5.5.4 illustrates triallists' expectations around HD content on Freeview.



**Figure 5.5.4: Expectations around HD content from the main terrestrial broadcasters on Freeview**

The BBC recognises that the HD triallists are not perfectly representative of the general population, as they are more likely to be male, young, and early adopters of new

<sup>39</sup> Human Capital, op. cit.

<sup>40</sup> TNS (DTT trial), op. cit.

technologies. However, the validity of their responses is reinforced by both market data (exposed in section 1.4.) and further research undertaken by BMRB for Digital UK.<sup>41</sup>

These results showed very high awareness of HD, with 81% of the public having heard of HD, and 70% of them being able to accurately describe what it is (a better quality/definition TV picture). Moreover, awareness was consistently high, and did not fall below 60% in any demographic group or even in analogue TV households. Digital UK also sought to test consumers current expectations around HD. They asked both why those with HD-Ready sets had bought them, and how respondents expected to be able to get HD in the future. The majority of those purchasing HD-Ready sets are doing so with some intention to get HD in the future; and that expectations of being able to get HD are running high amongst users of all digital TV platforms, including DTT. When asked why they had bought an HD-ready television, 70% said that had done so because they had some intention of getting high definition – either now or potentially at some point in the future.

[Question: Which of the following best describes your reason for buying an HD-Ready TV?]

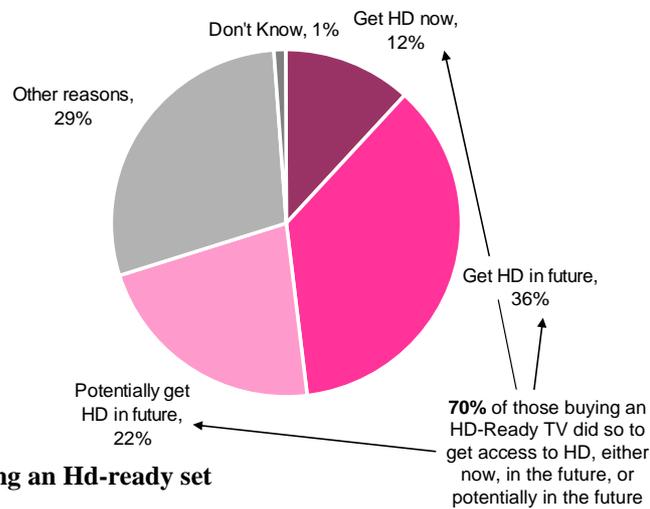


Figure 5.5.5: Reasons for buying an Hd-ready set

These high levels of intentions were extremely consistent across all the digital platforms.

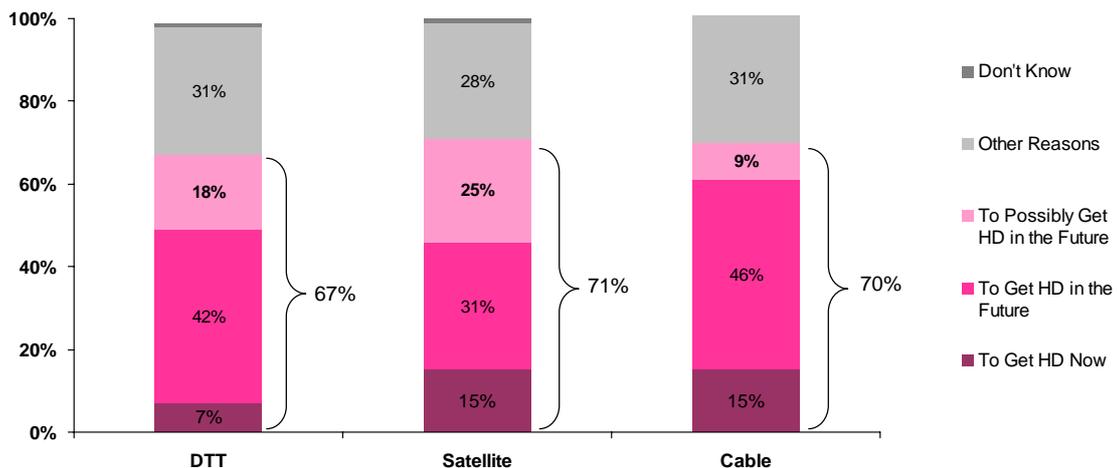


Figure 5.5.6: Reasons for buying an HD-Ready TV Set – By Current TV Platform

<sup>41</sup> The survey was conducted as part of a CATI (telephone interview) omnibus to a representative sample of 1010 UK adults over the age of 16 in late January 2007.

Although fewer DTT users were planning on getting HD now (7%), more were thinking of getting HD at some point in the future (60%, compared to 56% of satellite users and 55% of cable users).

For all the reasons explained in this section, HD must be available on DTT.

### 5.6 PSBs do not have sufficient capacity within their current spectrum/multiplex allocations to provide universal HD services

The BBC agrees that value to society can be delivered in many different ways but argues that different methods might not deliver this social value to the same extent nor at the same cost. The PSBs are required to make their services universally available and in order to achieve that must use terrestrial spectrum to complete the coverage on other platforms and then give a range of platform choices.

The BBC also agrees with Ofcom that it is useful to consider alternative ways that PSBs could deliver their services in HD, but the alternative options set out by Ofcom to deliver PSB services in HD either do not work or do not deliver as high benefits to consumers. Of all the options set out by Ofcom (their figure 6.3, reproduced below), only option E delivers both benefits to consumers and helps increase spectrum efficiency.

**Figure 6.3 Options for delivery of PSB services in HD**

Delivery option	Potential benefit	Implications
<b>A</b> : Use extra capacity available at switchover and rearrange multiplexes	Provide 5 HD channels to at least 90% of homes with no loss of existing services	Some PSB services in HD carried on commercial multiplexes. Services across the six multiplexes rearranged.
<b>B</b> : Boost coverage of commercial multiplexes	Increase coverage of HD channels under option A from 90% to c. 96%	Additional transmission costs to expand coverage. Wider availability of all services on those multiplexes, not just HD.
<b>C</b> : Use freesat services to ensure universal availability of HD free-to-view	Deliver 100+ HD channels to up to 98% of homes (including outside DTT coverage)	Additional costs for broadcasting via freesat. New freesat platform proposed by some PSBs could enhance competition & choice, but viewers would need satellite dishes.
<b>D</b> : Upgrade DTT platform from MPEG2 to MPEG4	Scope for up to doubling of capacity of DTT platform when transition complete. Capacity could be used for many HD and/or SD services.	Existing set top boxes and integrated digital TVs are MPEG2. Viewers would need new set top box to receive MPEG4 services. Various options for managing the transition to maintain confidence of viewers.
<b>E</b> : Acquire additional spectrum for seventh multiplex	Offer 3 HD channels to up to 98.5% of homes	Large opportunity cost of spectrum and risk that this is not optimal use.

#### 5.6.1 Option A - Use extra capacity available at switchover and rearrange multiplexes

Ofcom say (consultation document; p 88) that it would be possible, using extra capacity from a transmission mode change and re-arranging multiplexes, to provide 5 HD channels to at least 90% of homes within the existing six DTT multiplexes without any loss of existing services. This is incorrect because insufficient capacity will be released by the transmission mode change. The only way 5 HD PSB services could be accommodated would be for the PSBs to buy additional capacity from the commercial multiplex operators – the market failure arguments discussed below apply equally to such purchases as they do to purchases of spectrum.

The BBC understands that Ofcom considered that 32 (24 hour) video slots were available today on the existing multiplexes, and that on average by 2012 each might only require, 3 Mbps, so therefore the requirement for existing video services would be 96Mbps. According to these calculations, the six DTT multiplexes would by switchover have 144 Mbps (following transmission mode changes) which would leave 48 Mbps available, which would be enough to provide 5 HD services each requiring 8 Mbps video. However, the BBC disputes this assumption for a number of reasons:

(a) There are not 32 but actually 37 linear video slots across the 6 multiplexes – which today represent altogether 120Mbps: even at just 3 Mbps each by 2012, that would require 111 Mbps, with only 33 Mbps remaining. This is less than the 40 Mbps necessary for 5 HD services. Ofcom appears to have assumed that some services would be taken down.

(b) This calculation completely excludes all the radio services which use more than 4 Mbps, text services (2.5Mbps, including a PSB service, the Public Teletext), data services – including access services, service information, or related technical information which are required for the running of the platform (e.g. the Engineering Channel for updating receivers). This actually brings the balance of capacity used for Freeview and Top-Up TV services up to at least 120 Mbps (which represents full capacity utilisation).

(c) The extra capacity released at switchover corresponds to 24 Mbps scattered across 4 multiplexes: some complex redistribution between multiplexes would be necessary to ensure 3 blocks of 8 Mbps are available for 3 HD services, to be run by PSBs. This is very likely to require significant and vigorous intervention by Ofcom, and might raise serious practical and legal issues. Of that additional 24Mb/s, 12Mb/s will have UK coverage (i.e. capacity on multiplexes 1 and B operated by the BBC) and 12Mb/s will be available to about 90% of the UK population (i.e. capacity on multiplexes C and D) operated by National Grid Wireless). While this coverage might be increased to 96% through investment in additional transmitters, it will not provide universal coverage as currently defined for DTT services. The importance of achieving 98.5% rather than 96% coverage was underlined by Ofcom in its analysis of coverage options for SD DTT services.<sup>42</sup>

(d) Moreover, part of the capacity gained on the BBC multiplexes through the mode change is already committed to Five, S4C, S4C~2, TG4 & Gaelic Channel as required (by Government), and to accommodate the BBC's own services to meet its public service obligations. Thus, the extra capacity released at switchover across the 6 DTT multiplexes by a mode change from 16-QAM to 64-QAM (24Mbps) will actually be spread across 5 muxes, as the transfer of five and S4C to the BBC multiplexes will free up capacity on multiplex A of about 3 Mbps for five and 2.5 Mbps for S4C in Wales.

To deliver 5 HD services on the existing DTT muxes after switchover, which would require at least 40 Mbps<sup>43</sup>, PSBs would need to take two sets of actions:

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<sup>42</sup> Digital replacement licences to be offered to channel 3, 4,5 and public Teletext, Ofcom, September 2004

<sup>43</sup> Industry experts tell us that MPEG-4 may eventually achieve the 8Mb/s per HD service. This is currently only foreseen as achievable for “acceptable quality” for “most pictures” while making use of statistical multiplexing. Whilst this multiplexing benefit may be seen on wide satellite transponders where 5 or 6 HD services can share bit rate, it is unlikely to be as effective on smaller capacity terrestrial multiplexes with – at this bit rate - a maximum of 3 HD services possible in a multiplex.

- (1) to take at least 16 Mbps from other services operating i.e. by dropping around 6 services off the DTT platform or reducing the picture quality of existing services, **and**
- (2) to purchase all the 24Mbps made available on the commercial multiplexes by the mode change, assuming this was possible under contractual arrangements between the multiplex operator and other channel providers. It can be expected that this capacity would be auctioned by the multiplex operators to maximise revenue and because capacity must be provided on a non-discriminatory basis. As nearly three times the capacity is required for HD as compared with SD services, payments will need to be substantial to secure the capacity – multiplex capacity has recently traded at a price of between £5-10m p.a. for a single SD channel. If there is market failure in the auction of spectrum it will also apply in the case of auction of multiplex capacity hence purchase of additional multiplex capacity does not solve the problem.

In other words, without removing existing services from the platform, and successfully completing a very challenging reorganisation of multiplexes, there will not be sufficient capacity released to support 5 HD services contrary to the position suggested by Ofcom. The only way that broadcasters could achieve what Ofcom suggest would be to drop existing standard definition services and/or reduce the bit rate available to existing services (with a consequent loss of picture quality) which would put at risk the future of the DTT platform. Broadcasters have to consider the following before taking such drastic actions:

- Should a standard definition service on DTT have the same picture quality as analogue TV?
- Should a high definition service on DTT have a comparable picture quality to DVD and/or be better?
- Should a radio service on DTT have a comparable audio quality as to FM and/or DAB?
- Should a text or data service on DTT have a reasonable speed of access and depth of content?
- Should the range of services offered on DTT to existing viewers not be reduced below existing levels?

If, as we believe, the answer to these questions is yes, then there is no scope to reduce appreciably the bit rates below existing levels (MPEG-2 coders are now very mature in their development phase and further efficiency savings are likely to be marginal).

We would also like to stress the need to ensure that the access services are provided with an appropriate level of quality. For instance, DTT operators would like to provide a talking EPG, which will bring significant benefits to visually impaired viewers, but this would require significant bandwidth. Other services, such as the provision of information used by the electronic programmes guides, or the Engineering Channel, which is necessary for the platform and the receivers to continue to perform well, cannot be removed or constricted without a very significant impact on the platform.

#### 5.6.2 Option B - Boost coverage of commercial multiplexes

As for Option A, this option is not realistic, as the capacity on commercial multiplexes is not available. Boosting the coverage by rolling out commercial multiplexes to all the transmission sites used by PSBs and/or using potentially greater transmission powers will not increase the coverage of these multiplexes to 96%. In addition, such power increases will be

difficult to implement as they would lead to higher interference than agreed at the Regional Radio Conference (RRC-06) with neighbouring countries ; they would almost certainly interfere with the coverage of PSB multiplexes and thereby put at risk the achievement of switchover obligations.

### 5.6.3 Option C - Use Freesat services to ensure universal availability of HD free-to-view

Whether for a subscription service or a free to view service, satellite coverage remains the same, which is not universal. The BBC does not understand how “the use of Freesat services” would “ensure universal availability of HD free-to-view”.

As Ofcom has clearly explained relying on satellite and a limited availability of DTT would restrict consumer choice, disfavour those on low income and risk leaving some households with no television at all. *“Ofcom considers that the fact that alternatives to DTT are considerably more expensive for consumers presents an obstacle to ensuring that digital TV is affordable to all consumers - particularly for elderly people and people with low incomes. Some of these households may have to give up TV altogether were they unable to afford to switch to digital satellite. This would, in turn, hinder the interests of citizens and prevent the fulfilment of the objectives of public service broadcasting. It is possible that targeted assistance schemes may ameliorate the effects to some extent but these schemes may not cover enough of the lower-income deciles to prevent all of the negative consequences. The lower consumer costs of DTT also mean that, should DTT rollout be restricted, consumers in non-DTT areas will bear higher costs as a result of switchover than consumers in DTT-covered areas. This could potentially lead to concerns on the grounds of equity between different groups of consumers.*

*Preventing some consumers from selecting DTT as their preferred digital TV option would also restrict consumer choice. There is also some evidence that households intending to convert their sets would prefer DTT to other digital platforms. Consumer research indicates that, of those respondents who expressed a preference, two-thirds said they preferred DTT to other platforms (although 40 per cent of consumers said they did not know what platform they would choose). In addition, in some areas it may mean that only one TV platform is available which could potentially lead to competition concerns.*

*This option is also less certain to ensure that everyone who is currently able to receive analogue TV will be able to receive TV after switchover. (...) cable, satellite and DSL services are not available to everyone. Cable services are limited by the fact that cable networks currently only pass around half of UK households. TV through DSL is currently limited through the requirement to be close to the relevant local telephone exchange. Although satellite services are the most widely available throughout the country, not everyone is currently able to obtain a clear line-of-sight path to the relevant satellite and some households are unable to install satellite dishes. (...) if DTT coverage was below existing analogue coverage than it is likely that a proportion of households would not be able to obtain DTT coverage nor be able to install a satellite dish, nor connect to a cable or DSL network. Limited DTT coverage is therefore likely to mean that some households at least were prevented from receiving TV altogether. Not only would this damage the interests of consumers and citizens, it would also prevent the attainment of the Government’s switchover*

*criterion of ensuring everyone who can receive analogue TV coverage is also able to obtain digital TV coverage.”<sup>44</sup>*

The BBC believes that exactly the same arguments as then put forward by Ofcom apply now to justify the importance of making HD available free-to-view on DTT.

#### 5.6.4 Option D Upgrade DTT platform from MPEG2 to MPEG4

MPEG4 compression is two to three times more efficient than MPEG2. The transmission in MPEG4 of all the existing services would definitely free up enough capacity to develop HD services on the six DTT multiplexes. However, as Ofcom notes, this will occur only in the long term – well beyond 2012. This is because none of the 15.3 million DTT receivers (set top boxes and integrated digital televisions) sold to date<sup>45</sup> can decode MPEG4 signals and, unless a move to MPEG4 is signalled very soon, the 20-25m set-top boxes and integrated TVs that will be required by switchover<sup>46</sup> will be MPEG2-only too. This is not going to change unless there is consumer demand for MPEG4 equipment. While satellite receivers using MPEG4 technology are deployed in the UK, there is currently no strong business reason for manufacturers to produce similar devices for terrestrial transmissions.

Whilst it is possible that pay TV operators<sup>47</sup> start using and subsidising MPEG4 boxes, PSBs have currently an obligation to provide their services in MPEG2 format and would have to continue to do so until government policy changed in this regard. Simulcasting could be an option, but would additionally require capacity which PSBs do not have. Other free to air services will only move from MPEG2 to MPEG4 when most consumers have backward compatible MPEG4 boxes, and the loss of income due a reduced audience is more than offset by savings in distribution costs. Such boxes are already available in other countries (e.g. France) but are not and will not be marketed in the UK until there is an attractive set of MPEG4 services for consumers to receive. This is a vicious circle. Any capacity released by a hypothetical migration of SD services from MPEG2 to MPEG4, with the only incentive being additional channels, will take a long time to be released (beyond the timeframe in which HD services seem likely to become popular). MPEG4 is not therefore a practical way forward in the short-term for delivering capacity to transmit HD PSB services on the DTT platform.

However, HD could transform the vicious circle into a virtuous one. A strong HD offer could provide an incentive for such a move. The BBC therefore proposes to help launch a free-to-air HD offer on DTT as well as on the other platforms, including Freesat, to give the expected lead to manufacturers and help stimulate the production of set-top boxes and integrated televisions capable of receiving both existing SD services and future HD channels. The widespread adoption of dual standard MPEG4 receivers will create both the opportunity for spectrum efficiency gains sooner and the possibility of a faster transition. Allocating spectrum for HD services will kick-start a process that will greatly improve spectrum efficiency.

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<sup>44</sup> Ofcom consultation on the Digital replacement licences, September 2004, paras 198-sqq , [http://www.Ofcom.org.uk/consult/condocs/drl/drl\\_condoc/drl.pdf](http://www.Ofcom.org.uk/consult/condocs/drl/drl_condoc/drl.pdf)

<sup>45</sup> Digital Television Update – Q3 2006

<sup>46</sup> 25.5m sets are still to be converted to digital reception and around 80% are secondary etc sets. (source Indepen analysis based on Ofcom and Digital UK Switchover Tracker Survey – Switchover Progress Report Q4 2006) We assume the majority of these sets convert to DTT as this is the least cost option.

<sup>47</sup> Sky has proposed such a service.

### 5.6.5 Option E Allocate spectrum for HD

This is the only option which works, and its benefits of such an option are much higher than its opportunity costs, as will be demonstrated in section 5.8. The BBC proposes a “spend to save” strategy, which is the following :

- 1) The public service broadcasters are allocated by Government at least one, possibly two multiplexes (i.e. either 2/3 or 1/3 of the so-called “digital dividend” in order to develop an attractive free to air HD offer on the DTT platform.
- 2) In return, they would be expected to take reasonable commitments, such as:
  - Coverage obligations / using the existing network, with the exact figure dependent on the exact set of frequencies allocated and international negotiations
  - Use of the MPEG4 standard on the newly allocated frequencies
  - Close collaboration with the industry to promote the adoption of dual MPEG2-MPEG4 decoders in all TV equipment
  - Inclusion of relevant messages in their own and in Digital UK’ switchover information campaign on HD as part of their current obligations
  - Managed migration of other channels they control to the MPEG4 standard, whether in HD or in SD, in order to generate improved spectrum efficiency, and in the mid to long term.
- (3) At the end of the process, and no later than 12 years after the completion of switchover, the spectrum “loaned” will be given back, and the general move to MPEG4 will have made much more efficient the use of spectrum for the other DTT multiplexes.

Without additional capacity, it will simply not be possible to deliver a sufficiently strong offer of HD on DTT.

### ***5.7 Consumers will migrate from the DTT platform if HD PSB services are not provided***

Cable and satellite both currently offer HD services and market evidence shows that in the case of satellite the service is proving very popular. Over time, the attractiveness of these competing offerings will grow relative to Freeview on which the main services will all be transmitted in SD. Migration from Freeview to cable and satellite services will logically follow.

As Ofcom itself notes, *“There is a plausible scenario in which HD reaches a majority of UK homes over the medium term, and viewers come to expect and require most content to be available in HD, including the five main terrestrial channels”* (para A8.481) and that *“if this scenario developed, the DTT platform would probably need to make a similar transition to HD. If it did not, commercial channels might shun the platform preferring only to produce in high definition and large numbers of viewers might switch to other platforms”*.

There is no direct evidence on the possible scale of such a migration but the actual and forecast rapid growth in sales of HD ready TV sets meaning that around 50% of households are expected to be HD ready by 2010 and the rapid take-up of pay HD services both suggest the migration could be considerable.

The BBC has also collected evidence on consumers’ willingness to pay for a single HD BBC service including evidence on the incremental value of the service over and above the value of the content in SD. This evidence suggests that if there was a Freesat service (e.g.

an enhancement of the current Sky Freesat services) offering one HD BBC service (in addition to Freeview SD free to air services) over 50% of customers would find it worth purchasing the satellite equipment required for reception on one set i.e. there is clear evidence that migration would occur. But this would only render the DTT platform more inefficient as fewer people will use it, whilst leaving unsatisfied those who do not want to migrate but would still like to receive HD services.

**Note: sections 5.8 to 5.10 are extracted from Indepen’s report “Intervening to secure UHF spectrum for HD PSBs”, March 2007<sup>48</sup>**

## ***5.8 Is there equivalence between private and social value?***

*The allocation of spectrum for terrestrial broadcasting involves policy considerations if the social value of HD PSB services differs from the private value, and if realisation of this social value is dependent on the quantity of spectrum allocated for DTT. When assessing the extent of the divergence between social and private value, the following two issues need to be considered:*

### ***1. Can PSB broadcasters capture the private value associated with HDTV?***

### ***2. Will private decisions made by PSB broadcasters reflect social value?***

*In both cases the answer is no – in other words private decisions by PSB broadcasters will not result in socially efficient outcomes. Further, under current funding and institutional arrangements it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum, in which case there would be a significant market failure as all four PSBs must bid together if they are to secure spectrum for a single multiplex to provide HD PSB services. We have assumed that such co-ordination is not blocked on competition grounds and can be achieved practically.*

#### ***5.8.1 Can PSB broadcasters capture the incremental private value associated with HDTV?***

*Market and survey evidence indicates that consumers do attach private value to HDTV, however, it is far from clear that advertising funded PSB services (ITVI, Channel 4 and Five) can capture any, or at least much, of this value. In contrast to pay to view models, advertisers are primarily interested in audience size and composition, rather than the intensity with which viewers value a particular service and so advertising rates will not reflect viewers’ willingness to pay for services. Furthermore there is evidence that advertisers will not pay more for advertising airtime in an HD schedule as compared with an SD schedule,*

*For example, the head of CBC, Mr. Rabinovich, has stated that “There's no evidence either in Canada or the United States that we have found for advertisers willing to pay a premium for a program that's in HD...so basically they're saying if you want to shoot in HD, that's your business, we're not going to pay you more.”<sup>49</sup>*

*This means that provision of HD PSB services will imply additional cost (transmission and production costs and any spectrum fees) but little or no additional revenues. Hence for the commercially funded PSBs (i.e. Channel 4, Five and ITV), any bid for spectrum would have to be motivated by defensive concerns i.e. value of the audience lost to other*

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<sup>48</sup> In these sections, “We” refer to Indepen

<sup>49</sup><http://www.theglobeandmail.com/servlet/story/RTGAM.20061127.wcrtc1127/BNStory/Business/home>

platforms/channels. This value is likely to be less than the private value of HD services unlike the situation for a pay TV provider.

In the case of the BBC no additional revenue is earned by transmitting services in HD under current funding arrangements. Its willingness to bid will therefore depend on how it interprets achievement of its PSB objectives and its funding situation. This is considered below.

#### 5.8.2 Will decisions made by PSB broadcasters reflect the incremental social value associated with HDTV?

The privately owned PSB broadcasters (ITV and Five) would be expected to make decisions on HDTV based on private not social value and so will underbid for the spectrum from a social perspective.<sup>50</sup>

The BBC and Channel 4 (as publicly owned bodies) would be expected to reflect social (as well as private) value in their bids for spectrum, but they have constrained resources that mean they are unlikely to be able to bid for spectrum to reflect its full private plus social value.

Ofcom has forecast that “if there is no real change to the policy environment, ... provision of PSB will fall substantially”<sup>51</sup> because of anticipated real reductions in the revenues of the commercial PSBs.<sup>52</sup> Given this and the likelihood of no additional commercial revenue from HD services it seems unlikely that PSBs could justify borrowing to bid for additional spectrum.

The BBC is in a somewhat different and more complex position. Any new service, such as a new HD service, launched by the BBC must be subject to a Public Value Test. This involves Ofcom undertaking a market impact assessment and the BBC Trust assessing the public value of the proposition and coming to a conclusion as to whether the proposed service is in the public interest or not. These assessments and the associated consultations would need to be concluded in advance of the auction of UHF spectrum.

It will be difficult to undertake these assessments in a transparent manner without revealing the value of the BBC places on the spectrum in advance of the auction, which could in turn cause problems for the conduct of the auction. These complications are not discussed by Ofcom, but they seem likely to mean that the BBC's participation in an auction will not be as straightforward as Ofcom suggest.

Ofcom suggest that reform of institutional and funding frameworks for public sector bodies in general (i.e. in this case the BBC and Channel 4) is necessary if a market based policy in respect of spectrum management is to achieve its goals<sup>53</sup> and that such reform would promote efficient and effective use of spectrum together with the achievement of public service goals for broadcasting.<sup>54</sup> Implicit in the discussion appears to be the view that the current institutional and funding arrangements for PSBs are not consistent with a market based approach to spectrum management. This means application of a market based approach will result in some form of market failure. Ofcom's consultants seem to be of a

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<sup>50</sup> Unless this yielded benefits for their shareholders.

<sup>51</sup> Para 3.59, Ofcom Review of Public Service Broadcasting, 2004

<sup>52</sup> Economic analysis of the TV advertising market, PWC, for Ofcom 2004

<sup>53</sup> In paras 6.68-6.72 of the consultation document.

<sup>54</sup> In paras A8.513-A8.514 of the consultation document.

similar view and comment that “in the absence of funding considerations, not for profit PSBs would be likely to reflect this broader social value [of HD PSB content] in their assessment of the value of additional spectrum”<sup>55</sup>.

In practice appropriate funding arrangements are not in place, in the sense that the BBC and Channel 4 do not necessarily have sufficient funding available to it to bid for spectrum in a manner that reflects the private plus social value of HD PSB content given their other obligations. There is therefore a real risk that neither the BBC nor Channel 4 will bid for spectrum at auction, and certainly will not bid in a way that captures the private and social value of the services they offer.

### 5.9 Loss of private and social value

The value lost by the absence of HD PSB services on the DTT platform is as follows (see Figure 5.9.1):

- The loss of social value that arises from reduced audiences for PSB content and the deterioration in the quality of PSB services resulting from the reduced ability of commercial PSBs to fund PSB content. These effects are a consequence of the loss of audience caused by migration to other platforms. (Area A in Figure 5.9.1).
- The loss of private value from either 1) not receiving HD PSB services for those households that do not have a choice of TV platform or 2) the cost of having to invest in additional equipment (e.g. satellite dishes) and possibly also pay subscriptions to access HD PSB services for those households that do have a choice of platforms. (Area B in Figure 5.9.1).
- The social value directly associated with the HD PSB services – Ofcom estimates this to be around 5% of the private value of the services. It is unclear whether this includes any allowance for the loss of social value associated with universal provision of HD PSB services, should HD become the default format. (Area C in Figure 5.9.1).

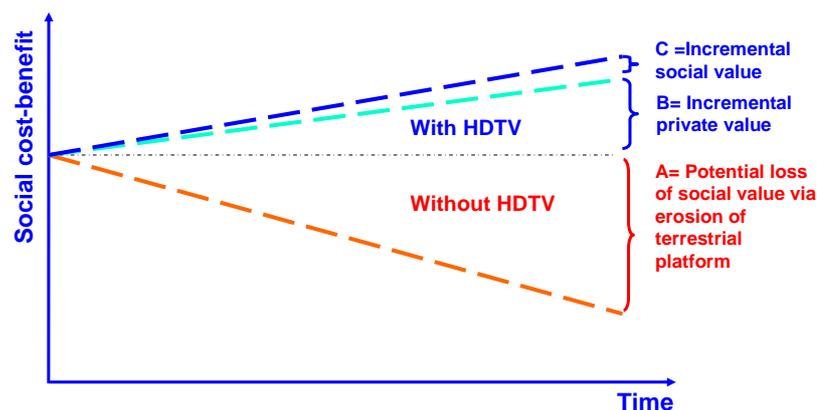


Figure 5.9.1 Private and social value associated with HD PSB services

We assess private and social value for two possible states of the world in terms of the delivery of HD PSB services:

<sup>55</sup> p63, “Preparatory study for UHF spectrum award, report for Ofcom, Analysys et al 2006.

*Scenario 1: HD PSB services are not provided free on any platform other than DTT.*

*Scenario 2: HD PSB services are provided free on a satellite service (either Sky's Freesat service or a new satellite service).*

*In each case we calculate values as the net present value (NPV) of benefits lost/costs incurred over a 20 year period assuming the Treasury discount rate of 3.5%.*

### *5.9.1 Loss of private value*

#### *5.9.1.1 No free HD PSB services on cable or satellite*

*Using the results of the BBC's research on willingness to pay for an incremental HD BBC TV service<sup>56</sup> we estimate that the value of a 20 year NPV of consumer surplus from such a service is £5.7bn for all households. If we assume conservatively that this is not available to the 50% of households using the DTT platform for main set reception then this gives a value of £2.85bn. It is important to note that this is the estimate of the value of the HD service over and above the SD value of the content shown and is net of any equipment costs.*

*We conservatively double this value to give an estimate of value for 3 HD PSB services i.e. around £5.7bn.*

#### *5.9.1.2 Free HD PSB services on satellite*

*In this case we assume (based on the BBC's willingness to pay data) that it could be worthwhile for 25% of DTT households to take-up the satellite service<sup>57</sup> i.e. around 3m households.<sup>58</sup> The loss of private value is then given conservatively by the cost of purchasing and installing satellite equipment by these households. If this is for one set only then there is a total cost £450m.<sup>59</sup> Households will wish to convert all sets over time if HD becomes the de facto format and there are there are on average 2.6 TV sets per household. We assume that the signal would be distributed internally using a wireless video sender and this would cost £50-100 per household.<sup>60</sup> This would imply an additional cost of £150-300m. Note that these calculations take no account of churn between platforms.*

*The remaining 75% of DTT viewers would lose the direct private value of HD PSB services. While these are viewers that place a lower than average value on the service we estimate the NPV of lost private value could be around £2.3bn.<sup>61</sup>*

*For this scenario, we therefore estimate that around £3bn<sup>62</sup> of private value would be lost.*

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<sup>56</sup> Survey respondents were shown a schedule on which HD content would be shown between 1500 and 2400 hours each day, extended when appropriate to accommodate live events. Outside 1500 to 2400 hours, a barker will run.

<sup>57</sup> At the average willingness to pay value it is worthwhile taking up a satellite service i.e. the WTP exceeds the additional equipment costs.

<sup>58</sup> Screen Digest forecast that by 2010 around 50% of households will use free to air DTT as their main means of receiving TV.

<sup>59</sup> Assuming an installation cost of £150 per household.

<sup>60</sup> This is based on an internet search of prices.

<sup>61</sup> We assume that the value per household is 40% of the average value per household obtained by the BBC.

<sup>62</sup> £2.3bn plus £0.6-0.75bn.

### 5.9.2 Loss of social value

The loss of social value comprises

- the loss in the value of PSB caused by migration from the DTT platform
- the social value directly associated with the HD PSB services, including the social value from universal provision of HD PSB services, should HD become the default format.
  - Migration from the DTT platform has two impacts that lead to a loss of social value.
  - First the scale and quality of PSB content on the platform by advertiser funded broadcasters will inevitably fall. Ofcom forecasts that “if there is no real change to the policy environment, ... provision of PSB will fall substantially”<sup>63</sup> because of anticipated real reductions in the revenues of the commercial PSBs.<sup>64</sup> Even a 10% loss of audience (decrease in advertising revenue) would imply around a further £300m reduction in revenues (operating profit).
  - Second, reduced viewing of PSB as a consequence of the reduced quantity of PSB content and migration to platforms where viewing of PSB content is likely to be lower. For example, viewing of PSB channels for DTT households is 20-100% higher than in satellite households (see Figure 5.9.1).

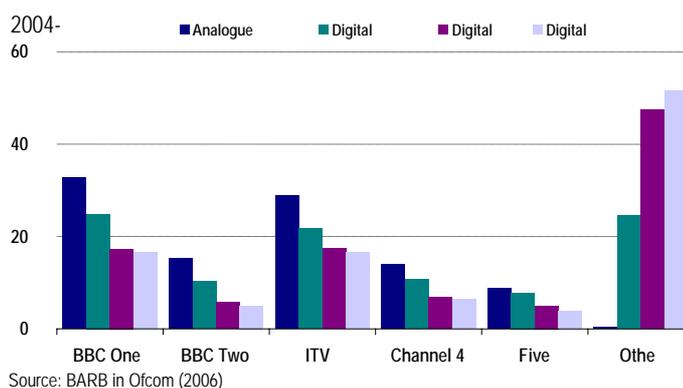


Figure 5.9.1 Channel share by platform

The scale of these impacts depends on the scale of the migration from DTT to other platforms and the extent of competition from non-PSB channels on other platforms. The extent of migration away from PSB viewing will be lower in the scenario where there is a free satellite HD PSB service. We do not have any market evidence on the scale of migration to other platforms, but it does not seem unreasonable to assume that loss of viewing of PSB services in the 5-20% range (on average over the next 20 years) would be possible – where the low end of the range applies in Scenario 2. Current and forecast rapid growth in sales of HD ready TV sets means that around 50% of households are expected to be HD ready by 2010. This and the rapid take-up of pay HD services both suggest the migration to platforms offering HD TV could be considerable.

To evaluate the impact on social value it is necessary to consider the value to society of PSB TV services. Ofcom has estimated that the costs of PSB interventions for TV amount

<sup>63</sup> Para 3.59, Ofcom Review of Public Service Broadcasting, 2004

<sup>64</sup> Economic analysis of the TV advertising market, PWC, for Ofcom 2004

to around £3bn p.a.<sup>65</sup> - this arguably gives an estimate of the value society places on PSB TV. Discounted over a 20 year period this has an NPV of around £45bn.

Hence, for scenario 1, the potential value lost could be around 20% of £45bn i.e. £9bn, and for scenario 2 could be around 5% of £45bn i.e. £2.3bn.

In addition, we need to count the social value associated with HD PSB services themselves which Ofcom estimates to be around 5% of the private value i.e. is £0.3bn<sup>66</sup> for scenario 1 and £0.1bn<sup>67</sup> for scenario 2.

## 5.10 Conclusions

In summary, we conclude that private decisions by PSB broadcasters will not result in socially efficient outcomes. Further, under current funding and institutional arrangements it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum, in which case there would be a significant market failure as all four PSBs must bid together if they are to secure spectrum for a single multiplex to provide HD PSB services.

We estimate that the value lost if PSBs are not able to acquire spectrum through auction ranges from £5.4bn to £15.6bn. The higher value of over £15bn applies if a free to view satellite offering does not enter the market, while the lower value of £5.4bn applies if free to view HD PSB services are available on satellite.

The £5.4bn includes the cost to some households of buying and installing satellite receivers. We note that such costs may not be affordable by lower income households. Our estimates take no account of these distributional issues, though we note this was an important consideration in Ofcom's decision to provide standard definition PSB services to 98.5% of the population using the digital terrestrial TV (DTT) platform rather than satellite services.<sup>68</sup>

	<i>Scenario 1: No FTA HD PSB services on cable or satellite</i>	<i>Scenario 2: FTA HD PSB services on satellite</i>
<i>Private value</i>	<i>£5.7bn</i>	<i>£3bn</i>
<i>Social value from deterioration of the DTT platform</i>	<i>£9.6bn</i>	<i>£2.3bn</i>
<i>Social value from the HD service</i>	<i>£0.3bn</i>	<i>£0.1bn</i>
<i>Total value</i>	<i>£15.6bn</i>	<i>£5.4bn</i>

*Table 5.10.1 Potential loss of private and social value under scenarios 1 and 2*

*Source: Indepen analysis*

Two issues not addressed by this analysis but that could have a bearing on public policy decisions related to digital switchover are as follows.

- *The advent of HD services on cable and satellite potentially undermines the government's cost benefit analysis of digital switchover. In that analysis around half the benefit<sup>69</sup> from*

<sup>65</sup> Table 3.2, Ofcom review of public service broadcasting, Phase 2 – Meeting the digital challenge, 24 November 2004

<sup>66</sup> 5% of £5.7bn

<sup>67</sup> 5% of £2bn

<sup>68</sup> Digital replacement licences to be offered to channel 3, 4,5 and public teletext, Ofcom, September 2004

<sup>69</sup> For switchover in 2012 there is a gross benefit of £6244m of which £2725m is the consumer benefit from DTT in current non-DTT areas and £659m is consumer benefit from additional DTT services that may be supplied (from commercial

*switchover comes from the extension of DTT to areas not currently served. If a significant number of these households adopt free to view or pay satellite or cable services because of the HD content offered, much of the benefit calculated in the government's cost/benefit analysis of switchover will be lost. If this migration occurs before the consumers have bought DTT equipment then there will be an offsetting cost saving, but if the migration happens after consumers have bought DTT reception equipment then there will be no cost saving – just a loss of net benefit.*

- *DTT is the centrepiece of the government's strategy for achieving switchover and universal free-to-air delivery of PSB in an all-digital world. Government has made a public policy commitment to the continuation of the DTT platform as the main way to deliver PSB and, in return, industry and consumers have invested significant sums – over £5 billion – in DTT transmission infrastructure and DTT receivers. The public policy commitment to the DTT platform needs to take into account the technological evolution of the platform from standard to high definition, just as the terrestrial platform has done in the past, in order to remain relevant to consumers.*

\* \*  
\*

The BBC believes it is useful to compare this figure with Ofcom's estimates<sup>70</sup> of the net present value of the incremental private and social value for other uses are as follows

- Mobile multi-media: £0-3bn plus up to 10% for 8-48 MHz
- DTT SD: £0.5-3bn plus up to 10% for 24-112 MHz
- Mobile broadband: £0-2.5bn plus up to 15% for 0-56 MHz
- Mobile communications: £0-2.5bn plus up to 15% for 0-64 MHz
- Local TV: £0.1-1bn plus up to 10% for 8-24 MHz
- PMSE: £0.1-0.5bn for 8 MHz

Mobile services may have difficulty sharing the spectrum with HD TV because of the need for continuous geographic coverage over wide areas, and so we assume conservatively the whole 48 MHz is sterilised for these services. Taking the top end of the range for the higher value services this data suggests the net present value of the opportunity cost of reserving spectrum for HD PSB services would be around £2-3bn.

The opportunity cost of reserving spectrum for HD PSB of around £2-3bn is therefore significantly lower than the £5.4-15.6bn which Indepen has derived for the benefits obtained directly and costs avoided by having HD PSB services on DTT. **For all the reasons set out in this section, there is a good case therefore for reserving UHF spectrum for HD PSB services.**

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multiplexes) in DTT areas. [http://www.digitaltelevision.gov.uk/publications/pub\\_archive2006.html](http://www.digitaltelevision.gov.uk/publications/pub_archive2006.html) and [http://www.digitaltelevision.gov.uk/pdf\\_documents/publications/Switchover\\_memo.pdf](http://www.digitaltelevision.gov.uk/pdf_documents/publications/Switchover_memo.pdf)

<sup>70</sup> Figure 4.4 Consultation Document

**6 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?**

*The BBC welcomes Ofcom's proposal to set aside some spectrum for use by low power PMSE devices. However, it is difficult to see a priori why access should only be granted to one group of users of such devices ("community use").*

The BBC recognises that making some of the Digital Dividend available on a licence-exempt basis will have benefits for many users. Aggregation problems for small and uncoordinated users make it difficult for them to have their needs met another way.

However, the BBC feels that Ofcom needs to undertake a more thorough analysis of the potential impact of a move to wholly unlicensed use on professional users of this spectrum. The BBC, for example, currently uses Channel 69 for wireless microphones used in conjunction with wireless cameras in newsgathering; clearly, it needs to be able to continue to do so free from interference.

The BBC believes that there may well be a strong case for setting aside a proportion of Channel 69 for licensed use and allocating the remainder for unlicensed use. The proportion allocated to each use could be determined by JFMG – or a similar organisation – and Ofcom, which would ensure that the overall requirements of the market are met. It would be most efficient from a frequency planning perspective if the lower part of Channel 69 were set aside for the licensed use as that would be easiest to manage from an interference perspective in relation to the likely new uses in Channel 68. This would leave the upper part of Channel 69 clear for unlicensed use which would then be better protected from any interference from new services in Channel 68.

**7 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?**

*The BBC welcomes Ofcom's proposal to guarantee access for PMSE use to spectrum interleaved with the six existing DTT multiplexes until at least the end of 2012 but is seeking more clarity on how this will work.*

Clearly, Ofcom's proposal is likely to go a long way to help the Government meet its commitments in the UK's 2012 Olympics bid. In Section 15.8 of the UK's Candidate File, the Secretary of State for Trade and Industry guaranteed the allocation of the frequencies required for the organisation of the Games; in Section 15.9, the Secretary of State commits to waiving fees payable for such frequencies. It is worth mentioning that the need for spectrum will be in London where the Games are largely held, and since London's switchover is planned for April 2012, less interleaved spectrum will be available at that time.

However, access to spectrum will continue to need to be coordinated after the current band manager, JFMG ceases to exist in 2008. This will be particularly true over Switchover as spectrum usage will shift considerably not least because as Switchover takes place, PMSE currently accommodated in spectrum to be cleared are likely to move to spectrum interleaved in the six existing DTT multiplexes, increasing such use of this spectrum.

We would therefore welcome clarification of the steps Ofcom intends to take to ensure that access to spectrum is coordinated, in the absence of JFMG, over the period during which Switchover takes place.

The BBC would also welcome certainty regarding access to spectrum suitable for PMSE use after 2012. If such access is determined via auction in 2008, we would urge Ofcom to consider capping the amount of spectrum in any particular geographic area that can be won by a single bidder, as well as imposing a "use-it-or-lose-it" rule, in order to maximise the likelihood that spectrum is made available for PMSE use on reasonable terms and conditions.

- 8 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.**

*The BBC does not have sufficient information to answer this question.*

The BBC would appreciate sight of Ofcom's work or evidence on low-power applications which might be developed in the UHF band.

The BBC would also like to know whether Ofcom is aware of any potential means of harmonisation for low power uses, without which it may be difficult to produce suitable equipment to benefit from economies of scale and generate significant value.

**9 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**

*The BBC believes this is an attractive idea, worth consideration.*

It might be difficult for the regulator (1) to predict, far in advance, which bands and what capacity would need to be set aside for future uses, and (2) to decide when and for which uses it is appropriate to release the spectrum so reserved.

However, the BBC believes that spectrum should be reserved for future use by known technologies for a limited period of time, when, because these are at an early stage in their development, their value is not yet clear enough to warrant intervention or to ensure success in an auction, or when their spectrum needs cannot be met by other bands, or through secondary trading.

High definition television services on DTT are one use that might meet these criteria.

Note relating to questions 10, 11 and 12.

*Before responding in detail to these questions, the BBC would first like to explain how, through detailed planning, a wide range of needs could be met. The following scenario is just an example of what might be done, and how the spectrum might be packaged, whether or not it is then to be auctioned.*

*In order to comply with competition law, details of this example scenario are kept confidential but have been made available to Ofcom.*

This scenario makes allowance within the 14 released UHF channels for:-

- two additional high power DTT multiplexes (to give a total of 8 DTT multiplexes),
- around 60 mobile broadcast TV services in three low power national multiplexes using dense Single Frequency Networks (SFNs),
- a hypothetical WiMax network if required.

In addition, there would be sufficient spectrum to meet the projected needs of:-

- the existing six high power DTT multiplexes (3 PSB and 3 COM),
- PMSE – radiomicrophones to match existing usage,
- Radioastronomy (maintained reservation of Channel 38),
- a number of Local TV services.

In this scenario it was assumed that 3G telephone network operators will have sufficient and appropriate spectrum to meet their needs in the newly assigned 3G Expansion Band at 2.5 – 2.69 GHz which is expected to be released to the market in 2007 i.e. significantly in advance of the completion of switchover. Otherwise the spectrum allocated to the hypothetical WiMax network might also be suitable for 3G services instead). Future compatibility studies would be needed to determine the potential interference from such bi-directional services to adjacent unidirectional services to determine if they could coexist.

### ***Mobile Broadcast TV***

‘Mobile broadcast TV’ is used in this note to describe a family of technologies for broadcasting TV to mobile handsets. These technologies include DVB-H and Qualcomm MediaFLO, and the DAB based technologies DAB-IP (BT Movio) and DMB-T. The former two technologies are suited to 8 MHz channels. The latter two DAB-based technologies are suited to 1.7 MHz channels although four such DAB multiplexes could be aggregated in any 8 MHz channel with the necessary guard bands.

In the scenario described, three UHF Channels are available for mobile broadcast TV. As each 8 MHz wide channel can typically provide around 20 or more good quality mobile broadcast TV services, this spectrum would provide the capacity for around 60 such services which could be sufficient to meet current and immediate future likely demand.

### ***WiMax***

In this example scenario, it was first necessary to determine how much spectrum would be required for a basic WiMax style 'service'. It is considered<sup>71</sup> that a service can be

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<sup>71</sup> 1. [http://www.wimaxforum.org/news/downloads/DeploymentConsiderations\\_White\\_PaperRev\\_1\\_4.pdf](http://www.wimaxforum.org/news/downloads/DeploymentConsiderations_White_PaperRev_1_4.pdf)

realised using around 15 MHz. Therefore, 16 MHz of spectrum (or two 8MHz UHF channels) was set aside for a WiMax network.

There is a trade-off between how many users can be supported in a cell, the available data rate, the number of network providers etc. However, it is felt that the allocation of two UHF channels to WiMax in this scenario could realise a viable WiMax network (subject to there being a commercial demand in this band). In practice however, many of the proponents of WiMax systems seem to be favouring higher frequencies such as 2.5 GHz or 3.5 GHz so these two UHF channels might only be required as a way of delivering WiMax services to remote rural communities (benefiting from the greater cell sizes in UHF) when the number of users per cell could be relatively small. Even then it is arguable that other solutions might be more efficient for delivery of such services.

### ***Local TV***

Local TV services could be realised in interleaved spectrum within the 32 UHF channels retained in the switchover plan. In many cases, Local TV could use QPSK modulation and this would be necessary to minimise interference to the digital switchover network and in the opposite direction; QPSK achieves the same coverage as 64 QAM while using about 10 dB less power. QPSK Rate 2/3 will carry about 8 Mb/s, which is enough for two local television services.

### ***Two Additional High Power Multiplexes***

The above uses still allow ten UHF channels for two new UK-wide high power DTT multiplexes (for standard or high definition services), named here as Mux 7 and Mux 8.

These 2 multiplexes can be realised using fewer UHF channels than currently allocated in the RRC-06 plan; though this revised plan may require additional bilateral agreements with neighbouring countries, this is not felt to be insurmountable.

### ***PMSE***

Sufficient spectrum will remain interleaved within the 32 channels in the 6 Mux switchover frequency plan to enable PMSE to operate to a similar capacity as currently enjoyed by existing devices. If provision is made for high power Muxes 7 and 8 (as described above), it would be possible to find additional capacity for PMSE interleaved within the channels used for these Muxes too.

It seems unlikely that PMSE could share the channels used for mobile broadcast TV because PMSE could be liable to interference from the mobile TV service. Channel 36 is currently used extensively for PMSE and this would raise particular compatibility issues if Channel 36 were to be made available for mobile TV. Nevertheless, there would be adequate alternative provision for PMSE in the channels shared with high power broadcasting.

An initial inspection seems to suggest that PMSE might be able to share with WiMax but this would need to be examined further with a consideration of the likely deployment of the two different uses. In this example, Channel 69 has been set aside, as it is now, exclusively to PMSE. This is because PMSE makes very heavy use of this channel and other needs can be met without gaining access to this channel. All of the above PMSE uses can be accommodated within existing usage without the need for international co-ordination or harmonisation because of the low powers of the devices used.

*The BBC therefore argues, in its responses to questions 10, 11 and 12, that spectrum should be not only packaged in a way that would be suitable for some services, but also reserved for them, in order to avoid as much as possible interference and to limit the need for “guard bands”. This would be a technology-neutral but not a service-neutral allocation mechanism, whether through auctions or not. After this first auction, change of use would be allowed, provided the new use does not generate more interference than the original allocation. This delivers on Ofcom’s spectrum efficiency objective more effectively than a pure market-based approach would do.*

**10 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?**

*The BBC agrees with this proposition but stresses the need to protect professional PMSE use in the interleaved spectrum, as well as, during the switchover process, coverage of the existing services.*

The BBC agrees with Ofcom that local television could bring broader value to society through a better awareness of what is going on in a given community. Plurality in the provision of local television would be an important way of supporting this citizen value, particularly in the area of local news. To further this aim, the BBC agrees with the proposition that some of the interleaved spectrum should be used for local television services. Digital terrestrial transmission could be an important way for community groups and other local media to bring local services to audiences.

However, the BBC also would stress the need to protect professional PMSE use in the interleaved spectrum and agrees with Ofcom's analysis that local content could also be provided on a range of other platforms in addition to digital terrestrial television.

The BBC is already working closely with the Community Media Association and other similar groups to understand the issues involved in making the transition to a fully digital world and to ensure that plurality is encouraged in local television after switchover.

The BBC agrees with Ofcom that further support to maximise the value to society of local television could be found at a local and regional level, through local authorities, Regional Development Agencies, and other public agencies.

One option to manage this spectrum is presented in response to question 17.

**11 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?**

*The BBC agrees that some spectrum could be packaged in a way which does not preclude mobile broadband use. However, packages for mobile broadband use are likely to comprise of one or two frequency channels. Therefore, we do not believe that all the spectrum should be packaged in that way, as it might preclude other usages.*

The BBC would also like to reiterate that there are other more attractive harmonised frequencies in higher spectrum bands, and that the most likely requirement for UHF spectrum is to meet demands in rural locations. Given the localised nature of this requirement, interleaved spectrum might be used to achieve maximum spectrum efficiency although for TV delivery over wireless broadband, traditional broadcast means would probably still be the most efficient.

**12 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?**

*The BBC agrees that the spectrum should be packaged in a way which is suitable for DTT use in addition to other uses but believes that some spectrum should be reserved for PSBs to develop HD services on DTT. The BBC argues that HD services must be available free-to-air on DTT, in order to ensure this platform continues to meet the needs of the millions of households who will continue to rely on it after switchover. There is strong evidence that consumers want HD, that they want the PSBs in HD, and on DTT. However only the allocation of additional spectrum will make this possible.*

The BBC has developed in its response to question 5 all the arguments why it believes there will be a market failure in relation to the development of HD on DTT. It will just focus here on the fact that an auction process would not ensure the socially optimal allocation

- A straightforward auction of released spectrum would be a socially optimal allocation mechanism if there were no material divergence between the social and private value of spectrum in alternative uses. However, when considering potential sources of divergence, it appears that the divergence between private and social value is likely to be high for HD PSB services on DTT. This divergence arises from the impact of not having the spectrum required to provide HDTV on the DTT platform and it is this impact which should be assessed in the appraisal of the need for intervention in the award process.

- Unlike other candidates for this spectrum, there are few, if any, alternative means of delivering HD PSB services while meeting PSB objectives of universality, plurality and free-to-air delivery. Satellite, cable and broadband all involve additional cost for consumers. The combination of these factors constitutes grounds for considering a modified spectrum allocation mechanism.

- The BBC has assessed a number of spectrum award options including: wait and see; a market auction; an auction with bidder credits; and spectrum reservation. It concludes that some form of spectrum reservation for HD best promotes social efficiency objectives (i.e. consumer and citizen interests) while at the same time avoiding practical difficulties with other options and the risk of undermining the DTT platform.

- If Ofcom does decide to award the released spectrum through auctions, then it is incumbent on the regulator to make the potential consequences of doing this clear, in terms of the lack of availability of HD services on DTT, so that consumers who might want HD can make more informed platform choices as they make the switch to digital.

- A decision taken in the next year or so over the allocation of the released spectrum will have irreversible long-term consequences on the development of PSB over the terrestrial platform. This introduces the potential for “regret” (see 20.2) should the wrong decision be made at the outset. It will be easier to take spectrum back from PSBs should HD fail to attract consumers than getting it back from private operators having acquired it through auctions.

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

*The BBC welcomes Ofcom's analysis of market failures, but believes the risk related to the inability of PSBs to bid at a level representing total value has been significantly underestimated.*

Using Indepen's analysis, the BBC has already argued (5.9) that expecting the PSBs to buy capacity on existing commercial multiplexes to transmit PSB services in HD to most of the population has all the same problems of market failure as requiring them to bid in auction. In addition, Indepen has undertaken its own assessment of the loss of value associated with market failure relative to the alternative of free satellite services.

Ofcom has also proposed one other solution to the market failure problem, namely the migration from MPEG2 to MPEG4. Under this option, PSBs would initiate a migration of the DTT platform from MPEG2 to MPEG4 to release additional capacity, while maintaining existing obligations for SD PSB services (Ofcom's Option D). The BBC has explained in section 5.4.1 why this would not work unless additional capacity is made available through some intervention.

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

*The BBC does not agree with Ofcom's proposal to auction licences for the use of the entire Digital Dividend. The responses to previous questions have set out the detailed arguments why the BBC believes some spectrum should be allocated to PSBs. As already developed in its response to Ofcom's consultation on spectrum pricing, the BBC also strongly believes that this is a much better way of achieving the public benefit objectives than other mechanisms such as auction bidder credits or direct funding which we understand are Ofcom's preferred solution .*

The arguments are set out in

- section 3.6. of the BBC's response to Ofcom's consultation on spectrum pricing, 27/10/2006, and in
- section 4 of Indepen's report "Intervening to secure UHF spectrum for HD PSBs", March 2007.

**15 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?**

*The BBC questions both the timing of the release of spectrum and the timing of the auctions.*

***15.1 Timing of the release of the frequencies cleared by switchover***

The BBC reiterates the need to protect the switchover programme, the success of which should be the absolute priority. This means

- allowing for the possible transitional use of “parking channels”
- protecting both DTT and analogue signals in the areas yet to switch
- allowing for power increases, which might appear necessary at switchover
- giving commercial multiplexes the ability to expand to additional sites.

A direct consequence is that services using the cleared spectrum cannot be deployed nationally before 2013.

***15.2 Timing of auctions***

An auction in 2008/9 will set the pattern of spectrum use until 2026/7 despite the rapid pace of technological progress and there being considerable uncertainty about the nature of demand.

It is far from certain that the best way of dealing with uncertainty is to auction the entire DD spectrum for the long periods proposed by Ofcom. It is extremely risky to trust any secondary market to ‘sort things out’ given that, once initial allocation has occurred, spectrum is in non-neutral hands: firms will have little incentive to sell to or trade with potential competitors. For nascent services and businesses, it might also be very difficult to assemble the “right” spectrum bands in a secondary market – especially where a critical mass might be needed to offer a viable scenario. Some rules allowing Ofcom to take back the spectrum under certain, well defined circumstances might be useful.

Whilst services using the cleared spectrum cannot be deployed nationally before 2013, operators will have to decide in 2008 their needs for spectrum, therefore bearing high uncertainty costs. It seems curious that Ofcom is auctioning the whole spectrum with many associated uncertainties, while Ofcom refers to a trade-off associated with delay between lower uncertainty and foregone consumer benefits.

The BBC believes that this trade-off has not received sufficient analysis and there may be a case for delaying the award of at least part of the spectrum.

***15.3 The specific case of mobile television***

The BBC believes that the mobile platform will be an important means of engaging with audiences in the future, particularly those who are currently hardest to serve by PSB,

such as young people. It also potentially offers new ways of engaging audiences, such as providing them with immediate, personalised, location-specific news and information.

The BBC urges Ofcom prior to auctioning L Band to make as clear as possible when substitutes such as Channel 36 will become available for use, as well as any restrictions that may apply to bidding in the relevant auctions. This will maximise the likelihood that a competitive market for mobile media services emerges.

A key question is whether all spectrum in the DDR must be auctioned at the same time. The BBC urges Ofcom to bring forward the date at which spectrum that could be used for mobile media services such as Channel 36 is auctioned (or alternatively to delay the auctioning of L Band). Work is also urgently needed to assess, and propose a timeline to mitigate, interference issues around Channel 36 to ensure that mobile media services will be well established prior to the London Olympics. Could Ofcom also indicate what progress they have made in getting approval for non-radar use of Channel 36 from our neighbours?

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

The BBC agrees that the released cleared spectrum should be offered on a national basis. However, it will not be possible to use any of the cleared spectrum (with the possible exception of Channel 36) on a national basis before the end of 2012.

It therefore seems curious that Ofcom is packaging spectrum with many associated uncertainties, while knowing that it cannot be deployed nationally before 2012. Ofcom refers to a trade-off associated with delay: between lower uncertainty and foregone consumer benefits. In our view, this trade-off has not received sufficient analysis and there may be a case for delaying the award of the process.

Thus with regard to packaging design, the BBC welcomes Ofcom's approach that ensures the spectrum is packaged such that DTT can make use of the spectrum.

Ofcom is seeking to accommodate different uses by packaging the spectrum in such a way that none of the higher value uses is precluded from the award process. Ofcom wants a process that trades off:

- Flexibility
- Aggregation risks (the situation where users might not be able to aggregate spectrum to create usable packages)
- Complexity of auction design

The BBC agrees that these trade-offs should be considered, with a view to ensuring that a proportion of the spectrum is likely to be used for the supply of DTT services.

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

*The BBC believes that the packaging options for the interleaved spectrum favoured by Ofcom will enable PMSE and local TV services to be offered. However, the BBC is sceptical about the degree to which competition can be made to work in the PMSE area – although it would welcome any effective competition that can be stimulated.*

*However, the spectrum is packaged, the BBC is mindful of the need for band management to occur given the practical complexities of PMSE use. The BBC believes more thought needs to be given to this particular issue.*

Channels 21-30 and 41-62 have been assigned for DTT and as a result there is considerable interleaved spectrum within these channels which can be used in a location where the DTT Muxes do not operate. Typically only six channels out of 32 channels will operate in a specific location. This means in each main station area up to 208MHz of spectrum could be used on an interleaved basis.

Ofcom has identified two main uses for the interleaved spectrum:

- Local TV (regional)
- PMSE (national)

Ofcom is seeking to promote local TV and is intending to reserve some of this spectrum for this purpose. The BBC agrees that local TV brings social value but is concerned that any spectrum set aside for local TV should not unduly compromise PMSE use. According to Ofcom's consultants it is possible to have a local TV multiplex in a region alongside PMSE use, with the possible exception in London. The BBC is concerned that Ofcom's desire for local TV in London may compromise PMSE use in the capital.

**The BBC strongly believes that the needs of both local television and PMSE could be more easily met through proper coordination and planning. It would like Ofcom to consider the option of assigning the management of the interleaved spectrum to one organisation** (possibly two, one for each package), which would be responsible for ensuring optimal coexistence of local television and PMSE and managing any interference with other services. With this approach, the auction for the spectrum package(s) would be a beauty contest, where the regulator would select the highest bidder amongst those presenting a satisfactory proposal to manage the interleaved package. The BBC would be ready to participate in any discussions that Ofcom would seek to organise on this proposition.

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

*As outlined earlier, the BBC has serious reservations on the use of auctions for the allocation of the entire DD spectrum and believes at least one third of it should be allocated to PSBs for the development of free-to air- HD services on DTT.*

*However, if an auction is to be used, the BBC would like more information on the details necessary to apply in any of the formats proposed.*

*The BBC would like Ofcom to discuss in greater detail its thinking behind the setting of the reserve prices in the auction. The BBC is particularly concerned that the failure of the BFWA in 2000 is not repeated. There is also little or no discussion regarding detailed bidding rules – who can bid for what. The BBC looks forward to seeing Ofcom’s detailed consultation later this year on the auction rules, and is particularly interested in knowing how Ofcom intends to safeguard competition in downstream markets.*

With regard to the key characteristics of the auction for the spectrum, the BBC wishes Ofcom to choose a relatively simple format that is readily understood and provides for transparency. Having said that, the BBC recognises that package bidding may be desirable which raises complexity and makes an auction less transparent. This is the key trade-off Ofcom needs to consider carefully in awarding this spectrum.

## **19 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?**

*The BBC broadly agrees with the licence terms proposed, although it has doubts on the duration proposed for the licences if they are not associated with clear rules on rights for Ofcom to revoke the licences. The BBC would welcome more clarity from Ofcom on the revocation powers it proposes during the minimum term.*

*The BBC would also welcome more clarity on how Ofcom plans to promote competition. It is concerned that, if the rules are not well designed, the auction might lead to problems in downstream markets. In particular, if a Pay TV operator were to acquire much of the spectrum for DTT purposes, this could lead to a substantial weakening in the position of PSBs and others. While other platforms may offer some form of competitive constraint, the BBC is concerned that the concentration of spectrum in the hands of a few might give rise to competition problems.*

### **19.1 Duration of the licences**

Ofcom has decided that the main non-technical terms will result in:

- Licences having an indefinite duration
- Licences having a minimum term of 18 years
- Limited revocation rights during the initial 18 years
- Revocation to occur with 5 years notice after 18 years (though they may be revoked with 5 years notice to expire after 18 years)

The BBC supports the licence term of 18 years as this aligns the expiry of these licences with the current DTT multiplex licences. It understands that, as UK-wide use of the spectrum cannot occur before 2013, the period probably could not be much shorter. However, it has been explained earlier why the combination of an early award and a long term for licences could be damaging to the UK. Therefore, if Ofcom maintains its timetable for the auction process, the BBC believes it would be necessary for Ofcom or Government to keep ultimate rights of revocation on public policy grounds; this would be separate from any rights of revocation on spectrum management grounds during the minimum term, which should be more limited.

This would of course need to be associated with proper safeguards, in order to ensure that investments are not unduly compromised.

Ofcom has a high degree of confidence that the auction will secure efficient use of the spectrum during the minimum term. The BBC does not share this confidence and would request Ofcom to publish any evidence it has to support this claim.

### **19.2 Ensuring competition**

A major concern for Ofcom should be competition matters. The BBC is particularly anxious to see how Ofcom intends to shape the rules relating to participation in the auction, but also to the potential ongoing acquisition of spectrum.

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

*The BBC does not agree with the assessment done by Ofcom of whether intervention is justified to resolve the market failure identified for HD on DTT.*

### **20.1 General approach**

In Annex 6 of the consultation document, Ofcom explains that they should adopt an approach that maximises welfare, where the welfare measure takes account of both private value (to consumers and producers) and social value (i.e. wider value to society that is external to any individual). This is why Indepen has taken the objective of maximising total welfare as the starting point of their analysis. This is developed in their report.

### **20.2 Potential for “regret”**

Ofcom notes<sup>72</sup> “There is a plausible scenario in which HD reaches a majority of UK homes over the medium term, and viewers come to expect and require most content to be available in HD, including the five main terrestrial channels” and that “if this scenario developed, the DTT platform would probably need to make a similar transition to HD. If it did not, commercial channels might shun the platform preferring only to produce in high definition and large numbers of viewers might switch to other platforms”.

It is therefore necessary to consider the potential for “regret”, i.e. whether a decision that is costly to reverse may turn out, with hindsight, to be wrong, and to include, when this is the case, the costs of regret and/or reversing the initial decision in the impact analysis.<sup>73</sup> There are a number of reasons why it may be costly to reverse a decision not to reserve spectrum for HD PSB services.

First, once the released spectrum is awarded, investors will begin to sink capital into developing and marketing the associated services. If the decision were reversed, they would expect to recoup this investment and any associated harm to goodwill, in addition to the price paid for the spectrum.

Second, the way the spectrum is configured by users may change over time, through trading. Repackaging the spectrum so that it was suitable for use by TV services providing universal coverage could involve substantial transaction costs and take some time, if it happens at all.

Third, a market based allocation may be difficult to reverse because potential sellers of spectrum may “hold out” for a strategic gain, unless of course Ofcom was able to intervene and take back the spectrum using its administrative powers. However, in any case, the use of such powers would necessarily be restricted, in order to avoid undermining market confidence in the value of spectrum assets and thereby the efficient operation of a spectrum market.

Ofcom does not explicitly deal with the issue of “regret” in its impact assessment. As set out in the response to question 5, Indepen has made a partial attempt at doing this by counting the costs to consumers denied service if universal coverage for HD PSB services is not achieved. However, this might not fully capture the social and political value of universality.

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<sup>72</sup> para A8.481 of the consultation document

<sup>73</sup> See Indepen’s report, section 2.2