

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title: Coexistence of new services in the 800 MHz band with digital terrestrial television

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*everything
everywhere™*

*Coexistence of new services in
the 800 MHz band with
digital terrestrial television*

*Everything Everywhere's response to
Ofcom's consultation*

August 2011



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Executive summary

Everything Everywhere welcomes the opportunity to comment on Ofcom's proposals in relation to the coexistence of new services in the 800 MHz band with digital terrestrial television (DTT).

Ofcom has undertaken a thorough technical analysis involving industry stakeholders through a technical working group and we are impressed by the effort Ofcom has put into understanding the issue and assessing mitigation options from a technical perspective. However, we are very concerned that the policy and implementation proposals in response to the technical results are still at the conceptual stage. Detailed, workable proposals now need to be drawn up at a record breaking pace in order to provide certainty and not to delay the auction. We urge Ofcom to also involve industry stakeholders in this process.

Ofcom has proposed that all interference to digital TV services should be mitigated and that the new 800 MHz licensees should pay for this through a lump sum payment as well as a 'tariff mechanism' linked to their network roll out. Unfortunately, Ofcom has not addressed the most important issue, which is that the costs of mitigation are uncertain. The costs will remain uncertain until the new licensees are well into their rollout programme and they are uncertain for reasons that are mainly outside the control of the new licensees.

Having this uncertainty hanging over bidders in the auction for 800 MHz licences gives a clear risk of an inefficient spectrum assignment. Bidders have no basis for knowing how to reduce their bids to take into account the risk of this winner's curse - by definition, the bidder who wins is most likely the bidder who has underestimated the mitigation costs the most. The bid shading in response to the risk of winner's curse would also give lower total auction revenue for Government. Hence we think that on this basis, there is a strong case for the Government setting aside a ring-fenced amount to fund the mitigation from the auction proceeds, including a suitable contingency amount, from the substantial revenues it will generate through the 800 MHz auction.

Everything Everywhere notes that although economic efficiency arguments may, in principle, support the case for DTT viewers paying some of the mitigation costs, we accept that other policy objectives may suggest that is unacceptable. However, a decision by Ofcom and the Government that DTT viewers do not pay does not imply that new 800 MHz operators should pay.

Ofcom is concerned that the new licensees factor the cost of mitigation into their roll out decisions. It is for this reason that Ofcom has proposed a 'tariff mechanism', whereby the new licensees will pay towards mitigation according to the interference caused. But the economic analysis supporting this proposal is cursory and we do not agree that Ofcom's consultation has applied relevant economic analysis to consider the impacts of its proposals on overall economic welfare or on the financial impacts on stakeholders.

The tariff mechanism proposal is flawed for several reasons:

- The new 800 MHz licensees would simply be deploying networks within the technical conditions specified in their licences, which they may have paid large sums for in the auction. The fact that DTT users are in situ does not constitute an argument for the new 800 MHz licensees paying for mitigation. On a cost causation basis, it could be argued that it is the DTT receiver equipment that is causing problems.
- Decisions regarding site locations and parameters by the new licensees will be constrained by past investment decisions, contractual issues and planning constraints. Any reasonable tariff mechanism to fund the likely mitigation costs would not be at a level to impact on incentives in this context and would simply become a business cost on licensees. For this reason the tariff mechanism is a disproportionate response to the challenge of funding mitigation.
- Ofcom should undertake a cost benefit assessment (CBA) by applying its own six principles of cost recovery to the question of who pays for mitigation to promote incentives for efficient investment between the 800 MHz and DTT frequencies.
- Moreover, Ofcom should undertake an analysis of the financial impacts of the proposals on stakeholders (an IA), including an assessment of the cumulative impact of this proposal, taking other recent regulatory decisions into account.

We agree with Ofcom that there are clear benefits to coordinating the mitigation effort. A large proportion of the mitigation costs could be common across two or more licensees and hence a key requirement for delivering mitigation at minimum costs is for a single body to undertake this. This body needs to be separate from the new 800 MHz licensees as it would need to receive commercially sensitive information from all licensees. It should be considered whether any existing organisations could accept this responsibility rather than presupposing a new body needs to be set up. We note that there are some critical institutional and ownership issues for a 'MitCo', which Ofcom has not yet touched on, such as what happens to any surplus that a MitCo may produce and how disputes are dealt with. If viewers do not have to pay for mitigation, there is a clear moral hazard issue whereby some viewers could take the opportunity to ask MitCo to remedy reception problems completely unrelated to interference from LTE800.

In conclusion, Ofcom has not put forward any compelling arguments for why the new 800 MHz licensees should pay - on the contrary, the uncertainty of the costs suggests they should not. A tariff mechanism will have no incentive benefits and hence the costs of developing and operating a tariff mechanism cannot be justified. We think there are clear benefits to a MitCo managing the mitigation effort, where MitCo is funded by the Government with that funding coming out of the auction proceeds. In order to minimise the costs of the mitigation effort, we think MitCo should 'buy' consumer-based as well as network-based mitigation as appropriate. We are interested in working with Ofcom to develop this proposal further and work further on the institutional set up and terms of reference for MitCo.

1 Introduction

This is Everything Everywhere's response to Ofcom's consultation "Coexistence of new services in the 800 MHz band with digital terrestrial television" ("the consultation"), published on 2 June 2011.

Ofcom has undertaken thorough technical analysis of the potential scope of the interference problem with the involvement of industry stakeholders. We applaud the effort Ofcom has put into the technical analysis including the summary of the modelling assumptions and input parameters that have already been discussed with industry stakeholders. Through this analytical process, some important policy decisions have already been covered, for example that indoor antennae for DTT reception are not considered part of the problem and hence should not be part of the mitigation effort. This means that good progress has been made in understanding the scale of the potential interference issue and the relative merit of different mitigation measures, allowing Ofcom to put forward in this consultation its assessment and initial conclusion with respect to the role that different mitigation measures should play. This is helpful and should allow the debate to move forward.

Having made a lot of progress on the technical analysis, we urge Ofcom to now focus on the implementation aspects where a number of important policy issues remain. We believe it is critical that Ofcom now develops detailed proposals for how:

- the mitigation effort is funded; and
- how mitigation is implemented and organised in practice.

These implementation issues are by no means trivial compared to the task of undertaking the technical analysis. Indeed, looking back at the time it took Government to set up the support functions for the Digital Switchover (DSO) and associated governance structure, it is clear that Ofcom must now develop a relatively streamlined framework for mitigation at a record breaking pace in order to provide certainty and not to delay the auction.

In the rest of this document, we first explain our views on how mitigation should be funded and who should pay (in sections 2 and 3). We then comment on the mitigation measures put forward in the consultation document (section 4) before highlighting some of the challenges related to implementing mitigation (section 5) and describing an alternative proposal, which we think have merit (section 6). Finally, we answer the specific consultation responses (section 7) with reference to the previous sections.

2 Funding mitigation under uncertainty

Ofcom has concluded on the basis of its assessment in paragraphs 5.24 - 5.28 that it has to act to mitigate interference to DTT from new services in the 800 MHz band. The basis of this is the history and specific circumstances around the planning of both DTT and 800 MHz services. As such we do not take issue with this conclusion but there should not be any general assumption that communications network service providers are responsible for mitigation of interference with television signals. However, this still leaves the important issue of how the mitigation effort is funded.

Ofcom has not yet put forward a detailed proposal for funding but it is now urgent that Ofcom works with those who would be affected by such funding structures to develop a detailed proposal in order to avoid causing delay to the auction time table. Our understanding of the concept for funding that Ofcom has put forward in this consultation document is that:

- The new 800 MHz licensees (i.e. winners of 800 MHz lots in the auction) would bear the cost of mitigation.
- The cost would consist of two parts:
 - a lump sum payment to cover ‘fixed’ costs of mitigation (the cost of establishing MitCo is the only example mentioned of what might constitute a ‘fixed’ cost in this context); and
 - a tariff mechanism to determine and attribute “controllable and predictable costs of interference and mitigation measures”¹ to individual licensees.
- There is no specific proposal yet for how the uncertainty of the costs would be dealt with.

The fact that the cost of mitigation is associated with very significant uncertainty is in fact, we believe, the key issue for designing an efficient funding mechanism. For this reason it is unhelpful to discuss funding without addressing the issue of uncertainty. Hence we comment on the issue of uncertainty first and explain why we believe that, in light of the uncertainty, the best funding mechanism is for the Government to ring-fence a budget for mitigation from the auction proceeds.

Ofcom has estimated that 750,000 households could be affected by DTT interference. Despite the effort and rigour Ofcom has put into this analysis, it remains the case that the analysis is based on a number of assumptions and some of these assumptions could have a material impact on the estimated number of affected households. Moreover, because the majority of mitigation will be consumer-based and there is uncertainty over the costs and take up of this, Ofcom’s estimated cost of mitigation at £100 million is associated with a very significant level of uncertainty:

- It is not known what type of TV aerials and other receiving equipment are in use, nor is the geographical distribution of the different types of receiver equipment known. The risk of interference depends on the type and quality

¹ Paragraph 6.53

of receiving equipment in use and hence the cost of mitigation depends on the receiver equipment.

- The cost of mitigation may depend on the personal circumstances of the individual viewer (e.g. whether a tech savvy able-bodied viewer or a disabled person).
- Future policy changes, e.g. the DCMS has just launched a consultation suggesting that a new mux is licensed specifically for local TV using geographically interleaved spectrum.² This could potentially increase the extent of geographical areas in which UHF channels 58, 59 and 60 are used for DTT and hence increase the number of households affected by interference.³
- It is not known how many winners of 800 MHz spectrum there will be and hence how many LTE800 networks may be rolled out.
- It is not known how many base stations each licensee will roll out (although existing MNOs will be able to give Ofcom a good estimate), the exact location of these base stations as well as other network parameters such as antenna height and power levels.

Of these unknowns, it is only the network dimensions (number of base stations, location and other dimensions) of their own network plans that individual bidders control and hence have the opportunity to take into account when bidding in the auction. These would seem to account only for a small proportion of the mitigation costs that could be required.

2.1 Winner's curse

Because the majority of mitigation costs are unknown to the prospective new 800 MHz licensees and outside their control, any bidder for 800 MHz licences would be poorly placed to estimate the extent of mitigation costs when placing their bids in the auction. Hence it would seem to constitute what auction theory refers to as “common value uncertainty” (as opposed to “private value uncertainty”). A common value auction is where the asset for sale has the same value to all bidders but these bidders may differ in their estimate of this value. Conducting an auction in the presence of common value uncertainty may lead to “winner’s curse”: ironically, the bidder who is most likely to have overestimated the value of the asset is also the bidder most likely to win but will by definition regret having won if on average bidders were right in their estimation of value.

Of course rational bidders anticipate this risk and hence factor into their bid the risk of winner’s curse by lowering the amount they bid. Over time and through repeated auctions, bidders would learn how much to shade their bid to account for the risk of overpaying, to the extent where winner's curse is no longer an issue because bidders have fully anticipated this risk and they know how to adjust their bids to take account of it. (But the auction proceeds are of course reduced compared to the initial auction where adjustments were not made.)

² DCMS, “A new framework for local TV in the UK”, July 2011

³ In this instance we would not expect the 800 MHz licensees to be responsible for any interference mitigation.

The issue for the upcoming auction of 800 MHz and 2.6 GHz spectrum is that bidders have no basis for making the right adjustment to their bids to reflect the uncertainty of the costs of mitigation. Although three 800 MHz auctions have now taken place in Europe (Germany, Sweden and Spain), there is still very little practical experience of deploying LTE800 networks and hence not much experience of the level of interference caused and the cost of mitigation from countries whose DTT penetration or requirements for mitigation are similar to the UK.⁴ This means that if the mitigation cost uncertainty is not removed from the licences before the auction, bidders face a real risk of winner's curse and they will attempt to shade their bids to avoid this. Bidders will take different approaches to bid shading (because they have different expectations to the mitigation costs, different attitudes to risk etc.) and the bidders who actually valued the 800 MHz spectrum the most may not win simply because they have shaded their bids to a greater extent in the light of uncertainty. This would lead to an inefficient assignment of spectrum, which we believe would contradict Ofcom's statutory duties. It is critical for the efficiency of the auction outcome that winners are not subject to a future liability, the size of which is uncertain when bidding for 800 MHz spectrum in the auction.

We would suggest that this risk could most easily be managed by the Government ring-fencing a budget to pay for the mitigation exercise from the auction proceeds, including a sufficient contingency fund.

2.2 Precedent

We have considered whether there is any precedent for how similar costs have been met in other circumstances. Whilst it is difficult to point to cases which have exactly the same characteristics, we believe it is relevant to consider the DSO.

The characteristics of the DSO information and support seem similar in at least the following respects:

- the issue was how to support in situ users through the change in order to make more capacity available for additional content and to create a Digital Dividend;
- the costs of 'mitigation' were uncertain at the time of setting up Digital UK and the Digital Switchover Help Scheme; and
- a very large portion of costs were common across the mux licensees (we return to the issue of common costs in section 3.1.1)

Ofcom's current proposal for a 'MitCo' seems in many ways modelled on Digital UK and the Digital Switchover Help Scheme, which are generally considered to have been successful.

Whilst the Public Service Broadcasters are funding the upgrade to the television transmission network as well as Digital UK's ongoing operational costs, the significant costs of the Digital Switchover Help Scheme (approx. £600 million) and information campaigns undertaken by Digital UK (approx.

⁴ We note that none have adopted the same thinking as Ofcom in relation to mitigation

£200 million) are funded through a ring-fenced amount.⁵ It is now clear that both types of costs provided for by the ring-fenced amount will not require the entire amount set aside – i.e. it would seem that the original budget must have included some contingency for costs that were uncertain at the time of budgeting.

We suggest that the funding arrangement for MitCo could also be modelled on this experience with a ring-fenced, lump-sum budget.

⁵ “The Digital TV Switchover Programme, Programme Structure”, July 2010, Digital UK, the Digital Switchover Help Scheme Ltd., the Department for Culture, Media and Sport, the Department for Business Innovation and Skills and Ofcom.

3 *The funding mechanism and incentives*

Ofcom is clearly concerned that the funding mechanism should place appropriate incentives on the parties concerned. It is on this basis it has proposed the tariff mechanism. Notwithstanding our preference for funding mitigation from the auction proceeds, we therefore comment on the idea of a tariff mechanism and more generally, what an economic framework would suggest for funding in terms of creating appropriate incentives for investment.

Everything Everywhere believes that Ofcom's proposal requiring the new 800 MHz licensees to pay the full mitigation costs, including "consumer-based based mitigation measures",⁶ is not soundly based. The arguments presented in paragraph 6.53 of the consultation document are cursory and do not constitute a proper economic analysis of the issue of who should pay for mitigation in order to promote the right incentives on the various economic agents concerned.

This section has three parts. First we outline the key elements of Ofcom's tariff mechanism and explain why Everything Everywhere does not think the mechanism provides sufficient incentives for efficient investment. Second, we explain why Ofcom's six principles of cost recovery do not support its proposal that new 800 MHz operators pay the full DTT mitigation costs. Third, we summarise our views.

3.1 *The tariff mechanism*

Ofcom states the purpose of the tariff mechanism is to encourage new licensees to make efficient decisions about their network roll out that reflects the cost of mitigation. For example, in theory one might imagine that a licensee could choose between two site locations in a town: site (a) and (b). Both sites are assumed to provide the same coverage and capacity benefits but where site (a) gives rise to less interference than site (b), site (a) is also more expensive to operate because of higher rents to the landlord. As the licensee would have to pay the costs of mitigation through the tariff mechanism, the licensee would choose site (a) when the higher rents were less than the costs of mitigating the additional interference arising from site (b).

However, whilst a tariff mechanism might create desirable incentives for licensees in principle, we cannot see how it can be made to work in practice. This is for number of reasons:

- A tariff mechanism to be imposed on individual licensees would need to take into account the high proportion of mitigation costs that are common to more than one licensee.
- Site locations and configurations are driven by past investment decisions and other constraints such as planning and contractual constraints. The level of tariffs needed to cover mitigation is unlikely to have any impact on

⁶ Ofcom classifies DTT receiver filtering, Improvements and alterations to DTT installations, Re-orientation of DTT aerials and Platform changes as consumer-based mitigation measures in paragraph 5.17.

site location choice or site configuration, but would simply become a business cost for licensees.

- The costs of developing and operating a tariff mechanism that sets the right incentives would be disproportionate to the modest (if any) incentive benefits it could deliver compared to other funding options.

We explain these views in detail in the following sub-sections.

3.1.1 Tariff mechanism and common costs

A very significant proportion of mitigation costs (53%) relate to receiver filters as these can remedy an estimated 676,000 cases out of the total 760,000. These costs are common to most or all licensees, depending on the number of households that could be affected by more than one of the new 800 MHz licensees. For example, assume that two operators who share sites both won licences in the middle or upper part of the 800 MHz band. Say that a viewer finds she suffers interference when the first of the two licensees switch on LTE800 on a nearby site, but that this can be resolved with the use of a receiver filter (because it relates to receiver overload). It is then highly likely that there are no further costs of mitigation for this viewer when the second licensee deploys LTE800 on the same site (or indeed a third or fourth licensee deploys on a different site within the same proximity of the viewer). For the tariff mechanism to include an appropriate incentive mechanism to individual licensees, it would need to take into account that some mitigation costs are common across licensees and hence less costly for the individual licensee to solve. We do not believe that this issue has been reflected in Ofcom's consideration of a tariff mechanism. We note this cannot be resolved by making the first licensee pay as that would give an unfortunate incentive to 'wait and see' before rolling out LTE800 in the hope that somebody else would pick up the mitigation bill. Nor is it a question of simply including hefty discount in the tariff mechanism for shared sites as this would not take account of sites nearby.

3.1.2 The level of tariffs needed would not change incentives of licensees

For existing MNOs, decisions on where to locate LTE800 sites (and often other design features such as the height of antennae) would be driven by our existing site portfolio. Our experience suggests that acquiring a new site can cost anything from £10,000 up to £100,000 and it can take from six months to five years to get it through planning approvals and building. Hence deploying LTE800 would be a question of upgrading existing GSM and/or UMTS sites wherever possible rather than deploying new ones, simply because the capital expenditure and potential time scales associated with acquiring new sites are prohibitive. The capex implications of acquiring new sites mean that Everything Everywhere is committed to certain site locations through past investment decisions (including decisions on site consolidation as a result of the merger between Orange and T-Mobile) and we are not in a position to plan our site grid to minimise DTT interference.

In addition to past investment decisions determining the site portfolio we would choose from for LTE, there are a number of contractual and planning issues

associated with upgrading existing sites. If we were to deploy LTE800, the network planning team would identify which of our existing sites to target (incl. ideal power levels, antenna height and antenna tilt) based on a radio planning exercise. It would then be up to the estate management team to execute this plan. This would typically involve:

- acquiring the legal rights to alter the structure through negotiations with the landlord;
- identify any structural issues preventing the deployment of new antenna and possible improvements to structures needed; and
- identify any planning constraints that may prevent the antenna upgrade, e.g. a new planning consent may be needed or planning restrictions could require that the antennae are placed lower on the structure than desired.

A very simplistic estimate suggests that tariffs could range from perhaps a couple of hundred pounds to a couple of thousand pounds.⁷ A difference in tariffs of say £2,000 between two alternative sites or two different site configurations is simply not going to have any impact on the site choices of 800MHz licensees given the capex and operational constraints described above. There is very little ability, if any, for our site selection process to respond to a tariff mechanism. An additional cost imposed on a particular site location as a result of a tariff mechanism would not influence the decision of where to locate an LTE800 site or the site configuration. The tariff would simply have to be absorbed as a business cost. This means the whole premise of the tariff mechanism, namely to get 800 MHz licensees to internalise DTT mitigation cost is invalid.

3.1.3 The costs of funding mitigation through a tariff mechanism are less than the benefits

A simple tariff mechanisms based on the number of base stations deployed and the frequency ranges they transmit in would not be able to capture the complexity of the costs of solving the problem and hence would not generate the right incentives for licensees (if you believed that licensees could in fact respond to such incentives). On the contrary, it would distort incentives for quick network rollout, and efficient use of the licences because inevitably licensees that rolled out more base stations for the widest possible use of the 800 MHz spectrum would pay more. As a general rule, lump sum payments are less likely to lead to distortions than tariffs, as lump sum payments these are effectively sunk costs which do not distort future investment choices.

A complex tariff mechanism on the other hand, which used a model to predict the extent of interference created and the costs of remedying it, would provide an unreasonable overhead compared to the size of the problem. In addition to the parameters listed in paragraph 6.36 and the issue of common costs, the obvious point that television transmitters are frequently used as mobile sites should be considered, in which case interference should be low as TV reception levels will be high. As we explain in section 3.2.5, such a tariff mechanism would be time consuming and expensive to set up and also require

⁷ Based on Ofcom's estimate of total mitigation costs of £100m of which the £25m to set up MitCo would be funded through lump sum payments. This leaves £75m to recover through tariffs from, say three licensees who each roll out approximately 10,000 sites, which would correspond to £2,500 on average per site.

ongoing additional administrative costs for Ofcom and licensees. We do not agree with Ofcom's statement in paragraph 2.19 that the consultation can be considered an impact assessment in relation to the tariff mechanism proposal. We have not seen any impact assessment from Ofcom showing that the incentive benefits of the tariff mechanism compared to other ways of funding mitigation would exceed the costs of developing and running a suitable tariff mechanism. In fact as explained above, we believe it is very unlikely there would be any incentive benefits at all.

3.2 Ofcom's six principles of cost recovery

Ofcom's six principles of cost recovery reflect Ofcom's preferred analytical tool for ensuring costs are recovered from parties in such a way as to ensure efficient investment incentives (in the absence of commercial negotiation).⁸ We find it interesting to consider what these principles would suggest for assessing who might be best placed to manage the costs of mitigation.

Ofcom's six principles of cost recovery are:

- Cost causation
- Cost minimisation
- Competitive effects
- Distribution of benefits
- Reciprocity
- Practicality

We consider these principles in turn below (except reciprocity which we do not believe is relevant in this context) and note that none of the principles would suggest that the new 800 MHz licensees should solely manage the cost of mitigation.

3.2.1 Cost causation

On a cost causation basis, economic efficiency is best served by making the party who causes the cost to pay. Accordingly it could be argued that DTT services are in situ and as the new 800 MHz licensees (through their LTE investment decisions), will cause interference to DTT services, the 800 MHz licensees should pay the full cost of interference and mitigation. However by Ofcom's own analysis, the state of DTT viewers' equipment influences the size of the negative externality on DTT services and the cost of mitigating it. The 800 MHz licensees are simply providing services within the conditions of the licences they have acquired at vast expense. For instance, receiver overload is caused by digital TV receivers that are overly receptive to signals which were

⁸ "The six cost recovery principles were first outlined in the Telephone Number Portability report by the then MMC in 1995 (http://www.competition-commission.org.uk/rep_pub/reports/1995/374telephone.htm#full). The six principles have subsequently been regularly applied by Ofcom in various market reviews and disputes under the Communications Act 2003 (UK), as well as competition investigations under the Competition Act 2000 (UK). For example, Ofcom applied the six principles when proposing to implement new mechanisms to manage the allocation and use of geographic telephone numbers in 'Geographic telephone numbers Safeguarding the future of geographic numbers', 25 November 2010 (<http://stakeholders.ofcom.org.uk/binaries/consultations/geographic-numbers/summary/geographic.pdf>). Most recently, these principles were proposed by Ofcom to assess "point of handover charges" for leased lines in its consultation LLCC PPC Points of Handover pricing review: Proposal for modification of SMP Conditions, 26 January 2011 (<http://stakeholders.ofcom.org.uk/binaries/consultations/points-handover-pricing/summary/main.pdf>).

part of the terrestrial broadcast range but are no longer. This problem is relatively easy to remedy for UHF channels below channel 58 by fitting an inexpensive receiver filter. We would imagine that if exposed to the right incentives, manufacturers of DTT receivers would integrate such filters into new receivers. In other words, this problem could be argued to be caused by an overly receptive receiver, which was built for the pre-DSO era rather than the transmission of signals by new 800 MHz licensees. DTT viewers may also find themselves interfered with because their TV aerial is orientated towards a different aerial transmitter than where they get the strongest signal and in this way they receive undue interference. In this case, it is very clearly DTT viewers who are the causal driver of interference and it can under no circumstance be argued that 800 MHz licensees are best placed to mitigate.

Everything Everywhere notes that this may be slightly different for adjacent channel leakage from LTE800 transmitters because receiver filters are more effective in combination with transmit filtering and hence the cost causation in those instances is less clear.

Taken in the round, Ofcom cannot simply ignore cost causation when making a considered decision on who pays for mitigation.

Application of the cost causation principle suggests there is no clear case for the new 800 MHz operators solely to pay for internalising the externality – in fact, the picture with regards to cost causation suggests costs be shared. This clearly undermines Ofcom’s proposal that the cost of ensuring interference free enjoyment of DTT services should be met solely by the new 800 MHz operators, since on a cost causation basis, a large proportion of the costs of mitigation can be managed by DTT viewers.⁹

The remaining five cost recovery principles either support sharing of costs (between DTT viewers and 800 MHz licensees) or that the costs be met fully by DTT viewers or the Government on their behalf.

3.2.2 Cost minimisation

Ofcom argues all mitigation activity and costs must be borne by the new 800 MHz licensees (even where the mitigation activity is undertaken with respect to DTT receivers or aerials). This clearly creates perverse incentives on DTT viewers by removing the incentive for consuming the optimal mitigation equipment mix that provides the most cost effective shielding from interference. If DTT broadcasters, viewers, receiver equipment manufacturers and installers expect that any future mitigation costs relating to DTT reception will be met by a third party, there will be no incentive for them to have regards to their own behaviour, including purchasing decisions. This could create a risk that equipment manufactures do not improve their equipment to take account of the Digital Dividend and the availability of mobile broadband services in the 800 MHz band.

⁹ We note with interest that in the Netherlands, an industry self regulation agreement between Mobile Network Operators (‘MNOs’) and cable operators with respect to possible interference from 800 MHz into coaxial cables has been reached brokered by the Government. Our understanding of this agreement is that there is an obligation on MNOs and cable operators to provide information to consumers about potential interference but that cable customers will have to pay for any upgrade to equipment needed.

Everything Everywhere understands that manufacturer and broadcaster incentives with regards to future mitigation are being (at least partially) dealt with by standardisation and regulation. However, the risk remains that some costs will not be minimised.¹⁰

Everything Everywhere considers that the principle of cost minimisation undermines Ofcom's proposal that the exclusive rights to interference-free DTT services should be paid for by the new 800 MHz licensees since this will generate perverse incentives whereby improvements in future receiver equipment are only achieved through regulatory intervention and whereby the costs of consumer-based mitigation costs are not minimised.

Everything Everywhere considers that on a cost minimisation basis, there is no argument for the new 800 MHz licensees to bear the full cost of mitigation. Rather cost minimisation would simply support Ofcom's proposal that a single body ('MitCo') should undertake all mitigation so that the economies of scope manifested in the high proportion of mitigation costs that could be common can be achieved.

3.2.3 Competition

Everything Everywhere does not believe that the issue of "who pays" is associated with any significant competition concerns and hence this principle cannot guide us in this regard. However competition concerns are relevant to the question of "how" mitigation is paid for.. Any tariff mechanism as discussed by Ofcom in paragraph 6.36 would necessarily involve an element of licensees paying per site deployed whether this is reflected explicitly in the tariff mechanism or implied by a calculation of interference.¹¹ The site grid of existing operators who do not have low frequency spectrum (i.e. H3G and Everything Everywhere) is not optimised for low frequency spectrum. We have more sites than the 900 MHz operators (i.e. Vodafone and O2) whose site grid was built for low frequency, because with 1800 MHz and 2.1GHz we need to have more sites to achieve the same coverage. Whilst we would not have to roll out LTE800 on all our existing sites in order to achieve good coverage, we would nonetheless have to roll out LTE800 on more sites than operators with a 900 MHz site grid to achieve the same competitive level of coverage. This means that a tariff mechanism would mean that if Everything Everywhere and/or H3G were to win 800 MHz licences they would be faced with a higher proportion of the mitigation costs than O2 and/or Vodafone in equivalent circumstances. This is clearly inequitable.

3.2.4 Distribution of benefits

Everything Everywhere considers that DTT broadcasters and audiences have benefited directly from the introduction of DTT. Whilst DTT broadcasters have obviously invested significant amounts in content and DVB-T transmission technology, they now have much more capacity for broadcasting. DTT viewers

¹⁰ EE recognises that it is not desirable, practical or proportionate that TV manufacturers incorporate filters at additional cost into all TV sets (Block A - channel 60 protection) where only a limited number of sets will ever require such protection.

¹¹ We know interference will be higher the more base stations are deployed because of the receiver overload issue.

have access to many more (primarily free-to-air) channels through small, one off investments in DVB-T receiver equipment. The Government will also benefit from awarding the Digital Dividend by auction, by which it will generate a potentially large sum of money for the public purse. Future mobile broadband customers will benefit by getting access to new services to the extent that there is a consumer surplus. The 800 MHz licensees however, can expect to hand over any potential producer surplus through auction payments. Everything Everywhere considers that between DTT broadcasters and viewers, the Government and the new 800 MHz licensees, the Government is likely to have from the greatest financial gain from the Digital Dividend and hence it should pay for mitigation. The Government may consider that paying for mitigation is a small cost that it has to bear in order to award the Digital Dividend without unnecessarily restrictive technical licence conditions and to avoid the introduction of possible uncertainties that would reduce the amount that bidders would be prepared to pay for 800 MHz spectrum in the auction and potentially lead to an inefficient allocation of this valuable national resource.

3.2.5 Practicality

We do not think that requiring the new 800 MHz licensees to bear the full mitigation costs is the most practicable or least complex option available, particularly not if this was done by a tariff mechanism. Ofcom should ensure that the cost of administering any pricing system is proportionate compared to the benefits it delivers. Therefore the question relevant to Ofcom's tariff mechanism proposal is how much a particular tariff system/charging schedule costs to implement and the incentive benefits of such a scheme. We note here that setting up a tariff mechanism, which is sufficiently sophisticated to produce efficient and effective incentives will be difficult and costly. It will also require ongoing administration costs both for Ofcom and for 800 MHz licensees. As explained in section 3.1, we do not believe that a tariff mechanism would actually influence the incentives of 800 MHz licensees when rolling out LTE800. Hence Ofcom is required to undertake an impact assessment of its tariff mechanism proposal showing that the costs of developing and running this would be less than the benefits it could deliver compared to alternative funding mechanisms.

In addition, because any tariff mechanism will have to be developed prior to the auction taking place and therefore also prior to any 800 MHz roll out plans, it will be developed in the abstract. This implies a further practical difficulty. It will be very hard to adjust any tariff mechanism in light of experience post the auction. Unintended consequences of any tariff mechanism cannot therefore be corrected. The same does not apply to an approach where MitCo buys freedom from interference, as we suggest in our concluding section 6.

We note that it would be much more straightforward and practical for the Government to fund the mitigation effort out of the auction proceeds or alternatively to require the new licensees to pay a lump sum per 2x5MHz lot, which obviously must be clearly stated in advance of the auction.

To the extent these alternatives make it easier for Government to earmark the money for mitigation, this could be viewed as a means for satisfying the

principle of practicality, albeit by giving a lower weight to the other cost recovery principles.

3.2.6 Summary

Everything Everywhere considers that Ofcom's analysis of who should pay the costs of mitigation is inadequate. In particular, there are two fundamental flaws with Ofcom's proposal.

First, Ofcom should not simply ignore relevant economic frameworks when assessing the question of who pays for mitigation, including when undertaking a CBA and an IA (which are essentially the application of economic tests).

Second, according to cost causation, cost minimisation, competition, distribution of benefits and practicality principles, there is no case for the new 800 MHz licensees funding mitigation solely. It is economically efficient for the Government to pay for a large proportion of mitigation. Of all the relevant cost recovery principles, only one – namely the distribution of benefits- would suggest no sharing of costs but rather require Government pay, including from the proceeds of the 800MHz auction.

We therefore strongly advise Ofcom to revisit its proposal that the 800 MHz licensees should fund the full cost of mitigation by undertaking a thorough analysis of relevant economic frameworks.

3.3 Conclusions on funding

Ofcom has proposed that new 800 MHz operators should pay for the full costs of mitigation of interference from 800 MHz to DTT services. The fact that DTT services are in situ is, in Everything Everywhere's view, inadequate as a justification for Ofcom's proposals.

In designing a funding mechanism, Ofcom must address the uncertainty in regards to the costs of mitigating interference from 800 MHz to DTT. By making no provision within its proposals for uncertainty as to the quantum of the costs of mitigation, Ofcom's proposals are unworkable in their present form.

Ofcom rightly recognises that its proposals must provide the right incentives to encourage efficient investment between the 800 MHz and DTT frequencies. Everything Everywhere does not believe that the desired incentives are created by the tariff mechanism. The price signals that would be generated under the proposed tariff scheme will, in practice, be ineffective in influencing decisions of new 800 MHz operators.

On the contrary, Everything Everywhere believes that because more than 50% of the mitigation costs refer to DTT receiving equipment which is owned and controlled by viewers, there is an economic rationale for viewers paying, at least in part, for mitigation. This would send the appropriate price signals to DTT viewers in order for consumer based mitigation to be implemented cost effectively and in turn, for DTT receiver equipment manufacturers to improve future equipment. We note that this latter concern is being addressed through regulation and standardisation and hence the incentive argument for DTT

viewers paying for consumer-based mitigation is less relevant and for other policy reasons, the Government can choose to pay mitigation on behalf of DTT viewers.

4. Mitigation measures

Everything Everywhere generally supports Ofcom's high level conclusions on mitigation options. Our preferences for mitigation are the use of DTT receiver filters and appropriate improvement in base station transmit filter performance. We believe these offer the most efficient and effective solution.

We have a number of specific comments and concerns relating to some of the mitigation measures, which Ofcom considers in the consultation, namely:

- Polarisation discrimination;
- On-channel repeaters ("OCR");
- Base station power reductions (EIRP limitations);
- Base station transmit filters; and
- DTT receiver filtering.

We set out these in turn below.

Polarisation discrimination

Everything Everywhere notes the results from the field trial which highlighted the uncertainty of propagation polarisation isolation between LTE transmitter and DTT antenna in the suburban environment. Everything Everywhere believes that similar results would be obtained routinely due to the near clutter path of propagation leading to loss of orthogonality as a result of clutter reflections. Everything Everywhere also re-iterates its view that MIMO¹² implementation using single polarisation orientation would be unfeasible. This is due to MIMO path de-correlation requirements and the lack of spatial separation that could be achieved in antenna designs and spacing within the requirement to meet mast loading physical dimensions and LPA acceptance. We believe (given the above) that a policy to mandate polarisation would be a disproportionate regulatory response and other mitigation techniques offer a more effective and efficient way forward.

OCR deployment

Everything Everywhere supports Ofcom's analysis and notes that it is not possible to deploy OCRs in low DTT signal strength areas given minimum output to donor antenna isolation requirements. Everything Everywhere believes it would also be challenging to achieve the necessary isolation on many mast structures including in stronger DTT signal strength areas. We agree that OCRs offer limited potential as a mitigation mechanism given the above and that the additional engineering and planning complications of their installation and maintenance makes them a non-preferred option.

Limitation to MFCN¹³ EIRP¹⁴

Everything Everywhere supports the Ofcom analysis that restriction in EIRP has a deleterious effect on indoor coverage. We note additionally that restriction in

¹² Multiple-input and multiple-output.

¹³ Mobile/fixed communications network

¹⁴ Equivalent isotropically radiated power

EIRP will tend at the margin to increase deployed site numbers and thus offset any theoretical reduction in interference achieved. EIRP limits should be set at close equivalence to those at 900MHz to allow competitive, cost effective rollout of infrastructure.

Generally, we cannot support Ofcom's suggestion in paragraph 6.63 that it may be proportionate to include licence conditions imposing further restrictions on the in clock emission levels in the 800 MHz licences in certain geographic areas. Whether this is proportionate depends entirely on the number and extent of such geographical areas. We understand that this approach was adopted in Sweden for the lowest 800 MHz block of 2x5 MHz and the auction price for this lot was substantially lower than other lots, showing the costs of this approach as a mitigation measure.

MFCN base station transmitter filtering

Everything Everywhere notes that little additional improvement in Adjacent Channel Interference Ratio is achieved beyond the first adjacent DTT channel by improvement in MFCN base station Adjacent Channel Leakage Ratio (ACLR). Everything Everywhere suggests that Ofcom should therefore be careful not to mandate excessive transmit filter requirements which deliver little or no mitigation benefit.

Everything Everywhere queries the decision to assume an enhanced base station ACLR of 76dB. We have found considerable variance in performance across manufacturers. Ofcom should consider lower ACLR values in light of the comments regarding ACIR above.

Filtering at the DTT Receiver

In general we support the Ofcom analysis but note that in the cases of overload on upper DTT channels, Ofcom should consider whether low cost filters should be so offset as to allow greater than 1dB insertion loss in DTT channels. This may solve the overload issue without materially degrading DTT reception. The issue of channel 60 filters with improved response has been omitted from the analysis except in the case of communal aerials. Dependent on the costs and physical installation requirements Ofcom should consider whether such filters should be offered as mitigation to other domestic installations where channel 60 is in use.

5. Delivery of interference mitigation through a 'MitCo'

Ofcom's technical analysis concludes that a very significant part of the overall mitigation effort will be most effectively achieved by what Ofcom categorises as "consumer-based mitigation measures", i.e. DTT receiver filtering, improvements and alterations to DTT installations, re-orientation of DTT aerials or as a last resort, and platform changes. On that basis, Ofcom proposes that a new body should be set up to implement mitigation, "MitCo".

5.1 The benefits of a single body

We agree that there are benefits of single body managing and delivering implementation although we do not agree with all Ofcom's proposals for that body. A single body, separate to the 800 MHz licensees, can coordinate the timing of mitigation effort with respect to the rollout plans of all licensees and it can make sure that viewer information and support is joined up, avoiding conflicting messages. Importantly, a very high proportion of the costs of mitigation are likely to be common across two or more 800 MHz licensees, for example information campaigns, running customer support telephone lines and providing DTT receiver filters. Up to 89% of the costs of mitigation as estimated by Ofcom could be common across two or more licensees.¹⁵ Having a single implementation body would be an obvious way of making sure that costs, which can be shared, do not have to be incurred and duplicated for each network roll out. Indeed, Ofcom's estimate of the total mitigation costs at £100m seems to be based on an implicit assumption that all such common costs efficiencies can be achieved.

5.2 Who should be responsible for MitCo?

We note that the above benefits can be achieved from a single entity managing the interference and that this body has to be separate from the 800 MHz licensees for information sharing reasons (we comment on information flows below) but that there is not a requirement for this body to be separate from Government or from existing bodies. The task could be taken on by an existing organisation such as Ofcom itself or Digital UK. We are not suggesting that Ofcom or Digital UK could undertake this without receiving further funding for the additional resources that would be required but it would nonetheless seem possible to save on some of the set up costs if the mitigation task was undertaken by an existing body. We also suggest that both Government, which will receive the proceeds of the auction, and Ofcom, which has duties in relation to spectrum and interference, both have continuing interests in mitigation.

¹⁵ Of the £100m mitigation costs as estimated by Ofcom, only £11m relate to network mitigation. The £89m that relate to consumer based mitigation can potentially all mitigate interference from two or more LTE800 networks.

5.3 *The institutional set up of MitCo*

If MitCo were to be set up as new, separate body, there are many different forms that MitCo could take: it could be set up as new quango, a statutory corporation, a charity, a private limited company, a private company limited by guarantee, etc. The consultation document does not contain any proposals for the legal and institutional set up of a MitCo. However, we believe that the form of a MitCo is in fact very important for the incentives of MitCo and its effective working, and we would encourage Ofcom to consider this question as soon as possible and put forward a detailed proposal.

When considering the legal and institutional set up, it will be relevant to consider as a minimum the following points:

- information sharing;
- MitCo cannot be allowed to fail;
- profit or not-for-profit;
- ownership; and
- disputes and appeals.

We set out these in turn below.

5.3.1 *Information sharing*

In order to be able to coordinate effectively, MitCo would need some prior notice of the roll out plans of the 800 MHz licensees. The 800MHz licensees will not have overlapping interests when it comes to network rollout: different business strategies and differences in legacy assets (particularly holdings of sub-1GHz spectrum) will result in different rollout strategies. Under Ofcom's current proposal as outlined in the consultation on the Combined Award,¹⁶ one licensee will have a coverage obligation. That licensee will by definition need to roll out a more extensive network than other licensees and to a specific deadline defined in the licence. Network rollout information is commercially confidential information and it is very important that MitCo does not become a method for 800 MHz licensees to see each other's plans and potentially coordinate rollout in a manner that could dampen competition. Moreover, the detailed site information that MitCo will need (e.g. site location, antenna type and height) will be sensitive information, leaving the 800 MHz licensees open to the risk of theft, criminal damage or terrorism if it was to be disclosed.¹⁷

The fact that MitCo would hold such sensitive information means that if MitCo were to be set up as some form a public or semi-public body, it would have to be considered how MitCo could assure the 800 MHz licensees that the information they provided to MitCo would not be passed on to other parts of Government and did not become subject to disclosure under the Freedom of Information Act or the Environmental Information Regulations.

¹⁶ Ofcom, "Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues", published 22 March 2011.

¹⁷ For example earlier this year, break in and theft from the O2 network led to a high profile gap in the provision of services - <http://blog.o2.co.uk/home/2011/05/network-issues-update.html?cid=6a010535c50a83970b014e887d0962970d>

For these reasons, we also note our objection to Ofcom's proposal as outlined in paragraph 6.69, whereby the new 800MHz licensees would effectively be subject to a blanket information requirement to MitCo. The information that MitCo can require from the 800 MHz licensees needs to be clearly specified in the licences so that it can be adequately protected and the burden of information provision be as light as possible.

5.3.2 MitCo cannot be allowed to fail

Depending on how the 800MHz licence conditions that require licensees to cooperate with a MitCo are formulated and how Ofcom plan to use directions to licensees to avoid interference (as alluded to in paragraph 6.72), we note that MitCo needs to function well in order for 800 MHz licensees to be able to roll out LTE800 networks. It will not be acceptable either to the new 800 MHz licensees or the general public if licensees have to slow down or postpone network rollout because MitCo had gone out of business. This may suggest that it would not work to set up MitCo as a private limited company but rather that some form of Government or Ofcom involvement is needed.

5.3.3 Profit or not-for-profit

MitCo should be incentivised to choose the most cost effective mitigation measures, given the agreed level of mitigation to be achieved. Whether MitCo is for profit or not-for-profit may affect its incentive to achieve the required level of mitigation in the most cost effective manner. If MitCo was not-for-profit, the incentive structure of MitCo's management to deliver mitigation at minimum costs would have to be carefully considered through some key performance indicators and would need to be related to its funding.

5.3.4 Ownership

We discussed the issue of cost uncertainty in Section 2. To deal with the cost uncertainty it is highly relevant to understand who would benefit from any surplus that MitCo may generate (whether in the form of profit or budget surplus), and who would have liability for any loss or deficit. We are particularly concerned that, if Ofcom were to set a lump sum amount or tariff payable by the new 800 MHz licensees, but the Government were allowed to keep any surplus generated by MitCo, Ofcom would have a clear incentive to overstate the cost of mitigation and include an excessive contingency in the amount payable by the new licensees.

5.3.5 Disputes and appeals

It is almost inevitable that some viewers will complain that their concerns were not dealt with adequately by MitCo. Who would be responsible for overseeing MitCo's work and settle any disputes? In addition, broadcasters or new 800 MHz operators may also raise disputes. Again who would settle disputes between these parties?

5.4 Terms of reference for MitCo

Finally, in order for MitCo to support affected DTT viewers effectively and within a given budget, the terms of reference for MitCo must be very clear.

Ofcom's consultation document simply lists the parameters that need to be considered for the terms of reference (paragraphs 6.11-6.13) with no proposal presented. A detailed proposal needs to be drawn up, which would also help Ofcom make better estimates of the costs of mitigation (the majority of which are consumer based). In time, the detailed terms of reference would also be needed for the development of a manual for how MitCo's consumer facing agents respond to calls and enquiries.

In addition to the considerations listed by Ofcom we note that there could be a clear issue of moral hazard if consumers do not have to pay for the consumer-based mitigation measures. We predict that once DTT interference information campaigns are launched, MitCo will get a high number of calls from consumers who for various reasons are unhappy with their DTT reception. If MitCo ends up having to send technicians out to assess such cases, the false alarms could swamp MitCo's resources and budget. Hence the terms of reference for MitCo would need to include a mechanism for MitCo to reclaim costs unrelated to interference from LTE800 that MitCo is not liable for, for example by having the right to demand a deposit paid on a credit or debit card in advance.

6 Conclusion

We believe that the uncertainty around the cost of mitigation means the obvious funding solution is to give MitCo a ring-fenced budget from the auction proceeds including a contingency fund. We do not believe that a tariff mechanism would work to create incentives for a number of reasons, nor do we believe that it is a proportionate response for the issue at hand. However, it is still perfectly possible to envisage a mechanism by which MitCo could be incentivised to deliver mitigation in the most cost effective manner.

We think an arrangement whereby MitCo would be tasked with “buying” mitigation has merit. Just as MitCo would buy (or self-provide) consumer based mitigation such as information campaigns, receiver filters and distribution services for those filters, it could buy network based mitigation. MitCo could buy transmit filters (in addition to those which licensees would need to use in order to comply with the BEMs¹⁸) and pay 800MHz licensees to install these on the base stations where this was deemed beneficial, or it could pay licensees to acquire such filters on its behalf and install them.

As the consultation document notes, in the relatively few cases where receiver and transmit filters cannot reinstate DTT services (estimated at up to 30,000 households), a case-by-case assessment is needed. MitCo would clearly have to undertake such assessments and decide on the relative effectiveness of the different mitigation techniques. Regardless of how MitCo is funded, it would only be able to make such assessments efficiently if it faced the costs of all the different mitigation options it would be considering - whether consumer or network based. If MitCo had to buy mitigation in this way, it would be appropriately incentivised to make efficient trade-offs between different mitigation options in those relatively few cases where receiver or transmit filters would not be effective.

We would be pleased to work with Ofcom to develop this suggestion further if Ofcom agrees it has merits.

¹⁸ Block Edge Masks

7 Consultation questions

Question 1: Do you have any comments on our modelling approach and assessment of numbers of households affected?

We do not have any comments on Ofcom's modelling approach in addition to those shared with Ofcom in the technical working group and further dialogue.

However, we note that Ofcom's modelling approach considers households that can receive DTT, rather than households which use DTT. According to Ofcom's research as quoted in the consultation paragraph 4.37, it is estimated that 27% of households do not currently use DTT. We note that the extent of interference for this reason alone may be overstated quite substantially. We encourage Ofcom to bear this mind when developing a more detailed budget proposal for the mitigation effort including a contingency to account for the uncertainty of mitigation costs.

Question 2: Do you agree with our high level conclusions on mitigation options?

Everything Everywhere generally supports the high level conclusions on mitigation options that DTT receiver filters and appropriate improvements in base station transmit filter performance offer the most efficient and effective solution. We have a number of reservations on the technical aspects as explained in section 4.

We also note that Ofcom's initial estimate of the cost of mitigation seems to be based on an implicit assumption that all costs which are common are indeed incurred only once. It may be helpful for Ofcom to acknowledge this link explicitly in its further work as:

- it strengthens the case for coordination of the mitigation effort (please refer to section 5 for our comments on coordination; but
- it questions fundamentally the possibility of designing a tariff mechanism that provides correct incentives to individual 800 MHz licensees when the majority of costs may be shared in a manner, which cannot be generalised (please refer to section 3.1).

Question 3: Do you have any comments, views or evidence that you would wish to be considered in our further work looking at the appropriate level of consumer support?

We do not have any views on the appropriate level of consumer support required but there may be some relevant experience from the DSO process that Digital UK can share with Ofcom.

It is however very important that the moral hazard issue that we have described in section 5.4 and 3.2.2 is addressed. If not, there is a clear risk that

the mitigation effort becomes much more costly than necessary due to DTT reception issues, which are unrelated to LTE800 interference.

Question 4: Do you have any comments or views on how we have assessed the approaches [for responsibility] and our preference for the hybrid approach?

Ofcom's preferred 'Hybrid' approach ('Approach 3') is based on an assumption that a tariff mechanism can be developed, which provides the correct incentives on new 800 MHz licensees. We have explained in section 3.1 why this is not possible or desirable. This means that Ofcom's assessment is flawed because it is considering amongst options at least one of which is not feasible.

We think there are other options, which would work better and we would encourage Ofcom to work with stakeholders (in particular MNOs) to develop this further. For example, as described in section 6 we believe that a modified version of Ofcom's 'Approach 2' would have merit where MitCo is responsible for all mitigation decisions, weighs up consumer based vs. network based mitigation and 'buys' either form of mitigation as appropriate.

Question 5: Do you agree with the options, the assessment approach and our initial conclusions [on funding]? What are your views on cost risks and how to deal with them?

Everything Everywhere believes that the uncertainty of costs (which are mainly outside the control of the new 800 MHz licensees) is in fact the main issue and that funding options cannot be considered without addressing uncertainty.

As explained in section 2.1, if bidders in the auction had this uncertainty hanging over them, it would create a risk of winner's curse and in turn a risk of an inefficient auction outcome. This can quite easily be managed by the Government funding the mitigation effort (for example from a ring-fenced amount including a reasonable contingency out of the auction proceeds). This should also avoid that Ofcom could have an unfortunate incentive to overestimate the funding required, if the new 800 MHz paid for mitigation but the Government got to keep any surplus.

Everything Everywhere considers that the economic analysis supporting this proposal is cursory and we do not agree that Ofcom's consultation has applied relevant economic analysis to consider the impacts of its proposals on overall economic welfare or on the financial impacts on stakeholders as set out in section 3.

Specifically, Everything Everywhere does not consider that Ofcom has undertaken the required steps to demonstrate a full cost benefit assessment (CBA) or impact assessment (IA).

- First, Ofcom must have regard to principles of economic efficiency in order to determine likely consumer and producer welfare outcomes from its proposals. We request that Ofcom should undertake a CBA by applying its own six principles of cost recovery to the question of who pays for mitigation and the likely incentives for efficient investment.
- Second, Ofcom has failed to undertake an IA (an analysis of financial impacts on licensees). Ofcom must identify the financial impacts of any lump sum and tariff formula payment on licensees and between licensee types. Although the sums of money might not be large compared to the amounts likely to be bid in the 800 MHz auction (for example), Ofcom should nevertheless be concerned with the cumulative effect of this regulatory decision impacting on licensees cash flows given recent or imminent judgements and regulatory decisions on mobile termination rates, number translation services and international roaming. Any Ofcom decisions that incrementally push Everything Everywhere's service margins further below the cost of capital cannot simply be ignored.