

# Annual licence fees for 900MHz and 1800MHz

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EE Limited's response to Ofcom's further  
consultation

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Non-confidential version

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## 1. Introduction

This document contains EE Limited's ("EE") response to Ofcom's further consultation on revised annual licence fees ("ALFs") for 900 MHz and 1800 MHz, published on 1 August 2014 (the "Further Consultation").

Where applicable, our comments on the Further Consultation also apply to the parallel consultation on Ofcom's Notice of proposal to make regulations to revise the fees payable for 900 MHz and 1800 MHz licences, also published on 1 August 2014.

EE's response covers a range of issues and concerns with Ofcom's latest proposals, which in our view contain several manifest errors, as described below.

This response should be read in conjunction with our earlier responses to:

- Ofcom's first consultation on annual licence fees for 900 MHz and 1800 MHz published in October 2013 (the "October 2013 Consultation");
- Ofcom's further consultation on the methodology to derive a discount rate consistent with CPI inflation, published in April 2011);
- Ofcom's invitation for comments on European auctions that had taken place since the time of the October 2013 consultation; and
- the first and second consultations on the assessment of future mobile competition and proposals for the auction of 800 MHz and 2.6 GHz spectrum and related issues, published in March 2011 and January 2012 respectively (the "First / Second Auction Consultations").

### **Confidentiality**

Those parts of this response marked with [X] and highlighted in blue contain commercially and competitively sensitive confidential information, which should not be published without EE's prior written consent.

## 2. Executive summary

Ofcom's Further Consultation proposes a substantial increase in ALFs for 900 MHz and 1800 MHz spectrum from the current total of £64.4m per annum to £246.7m. This represents a reduction from Ofcom's previous proposal but is still in our view unjustifiably high, especially with regards to 1800 MHz spectrum.

In particular, Ofcom continues to propose ALFs which significantly overstate the market value of the ALF spectrum bands. If Ofcom were to proceed with its current proposals it will therefore be failing to meet the requirements of the Wireless Telegraphy Act 2006 (Directions to Ofcom) Order 2010 (the "Government Direction") and acting unlawfully both as a matter of EU law and as a matter of English public law.

We do welcome a number of important revisions made by Ofcom in its proposed approach, addressing comments previously made by EE and other mobile network operators ("MNOs"). However, these positive steps are severely tempered by Ofcom's failure to address other serious concerns, and more worryingly by the introduction of additional manifest errors in several areas.

Moreover, whilst Ofcom now asserts in the Further Consultation that it accepts the need to adopt a conservative approach in setting ALFs, it has failed to consistently or properly apply this highly relevant consideration when conducting its analysis. This, coupled with Ofcom's continued failure to carry out a proper impact assessment on the various aspects of its determination which rely on the exercise of its regulatory judgment, result in a vastly inflated estimate of the appropriate level of ALFs, as well as insufficient consideration of the need to phase in ALFs over a longer period than Ofcom currently proposes.

EE considers that Ofcom's proposed approach to determining and implementing ALFs that reflect "full market value" is flawed and insufficiently conservative for the reasons summarised below, and explained more fully in this response:

### **Ofcom's proposed adoption of a flawed marginal bidder analysis is a serious error which is inconsistent with the Government Direction**

Ofcom's new proposed approach to estimating the UK market value of 800 MHz and 2.6 GHz spectrum based on bids in the UK 4G auction – the marginal bidder analysis ("MBA") – is fundamentally flawed both in its concept and implementation.

Most significantly, by producing an estimate which does not reflect the market value of the ALF bands as a whole, the MBA does not meet the requirements of the Government Direction. Furthermore, by considering each spectrum band in isolation, the MBA is inconsistent with the multi-band design of the UK 4G auction, in which bidders were encouraged to express complementarities for packages of 800 MHz and 2.6 GHz spectrum.

These inherent limitations of the MBA are exacerbated by the fact that Ofcom does not have sufficient evidence to implement the MBA properly, as a result of an insufficient evidence base which prevents Ofcom from identifying the marginal value which EE, or indeed other bidders, in the auction would place on

additional 800 MHz spectrum. In consequence, the application of the MBA is highly subjective and extremely unreliable.

**Ofcom significantly overstates the market value of 800 MHz by implementing the marginal bidder analysis in a manifestly erroneous manner**

Ofcom compounds these basic flaws by implementing the MBA in a manner which vastly inflates the market value of 800 MHz spectrum.

Ofcom does so by erroneously focusing on a bid made by EE in the auction which is irrelevant for the purpose of determining ALFs because it incorrectly includes a contiguity premium, as a result of Ofcom's flawed decision to focus on a 2x10 MHz marginal increment, and also incorporates an implicit "complementarity premium" expressed by EE for a specific package of 800 MHz and 2.6 GHz spectrum, which is over and above EE's intrinsic valuation of 800 MHz spectrum.

As a result of these errors Ofcom's proposals create a serious risk of inhibiting efficient trading of spectrum, and consequently of spectrum being left unused, in clear contradiction of Ofcom's statutory duties and the purpose of the Government Direction.

**Ofcom should revert to the revenue-constrained LRP methodology**

In light of the clear defects of the MBA, EE believes that Ofcom should revert to its previously proposed linear reference price ("LRP") methodology with revenue constraint, which represents the most appropriate and reliable approach to estimating market value, based on the bids made in the UK 4G auction.

The LRP method – developed and consulted upon by Ofcom for a period of over three years – effectively derives an estimate of the average marginal price for the spectrum sold in the auction, consistent with the requirements of the Government Direction. It has the clear benefit of taking account of all bids made in the auction, thereby avoiding the arbitrary choices required to implement the MBA. Furthermore, we believe that the total revenue achieved in the auction must therefore be seen as an upper bound when determining the level of ALFs.

**Ofcom's flawed international benchmarking analysis produces a disproportionate estimate of the 1800 MHz lump sum value and unequal treatment as between 900 MHz and 1800 MHz licence holders**

In assessing international auction benchmarks to derive lump sum estimates of the UK market value of 900 MHz and 1800 MHz Ofcom implements a tiering and weighting framework which is highly subjective and effectively excludes several relevant data points without adequate justification. As a result Ofcom's analysis becomes overly reliant on a very small selection of benchmarks which, in combination with Ofcom's use of erroneous input data for certain countries, produces a distorted outcome.

Ofcom also fails to apply objective and proportionate regulatory principles by failing to conduct any rigorous sensitivity analysis to its benchmarking analysis. When sensitivities are applied, they show that Ofcom's current approach produces wildly different outcomes as regards 900 MHz and 1800 MHz spectrum – whilst Ofcom's 900 MHz estimate is towards the centre of possible

results, it is clear that Ofcom's 1800 MHz estimate is far too high, and completely inconsistent with Ofcom's acknowledged need to adopt a conservative approach.

This difference in treatment is not justified, and breaches the principle of non-discrimination. Moreover, it indicates that Ofcom's lump sum estimate for 1800 MHz would fail any basic proportionality test. Analysys Mason and Aetha, commissioned jointly by EE and Three, adopt a more rigorous and robust approach to tiering and weighting international benchmarks, and on this basis propose lump sum estimates which are significantly below Ofcom's current proposals (particularly for 1800 MHz).

### **Ofcom makes several errors in estimating the cost of debt and as a result overstates the appropriate level of annual payments**

EE agrees with Ofcom's proposal to use the cost of debt instead of a weighted average cost of capital measure for the discount rate to convert its lump sum estimates into ALFs. However, Ofcom simply proposes to adopt a cost of debt estimate that it has used in other regulatory settings, without recognising that several different considerations apply in the context of setting ALFs, including the need to adopt a conservative approach.

EE believes that, in contrast to its current proposal, Ofcom should adopt the yield to maturity ("YTM") approach to estimating the cost of debt. The YTM measure reflects the cost of raising debt today and is therefore the relevant benchmark for the purpose of determining a discount rate for ALFs. Ofcom's current estimate of the YTM is, however, too high, particularly as it fails to take into account the difference between the profiles of the payment flows associated with debt instruments and ALFs respectively. We propose a revised estimate of the cost of debt of 1.3%, reflecting the lower YTM of debt instruments with a similar profile of payment flows to ALFs.

### **Ofcom presents an inadequate impact assessment**

Ofcom cannot simply rely on the fact that the Government Direction requires it to set ALFs reflective of market value to avoid undertaking a proper cost benefit assessment and consideration of the impact of different potential levels of ALFs which would be consistent with Ofcom's statutory duties. Ofcom's continued failure to properly identify – let alone quantify – the risks, costs and benefits of its proposed revised ALF levels is a fundamental error, and conceals the true extent to which the proposals contained in the Further Consultation are utterly inconsistent with the conservative approach that Ofcom asserts it has taken.

### **Implementation**

EE welcomes Ofcom's recognition of the fact that phasing-in of higher ALFs is necessary. However, regulatory precedent, including in the aeronautical and maritime sectors, supports a far more conservative approach than Ofcom is currently proposing. Ofcom cannot claim that the Government Direction somehow precludes or mitigates the need for phasing-in for the mobile sector which is consistent with that applied by Ofcom elsewhere. We believe that a phase-in period of 3 or more years is warranted given the risks of adverse impacts on licensees from changing fee rates too rapidly.

### Our proposed level of ALFs

After correcting for the various errors identified in our response, we believe that an appropriate level for ALFs, reflective of the true market value of 900 MHz and 1800 MHz licences, would be **£1.26m per MHz per annum for 900 MHz** and **£0.48m per MHz per annum for 1800 MHz** (in March 2013 prices).

This response is structured as follows:

- **section 3** sets out EE's views on Ofcom's method for deriving lump sum values for 800MHz and 1800MHz spectrum based on bids made in the UK 4G auction;
- **section 4** considers Ofcom's international benchmarking analysis and derivation of lump estimates of the UK market value of 900 MHz and 1800 MHz spectrum;
- **section 5** sets out EE's views on the appropriate discount rate to convert lump sum valuations of 900MHz and 1800MHz spectrum into annual licence fees, and reiterates our continued disagreement with Ofcom's position regarding the need to make an adjustment for terminal value;
- **section 6** explains EE's reasons for considering that Ofcom has failed to conduct a sufficiently robust impact assessment on the determination and implementation of ALFs;
- **section 7** sets out EE's view that Ofcom should adopt a longer phase-in of revised ALFs; and
- **section 8** contains our concluding remarks, including our proposed level of ALFs taking into account the various errors we have identified with Ofcom's current approach.

### 3. UK market values of 800 MHz and 2.6 GHz spectrum for the purpose of ALFs

The starting point of Ofcom's analysis is to determine the full market value of the 800 MHz and 2.6 GHz bands, based on the bids made in the UK 4G auction. In the Further Consultation, Ofcom sets out a wholesale change to its proposed approach to making this assessment, adopting a new and untested marginal bidder analysis ("MBA") which focuses on pairs of losing bids made in the auction for a marginal increment of spectrum in each spectrum band.

In doing so, Ofcom moves away from the linear reference price ("LRP") methodology, which it has developed and consulted on over a period of over three years since the Government Direction. Ofcom does this on the basis of concerns regarding the LRP approach which, in EE's view, are unfounded. We believe that the LRP with revenue constraint is in fact the best available methodology from which Ofcom can reliably derive estimates of market value for 800 MHz and 2.6 GHz spectrum based on the bids in the auction.

Importantly, the LRP takes into account both inter-band effects and bidders' preferences for different increments of spectrum – in a way that is appropriately tailored to the rules and design of Ofcom's combinatorial clock auction ("CCA") – and produces an estimate of the average marginal price of 800 MHz and 2.6 GHz on the basis of all of the bids submitted in auction.

In stark contrast, the MBA is an inadequate, inappropriate, and indeed irrational methodology for estimating a linear market value for the spectrum sold in the auction. It fails properly to pursue the objective of the Government Direction, fails to take account of relevant features of the auction and fails to respect Ofcom's statutory duties. If Ofcom proceeds to adopt the MBA it will be acting unlawfully both as a matter of EU law and as a matter of English public law.

Ofcom's proposed adoption and implementation of the MBA suffers from five fundamental flaws:

- First, by attempting to estimate the value of a single "marginal increment" of spectrum, the MBA fails to provide an estimate of the market value of frequencies in the 900 MHz and 1800 MHz bands as a whole. This is a manifest error which is inconsistent with the requirements of the Government Direction – as previously accepted by Ofcom – and creates a serious risk of spectrum being left unused (see section 3.1.1).
- Second, the MBA is wholly inappropriate in the context of a CCA auction as it fails to take account of the fact that bidders were encouraged to (and did) make bids for packages of 800 MHz and 2.6 GHz spectrum, and express complementarities in their bids (see section 3.1.2).
- Third, in adopting the MBA, Ofcom is failing to take account of further features of the auction, which mean that Ofcom lacks the necessary evidence base to reliably implement the MBA. Ofcom's MBA is

therefore highly subjective and prone to significant error (see section 3.1.3) contrary to Ofcom's duty to adopt objective, transparent and proportionate regulatory principles.<sup>1</sup>

- Fourth, Ofcom has compounded these inherent flaws associated with the MBA by implementing the MBA in a manifestly erroneous manner in relation to 800 MHz by focusing on an irrelevant incremental bid value ("IBV") of EE which is so far removed from what Ofcom is actually trying to measure that it simply cannot be relied upon as the sole determinant of Ofcom's market value estimate. As a result, Ofcom's implementation of the MBA significantly overstates market value by:
  - focusing on the wrong (higher value) marginal increment of spectrum and therefore including a contiguity premium which is irrelevant to determining market value for the purpose of ALFs - creating an inherent risk of preventing efficient trading of spectrum in smaller increments (see section 3.2.1); and
  - over-estimating the intrinsic value placed on additional 800 MHz spectrum by EE by failing to recognise that EE's bids for packages of 800 MHz and 2.6 GHz spectrum in the auction contained significant complementarities (see section 3.2.2).
- Finally, the adoption of the MBA also raises wider concerns about the potential impact on bidders' incentives in future auctions, including the upcoming auctions for 2.3 / 3.4 GHz and 700 MHz spectrum. In the knowledge that specific losing bids may be focused on by Ofcom to estimate full market value in future ALF determinations, bidders which expect they are likely to be the "marginal bidder" may be incentivised to bid below their true valuation, with potential implications on the efficient allocation of those new spectrum bands as well as the auction receipts. This is particularly relevant given Ofcom must set ALFs for 2.1 GHz spectrum to reflect market value by December 2021 (see section 3.3).

These are serious errors and, as a result, Ofcom's approach would undoubtedly be open to challenge if Ofcom were to proceed with it. Given the MBA's inherent flaws, EE strongly believes that Ofcom must revert to its previously proposed LRP method with revenue constraint. We understand that under Ofcom's latest proposals this produces market value estimates of £26.89m per MHz for 800 MHz and £4.99m per MHz for 2.6 GHz.

In light of the significant differences in outcome depending on which approach is taken, Ofcom's accepted need to adopt a conservative approach should, in any event, dictate in favour of selecting the methodology which produces lower results.

Alternatively, if Ofcom does decide to proceed with the MBA in spite of our significant concerns, it must revise its proposed implementation to correct for the errors in implementation, as explained in greater detail below. Indeed, once applied in a more robust and appropriate manner, the MBA produces market

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<sup>1</sup> See Article 8(5) Framework Directive.

value estimates for 800 MHz which are significantly below Ofcom's estimate and similar to the results derived from Ofcom's LRP methodology.

### 3.1 Ofcom's adoption of the MBA is an unwarranted departure from LRP with revenue constraint

Until the Further Consultation Ofcom had, throughout a period of well over 3 years and various consultations with stakeholders, consistently maintained the view that the LRP methodology was the best available method to fulfil the requirements of the Government Direction. Ofcom's proposal to adopt the MBA in the Further Consultation therefore represents a surprising, unwelcome and, in our view, unwarranted departure from Ofcom's previously clear preference as to how the bids submitted in the UK 4G auction should be taken into account in deriving an estimate of the market value of 900 MHz and 1800 MHz spectrum.

In our view Ofcom's revised proposal to adopt the MBA is a manifest error which is inconsistent with the wording and purpose of the Government Direction and Ofcom's statutory duties, fails to take account of relevant features of the MBA and significantly overstates market value for the purpose of ALFs.

In this section we set out a number of inherent flaws in the MBA which make it entirely inappropriate as a method to meet the requirements of the Government Direction, and explain why Ofcom's previously preferred method of LRP with revenue constraint is both more appropriate and more reliable than the MBA.

Notwithstanding our in principle objection to the MBA as a methodology, in section 3.2 below we proceed to analyse Ofcom's proposed implementation of the MBA, and explain why it leads to a significant overstatement of market value of 800 MHz spectrum.

#### 3.1.1 The Government Direction implies that Ofcom should estimate the market value of the 800 MHz and 2.6 GHz bands taken as a whole

As set out below, Ofcom's revised proposal to adopt the MBA is a manifest error which is inconsistent both with the Government Direction and with Ofcom's statutory duties and significantly overstates market value for the purpose of ALFs.

In essence, the MBA seeks to estimate the market clearing price of a *single marginal increment* of spectrum, assuming it was available for purchase by the bidders in the auction in addition to their winning packages, by considering the losing bids of the highest losing bidder in the auction, on a band-by-band basis.

This is markedly different to the LRP method, which estimates an approximate linear market clearing price for *each spectrum band* (as a whole) sold in the auction, i.e. all of the frequencies in the 800 MHz and 2.6 GHz bands, considering each band simultaneously. Given the design of the auction – whereby each bidder's auction price was determined on the basis of the highest losing bids (i.e. the opportunity cost to other bidders for the particular package of spectrum acquired) – the LRP method applied with the revenue constraint effectively derives an average marginal price for the spectrum sold in the auction.

This distinction – between valuing each spectrum band as a whole, or only a single marginal increment of spectrum – is an important one, which makes a significant difference to Ofcom’s market value estimate. However, it appears to be one which Ofcom has failed properly to take account of within its revised proposal to adopt the MBA.

In this section we first revisit the requirements of the Government Direction before considering Ofcom’s previous statements as to the appropriate approach to meeting the Direction’s requirements. We also explain why the justifications put forward by Ofcom for moving away from the LRP method in the Further Consultation are unfounded. We conclude that only an approach which derives ALFs reflective of the market value of the 900 MHz and 1800 MHz bands as a whole will be consistent with the Government Direction, and that Ofcom’s latest proposal to adopt the MBA represents a serious error which must be reversed.

**a) The Government Direction**

As Ofcom is aware, the Government Direction requires Ofcom to set ALFs for 900 MHz licences and 1800 MHz licences so that they reflect the full market value of the frequencies in those bands.

Ofcom is not directed to reflect the market value of a licence for a particular size of holding within either the 900 MHz or 1800 MHz bands. Rather, the Direction requires Ofcom to consider a generic “*licence authorising the use in the United Kingdom of frequencies in the 900 MHz [or 1800 MHz] band to provide cellular mobile electronic communications services.*”<sup>2</sup>

On the plain wording of the Government Direction therefore, Ofcom is required to reflect the generic value of the frequencies in those bands *taken as a whole*, and not to arbitrarily base its market value estimate on any particular increment of spectrum. In doing so, Ofcom is effectively required to estimate a linear price which would result in all of those frequencies being sold in a hypothetical (competitive) auction.

This is supported by a number of statements made in the lead up to the making of the Government Direction which indicate that the purpose of requiring Ofcom to revise ALFs was to replicate the outcome of a spectrum auction for indefinite licences for the frequencies in those bands (i.e. an auction equivalent to the UK 4G auction), given that the licences were not originally awarded pursuant to an auction.

For example, the Interim Digital Britain Report explained that:

*“As part of the structured trading framework existing time-limited licences could be made indefinite and subject instead to AIP beyond the end of the current term. If this were achieved the Government would look to ensure that the AIP then set reflected the spectrum’s full economic value and hence would **capture over time the return equivalent to the proceeds that would have been realised in the***

<sup>2</sup> Government Direction, Article 3.

*market from an auction for a licence of the same period.”<sup>3</sup> (emphasis added)*

Similarly, in the Consultation on the Government Direction the following rationale was given:

*“In recognition that these licences were not awarded through spectrum auctions granting indefinite licences, they will be subject to revised licence fees reflecting their full economic value, and so provide an appropriate return for taxpayers and correctly incentivise the holders.”<sup>4</sup> (emphasis added)*

It must, furthermore, be remembered that an important purpose of the requirement for Ofcom to revise ALFs is to encourage the efficient use of spectrum.<sup>5</sup> This is of course also one of Ofcom’s key statutory duties under the Communications Act 2003. This means that the ALFs determined by Ofcom should not only encourage the trading of a single, marginal, increment of spectrum (where efficient), but also beyond that “initial” trade. In other words, Ofcom’s market value estimate should not inhibit efficient trading by setting ALFs above the average market value of the frequencies in the ALF bands.

#### **b) Ofcom’s pre-auction statements**

Ofcom first set out its views on the requirements of the Government Direction in the First Auction Consultation. In that document, Ofcom set out its view – which it has maintained through to the Further Consultation – that:

*“full market value is the price that would arise in a well functioning spectrum market. This would be the market clearing price when supply equals demand.”<sup>6</sup>*

Ofcom went on to identify and consider several potential sources of information that could be used to determine the full market value of the 900 MHz and 1800 MHz spectrum, before provisionally concluding that:

*“the use of the amounts bid and licence fees paid in the auction are likely to provide the most reliable basis on which we can determine the full market value of 900 MHz and 1800 MHz spectrum...because... if the auction is sufficiently competitive, the licence fees paid are likely to reflect the prices that would emerge in a well functioning market. Therefore, provided the spectrum auctioned is reasonably comparable to 900 MHz and 1800 MHz spectrum then we believe that*

<sup>3</sup> Department for Culture, Media and Sport and Department for Business, Enterprise and Regulatory Reform, Digital Britain – the Interim Report, January 2009, p.30.

<sup>4</sup> Department for Business, Innovation & Skills, A Consultation on a Direction to Ofcom to implement the Wireless Radio Spectrum. Modernisation Programme, October 2009, p.41.

<sup>5</sup> Explanatory memorandum to Government Direction.

<sup>6</sup> Ofcom, Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues, para 10.3.

*using information derived from the auction is likely to be more reliable than other ways for estimating the full market value*<sup>7</sup> (emphasis added)

Ofcom continued to explain that it considered that, in taking account of the bids made in the auction, the Government Direction:

*“pushes [Ofcom] towards the estimation of an **average price per lot for each category of spectrum** available in the auction.”*<sup>8</sup> (emphasis added)

Ofcom therefore proposed that it would determine ALFs through three key steps:

- a) First, deriving average linear price information for each lot category.
- b) Second, considering how best to use this information and whether any adjustments are necessary (e.g. to reflect differences between spectrum bands) to estimate the market value of 900 MHz and 1800 MHz spectrum.
- c) Third, converting this lump sum information into ALFs.<sup>9</sup>

Ofcom put forward the LRP method to implement step (a) above, setting out two requirements it proposed to impose on the linear reference prices derived from the LRP calculation:

- First, that the total of the linear reference prices for all lots sold should be the same as the total revenue from the auction (i.e. the revenue constraint) to *“ensure that the final linear reference prices will in one sense represent the average of the base prices paid by winning bidders.”*<sup>10</sup>
- Second, that the linear reference prices should minimise the total of the excursions across all bidders, to ensure that the linear reference prices are *“approximate market clearing prices”*.<sup>11</sup>

In response to the First Auction Consultation, several respondents raised concerns regarding the potential for Ofcom’s proposed approach to create incentives for bidders in the auction which would also be subject to ALFs to “shade” their bids. Ofcom considered these concerns in the Second Auction Consultation, but concluded that there were mitigating factors which materially reduced the likelihood of this risk crystallising. Ofcom therefore came to the view that:

*“the methodology using linear reference prices set out in March 2011 is [still] a relevant and helpful input to ALFs.”*<sup>12</sup>

<sup>7</sup> Ofcom, First Auction Consultation, para 10.6.

<sup>8</sup> Ofcom, First Auction Consultation, para 9.78.

<sup>9</sup> Ofcom, First Auction Consultation, para 10.9.

<sup>10</sup> Ofcom, First Auction Consultation, Annex 10, para A10.16.

<sup>11</sup> Ofcom, First Auction Consultation, Annex 10, para A10.14 to A10.19.

<sup>12</sup> Ofcom, Second consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues, para 8.09.

Nevertheless, Ofcom developed another potential methodology – the “additional spectrum methodology” (“ASM”) – for estimating market value on the basis of the bids in the auction. The ASM excludes the bids made by a particular ALF payer, in order to prevent its bids from influencing the estimate of market value that results, and is therefore designed to mitigate any potential impact on incentives.<sup>13</sup> Ofcom indicated in the Second Auction Consultation that it would use the ASM alongside other approaches in order to take a rounded view of full market value for the purpose of setting ALFs.<sup>14</sup>

Ofcom maintained this approach in the auction Statement<sup>15</sup>, and this was the basis upon which EE (and most likely other bidders) made assumptions about Ofcom’s future approach to setting ALFs when bidding in the auction.

**c) October 2013 Consultation**

Following the auction that completed in February 2013, this was also the approach Ofcom adopted in the October 2013 Consultation, in which Ofcom confirmed its view that “*the UK 4G Auction was sufficiently competitive for us to use price information from the auction as relevant evidence for the purpose of revising ALFs.*”<sup>16</sup> Ofcom further set out its intention to:

*“estimate a full market value of 900 MHz and 1800 MHz spectrum that reflects the inherent value of the spectrum covered by these licences, but in generic terms – i.e. without seeking to reflect the specific circumstances of the existing licensees, or the uses that current licence holders are making or planning to make of the spectrum. So, for example, we are consulting on linear prices which do not distinguish the market value of one specific size of holding from the market value of another size of holding within each of the frequency bands, nor vary between licensees.”*<sup>17</sup>

Ofcom proceeded to explain that its preference for valuing 800 MHz and 2.6 GHz spectrum was to use the previously developed LRP method (with revenue constraint) as its base case, rather than the ASM, because the LRP:

*“is based on the spectrum, participants and bids in the auction rather than making hypothetical changes to these variables and because, in practice, the ASM results appear highly sensitive to the underlying assumptions.”*<sup>18</sup>

The ASM was therefore only taken into account as part of Ofcom’s sensitivity analysis, which also considered a range of adjustments, such as different assumptions about coverage and co-existence costs, and implications of other hypothetical changes to the auction.<sup>19</sup> However, Ofcom ultimately concluded

<sup>13</sup> Ofcom, Second Auction Consultation, para 8.12.

<sup>14</sup> Ofcom, Second Auction Consultation, para 8.14.

<sup>15</sup> Ofcom, Auction Statement, section 12.

<sup>16</sup> Ofcom, October 2013 Consultation, para 4.17 & Annex 5.

<sup>17</sup> Ofcom, October 2013 Consultation, para 2.12.

<sup>18</sup> Ofcom, October 2013 Consultation, para 4.24.

<sup>19</sup> Ofcom, October 2013 Consultation, Annex 8.

that it was appropriate to place materially more weight on the base case LRP estimate of the value of 800 MHz and 2.6 GHz spectrum.

**d) Ofcom's rejection of the LRP is unwarranted**

In the Further Consultation, Ofcom sets out its revised position that the “*method of revenue-constrained LRPs is not an appropriate basis to derive estimates of full market value of the auction bands in the specific circumstances of the UK 4G auction.*” This conclusion is based on a view that “*the 4G auction revenue understates the market value of the auction bands as a basis for ALF, especially 800 MHz, because of the specific circumstances of the auction*”<sup>20</sup>.

Ofcom sets out three reasons for this revised view:

- spectrum reservation;
- the reserve prices applied by Ofcom in the auction; and
- a “packing issue” affecting the amounts paid by Telefonica and Vodafone.

Ofcom also argues that, because the estimate produced by the revenue-constrained LRP for 800 MHz is below Telefonica's auction price (for a block containing the coverage obligation) this provides evidence that the estimate must have been below full market value for the purpose of ALF.<sup>21</sup>

With respect, EE strongly disagrees. We have already explained in our response to the October 2013 Consultation that, contrary to Ofcom's suggestion that the fact some spectrum sold at the reserve price may mean that auction prices understate market value, the opposite is in fact true – reserve prices are very likely to *overstate* the market value. In any case, Ofcom must recognise that in the auction there were only three bidders that expressed a marginal value for more 800 MHz spectrum above the reserve price.

Furthermore, for the reasons outlined above, we believe that the Government Direction implicitly requires Ofcom to derive an estimate of the average market value of the ALF bands. The total revenue achieved in the auction must therefore be seen as an upper bound for ALFs, and in our view the LRP with revenue constraint is the best available method to achieve this.

Notably, this was also the position adopted by Ofcom in the October 2013 Consultation:

*“linear prices derived without the revenue constraint are higher overall than the prices actually paid in the auction, which raises a question of whether substantial weight should be placed on them for the purpose of revising annual licence fees. On balance we do not consider there is a stronger case for this approach.”*<sup>22</sup>

It is dangerous for Ofcom to make hypothetical assumptions about what might have happened in the auction had different rules been in place (as Ofcom has acknowledged in relation to the ASM – see above). For example, Ofcom has

<sup>20</sup> Ofcom, Further Consultation, paras 2.16 to 2.17.

<sup>21</sup> Ofcom, Further Consultation, paras 2.27 – 2.29.

<sup>22</sup> Ofcom, October 2013 Consultation, Annex 8, para A8.43.

acknowledged the presence of budget constraints in the auction and therefore any assumption that the total revenue achieved through the auction would have been greater with a different auction design is highly unreliable and subject to spurious accuracy. EE considers that, notwithstanding that the LRP without the total revenue constraint is not the appropriate methodology for determining ALFs, it does provide an important reference point which lends further support to our overriding concern that Ofcom's proposed MBA substantially overstates market value.<sup>23</sup>

**e) *The proposed adoption of the MBA is a manifest error***

In contrast to the considered development of the LRP over a number of years and through several consultations, Ofcom's proposal in the Further Consultation to adopt the MBA represents a sudden and wholesale change in approach to a new method, which has not been contemplated by Ofcom in any of its previous consultations which discussed ALFs for 900 MHz and 1800 MHz. Indeed, the proposed MBA approach indicates that Ofcom has changed its clearly expressed view – referred to above – that the Government Direction requires it to estimate an average price per lot for each spectrum band. This is, however, neither acknowledged nor justified by Ofcom in the Further Consultation.

We strongly believe that the adoption of the MBA is in fact inconsistent with the requirements of the Government Direction, as well as Ofcom's statutory duties. In particular:

- by estimating the market value of a single marginal increment of spectrum in the 800 MHz and 2.6 GHz bands, the MBA fails to meet the implicit requirement of the Government Direction to set ALFs reflecting the market value of the frequencies in those bands *taken as a whole*.
- Ofcom's proposed approach is in fact likely to create a significant risk of spectrum being left fallow, as beyond the first marginal increment of spectrum it will inevitably overstate the market value of the remaining frequencies in the band. As a result, the ALFs determined by Ofcom could well (now or in the future) be both:
  - above the private value placed on 900 MHz / 1800 MHz spectrum by the existing licence holders for at least some of their spectrum holding (e.g. in relation to 900 MHz, whilst Vodafone / O2 might have a valuation for their first 2x10 MHz

<sup>23</sup> We note that Ofcom's reasons for rejecting the LRP *without* constraint suffer from the same shortcomings. In particular, to assume that EE would have bid significant sums for additional spectrum in the auction in the absence of spectrum caps is simply without any evidential basis and ignores the fact that EE, like other bidders, was subject to budget constraints. Ofcom's hypothetical exercise set out in Annex 6 is therefore irrelevant. As we believe that the total revenue in the auction must be seen as an upper bound for the purpose of revising ALFs, we nevertheless agree with Ofcom's ultimate conclusion not to use the LRP without revenue constraint as a base case.

above the market value estimate derived from the MBA approach, they may well place less value on the remaining 2 x 7.4 MHz in their respective holdings); and

- above the value placed on that spectrum by the “marginal operator”. For example, if EE were hypothetically to acquire a block of 900 MHz from either O2 or Vodafone<sup>24</sup>, the market value of O2’s and Vodafone’s *remaining 900 MHz holdings* would inevitably be below the level of the ALF determined by Ofcom. This is because, having already acquired some 900 MHz spectrum, EE’s marginal value for (additional) 900 MHz spectrum would have diminished, and equally the (incomplete) evidence available to Ofcom suggests that no other party would place the same value on acquiring 900 MHz spectrum.<sup>25</sup>
- As a result, Ofcom’s approach could well result in a situation in which a significant proportion of spectrum in the ALF bands is wanted by neither existing licence holders nor other operators at the level of ALFs set by Ofcom. Ofcom should be highly concerned at the prospect of such an outcome, which would directly contradict Ofcom’s statutory duty to encourage “*efficient use and [ensure] the effective management of radio frequencies*”<sup>26</sup> and the purpose of the Government Direction.

In the following section, we explain a number of other concerns with Ofcom’s proposed adoption of the MBA to estimate market value on the basis of the bids made in the auction.

### 3.1.2 The MBA is inconsistent with the design of the auction

In using the MBA to derive a spectrum price from the auction data, Ofcom is failing to take any account of real practical difficulties which mean that the MBA will not provide a reliable estimate of market value for the purpose of determining ALFs.

The MBA seeks to derive an estimate for market value by examining the highest losing bid at the margin. However, whilst Ofcom claims that the MBA “*has the benefit of being transparent in how estimates of market value are derived*”<sup>27</sup>, there are in fact substantial practical difficulties in applying the MBA in the present context.

<sup>24</sup> I.e. assuming that Ofcom’s implementation of the MBA actually resulted in an ALF which accurately reflects EE’s marginal value of acquiring additional 900 MHz spectrum, and that in due course this exceeded the value placed on that spectrum by an existing licence holder.

<sup>25</sup> Although, as noted above, due to the spectrum caps in the auction Ofcom does not have evidence on Vodafone or O2’s marginal value for additional sub-1 GHz spectrum.

<sup>26</sup> Framework Directive, Article 8(2)(d).

<sup>27</sup> Ofcom, Further Consultation, para 2.64.

In the UK 4G auction there were various factors which may mean that focusing on a particular bid / IBV (or even a small subset of bids / IBVs) fails to provide a reliable estimate of market value for the purpose of determining ALFs.

Most significantly, the MBA fails to recognise or take account of one of the most important features of the auction, namely that it was for multiple spectrum bands. By considering one band at a time, the MBA does not take account of the effects in other bands. This is in contrast to the LRP methodology, which calculates linear prices considering all bands simultaneously.

Ofcom notes the potential relevance of “cross-band” effects in Annex 6 of the Further Consultation, but fails to do anything about this.<sup>28</sup> This is surprising given that Ofcom chose to implement a CCA design for the auction specifically in order to encourage bidders to express complementarities in their bids. For example:

*9.21 In auctions with multiple lots, bidders seeking combinations or packages of lots may face aggregation risks as, when bidding for complementary lots, those bidders may have to bid separately for each lot without certainty over whether, and at what price, they might win the complementary lots.*

*9.22 A partial solution to manage their aggregation risks would be to allow bidders flexibility to shift demand across lots in response to changes in prices. However, there is always a risk that, as demand for lots diminishes towards the end of an auction, bidders may become stranded with unwanted lots.*

*9.23 The most effective solution to this risk is to allow bidders to make “package bids” (or combinatorial bids), i.e. linked bids for multiple lots that are accepted or rejected in their entirety. The downside of allowing combinatorial bidding is that facilitating aggregation for larger bidders needs to be balanced against the risk that smaller bidders, who might want only individual lots or relatively few lots, may be unable to coordinate their demand adequately to displace such larger bidders.*

...

*9.27 We consider that combinatorial bidding is likely to play an essential part in managing some key risks to the efficiency of the auction outcome and to make it simple for bidders to express their preferences in response to price changes. We are therefore proposing to use combinatorial bidding.”<sup>29</sup>*

In consequence, Ofcom is now proposing a method for deriving market value which is totally inconsistent with its own auction design. As explained further in section 3.2 below, as a result of this failure to take account of inter-band effects, Ofcom’s proposed implementation of the MBA leads to a significant overstatement of market value by failing to adjust for significant

<sup>28</sup> Ofcom, Further Consultation, Annex 6, para A6.70.

<sup>29</sup> Ofcom, First Auction Consultation, paras 9.21 to 9.27.

“complementarity premiums” included by EE in its bids for packages of 800 MHz and 2.6 GHz spectrum.

The unreliability of the MBA is also demonstrated by the fact that, in the case of 800 MHz, Ofcom is attempting to use a bid (EE’s bid for 2x20 of 800 and 2x20 2.6 GHz) that would have resulted in either excess supply for some spectrum bands in the auction or would have resulted in a significantly lower 2.6 GHz winning bid value. That is, Ofcom is ignoring that this result would have cannibalised the value of 2.6 GHz spectrum. In other words, awarding EE the package including 2x20 MHz of 800 MHz and 2x20 MHz of 2.6 GHz would have led to less 2.6 GHz being awarded to EE, and an alternative winner would have placed less value on that spectrum.

Ofcom has also acknowledged that factors such as budget constraints and strategic bidding may have played a role in the auction, meaning that any particular bid may not fully reflect the relevant bidder’s intrinsic valuation of the spectrum.

### **3.1.3 Ofcom does not have sufficient evidence to reliably implement the MBA**

In the present case, the inherent limitations of the MBA outlined above are significantly compounded by the fact that Ofcom does not have sufficient evidence to implement the MBA properly. This is a direct result of the spectrum caps imposed in the auction, which mean that Ofcom does not have information on how EE, Vodafone or O2 would have bid for packages containing additional 800 MHz spectrum. In the absence of such information any implementation of the MBA is reliant on speculation and highly sensitive to assumptions. In consequence, there is no rational basis on which the MBA can be implemented, and in doing so Ofcom would be failing in its duty to apply “*objective, transparent....and proportionate regulatory principles*”.<sup>30</sup> Further, and crucially, in adopting the MBA, Ofcom simply could not be sure that the ALFs it sets will approximate to market value, nor that they will fulfil Ofcom’s statutory duties.

In EE’s view, the fact that Ofcom does not have information on how EE or other bidders would have bid for additional 800 MHz spectrum should in itself be a clear signal to Ofcom that the adoption of the MBA is prone to significant error and that its results are therefore unreliable. As set out above, any hypothetical assumptions about how EE may have bid had it not been subject to a spectrum cap are simply unreliable and therefore flawed as a basis for determining ALFs.

In relation to 800 MHz, Ofcom states that the MBA should examine the value bid by EE for an increment of spectrum in addition to its post-spectrum holdings, to provide an estimate of the marginal opportunity cost. Ofcom does so on the basis that “*the highest losing bidder for 800 MHz spectrum was EE*”.<sup>31</sup> However, this misses a crucial point – because of the spectrum caps in the auction Ofcom has no data on how either Vodafone or O2 may have bid for additional 800 MHz spectrum over their current holdings had they been permitted to.

<sup>30</sup> Framework Directive, Article 8(5).

<sup>31</sup> Ofcom, Further Consultation, para 2.65.

Ofcom cannot therefore simply rely on the fact that EE was the highest losing bidder for 800 MHz to select its bids as the focus point of the MBA. Whilst we proceed below to consider Ofcom's application of the MBA to EE's bids, this is a fundamental flaw which taints the rest of Ofcom's analysis.

On the shaky assumption that EE does indeed have the highest marginal value for 800 MHz, properly applied the MBA should estimate the value placed by EE on obtaining additional spectrum on top of its current holding of 2x5MHz of 800 MHz and 2x35 MHz of 2.6GHz, and, as explained further in section 3.2.1 below:

- It is evident that the relevant "marginal increment" for the purpose of determining ALFs based on bids made in the auction must be a 2x5 MHz block.
- This estimate of EE's "marginal value" would then need to be adjusted in order to remove the "contiguity premium" associated with EE achieving in total a 2x10 MHz block of contiguous 800 MHz spectrum.

However, as Ofcom recognise, there is a "challenge" in doing this because "*some of the most relevant IBVs are bids that EE was not permitted to make because of the overall spectrum cap which applied in the auction*".<sup>32</sup> In EE's view this is more than just a challenge – it completely undermines Ofcom's attempt to implement the MBA.

As a result of inadequacy of its dataset for applying the MBA, Ofcom proceeds to base its estimate of the market value of 800 MHz on EE's IBV for a third and fourth block of 800 MHz, together with four blocks of 2.6 MHz. However, this is so far removed from the actual IBV that Ofcom needs to find that it is simply not reliable as Ofcom's single source of evidence. Furthermore, as explained below, Ofcom's erroneous approach substantially overstates the marginal value expressed by EE for additional sub-1 GHz spectrum for the purpose of determining ALFs.

In relation to 2.6 GHz, significantly Ofcom again notes that there is a "material complication" as there is no linear market-clearing price, given the bids in the auction.<sup>33</sup> As a result, Ofcom is *unable to apply the MBA* to select a losing bid which would clear the market. Ofcom therefore instead applies the MBA by focusing on a winning bid (which also would not clear the market). This again clearly indicates that the evidence available from the auction does not permit the MBA to be applied in a manner which produces a reliable estimate of market value.

As a result of these issues, the MBA becomes an inherently subjective exercise, dependent on arbitrary choices about which is the relevant increment of spectrum and which bid / IBV is most reflective of market value. Indeed, Ofcom's proposed reliance on the MBA is in direct contrast with Ofcom's pre-auction statements to the effect that "*by using a broad set of evidence, and by using market information in particular, we believe that our approach is likely to be appropriate in the circumstances*".<sup>34</sup>

<sup>32</sup> Ofcom, Further Consultation, para 2.67.

<sup>33</sup> Ofcom, Further Consultation, para 2.79.

<sup>34</sup> Ofcom, Second Auction Consultation, para 8.17.

It is also inconsistent with Ofcom’s reasoning for rejecting the possibility of relying on prices paid for future spectrum trades as evidence in considering potential reviews of ALFs - in the context of which Ofcom has previously noted: *“if there is only a small number of trades, transaction prices are likely to be sensitive to the particular circumstances of the trades concerned and may require careful consideration as indicators of market value.”*<sup>35</sup>

## 3.2 Ofcom’s proposed implementation of the MBA substantially overstates the market value of 800 MHz

Given the significant flaws of the MBA outlined in section 3.1 above, we believe that Ofcom should admit that its proposed adoption of the method is a mistake and revert to the LRP with revenue constraint.

Nonetheless, in this section we proceed to analyse Ofcom’s proposed implementation of the MBA, and explain why this results in a significant overstatement of the market value of 800 MHz.

In particular, Ofcom erroneously focuses on a bid made by EE in the auction which is **irrelevant for the purpose of determining ALFs** because it:

- includes a contiguity premium, as a result of Ofcom’s decision to focus on a 2x10 MHz marginal increment; and
- includes an implicit complementarity premium expressed by EE for a specific package of 800 MHz and 2.6 GHz spectrum, which is over and above EE’s intrinsic valuation of 800 MHz.

We then go on to demonstrate a number of ways in which the key errors in Ofcom’s approach could be corrected for (without prejudice to our overriding view that the MBA should be rejected outright), producing results which are not dissimilar from those derived from the revenue-constrained LRP method.

### 3.2.1 Ofcom erroneously bases its market value estimate solely on an IBV containing a contiguity premium

As noted above, the application of the MBA first calls for a decision to be made as to which is the relevant “marginal increment” of spectrum for the purpose of determining ALFs.

In the Further Consultation, Ofcom sets out its view that the relevant increment is 2x10 MHz, rather than 2x5 MHz. It does so on the basis that a 2x10 MHz increment is more valuable to marginal operators, because of the contiguity premium associated with a larger holding:

*“the contiguity premium would be relevant to the opportunity cost of the 900 MHz spectrum. By maintaining their current holdings of 900*

<sup>35</sup> Ofcom, First Auction Consultation, Annex 11, para A11.46.

*MHz spectrum, the existing licensees are denying the value to non-holders of acquiring a 2x10 MHz block.”<sup>36</sup>*

Ofcom therefore proceeds to base its estimate of market value on an IBV which included a significant contiguity premium associated with EE achieving a 2x20 MHz block of contiguous 800 MHz spectrum.

EE believes this a serious mistake by Ofcom. Ofcom is setting linear prices for ALFs, which do not distinguish the market value of one specific holding from that of another size of holding.<sup>37</sup> In our view it is therefore wholly inappropriate for Ofcom to base its estimate of the value of 800 MHz on a size of holding which will inevitably produce a higher estimate than smaller (tradeable) blocks.

Ofcom’s proposed approach is, furthermore, without a sound logical basis. The smallest available lots in the auction – on the basis of which Ofcom is determining its estimate of market value – were of 2x5 MHz, and both EE and Hutchison purchased holdings of 2x5 MHz of 800 MHz spectrum. In addition it is clear that an operator could purchase a 2x5 MHz holding of 900 MHz spectrum and use this to provide national GSM or LTE services.

Moreover, the impact of Ofcom’s approach could well be to prevent efficient trading of spectrum, and consequently to lead to inefficient use of spectrum contrary to Ofcom’s statutory duties. This results from the fact that the ALFs payable on a 2x5 MHz increment of 900 MHz spectrum would inevitably be greater than its inherent value (which will not include a contiguity premium) and marginal operators which may otherwise have purchased a 2x5 MHz block of spectrum could therefore be priced out of doing so.

Indeed, whilst Ofcom argues that the 900 MHz licence holders are denying non-holders from acquiring a 2x10 MHz block, this disregards the fact that, given the size of Vodafone’s and Telefonica’s holdings (2x17.4 MHz), it is much more likely that if they were to dispose of any 900 MHz spectrum this would be a 2x5MHz block, rather than a 2x10 MHz block.<sup>38</sup> It should not, in any event, be for Ofcom to effectively determine which increments of spectrum are tradeable in the market in this way.

Ofcom sets out illustrative examples of price signals created by different ALFs in Annex 6. Whilst Ofcom starts by considering examples where there is an available supply of 2x20 MHz, it is clear that the most relevant examples presented relate to an available supply of 2x15 MHz, which is the closest to the current 900 MHz holdings of Vodafone and O2. Ofcom provides two sets of examples under this heading, the first of which clearly demonstrates the potential for Ofcom’s proposed ALFs to prevent efficient trading of spectrum:

- In relation to “case (a)”, Ofcom notes that *“it is efficient for the [licence holder (“LH”)] to relinquish 2x5 MHz because the [incremental value] of*

<sup>36</sup> Ofcom, Further Consultation, para 2.73.

<sup>37</sup> Ofcom, October 2013 Consultation, para 2.12.

<sup>38</sup> Since if Vodafone or O2 were to dispose of 2x10 MHz they themselves would lose the benefit of holding a 2x10 MHz block of 900 MHz spectrum.

*the [licence holder] for its last 2x5 MHz at £22.5/MHz is less than the [incremental value] of the [non-holder's] first 2x5 MHz at £25m/MHz."*

- A linear ALF of £25m/MHz, based on a 2x5 MHz increment, provides the incentive for the licence holder to make this efficient relinquishment, and the ALF is also set at the non-holder's incremental value for a 2x5 MHz, meaning it has the incentive to purchase it.
- Ofcom goes on to note that the "*linear ALF based on the value of a 2x10 MHz increment of £32.63m/MHz also provides an incentive to make the efficient relinquishment of 2x5MHz*". What Ofcom fails to note, however, is that in this example the ALF is set too high to provide the non-holder with the incentive to purchase that 2x5MHz (despite it having a higher incremental value for it than the licence holder).
- As a result, an ALF determined on the basis of a 2x10 MHz increment would prevent an efficient trade of spectrum between the licence holder and non-licence holder and ultimately if the spectrum were relinquished by the licence holder it would lie fallow.<sup>39</sup>

If the MBA were applied to a 2x5 MHz increment of 800 MHz, it is apparent that the relevant value would be significantly lower than that currently proposed by Ofcom - as Ofcom states "*the value of a 2x10 MHz contiguous block is more than double the value of a 2x5 MHz block*".<sup>40</sup> It is therefore clear that Ofcom's suggested estimate of £38.3m/MHz in the main body of the Further Consultation for EE's second block of 800 MHz vastly inflates market value for the purpose of ALFs.

Ofcom acknowledges this fact, and in Annex 6 considers estimates of £20m/MHz and £25m/MHz as the value of a first block of 2x5MHz, and accordingly as the ALF which would apply if the MBA were based on a 2x5 MHz increment.<sup>41</sup>

In EE's view, faced with the option of choosing between a 2x5 MHz increment or a 2x10 MHz increment (or indeed some form of average of the two, i.e. under the LRP method), for Ofcom to choose the option which will inevitably lead to a higher value is not only contrary to Ofcom's legal duty to encourage efficient use of spectrum, but also completely at odds with Ofcom's stated need to adopt a conservative approach in determining ALFs.

In contrast, our preferred LRP method takes into account both bids which include a contiguity premium and bids which do not, and consequently does not require Ofcom to make an arbitrary judgment as to which is the "relevant" marginal increment. The results of the LRP methodology therefore reflect the full range of demand shown by bidders in the auction, and consequently provide a more accurate and reliable picture of the inherent value of the auctioned spectrum. As noted above, the LRP derives an estimate for the average marginal price across different package sizes and therefore is fully

<sup>39</sup> Unless Ofcom were to reduce the level of the ALF to an appropriate level. Ofcom, Further Consultation, Annex 6, paras A6.112 to 6.116.

<sup>40</sup> Ofcom, Further Consultation, para 2.70.

<sup>41</sup> Ofcom, Further Consultation, Annex 6, para A6.101.

consistent with both the requirements of the Government Direction and Ofcom's stated need to measure the opportunity cost of the holders of 900 MHz / 1800 MHz licences continuing to hold that spectrum.<sup>42</sup>

### 3.2.2 Ofcom's implementation of the MBA fails to account for the complementarity premiums contained in EE's bids

Another fundamental problem with Ofcom's implementation of the MBA is that Ofcom fails to take account of a relevant feature of EE's package bids (i.e. bids for both 800 MHz and 2.6 GHz spectrum), namely the complementarities inherent in such bids. In consequence of that serious error, Ofcom assigns significant value to 800 MHz over and above the inherent value which EE placed on that spectrum and substantially overstates "market value".

As discussed above, the auction was designed to encourage bidders to submit package bids and express complementarities between bands in those bids. In the auction, EE submitted a rich bid stack for packages that included both 800 MHz and 2.6 GHz spectrum bands. Consequently, any analysis of EE's bids that include combinations of 800 MHz and 2.6 GHz products must account for these complementarities.

This "complementarity premium" can clearly be seen by considering Equation 1 below, which relates to EE's losing bid for 4 blocks of 800 MHz and 2.6 GHz which Ofcom focuses on for the purpose of its IBV analysis:

$$(1) \text{ EE Bid}(4,0,4,0) = \text{EE Bid}(4,0,0,0) + \text{EE Bid}(0,0,4,0) + X_1$$

- Equation 1 states that EE's bid for the (4,0,4,0) package can be decomposed into three components: its bid for (4,0,0,0), the bid for (0,0,4,0), and the complementarity,  $X_1$ , that occurs when those two separate packages are combined together.
- EE's bid for (4,0,0,0) was £1,176,622,000, and its bid for (0,0,4,0) was £410,000,000.
- This allows one to determine the value of the complementarity ( $X_1$ ) embedded in EE's bid for (4,0,4,0), which equals £211,378,000.
- This complementarity is an amount unrelated to the stand-alone value of 800 MHz that Ofcom incorrectly includes in its calculation.

EE's bid for the (2,0,4,0) package, on which Ofcom also relies, also contains a complementarity, as shown in Equation 2 below:

$$(2) \text{ EE Bid}(2,0,4,0) = \text{EE Bid}(2,0,0,0) + \text{EE Bid}(0,0,4,0) + X_2$$

- EE's bid for (2,0,0,0) was £650,001,000. As noted above, its bid for (0,0,4,0) was £410,000,000.
- This allows one to determine the complementarity ( $X_2$ ) embedded in EE's bid for (2,0,4,0), which equals £85,477,000.

<sup>42</sup> Ofcom, Further Consultation, paras 2.9 – 2.11.

- It is worth noting that this complementarity is less than ( $X_1$ ) because the total amount of spectrum in the package is smaller.

Ofcom executes its MBA on EE's bid stack by conducting a comparative static exercise that holds the quantity of 2.6 GHz bid constant at 4 lots. However, by doing so, Ofcom's IBV calculations incorrectly assign to the marginal 2x10 MHz of 800 MHz certain amounts of value (i.e. the complementarity premium) which *in fact relate to EE's valuation of the package as a whole* and are over and above EE's intrinsic value for the additional 800 MHz spectrum.

This effect is compounded in relation to the particular bid focused on for the purposes of its MBA because by focusing on the difference between EE's bid for the (4,0,4,0) package from the (2,0,4,0) package Ofcom includes significant value which EE placed on winning 2x40 MHz and an LTE position that would allow for two 2x20 MHz carriers.

**a) Correcting for Ofcom's failure to recognise EE's complementarity premiums – Option A**

In order to correct for Ofcom's erroneous approach, a more appropriate analysis for the calculation of EE's marginal value for 800 MHz would involve changing the composition of spectrum won by EE while maintaining the total quantity of spectrum won. In particular:

- both the package examined and the reference package have 2x40 MHz of spectrum; and
- in the event that 2.6 GHz spectrum was lost in moving from the reference package to the package being used to value 800 MHz, the fair market value of that lost spectrum is added back.

Table 1 below presents this calculation for the IBV of 2x10 MHz of 800 MHz spectrum (although, as set out above, we have serious reservations concerning the use of a 2x10 MHz increment).

**Table 1 – IBV calculation for 2x10 MHz of 800 MHz using (4,0,4,0) and (2,0,6,0) package bids**

800 MHz Valued	Package 1	Package 1 Bid (A) (£)	Package 2	Package 2 Bid (B) (£)	2.6 GHz Adjustment (C) (£)	Total IBV (A - B + C) (£)	IBV per MHz (£)
2x10 MHz	(4,0,4,0)	1,798,000,000	(2,0,6,0)	1,360,000,000	110,000,000	548,000,000	27.4m

Source: EE

The reference package used in Table 1 is the (2,0,6,0) package. This package is particularly relevant because of its proximity to the package that EE actual won, namely (1,0,7,0). In moving to (4,0,4,0) from (2,0,6,0), 2x10 MHz of 800 MHz is gained, which increases value, but 2x10 MHz of 2.6 GHz spectrum are lost. To account for the value of the lost 2.6 GHz, an adjustment of £55 million

per 2x5 MHz is made.<sup>43</sup> The resulting value of 800 MHz is found to be £27.4 million per MHz.

**b) Correcting for Ofcom's failure to recognise EE's complementarity premiums – Option B**

Another potential methodology involves the use of EE's bids to estimate the value of the first block of 800 MHz won by any bidder. Specifically, Ofcom's primary concern with ALF determination from prices for 800 MHz is that the *first block* of 800 MHz won by any bidder was priced at the reserve. Table 2 shows how one can use EE's bids to estimate the value for the first block of spectrum a bidder wins.

**Table 2 – IBV calculation for first 2x5 MHz of 800 MHz won by Vodafone and O2**

800 MHz Valued	Package 1	Package 1 Bid (A) (£)	Package 2	Package 2 Bid (B) (£)	2.6 GHz Adjustment (C) (£)	Total IBV (A - B + C) (£)	IBV per MHz (£)
2x5 MHz	(1,0,7,0)	1,049,500,000	(0,0,8,0)	850,000,000	55,000,000	254,500,000	25.45m

Source: EE

The calculation in Table 2 shows that in moving from a package of (0,0,8,0) to EE's winning package of (1,0,7,0), EE gained £254,000,000 in value. This incremental value is indicated by the difference between the two bids – a difference of £199,500,000 – summed with the market value of the C lot that EE was forced to give up. Therefore, £254,000,000 represents the value to the market of the *first 2x5 MHz* of 800 MHz won at or about the final auction outcome.

After the analysis above, one must incorporate this figure of £25.45m per MHz into the overall 800 MHz valuation exercise. For Vodafone and O2, this is straightforward – Vodafone paid £38.4 million per MHz for its second A1 lot and O2 paid £32.5 million per MHz for its second 2x5 MHz segment of 800 MHz, as Ofcom indicates in the Further Consultation. Pricing their first blocks at £25.45m per MHz, the average market value for *Vodafone's and O2's* spectrum is a combined £30.425 million.

EE and Three, however, won only 2x5 MHz. Under the most aggressive pricing methodology, one would assign values of £25.45 million per MHz to these two blocks. This would bring the average value of 800 MHz in the auction to £28.78m per MHz.<sup>44</sup> Three, however, did not indicate marginal values for 800 MHz in excess of the reserve price.<sup>45</sup> Moreover, no other bidder in the auction

<sup>43</sup> This is, conservatively, based on Ofcom's estimate of £5.5m per MHz for the market value of 2.6 GHz based on the MBA. If Ofcom were to follow our proposal to revert to the LRP with revenue constraint, the adjustment should instead be £49.9m per 2x5 MHz, based on Ofcom's revised LRP estimates.

<sup>44</sup> Calculated as the average of £38.4m, £32.5m, £25.45m, £25.45m, £25.45m, and £25.45m.

<sup>45</sup> Although H3G did submit a large bid for a single lot of A1 and a large bid for A2, what matters when analysing H3G bidding is the

even bid for 800 MHz, as the reserve price for that spectrum was so large. Consequently, the final block of 800 MHz won should be priced at the reserve when using this methodology. This would lower the 800 MHz average value to £28.29m per MHz.<sup>46</sup>

**c) Correcting for Ofcom's failure to recognise EE's complementarity premiums – Option C**

The final methodology one can use to determine market value of 800 MHz from EE's IBVs is to rely on the same packages that Ofcom selected for its market value calculation, but to adjust Ofcom's number by the value of the complementarities that EE expressed in these two packages of interest.

Equations 1 and 2 above show that the complementarity expressed in the (4,0,4,0) package was £211,378,000 and the complementarity embedded in the (2,0,4,0) package was £85,477,000. Therefore, the *difference* between these two complementarities (an amount equal £125,901,000) represents the adjustment that must be made to determine the stand alone value of 2x10 MHz of 800 when using EE's bid for the (2,0,4,0) package as a reference.

This calculation is as follows:

$$\text{Value } 2x10 \text{ MHz } 800 = \text{EE Bid}(4,0,4,0) - \text{EE Bid}(2,0,4,0) - (C_1 - C_2)$$

$$\text{Value } 2x10 \text{ MHz } 800 = £1,798,000,000 - £1,145,478,000 - £125,901,000 = £526,621,000$$

According to EE's bids and the complementarities that EE expressed in those bids, this calculation results in a value of 2x10 MHz equal to £26.33 million per MHz.

**d) Summary**

Table 3 below lists the different calculations performed above and the resulting values for 800 MHz that are calculated.

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differences between its package bids. H3G was the only bidder that opted into MPP status, information it knew by the start of the auction. Therefore, H3G knew that it was guaranteed to win one of the MPP packages *at the reserve price* so long as the differences between its bids for these three MPPs equalled the differences between their respective reserve prices.

<sup>46</sup> Calculated as the average of £38.4m, £32.5m, £25.45m, £25.45m, £25.45m, and £22.5m.

Table 3 – Summary of 800 MHz value calculations from corrected MBA analyses

Description of calculation	Amount of 800 MHz valued through MBA methodology	800 MHz value per MHz
Bids for (4,0,4,0) to (2,0,6,0) used to calculate 2x10 MHz value	2x10 MHz	<b>£27.40m</b>
Bids for (1,0,7,0) to (0,0,8,0) used to calculate first 2x5 MHz value, applied to 4 800 MHz lots	2x5 MHz	<b>£28.78m</b>
Bids for (1,0,7,0) to (0,0,8,0) used to calculate first 2x5 MHz value, applied to 3 800 MHz lots	2x5 MHz	<b>£28.29m</b>
Complementarity adjustment for (4,0,4,0) and (2,0,4,0) bids	2x10 MHz	<b>£26.33m</b>

Source: EE

The data above indicates that, after correcting for the flaws in Ofcom's application of the MBA methodology to EE's bids in one of several potential ways, one finds values for 800 MHz in the range of £26.33m to £28.78m per MHz.<sup>47</sup> The higher of these estimates are, however, likely to overstate market value for the purpose of ALFs as they are for a 2x10 MHz increment of 800 MHz without any adjustment for a contiguity premium, and bidders' first block of 2x5 MHz of 800 MHz without any adjustment for a coverage premium.

### 3.3 The adoption MBA would be likely to influence incentives in future auctions

Distinct from the concerns outlined above concerning the application of the MBA in relation to the UK 4G auction, the adoption of such an approach raises wider concerns about its potential impact on future spectrum auctions conducted by Ofcom.

MBA relies on the marginal bids of selective bidders to derive the market value which is used to set ALFs. This means that bidders who know or expect they are likely to be the relevant "marginal bidder", and are also a holder of existing licences which are or will be subject to ALFs, may be influenced in determining the level at which they bid as there may be financial benefits from bidding below the opportunity cost (or below what they would have otherwise paid without MBA) in the form of lower ALFs for other spectrum.

[X]

The application of the MBA could, therefore, significantly weaken bidders' incentives to reveal their true opportunity cost. This would undermine the efficiency of future auctions, in particular CCA auctions, as it could lead to:

<sup>47</sup> Note, these estimates are for a 2x10 MHz increment of 800 MHz, without any adjustment for a contiguity premium, and bidders first block of 2x5 MHz of 800 MHz, without any adjustment

- spectrum not being awarded to the bidder with the highest intrinsic valuation;
- spectrum not being awarded at all (i.e. where bids are not submitted and spectrum is left fallow);
- in any event, lower revenues from auctions and lower revenues from ALFs determined / revised on the basis of the bids made in the relevant auction.

Ofcom has previously acknowledged in principle that a mechanistic link between ALFs and bids in the auction may create “bid shading” incentives.<sup>48</sup> Ofcom has also indicated that this risk is greatest in circumstances where there is a strong mechanistic link between ALFs and the bids made by a bidder:

- As noted above, this was the reasoning behind the development of Ofcom’s ASM.
- In the First Auction Consultation, Ofcom rejected the possibility of relying on spectrum trades to conduct future reviews of ALFs “*principally because using information from trades to change ALF may distort trade incentives.*”<sup>49</sup>
- In contrast, Ofcom has previously considered that the LRP method – which also (like the MBA) takes account of bids made in the auction, but does not place significant weighting on a single bidder – was “unlikely” to raise incentive effects in practice.<sup>50</sup>

These issues should be of particular concern to Ofcom given a number of upcoming spectrum auctions (in particular for 2.3 and 3.4 GHz, and 700 MHz spectrum), and the requirement upon Ofcom under the Government Direction to revise ALFs for 2100 MHz spectrum to reflect full market value by 31 December 2021.<sup>51</sup> The outcomes of future spectrum auctions will also be highly relevant to Ofcom’s ongoing consideration of whether the level of ALFs for 900 MHz and 1800 MHz are appropriate and continue to reflect market value.

### 3.4 Summary

In summary, EE believes that Ofcom’s proposed adoption and implementation of the MBA is fundamentally flawed. Ofcom’s proposal represents an unwarranted departure from its consistently stated preference for the LRP method, and introduces wider concerns about the potential impact on bidders’ incentives in future auctions.

Furthermore, the proposed MBA method is inconsistent both with the requirements of the Government Direction and Ofcom’s statutory duties, as well as the very nature of the CCA designed by Ofcom in full knowledge of the need to revise ALFs for 900 MHz and 1800 MHz in order to reflect full market value.

<sup>48</sup> Ofcom, Second Auction Consultation, Annex 13, para A13.45.

<sup>49</sup> Ofcom, First Auction Consultation, para 10.23.

<sup>50</sup> Ofcom, Second Auction Consultation, Annex 13, para A13.83.

<sup>51</sup> Government Direction, Articles 5(3) and 6(3).

We therefore believe that **Ofcom should reverse its latest proposals and revert to the LRP with revenue constraint.** We understand that under Ofcom's latest proposals this produces market value estimates of **£26.89m per MHz for 800 MHz and £4.99m per MHz for 2.6 GHz.**

Ofcom has compounded these inherent flaws of the MBA by implementing it in a manifestly erroneous fashion, focusing on an irrelevant IBV of EE and consequently significantly overstating market value of 800 MHz spectrum. Whilst we reject the MBA in principle, we have also shown that applied in a more appropriate and robust manner, the MBA produces estimates of market value of between £26.33-28.78m per MHz (the higher of which are likely to overstate market value).

## 4. Assessment of lump-sum values for 900 MHz and 1800 MHz

The second “step” of Ofcom’s ALF determination involves assessing lump sum values for the 900 MHz and 1800 MHz bands in the UK, based on international benchmark evidence and Ofcom’s estimated market values for 800 MHz and 2.6 GHz.

In the Further Consultation Ofcom sets out a number of revisions to its proposed approach to this step in its analysis. Amongst these changes, Ofcom’s decision to focus on relative rather than absolute international benchmarks, and to adopt the distance method for the determination of the 1800 MHz lump sum value (as proposed by EE and Analysys Mason / Aetha (“AM/Aetha”)) are to be welcomed.

However, we continue to believe that Ofcom has made a significant error in its estimation of the lump sum value of 1800 MHz – simply put, Ofcom’s estimate of £14m/MHz is far too high, and is disproportionate to the aims of reflecting market value and promoting efficiency.<sup>52</sup> This error arises because Ofcom’s analysis fails to apply objective, transparent, accountable, non-discriminatory and proportionate regulatory principles.<sup>53</sup>

Equally concerning is the fact that Ofcom’s analysis produces a significant bias, which results in Ofcom getting the relativity between 900 MHz and 1800 MHz wrong. In contrast to the overstatement of the 1800 MHz lump sum value, Ofcom’s estimate for 900 MHz of £23m/MHz is clearly conservative, in particular given it is just 65% of the UK value of 800 MHz notwithstanding the similar propagation and other technical characteristics of the two bands. Consequently, Ofcom’s current approach would result in unequal treatment as between 900 MHz and 1800 MHz licence holders and distortion of competition.<sup>54</sup>

As in relation to the October 2013 Consultation, EE and Three jointly commissioned AM/Aetha to review Ofcom’s revised benchmarking analysis. We provide AM/Aetha’s report titled “*Review of Ofcom’s determination of UK lump-sum values for 1800MHz and 900MHz spectrum to set annual licence fees*” with our response and Ofcom should treat it as an integral part of our response in relation to the issues contained therein.

AM/Aetha’s critique of Ofcom’s approach to evaluating international benchmark evidence clearly demonstrates not only that Ofcom has made several errors in its analytical approach, but also that its current proposals with regards to 1800 MHz are entirely inconsistent with the conservative approach which Ofcom has accepted it must adopt, especially with regards to 1800 MHz spectrum.

In particular:

<sup>52</sup> See the Government Direction, Article 6(1); Framework Directive, Article 8(2)(d) and 8(d); Communications Act 2003 s.3(2)(a) and 3(4)(d).

<sup>53</sup> See Framework Directive Article 8(5); Communications Act 2003 s.3(3).

<sup>54</sup> See Framework Directive Articles 8(2)(b) and 8(5), in particular at point (b); Communications Act ss.3(4) and 4(3).

- Ofcom acknowledges that there is a high degree of uncertainty as to whether particular benchmark countries provide an accurate reflection of market value in the UK for the purpose of ALFs. Such uncertainty cautions in favour of an inclusive approach to assessing the benchmarks, to ensure that short-comings in individual data points do not unduly skew Ofcom’s lump sum value estimates, particularly given that Ofcom’s analysis is highly sensitive to the tierings / weightings applied to the available benchmark data.
- In contrast, however, Ofcom has implemented a tiering and weighting approach which is highly subjective and effectively excludes several benchmarks altogether. As a result Ofcom’s analysis is overly reliant on a very small selection of “Tier 1” benchmarks, in particular Ireland and Austria. In doing so, Ofcom has failed to apply objective, transparent and proportionate regulatory principles (see section 4.1).
- Ofcom fails to apply objective and proportionate regulatory principles in that it has not conducted any rigorous sensitivity analysis. Sensitivities applied to Ofcom’s tiering by AM/Aetha show that its approach produces a weighted average calculation result in the top 2% of potential estimates of the lump sum value of 1800 MHz spectrum in the UK, when applied as a cross-check. In contrast, the outcome for 900 MHz is towards the centre of possible results. This difference in treatment is not justified and breaches the principle of non-discrimination. Moreover, it indicates that Ofcom’s lump sum estimate for 1800 MHz would fail any basic proportionality test (see section 4.1.1)
- Ofcom also uses erroneous input data for certain countries. These errors have the effect of significantly increasing Ofcom’s estimate of the 1800 MHz lump sum value, with a comparatively small impact on 900 MHz, leading to a breach of equal treatment (see section 4.2).
- Ofcom’s “cross-check” of the ratio of 900MHz / 1800 MHz lump sum values is also manifestly flawed as it is based on two benchmarks which heavily influence Ofcom’s lump sum determinations, making it an inevitability that the cross-check will support Ofcom’s results. A more robust cross-check supports the 1800 MHz value being significantly lower (see section 4.3).

AM/Aetha adopt a more rigorous and robust approach to tiering and weighting, and on this basis propose estimates of £8m per MHz for 1800 MHz and £21m per MHz for 900 MHz, using the revenue-constrained LRP estimates for the UK value of 800 MHz and 2.6 GHz spectrum, as proposed by EE (or £9m per MHz for 1800 MHz and £23m per MHz for 900 MHz using Ofcom’s current MBA-based estimates) (see section 4.5).

In this section we summarise the key errors in Ofcom’s proposed methodology, as identified and discussed more fully in the AM/Aetha report.

## 4.1 Tiering and weighting approach

In our response to the October 2013 Consultation, we set out a concern that Ofcom’s assessment of international benchmarks was highly subjective

because Ofcom had not set out at the start of its analysis a set of robust criteria for deciding which benchmarks are sufficiently relevant to be included in the sample, nor to distinguish between more and less relevant (included) data points.

This criticism remains. Whilst Ofcom appears in the Further Consultation to follow a high level framework for determining if benchmarks are informative of UK market value, and assigns relevant benchmarks to three different tiers with different weightings depending on Ofcom's view of their importance, Ofcom's detailed criteria for doing so are neither robust nor sufficiently transparent. Ofcom notes that its "main criterion" is the extent to which auction prices in the country concerned appear to have been determined by bidding in the auction(s).<sup>55</sup> However, Ofcom goes on to consider a variety of other factors, acknowledging that in some cases it is these other factors which are largely determinative of the tiering for a particular benchmark.<sup>56</sup>

The AM/Aetha report summarises the various criteria relied upon by Ofcom – 11, for just 9 benchmark countries – and demonstrates that Ofcom's approach amounts to little more than the subjective, country-by-country specific, approach used in the October 2013 Consultation. In particular, AM/Aetha conclude that:

*"it appears that Ofcom has not considered its criteria ex ante but has adopted criteria ad hoc, such that benchmarks fit Ofcom's subjective view of the reliability of each benchmark"*

As AM/Aetha observe, the relevance of several of the criteria used by Ofcom is highly questionable, suggesting that they may have been chosen by Ofcom specifically in order to downgrade certain countries rather than because they are significant drivers of spectrum value. This includes:

- 2G heavy markets;
- non-contiguity of blocks created obvious contenders for certain lots;
- fewer bidders imply market value was not achieved; and
- small lots imply less value for LTE.

Furthermore, Ofcom's failure to take into account the reliability of the inputs used to derive the benchmarks in determining which tier to assign them to is a significant omission. In particular:

- a) whether proxies for 2.6 GHz prices are required in order for the data point to be included in the distance method calculation; and
- b) whether inaccuracy arises through the disaggregation of package auction prices into band-specific prices.

Ofcom's apparent ignorance of these highly relevant issues is particularly significant as:

<sup>55</sup> Ofcom, Further Consultation, para 3.35.

<sup>56</sup> Ofcom, Further Consultation, para 3.36.

- in relation to (a), it results in a significant overstatement of the Swedish benchmark value (see section 4.2 below) and is also relevant to Ireland; and
- in relation to (b), it applies to both Austria and Ireland (as well as other countries) both of which we, and AM/Aetha, consider to be incorrectly assigned to Tier 1 by Ofcom.<sup>57</sup>

It is inevitable that a tiering and weighting exercise of the nature conducted by Ofcom will include an element of subjectivity, given the numerous idiosyncratic factors that affect spectrum value in any particular country, including the number of operators, the auction format, spectrum caps and reservation for entrants, and the timing of the auction. We also agree that not all auctions provide equally useful benchmarks, and that some form of tiering / weighting is therefore appropriate.

However, unless Ofcom has a very high degree of confidence as to which are the most relevant benchmarks, taking into account all influencing factors (which may result in prices paid either overstating or understating market value for the purpose of determining ALFs), in our view it must seek to include as broad a range of evidence as possible within its assessment. Otherwise, Ofcom creates an unacceptable and significant risk that its lump sum value estimates are unduly influenced by benchmarks that do not accurately reflect UK market value.

This is especially the case where the outcome of Ofcom's analysis is highly sensitive to the tierings / weightings assigned to particular countries. AM/Aetha explain that there are 19,863 possible combinations of placing the nine available 1800 MHz benchmarks into Ofcom's tiers, producing a wide range of potential lump sum estimates (see further section 4.1.1 below).

This is further illustrated by considering the examples below, which show the impact on the weighted calculation of 900 MHz and 1800 MHz lump sum values of two very rational alternative assignments of tierings within Ofcom's framework, both of which are advocated by AM/Aetha in their report.<sup>58</sup>

- **Example 1** – if Germany is moved to Tier 1, the lump sum value of 1800 MHz reduces by £1.1m per MHz, or around 7%.

<sup>57</sup> Note, the 2.6 GHz proxy issue is also relevant to Ireland. Whilst AM/Aetha do not raise the same criticism of the use of the proxy in Ireland as in Sweden, given that 2.6 GHz has unusually not been auctioned in Ireland, the use of a proxy nevertheless draws into question the reliability of the input data used by Ireland.

<sup>58</sup> Note, these examples are based on Ofcom's proposed valuations of 800 MHz and 2.6 GHz for ease of exposition, although as explained in section 3 above we strongly disagree with those valuations. They compare the results of a weighted average calculation of the lump sum value of 900 MHz and 1800 MHz before and certain changes to tierings of particular countries.

**Table 4 – Change in 900MHz and 1800MHz lump-sum values from movement of Germany to Tier 1**

	1800MHz	900 MHz
Before	£16.2m / MHz	£27.3m / MHz
After	£15.1m / MHz	£27.3m / MHz
% change	- 6.8%	-

Source: AM/Aetha

- **Example 2** – if Austria and Ireland are moved from Tier 1 to Tier 2, the lump sum value of both 1800 MHz and 900 MHz reduces by around £1.2m per MHz – a 7.4% reduction in relation to 1800 MHz and 4.4% in relation to 900 MHz.

**Table 5 – Change in 900MHz and 1800MHz lump-sum values from movement of Austria and Ireland to Tier 2**

	1800MHz	900 MHz
Before	£16.2m / MHz	£27.3m / MHz
After	£15.0m / MHz	£26.1m / MHz
% change	- 7.4%	- 4.4%

Source: AM/Aetha

Ofcom concedes in the Further Consultation that it has very little certainty as to whether or to what extent its benchmarks may understate or overstate market value. Ofcom summarises its assessment of the risk of its 1800 MHz benchmarks understating or overstating UK market value for the purpose of determining ALFs in Annex 8 of the Further Consultation, which is shown in Table 6 below. As AM/Aetha note, out of nine benchmarks Ofcom is unaware of the extent, scale or direction of this risk in five cases.

**Table 6 – Ofcom’s assessment of the risk of under/overstatement of market value based on 1800MHz distance method benchmarks**

Country	Quality of evidence	Interpretation of benchmark: risk of under/overstatement		
		Likelihood (extent of risk)	Scale	Direction
Austria	1 <sup>st</sup> tier	Unknown	Unknown	Unknown
Ireland	1 <sup>st</sup> tier	Larger	Unknown	Overstate
Italy	1 <sup>st</sup> tier	Unknown	Unknown	Unknown
Germany	2 <sup>nd</sup> tier	Larger	Larger	Understate
Sweden	2 <sup>nd</sup> tier	Unknown	Unknown	Unknown
Czech Republic	3 <sup>rd</sup> tier	Larger	Unknown	Understate
Portugal	3 <sup>rd</sup> tier	Unknown	Unknown	Unknown
Romania	3 <sup>rd</sup> tier	Unknown	Unknown	Unknown
Slovakia	3 <sup>rd</sup> tier	Unknown	Unknown	Understate

Source: Figure A8.2, Further Consultation

Despite this lack of certainty, Ofcom proceeds to apply tiering and weightings which make its 1800 MHz lump sum estimates heavily reliant on just three countries - two (Austria and Italy) where the risks are unknown, and another (Ireland) where the benchmark is considered likely to overstate market value.

Ofcom in fact disregards a large number of available benchmarks completely, by first excluding certain benchmarks from its analysis entirely, and then effectively excluding nearly half (four) of the benchmarks considered sufficiently relevant to be included in the data set referenced by Ofcom, by assigning those benchmarks to Ofcom’s Tier 3 and giving that tier a weighting of zero.

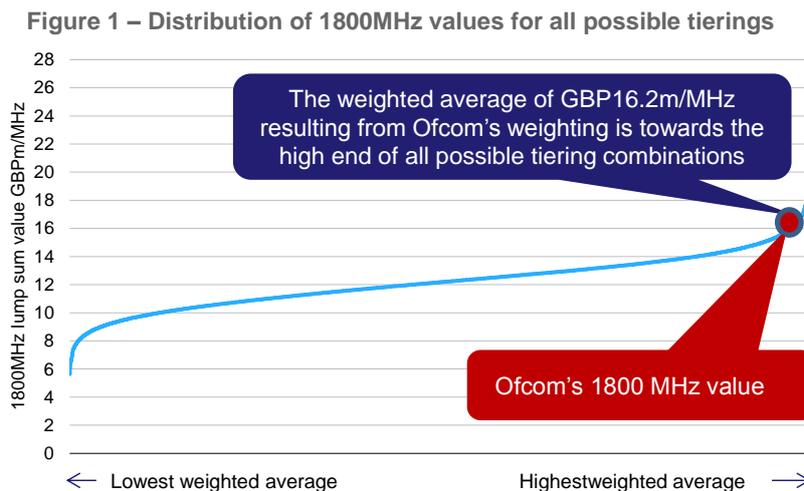
The effect of Ofcom’s approach is to introduce a second “excluded” category, without explicitly acknowledging that this is the case. Notably, two of these benchmarks (Portugal and Romania) have “unknown” risks, whilst the other two (Slovakia and Czech Republic) are considered to risk understatement (in the case of Slovakia to an unknown extent).

In the face of such uncertainty regarding the relevance of the data before it, for Ofcom to apply tierings and weightings which leave its lump sum value estimates reliant on so few benchmarks is, in our view, a failure to apply objective and proportionate regulatory principles and a manifest error of reasoning. Furthermore, as explained below, Ofcom’s approach significantly skews the lump sum estimate for 1800 MHz, whilst the outcome for 900 MHz is comparatively unaffected, leading to discriminatory treatment of operators depending on their spectrum holdings.

**4.1.1 Ofcom fails to carry out any rigorous sensitivity analysis**

In the Further Consultation Ofcom fails to carry out any rigorous sensitivity analysis on its proposed benchmarking analysis and resultant UK lump sum value estimates. As a result, Ofcom appears to be unaware that its tiering and weighting framework produces markedly divergent outcomes for 900 MHz and 1800 MHz spectrum.

AM/Aetha report that, in relation to 1800 MHz, the erroneous approach currently proposed by Ofcom to tiering and weighting produces a weighted average lump sum value for 1800 MHz which is in the top 2% of all possible outcomes (£16.7m per MHz).<sup>59</sup> This is shown in Figure 1 below.



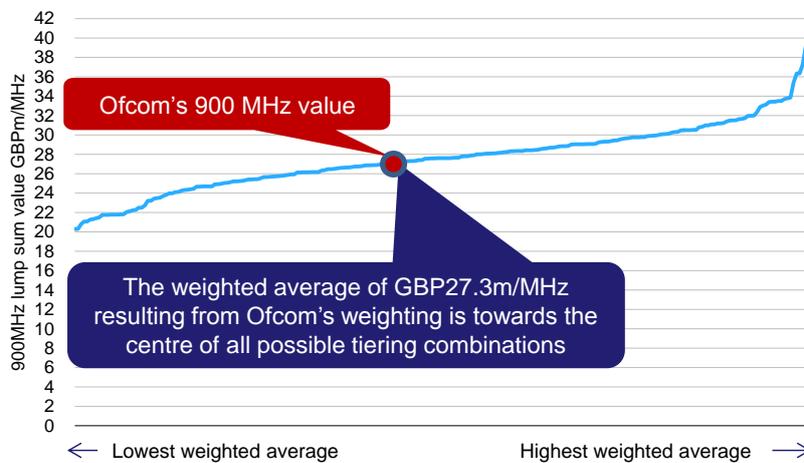
Source: AM/Aetha

<sup>59</sup> Using Ofcom’s assumed valuation of 800 MHz and 2.6 GHz spectrum.

This fact alone suggests a clear failing by Ofcom to apply a conservative approach - almost any other tierings that Ofcom could have chosen would have resulted in a lower estimate for 1800 MHz. Indeed, even Ofcom’s chosen “in the round” lump sum value of £14m per MHz for 1800 MHz is significantly higher than an unweighted average of Ofcom’s 1800 MHz benchmarks (£12.2m per MHz), which should be a clear signal to Ofcom that its current proposals are not only not conservative, but in fact tending towards the opposite end of the scale.

In contrast, Ofcom’s assessment of the lump sum value of 900 MHz, although suffering from many of the same analytical errors, does not produce a similarly distorted outcome. AM/Aetha show that Ofcom’s weighted average lump sum value for 900 MHz (£27.3m per MHz) is much closer to the centre of the possible results.<sup>60</sup> This is shown in Figure 2 below.

Figure 2 – Distribution of 900MHz values for all possible tierings



Source: AM/Aetha

Ofcom selects an “in the round” lump sum value of £23m per MHz for 900 MHz. In contrast to 1800 MHz, notably this is *below* the unweighted average of all Ofcom’s 900 MHz benchmarks.<sup>61</sup>

This is plainly a difference in treatment, which is prima facie discriminatory. Moreover, Ofcom does not advance any justification for such a difference in treatment (nor can EE imagine what such a justification might be).

<sup>60</sup> £27.3m per MHz, using Ofcom’s assumed valuation of 800 MHz and 2.6 GHz.

<sup>61</sup> This unweighted average stands at £24m per MHz, and would be significantly higher (£27.6m per MHz) if Ofcom were to follow AM/Aetha’s recommendation to exclude Denmark (which is currently assigned to Tier 3) from the relevant benchmarks altogether - AM/Aetha propose that Denmark should be excluded on the basis that incumbent operators were excluded from the auction and therefore the auction results are likely to significantly understate market value. Indeed it is notable that the value of the Danish 900 MHz benchmark (£6.1m/MHz) is 70% lower than the next highest benchmark (Ireland (which Ofcom notes is likely to overstate market value)).

#### 4.1.2 Correcting for Ofcom's erroneous approach to tierings / weightings

Building upon the approach proposed in their January 2014 report, AM/Aetha propose an alternative, more robust, framework to determining 1800 MHz lump sum values, which has the important benefit of taking a more inclusive approach to the available evidence. In particular, AM/Aetha assign a weighting to every benchmark included within their data set in order to improve the accuracy of their analysis

AM/Aetha's suggested framework results in a weighted calculation of £11.7m per MHz for 1800 MHz, which is close to the unweighted average and significantly below both Ofcom's chosen lump sum value and Ofcom's weighted average.

In relation to 900 MHz, AM/Aetha explain that in their view the distance method used for 1800 MHz is also the most robust method for determining the 900 MHz lump sum value. However, AM/Aetha conclude that Ofcom's chosen approach nevertheless does not raise material concerns because, if correctly implemented, both approaches produce similar results.

AM/Aetha proposed approach produces an estimate of £27.6m per MHz for the 900 MHz lump sum value. This is close to Ofcom's weighted average and significantly above Ofcom's chosen lump sum value of £23m/MHz, providing further evidence that Ofcom's proposed approach to 900 MHz is very conservative, in stark contrast to 1800 MHz.

## 4.2 Input data issues

In addition to the issues with Ofcom's tierings and weightings outlined above, the AM/Aetha report identifies two important errors regarding the input data used by Ofcom for its international benchmarking exercise.

First, Ofcom incorrectly calculates auction values in each country and spectrum band using a straight average of the lots sold, ignoring relevant factors such as the population covered by each lot and the size of the lot. AM/Aetha identify four instances of this occurring. In three of these instances (Sweden, Czech Republic and Spain), Ofcom's approach leads to an overstatement of market value. In the other (Portugal) there is a very slight understatement.

Second, and more significantly, Ofcom uses proxy data for Sweden for the value of 2.6 GHz, despite the fact that Ofcom has 2.6 GHz auction results available for Sweden from May 2008. Ofcom chooses to ignore this data point, based on its subjective and arbitrarily chosen cut-off point of 2010 for all benchmarks, and instead uses a proxy which is simply derived from a geometric average of the 800 MHz / 2.6 GHz ratios from all relevant benchmark countries applied to the absolute value of 800 MHz in Sweden.<sup>62</sup>

Ofcom's proposed approach therefore results in its Swedish benchmark data being polluted by evidence from other countries, without any consideration of how reflective those other benchmarks might be of market circumstances in Sweden. This is completely contrary to the purpose of Ofcom's benchmarking

<sup>62</sup> Ofcom, Further Consultation, Annex 7, para A7.49.

exercise. In their report, AM/Aetha propose a solution to address this serious shortcoming which involves adjusting the value of the 2.6 GHz Swedish benchmark to be equal to the value of 1800 MHz (i.e. a proxy based on Swedish data). It is apparent that this provides a much more representative figure for the market value of 2.6 GHz spectrum in Sweden than a simple average based on market value in other countries.

The above errors (in particular the use of flawed proxy data for 2.6 GHz in Sweden) again have the effect of significantly increasing the estimate of the 1800 MHz lump sum value, provide further evidence that Ofcom has failed to implement either a conservative or proportionate approach. Table 7 below summarises these errors and shows the effect of correcting for them on weighted average calculations of the 1800 MHz lump sum value and using both Ofcom’s and AM/Aetha’s proposed tiers and weightings (and assuming Ofcom’s valuation of 800 MHz and 2.6 GHz spectrum).

**Table 7 – Impact of Ofcom’s input data errors on 1800 MHz lump sum values**

	1800MHz weighted average values	
	Using Ofcom’s tiers and weightings	Using AM/Aetha’s tiers and weightings
Value prior to amendments	£16.2m / MHz	£11.7m / MHz
Correction to averaging	£16.2m / MHz	£11.6m / MHz
Use of Swedish 2.6GHz auction result	£14.7m / MHz	£10.8m / MHz
<b>After both changes</b>	<b>£14.7m / MHz</b>	<b>£10.6m / MHz</b>
<b>% change</b>	<b>9.4%</b>	<b>9.4%</b>

Source: Ofcom, AM/Aetha

### 4.3 900 MHz / 1800 MHz ratio

In our response to the October 2013 Consultation, we expressed a serious concern that Ofcom’s analysis of international benchmarks produced a significant bias, resulting in Ofcom setting 1800 MHz values higher than can be justified by the evidence and getting the relativity between 900 and 1800 MHz wrong.

As already referred to above, Ofcom’s revised approach has unfortunately failed to address this concern. Ofcom’s lump sum valuations results in 1800 MHz being valued as 61% of the value of 900 MHz spectrum, compared to 60% in the October 2013 Consultation. However, this ratio is simply not consistent with the benchmark evidence. As shown in Table 8 below, the geometric mean of the benchmarks for which Ofcom has both 900 MHz and 1800 MHz valuations is just **40%** and Ofcom’s proposed ratio is right at the upper end of available benchmarks.

Table 8 – Benchmark evidence on relative prices of 900 MHz and 1800 MHz

	UK equivalent price per MHz		Relative prices
	900 MHz	1800 MHz	1800 / 900MHz
Ireland	£39.6m	£25.2m	64%
Austria	£79.4m	£48.6m	61%
Greece	£32.8m	£14.5m	44%
Denmark	£2.9m	£1.2m	43%
Romania	£47.3m	£19m	40%
Portugal	£24.9m	£3.2m	13%
<b>Geometric mean</b>			<b>40%</b>

Source: Further Consultation

As a result, we believe that Ofcom’s current proposals for 1800 MHz are not only flawed and disproportionate in themselves, but would also have a discriminatory impact on 1800 MHz licence holders, relative to 900 MHz licence holders.

Our position in this respect is supported by AM/Aetha, who conclude that:

*“[Ofcom’s] revised lump sum value for 1800 MHz spectrum appears to be far from conservative; in fact it is aggressive. In contrast, the 900 MHz value appears to reflect Ofcom’s approach of being conservative...Ofcom’s 1800 MHz lump sum value is very high compared to its proposed 900 MHz value.”<sup>63</sup>*

Furthermore, AM/Aetha point out a serious deficiency in Ofcom’s “cross-check” of the relative value of the two bands. In particular, since the cross-check effectively only takes into account the benchmark ratios in Austria and Ireland, it merely serves to highlight the shortcomings of Ofcom’s analysis (i.e. over reliance on the benchmarks for Austria and Ireland, and the exclusion of too many data points) and does not provide any meaningful corroboration. As AM/Aetha note, it is a mathematical inevitability that if a significant weighting is placed on two benchmarks for 900 MHz and 1800 MHz then the ratio derived from that analysis will be similar to the ratio derived from the two benchmarks alone (i.e. sample bias).

We also note that:

- Ofcom uses the ratio for Austria to justify its 900 MHz / 1800 MHz ratio, despite giving the Austrian benchmark very little weighting in its determination of the 900 MHz lump sum value, where it gives significantly more (effectively 75:25) importance to the Irish benchmark.
- Ofcom note in a footnote that there is a risk that the Irish benchmark is overstated. However, this risk is considered larger in relation to 1800

<sup>63</sup> AM/Aetha report, pp.1 and 41.

MHz – implying that the ratio between the bands is likely to be lower than Ofcom’s benchmarks indicate.<sup>64</sup>

## 4.4800MHz / 900MHz ratio

Ofcom has estimated a value for 900MHz (£23m per MHz) that is just 65% of the UK 800MHz value. We consider this to be highly conservative, considering both the available benchmark data and the similar propagation and other technical characteristics of the two bands. This conservatism may well be appropriate in light of the asymmetric risk involved in setting ALFs which Ofcom acknowledges in the Further Consultation. However, in order to ensure that there is no discrimination as between operators that rely predominately on 900 MHz and 1800 MHz respectively. Ofcom must take a correspondingly conservative approach to estimating the lump sum value for 1800 MHz, which it currently fails to do.

## 4.5 Revising the 900 MHz and 1800 MHz lump sum values

For the reasons set out above, we believe it is incumbent upon Ofcom to revise its lump sum estimate for 1800 MHz, both to correct the clear errors in its benchmarking analysis and in order to ensure an outcome that is proportionate to the aims of reflecting full market value and promoting efficiency, that is non-discriminatory and does not distort competition.

We have explained in section 3 above that Ofcom has significantly overstated its UK market value estimates for 800 MHz and 2.6GHz, and proposed that Ofcom should revert to its revenue-constrained LRP estimates of £26.89m per MHz (800 MHz) and £4.99m per MHz (2.6 GHz). Ofcom’s 900 MHz and 1800 MHz lump sum values should therefore also be revised down to reflect these lower valuations of the auction bands.

In their report, having explained the errors in Ofcom’s analytical approach and the input data used by Ofcom, AM/Aetha proceed to propose revised lump sum values for 900 MHz and 1800 MHz spectrum. In choosing their proposed lump sum values, AM/Aetha:

- use their proposed tierings and weightings, as referred in section 4.1.3 above;
- correct for Ofcom’s averaging of benchmarks and the use of 2.6 GHz proxies, as referred to in section 4.2 above
- broadly follow the approach taken by Ofcom in section 3 of the Further Consultation, i.e. selecting a value “in the round” before conducting a weighted average cross-check of the benchmarks; and
- choose lump sum values assuming both Ofcom’s estimated UK values for 800 MHz and 2.6 GHz spectrum, as well as the revenue-constrained

<sup>64</sup> Ofcom, Further Consultation, footnote 65.

LRP estimates, which as explained in section 3 above EE believes Ofcom should revert to.

#### **4.5.1 AM/Aetha's proposed lump sum values assuming Ofcom's MBA values for 800 MHz and 2.6 GHz**

AM/Aetha conclude that, assuming Ofcom's values for 800 MHz and 2.6 GHz based on its MBA analysis, **£9m per MHz** would be an appropriate estimate of the UK lump sum value for 1800 MHz.

In contrast, based on their analysis, AM/Aetha do not find a need to revise Ofcom's estimate for 900 MHz of £23m/MHz, which as noted above is already considered to be a conservative estimate.

#### **4.5.2 AM/Aetha's proposed lump sum values assuming Ofcom's revenue-constrained LRPs for 800 MHz and 2.6 GHz**

Based on Ofcom's revenue-constrained LRP estimates for the UK market value of 800 MHz and 2.6 GHz, AM/Aetha consider **£8m per MHz** to be an appropriate estimate of the UK lump sum value for 1800 MHz.

In relation to 900 MHz, AM/Aetha propose a UK lump sum value of **£21m per MHz**.

#### **4.5.3 A cross-check of AM/Aetha's proposed lump sum values**

Notably, the ratio implied by AM/Aetha's proposed lump sum values for 1800 MHz and Ofcom's 900 MHz estimate is either 38% or 39% (depending on whether Ofcom's MBA 800 MHz / 2,6 GHz values are assumed or the revenue-constrained LRP estimates). These are both very close to the geometric mean of the benchmark ratios (see section 4.4 above), demonstrating that AM/Aetha's proposed lump sum values are considerably more robust than Ofcom's.

## 4.6 Summary

The evidence set out in the AM/Aetha report, and summarised in this section, shows that Ofcom has made several serious errors in its international benchmarking, which has led it to significantly overstate the UK lump sum value of 1800 MHz spectrum.

Furthermore, because Ofcom's 900 MHz lump sum value estimate is not affected in the same way by Ofcom's erroneous approach, if Ofcom proceeds with its current proposals it would have an impact on 1800 MHz licence holders which would be discriminatory and distort competition.

Correcting for the errors in Ofcom's approach, and assuming our proposed UK market values of 800 MHz and 2.6 GHz (i.e. Ofcom's revenue-constrained estimates), AM/Aetha propose lump sum values of **£8m per MHz for 1800 MHz and £21m per MHz for 900 MHz**.

Alternatively, assuming Ofcom's current proposed market value of 800 MHz and 2.6 GHz (i.e. using the MBA), AM/Aetha proposes lump sum values of £9m per MHz for 1800 MHz and £23m per MHz.

We believe that Ofcom should adopt AM/Aetha's proposed lump sum values, which compared to Ofcom's current proposals set out in the Further Consultation are clearly more consistent with the international benchmark evidence before Ofcom, Ofcom's acknowledged need to adopt a conservative approach, and Ofcom's duty to apply equal treatment to different stakeholders.

## 5. Deriving annual licence fees from lump-sum values

On the basis of its lump sum estimates for the UK market value of 900 MHz and 1800 MHz spectrum, Ofcom proceeds in section 4 of the Further Consultation to set out how it proposes to derive the base levels of ALFs by spreading those lump sum values over 20 years, using a constant real profile.

In this section we:

- set out a number of serious errors made by Ofcom in selecting a discount rate in order to make the conversion of its lump sum valuations into annual fees (see sections 5.1 to 5.7); and
- reiterate our continued disagreement with Ofcom's failure to make an adjustment for terminal value (see section 5.8).

### 5.1 The discount rate

In the Further Consultation, Ofcom proposes to use the cost of debt as the discount rate to derive annual fees from Ofcom's estimated lump sum values of 900MHz and 1800MHz spectrum.<sup>65</sup> The use of the cost of debt reflects comments made by EE and other stakeholders in response to the October 2013 Consultation. However, as explained below, in selecting a discount rate Ofcom make several serious errors, which result in Ofcom using a discount rate which is too high and consequently Ofcom overstates the appropriate level of annual fees.

Ofcom state in the Further Consultation that the discount rate should be set such that the average efficient MNO is indifferent between paying a lump sum payment and paying annual fees over a 20 year period. Ofcom suggests that, conceptually, the discount rate would in fact be somewhere between the weighted average cost of capital ("WACC") and the cost of debt, but citing the need to take a conservative approach, proposes to set the discount rate based on an estimate of the cost of debt. Although Ofcom acknowledges that there are characteristics of ALFs which make them akin to a debt instrument,<sup>66</sup> it asserts that there are some characteristics of ALFs which mean that they are somewhat more risky than debt.<sup>67</sup>

In this section, we first explain why the correct discount rate is not above the cost of debt. Hence, Ofcom is not adopting a conservative approach merely by virtue of using the cost of debt, and it is therefore necessary explicitly to adopt a conservative approach to estimating the cost of debt itself. We then explain why Ofcom's approach to estimating the cost of debt is flawed.

In summary, we believe that Ofcom's errors fall into four categories:

- Ofcom incorrectly concludes that the discount rate should lie somewhere between the WACC and the cost of debt. In order for the

<sup>65</sup> Ofcom, Further Consultation, para 4.10.

<sup>66</sup> Ofcom, Further Consultation, para 4.17.

<sup>67</sup> Ofcom, Further Consultation, para 4.18.

lump sum and annual payments to be equivalent to operators, the discount rate used to convert an upfront payment into an annuity should reflect the riskiness of the flow of payments. The riskiness of spectrum payments to the Government is akin to the risks associated with senior secured debt to a bond holder, and the discount rate should therefore be the cost of debt. A truly conservative approach to the selection of the discount rate would be to adopt the risk free rate.

- Ofcom’s preferred approach to estimating the cost of debt is inappropriate in the context of setting ALFs. Ofcom has proposed to use the traditional approach (Option A) to estimate the cost of debt, on the basis that it maintains consistency with the WACC used in other contexts, and that it reflects the long-term nature of ALFs. We explain why the yield to maturity (“YTM”) approach (Option B) better reflects the cost of raising debt today, which is the relevant benchmark for estimating the discount rate.
- Ofcom overstates the appropriate cost of debt by using long-term corporate bonds as the basis for its estimates of the YTM and debt premium, which are likely to be more risky to bond holders than ALFs will be to the Government. This is because the bond payments are weighted more heavily towards the maturity date (as they involve a principal being paid at the maturity date), whereas ALFs payments are broadly uniform and therefore payments are more evenly weighted over a 20 year period. The Government therefore faces a lower payment term risk. Our proposed approach suggests that the yields on ALFs should be 0.4% lower than on these bonds and Ofcom should adjust its estimate of the YTM and debt premium for ALFs to reflect this lower risk.
- Under Ofcom’s current proposed approach to estimating the cost of debt (i.e. Option A), Ofcom’s estimates of the RFR and debt premium are not supported by the latest available market evidence, and fail to take account of the nature of ALF payments. If Ofcom continues (incorrectly in our view) to adopt this approach, its current estimates will have a high likelihood of remaining significantly above the observed cost of debt well into the future. Consequently, the ALFs set by Ofcom will be far too high.

## 5.2 The cost of debt is the appropriate discount rate

As Ofcom notes, the primary objective in setting the discount rate for ALFs should be to ensure that the average efficient operator is indifferent between making an upfront lump sum payment and paying the ALFs.<sup>68</sup> The discount rate used to convert an upfront lump-sum payment into an annuity should therefore represent the riskiness of the payments. If this is not the case then

<sup>68</sup> Ofcom, Further Consultation, para 4.12.

ALFs will either be set too high (if the discount factor overstates the underlying risk of the ALFs) or too low (if the discount factor understates the risk).

While Ofcom suggests in the Further Consultation that it has taken a conservative approach by using the cost of debt as the discount rate<sup>69</sup>, and that the discount rate may actually lie between the cost of debt and the WACC (i.e. the cost of debt is the floor), there are factors which indicate that ALF payments are in fact *less* risky than debt. EE considers that the characteristics and underlying risk of ALFs are closely mirrored by a senior secured debt instrument, and in some respects may even be considered less risky than such a debt instrument.

As explained below, Ofcom incorrectly concludes that ALFs are more risky than debt instruments by:

- failing to take any account of certain features of ALFs which make them less risky, from the point of view of the Government, than debt instruments; and
- making three specific errors of fact in respect of certain features of general debt instruments.

### 5.2.1 ALFs are less risky than debt

The highly marketable nature of mobile spectrum and the fact that it is an essential input into MNOs' businesses means that the Government is less likely to suffer any significant loss in the event that an operator becomes insolvent, compared with a general secured debt holder. Further, spectrum licences include the option for Ofcom to revoke the licence under specific conditions, a feature not present for a conventional corporate debt instrument.

The ALF obligation is backed by an asset, namely spectrum which can be re-sold by the Government in a credit event, just as the principal on secured debt in a credit event might be returned to the bond holder through the selling of collateral. Indeed, Ofcom's proposed ALFs are, necessarily, based on the notion that 900 MHz and 1800 MHz licence have significant market value (albeit that, as set out in the previous sections of our response this market value has currently been vastly overstated by Ofcom).

Ordinary secured debt is more risky than ALFs for three reasons:

- First, bondholders on secured debt may in practice face partial default on repayment of the principal if the borrower becomes insolvent. In contrast, spectrum suitable for mobile services will be highly valued by other users and the full market value of the spectrum would be obtained by the Government in the event that an operator became insolvent.
- Second, under spectrum licences subject to ALFs, in the event that the operator goes bankrupt, the Government has a priority claim on project cash flows as well as the licensed spectrum that is being paid for. This is akin to senior secured debt, where the senior debt holders (in this case the Government) are first in line to the collateral (the licensed

<sup>69</sup> Ofcom, Further Consultation, para 4.25.

spectrum) above other claims of debt and equity holders in the event of the operator going bankrupt.

- Third, in assessing the comparative level of risk associated with debt instruments and ALFs, Ofcom has failed to take into account the difference between the respective profiles of the payment flows. Most debt instruments, including the corporate bonds Ofcom relies on in its spread and YTM analysis, have a principal which is only repaid upon bond maturity. This means that the payment flow is weighted towards the end of the bond period. This is different to the timing of payments for ALFs, which are made uniformly (in real terms) over the period. In the case of ALFs the Government receives annual payments over 20 years, which are intended to provide the same yield as a bond, but with a much earlier weighted average of the timing of the payments.

The difference in the weighting of the time of payments means that ALFs will tend to have a lower Macaulay duration than corporate bonds and in particular those used in Ofcom's analysis. The Macaulay duration measures the price sensitivity of a debt instrument to a change in yields. Since ALFs will have a lower Macaulay duration than Ofcom's selected corporate bonds, this implies that they are less sensitive to a change in yields. As a result the risk profile of ALFs will be significantly lower than that of corporate bonds, particularly long dated corporate bond such as those relied upon by Ofcom for its cost of debt estimate.<sup>70</sup>

### 5.2.2 Ofcom's errors

Ofcom makes three specific errors of fact regarding corporate debt instruments, which lead it to the false conclusion that such instruments may be less risky than ALFs.

First, Ofcom argues that ALFs may be deemed to be more risky than corporate debt instruments because there is no cross-default clause which "*seems to provide the option of 'defaulting' on this debt with no effect on the rest of its financial operations*".<sup>71</sup> However, Ofcom makes a significant leap in assuming that corporate debt instruments do, on the whole, contain cross-default clauses. This is simply incorrect. In fact, according to a study on default clauses in debt contracts<sup>72</sup>, only around half (51.5%) of bond agreements contain cross-default clauses. This is therefore not a characteristic that distinguishes debt instruments from ALFs. Given that a significant proportion of corporate debt instruments do not contain this clause, and this is only one characteristic which affects yields on bonds, Ofcom simply cannot justify any discount rate in excess of the cost of debt on this basis.

<sup>70</sup> Ofcom uses spread and YTM analysis of UK MNO parent company bonds with at least a 20 year maturity to estimate the cost of debt.

<sup>71</sup> Ofcom, Further Consultation, para 14.18

<sup>72</sup> See: [https://business.rice.edu/uploadedFiles/Faculty\\_and\\_Research/Academic\\_Areas/Accounting/papers/Vasvari%20paper%20.pdf](https://business.rice.edu/uploadedFiles/Faculty_and_Research/Academic_Areas/Accounting/papers/Vasvari%20paper%20.pdf), page 11.

Furthermore, Ofcom has presented no evidence to demonstrate that yields on secured debt instruments that contain a cross-default clause would be materially lower than the yields on secured debt that does not have such clauses where the collateral is an asset of the importance for a business as is spectrum for the operators. In particular, the ALF payments are effectively secured against an asset which is of critical importance to mobile operators' ongoing supply of services and hence an asset that would be highly unlikely to be returned to the Government except in the most extreme circumstances.

In EE's view it is fanciful to suggest that an operator that remains financially viable would choose to default on payments and hand back spectrum to the Government. As Ofcom notes in the consultation:

*“any operator who needs a particular block of spectrum in order to be credible is likely to place a high valuation on it, and is relatively unlikely to hand it back to avoid paying ALFs.”<sup>73</sup>*

An operator that has incurred sunk costs in optimising its network for the spectrum and acquiring a customer base to be served using the spectrum would be expected to attach a greater forward-looking private value to the spectrum than the market value of the spectrum (i.e. which would reflect the value of the spectrum rights to other parties). Operators would also be reluctant to give up their spectrum rights, as the rights (potentially with revised ALFs) would be highly likely to be acquired by others, and spectrum suitable for mobile services is generally in short supply. As such, an operator releasing some spectrum would also face the potential loss of access to further spectrum indefinitely into the future (i.e. there would be a significant value to an operator retaining spectrum in terms of the real option to expand that it provides).

Moreover, even in the case where an operator found itself in financial difficulties, but remained a going concern, the operator would be unlikely to return the spectrum. This is because the use of the spectrum to provide core business services is critical to the operator's ability to generate the income required to remain solvent.

In a scenario where an operator became insolvent and ceased to be a going concern, the operator would have no choice but to return the spectrum with the debt holders making claims on any remaining assets. The Government would receive the spectrum rights, and while there may be a fallow period in which the ALFs are not paid while the spectrum is being re-assigned, this is unlikely to be a significant loss given the demand for spectrum. In contrast, debt holders may face substantial losses, potentially as much as their entire holdings, as the value of their collateral may be less assured.

A second reason which Ofcom considers might lead to ALFs being more risky than debt is that, whereas debt payments are likely to be fixed, the payment amounts in respect of ALFs may be changed in the future. Ofcom reasons that:

*“This suggests that the Government could in practice be left sharing the underlying risks of the business for which the spectrum is employed.”<sup>74</sup>*

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<sup>73</sup> Ofcom, October 2013 Consultation, Annex 9, para A9.32.

EE strongly contests this reasoning. We note that in the Further Consultation Ofcom state that they are not minded to review ALFs within the next five years, and only then if there is a “material misalignment” with spectrum values<sup>74</sup>. Accordingly, the ALF payments will be much less volatile than the profitability of a business. Further, ALFs are based on the market value of spectrum and the spectrum can be re-assigned if one operator does not make the payments so that, even after 5 years, the Government would not be exposed to individual business risks but only to significant changes in overall market value.

It is also not the case that corporate debt payments are always fixed or non-performance related. For example, many corporate bonds contain a performance related element in the form of clauses which allow for an adjustment to coupon payments following a change in the credit rating of the bond issuer. In fact, the Deutsche Telekom (“DT”) bond with a maturity date of 2030 – which Ofcom uses as the basis of its own cost of debt estimates – contains such a clause and by implication the coupon payments are not fixed for the term of the bond.

EE therefore considers that Ofcom has again inaccurately characterised debt. The potential for ALFs to be revised after five years does not imply that ALFs are any riskier than the DT bond nor that the cost of debt is not the relevant proxy for the discount rate.

In summary, the overall balance of factors suggests that the risk profile of ALFs is around the cost of debt, and potentially somewhat lower. Ofcom appears to have incorrectly characterised corporate debt instruments and used this to conclude that in some respects ALFs are not akin to the cost of debt and may actually be more risky than secured corporate debt. Ofcom has also not taken into account other key features of ALFs which make the payments less risky than secured debt. Ofcom’s proposal to adopt a measure of the cost of debt as the discount rate cannot therefore be considered conservative. It is thus of fundamental importance that Ofcom applies a conservative approach to estimating the precise cost of debt to be applied.

### 5.3 The yield to maturity is the relevant cost of debt

Ofcom considers two separate approaches to estimating the cost of debt in the Further Consultation:

- Ofcom’s first approach, Option A, is derived as the sum of Ofcom’s estimate of the RFR and debt premium for the average efficient mobile operator. This approach is consistent with the approach taken to calculating the cost of debt for the purposes of the Fixed Access Markets Review 2014 (“FAMR 2014”) and the Wholesale Mobile Call Termination Market Review 2014 (“MCT 2014”).

<sup>74</sup> Ofcom, Further Consultation, para 4.22.

<sup>75</sup> Ofcom, Further Consultation, para 4.21.

- Ofcom also considers an alternative approach, Option B, which is to set the cost of debt with respect to YTM on selected MNO parent company corporate bonds with a maturity of at least 20 years. The YTM reflects the expected rate of return on the debt if it was bought today and held to maturity.

Ofcom's preferred approach is Option A. In the consultation Ofcom explains that:

*"We [Ofcom] may therefore be more interested in the long-term equilibrium market rate as reflected in Option A, which is likely to be less affected by short-term distortion"; and*

*"Option A is also the approach we generally take in calculating the cost of debt for the WACC for a similar reason of consistency through time, and so there is also a potential benefit from regulatory consistency to consider."<sup>76</sup>*

In contrast to Ofcom's proposed approach, EE believes that the YTM provides a more accurate estimate of the cost of debt for the purpose of calculating ALFs. Crucially, it is also the more conservative estimate. As set out above, Ofcom has not ensured a conservative estimate merely by choosing to use a cost of debt benchmark rather than the WACC as the discount rate. The cost of debt is the appropriate discount rate, and the existence of asymmetric risks of errors, requires Ofcom to adopt a conservative approach in estimating it.

In order to replicate the underlying risk of the ALF cash flows – as required to ensure that an average efficient operator would be indifferent between a lump sum payment and annual fees – Ofcom must consider how UK MNO parent companies would finance the lump sum costs that are assigned for the spectrum. Given that the lump sum would need to be paid today (i.e. at the effective date of ALF payments), the equivalent amount can be determined as if MNOs issued long-term debt today in order to finance the lump sum. It follows that, as a matter of principle, the relevant discount rate should reflect the current cost of debt which operators would consider when weighing up whether to pay a lump sum or annual payments.

In the Further Consultation, Ofcom appears to accept that Option B is the appropriate choice if this point of principle is to be reflected:

*"We recognise that Option B [YTM] reflects data on the actual returns investors currently expect at this point in time, which is the return a generic MNO would have to offer if seeking financing."<sup>77</sup>*

EE agrees with Ofcom that the YTM is the parameter that MNOs would consider when deciding whether to issue debt.

Furthermore, in its recent final determination for the Northern Ireland Electricity ("NIE") price controls, the Competition Commission ("CC") also based its estimate of the cost of new debt on the YTM<sup>78</sup> (in particular, on NIE's £400m

<sup>76</sup> Ofcom, Further Consultation, Annex 10, paras A10.29-A10.30.

<sup>77</sup> Ofcom, Further Consultation, Annex 10, para A10.27

<sup>78</sup> In particular, on NIE's £400m bond.

bond) as well as market data for publicly traded bonds and recent new issues.<sup>79</sup> The CC stated that the YTM on NIE's bond was:

*“equivalent to the return that an investor would earn by purchasing an NIE bond now and holding it until the capital is repaid in 2026. This provided a proxy for the rate at which NIE could borrow now if it was offering a fixed rate to 2026.”<sup>80</sup>*

Given that the CC has accepted that YTM is an appropriate proxy for the cost of raising new debt over the course of a price control, in which investments are phased over the price control, it seems even more relevant for the purposes of setting ALFs, where the equivalent lump-sum investment would effectively require a one-off issuance of debt at or prior to the effective date of the ALF payments.

In relation to Ofcom's reasoning that Option A has the benefit of regulatory consistency, EE considers that Ofcom has failed to recognise or acknowledge that the specific purpose of calculating the level of annual payments equivalent to a market value is distinct from the purpose of the WACC in charge controls. Ofcom would be wrong both in principle and as a matter of law to apply a “consistent” approach when the difference in contexts requires different approaches.

Ofcom is subject to two related duties, namely the principles of equal treatment<sup>81</sup> and regulatory consistency<sup>82</sup>, which are of particular relevance in this context. The principle of regulatory consistency is stated in the Framework Directive as being “*promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods*”. Regulatory consistency is in part a specific expression, in the telecommunications context, of the principle of equal treatment. In any event, it should not be understood as being in conflict with the principle of equal treatment, which is a constitutional principle of EU law to which directives, such as the Framework Directive itself, are subject.<sup>83</sup> Moreover, the principle of equal treatment (or non-discrimination),<sup>84</sup> requires not just that Ofcom should treat comparable situations similarly but also that it should treat different situations differently (unless such unequal treatment is objectively justified).

Several considerations which are central in the context of setting charge controls are simply not relevant for the purpose of setting ALFs. For example, Ofcom is required by the Access Directive to set controls that provide a

<sup>79</sup> CC, Northern Ireland Electricity Limited price determination, A reference under Article 15 of the Electricity (Northern Ireland) Order 1992, 26 March 2014 (the “2014 NIE Final Determination”), para 13.70.

<sup>80</sup> CC, 2014 NIE Final Determination, para 13.70.

<sup>81</sup> See Article 8(5) Framework Directive. Ofcom is also required to respect the principle of equal treatment as a matter of general EU law.

<sup>82</sup> See Article 8(5)(a) Framework Directive and s.3(3) CA 2003.

<sup>83</sup> See Case C-17/08 *NCC Construction Danmark A/S v Skatteministeriet* [2009] ER I-10567 at §45.

<sup>84</sup> See Article 8(5) Framework Directive. Ofcom is also required to respect the principle of equal treatment as a matter of general EU law.

reasonable rate of return on adequate capital employed. In particular, charge controls must ensure that operators are able to recover their efficient costs on an ongoing basis and provide the incentive for new investment over the period ahead. There is also a need to provide incentives for operators to outperform financing assumptions (i.e. the basis of RPI-X regulation), as explained by Ofcom in the Fixed Narrowband Market Review (“FNMR”):

*“Under our preferred method of charge control regulation (RPI +/- X), the dominant CP is incentivised to increase its efficiency, thereby imitating the effect of a competitive market. If the firm can reduce its costs below the level expected when the cap was set, then the firm retains the increased profits, at least for the period the control is in place.”<sup>85</sup>*

In the CC’s final determination for NIE price controls, the CC also noted that setting the rate with reference to a period before the control period would give companies incentives to reduce the cost of their debt to outperform the index.<sup>86</sup> As operators raise finance and undertake investments over time, it can make sense in the context of charge controls to allow a return based on a longer term estimate of the cost of capital.

In contrast, in the case of ALFs, the primary objective in setting the discount rate is to determine a stream of annual payments equivalent to the lump sum market value of the spectrum. A lump sum equivalent payment for spectrum would require a one-off debt issuance rather than a series of debt issuances over time.

We also note that whilst Option A reflects the traditional approach taken by Ofcom to estimating the cost of debt, the CC along with other regulators have tended to base their estimates of the cost of new debt on observed yields on corporate debt. As noted above, the CC bases its estimate of the cost of new debt on the YTM.<sup>87</sup> This is particularly significant given that in the context of ALFs the primary consideration is the cost of raising new debt rather than any need to also recover the cost of existing embedded debt. Other regulators have also placed significant weight on current bond yields to estimate the cost of new debt. For example, Ofwat based its cost of new debt estimate on the yields on benchmark corporate debt (using Iboxx indices of A and BBB corporate debt maturities of ten or more years) alongside current yields on traded water company bonds.<sup>88</sup>

There is clearly no need to reflect historical levels of the cost of debt in determining the discount rate in the ALF context. Even were it argued that the discount rate should be forward-looking, the current YTM reflects the market’s forward looking expectations of bond yields. Maintaining consistency, with an approach that is adopted in an entirely different context, is not sufficient

<sup>85</sup> Ofcom, Review of the fixed narrowband services markets, September 2013, Page 163, Footnote 393

<sup>86</sup> CC, 2014 NIE Final Determination, para 13.57.

<sup>87</sup> CC, 2014 NIE Final Determination para 13.70.

<sup>88</sup> Ofwat, Setting price controls for 2015-20– risk and reward guidance, January 2014, page 21.

grounds to use an approach which relies heavily on historic values to estimate the cost of raising new debt today. In the next section, we consider in more detail market expectations of the cost of debt, which we believe represent the appropriate basis for Ofcom's determination of the discount rate.

## 5.4 Estimates of the yield to maturity

In the Further Consultation Ofcom estimates a YTM of 3.7% (nominal, post tax).<sup>89</sup> This is equivalent to a real, post-tax cost of debt of 1.7%, which is the relevant metric for converting lump sum values into ALFs. Ofcom derive this estimate by attempting to model the YTM for an average efficient operator. Ofcom base their analysis on the prevailing YTM on selected UK MNO parent company debt, to arrive at a cost of debt range of 1.4% to 2.3% (real, post tax).<sup>90</sup>

However, in the context of setting the discount rate for ALFs, Ofcom's current estimate of the YTM is an inappropriate benchmark for three reasons.

First, Ofcom has failed to take into account differences between ALFs and most corporate debt which make ALFs less risky. As Ofcom acknowledges in the Further Consultation, and as has been explained above, ALFs are a highly secured (low risk) asset, whereas the standard YTM reflects average risks to corporate debt holders. The risks associated with ALF payments to Government are not affected by the firm-specific factors that are reflected in the YTM on MNO parent company bonds. Basing the discount rate on a YTM that reflects the average risk of a MNO is therefore likely to lead to ALFs being set too high.

Second, using an estimate related to the average efficient operator does not appropriately incentivise efficiency. Setting ALFs on the basis of Ofcom's current estimate would mean that MNOs that are able to raise debt more efficiently will effectively pay a higher ALF due to the fact that other MNOs raise debt less efficiently (i.e. at higher cost). EE sees no reason why operators that are able to raise debt more efficiently should be penalised by the financing costs of other operators. It should be noted that this is in contrast to setting charge controls on regulated services where Ofcom needs to ensure operators can reasonably cover their costs and where limiting charges to the estimated costs of the lowest cost operator might force other operators to incur losses if there are estimation issues or factors for the low costs that others cannot match.

Third, Ofcom's estimate fails to take into account the difference between the profiles of the payment flows associated with debt instruments and ALFs respectively, which has a significant impact on the riskiness of ALFs compared to bonds. Ofcom's estimate of the YTM is based on the yields on bonds that

<sup>89</sup> Ofcom, Further Consultation, Annex 10, para A10.24.

<sup>90</sup> This is derived by deflating Ofcom's nominal, post tax cost of debt range of 3.4% to 4.3% by CPI of 2.0% using the Fisher formula.

have a principal repayment on maturity, where the maturity date is at least 20 years in the future.<sup>91</sup>

In contrast to these bonds, ALFs are uniform (in real terms) annual payments without the relatively large payment (i.e. principal) at the end of the term. As noted in section 5.2, this means that from the first payment forward (over the 20 year period), the Government will have received a much greater proportion of the payments due to it, compared to bond holders of long-term debt such as the MNO parent company bonds. The bonds benchmarked by Ofcom therefore have their payments more heavily weighted towards the maturity date of the instrument compared to ALFs and as a result bond holders of long-term debt will face greater term risk than that faced by the Government in relation to ALFs.

The Macaulay duration provides a measure of the extent to which payments from an instrument are weighted towards the maturity date.<sup>92</sup> An instrument with a longer Macaulay duration (i.e. payments weighted more towards the maturity date) can, other things being equal, be said to have higher term risk than an instrument with a shorter Macaulay duration (therefore requiring a lower yield).

In Appendix A, we compare two 20-year bonds with the same face value but with one having annual coupon payments and a principal payment in the 20th year, and the other only having annual payments (i.e. with no principal payment at maturity). This analysis shows that the Macaulay duration of the bond without the principal payment (similar to ALFs) is 8.75 years, which is 31% less than the Macaulay duration of the bond with the principal payment at the end (similar to long dated bonds).

This means that by relying on long-term bonds in its analysis, without adjusting for the greater term risk (i.e. the longer Macaulay duration) of these bonds compared to ALFs, Ofcom is likely to be significantly overestimating the YTM (and debt premium, as discussed in section 5.6). We set out below our proposed method for adjusting Ofcom's YTM estimate to reflect the different payment profile of ALFs (i.e. their shorter weighted average term and accordingly shorter Macaulay duration) and therefore the lower risk of ALFs to the Government.

#### **5.4.1 Using zero coupon bond analysis to reflect shorter duration of ALFs**

In order to quantify the impact of the shorter Macaulay duration of ALFs, Ofcom should consider the difference between the yield on a 20 year bond with a principal at maturity (i.e. the bonds Ofcom uses in its analysis) and the implied yield on debt instruments that would more accurately reflect the payment profile of ALFs.

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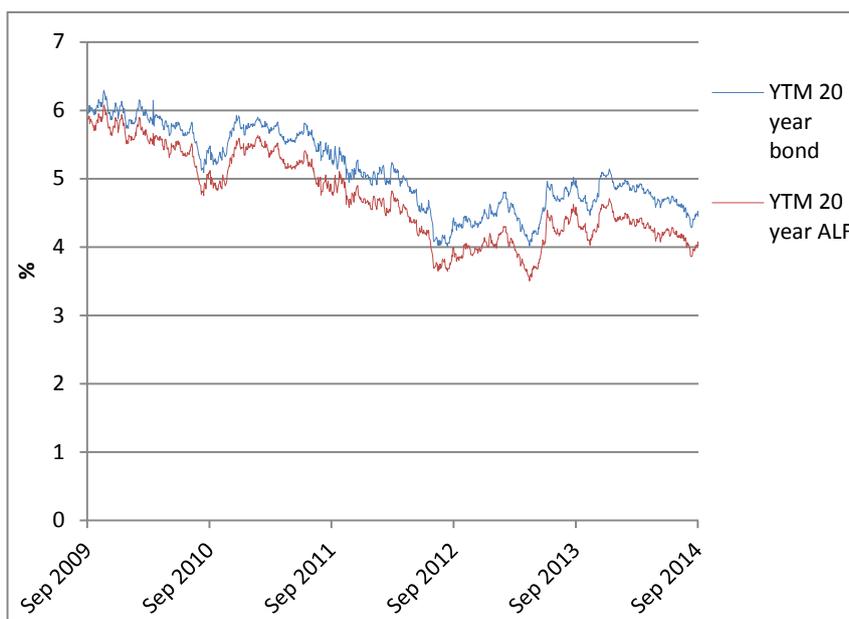
<sup>91</sup> Ofcom's estimate of the debt premium is based on spreads over gilts on the same bonds that Ofcom rely on for its YTM estimate.

<sup>92</sup> The Macaulay duration derives the present value weighted average term of the payments made by an instrument over its life.

ALFs can be thought of as a series of 20 zero coupon bonds, with terms ranging from 1 year to 20 years, with the principal payment on each of the bonds matching the annual ALF payment.

In order to calculate the relevant adjustment for the difference in yield, we have constructed a nominal par yield curve, using Bloomberg data<sup>93</sup>. This enables a comparison to be made between the YTM on UK MNO parent company bonds with a 20 year maturity and the YTM on 20 zero coupon bonds. Figure 3 shows the YTM on these two bonds with the series of zero coupon bonds denoted as a “20-year ALF”.

**Figure 3 - Fair yield curve: UK MNO parent company bonds with a 20 year maturity and 20 zero coupon bonds matching ALF payment profile**



Source: Bloomberg, EE analysis

The YTM on the 20 year bond has been significantly above the YTM on the “20-year ALF”. In fact, as shown in Table 9 below, the average YTM on a “20 year ALF” is 0.39% lower than the average YTM on the 20 year bonds over the past five years. This difference has been even greater over the last 12 months, averaging 0.47%.

<sup>93</sup> We have conducted this modelling using Bloomberg’s GBP BBB composite BVAL fair value curve. This is a par yield curve providing Bloomberg’s evaluated benchmark yields for GBP denominated senior unsecured fixed rate bonds issued by domestic companies with a composite credit rating of BBB-, BBB or BBB+. We note that of the four firms benchmarked by Ofcom, three (Telefonica, Orange and Deutsche Telekom) are rated in this range whilst Vodafone is rated A-.

Table 9 – Average YTM on 20-year bond versus 20-year ALF

YTM (%)	20-year bond	“20-year ALF”	Difference in YTM
3 month average	4.56	4.10	-0.45
1 year average	4.75	4.28	-0.46
2 year average	4.63	4.17	-0.46
5 year average	5.11	4.72	-0.39

Source: Bloomberg, EE analysis

This analysis indicates that Ofcom is overstating its estimate of the YTM by at least 0.39% (and potentially greater) because Ofcom has not made an adjustment for the shorter weighted average term of the ALFs compared with the corporate bonds it has used for its analysis. **Ofcom should therefore adjust down (by 0.4%) its YTM estimate of 1.7% to 1.3%.**

## 5.5 Estimates of the risk free rate

Even if Ofcom were to (incorrectly in our view) proceed with its current proposal to estimate the cost of debt using its Option A, Ofcom must nevertheless revise its proposals to avoid significantly overstating the appropriate level of ALFs by over-estimating the levels of the RFR and the debt premium.

In relation to the RFR, Ofcom proposes to use the same real RFR of 1.3% as Ofcom adopted in its FAMR 2014 statement, which was in turn taken from the BCMR 2013 statement. In estimating this real RFR, Ofcom considered prevailing and historical average yields for RPI linked gilts, forward rates on RPI linked gilts, and regulatory precedents on estimates of the RFR. Ofcom relied on data up until February 2014, but noted that it considered it appropriate “to reflect the continued fall in estimates of the real risk free rate to some degree”.<sup>94</sup>

EE considers that Ofcom’s estimate of the RFR represents a significant over-estimate. It was not supported by the market evidence that was available to Ofcom at the time of the FAMR 2014, and is now contradicted by the latest market evidence.

Table 10 below shows that at the time of the FAMR 2014 Statement the latest available market data showed that spot rates on index-linked gilts were negative and the average historic yields considered by Ofcom were below 1.3%. Despite this, Ofcom stated that:

*“we do not think we should reduce our estimate of the real RFR further...since although short-term average yields on index-linked gilts remain negative, they have started to increase”.<sup>95</sup>*

However, Table 10 also shows that since February 2014 (the endpoint for the data presented in the FAMR 2014), current yields have remained negative and longer term average yields (5 and 10 year averages) are even lower than the

<sup>94</sup> Ofcom, Business Connectivity Market Review, March 2013 (“BCMR13”), Annex 14, para A14.71.

<sup>95</sup> Ofcom, FAMR 2014, Annex 14, para A14.50.

yields Ofcom considered for the FAMR 2014 and well below Ofcom’s current RFR estimate of 1.3%.

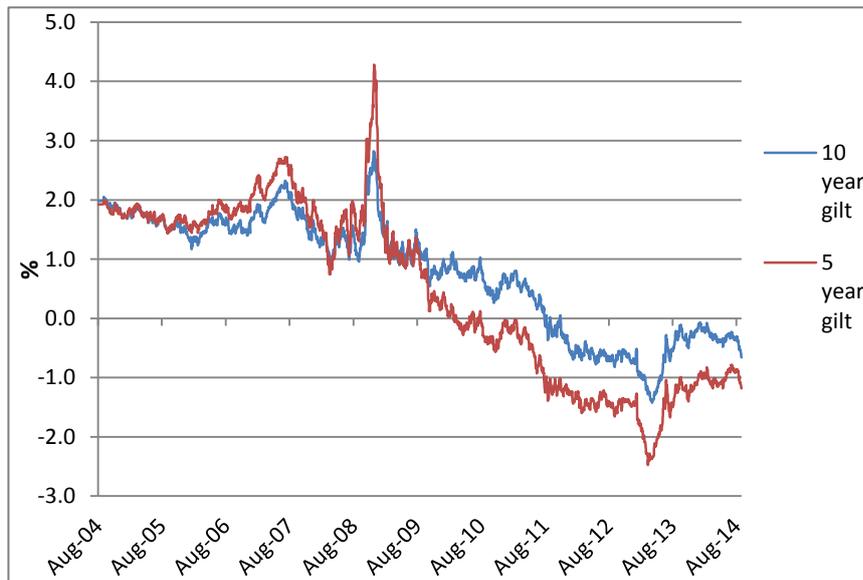
**Table 10 – Historical average yield on index-linked gilts**

Real risk free rate (%)	5 year gilts		10 year gilts	
	Feb 2014 (FAMR 2014)	Aug 2014	Feb 2014 (FAMR 2014)	Aug 2014
Spot rate	-0.9	-1.2	-0.1	-0.7
1 month average	-0.9	-1.0	-0.2	-0.5
3 month average	-1.0	-1.2	-0.2	-0.4
1 year average	-1.5	-1.1	-0.6	-0.3
2 year average	-1.5	-1.4	-0.6	-0.6
5 year average	-0.7	-1.1	0.1	-0.3
10 year average	0.6	0.5	0.9	0.8

Source: Bank of England

Furthermore, Figure 4 below shows that the spot rate on long-dated index-linked yields have remained broadly below 1% for the last five years (i.e. since 2009) and current yields on ten-year index-linked gilts continue to remain close to zero.

**Figure 4 - Spot rates on five and ten year index-linked gilts**



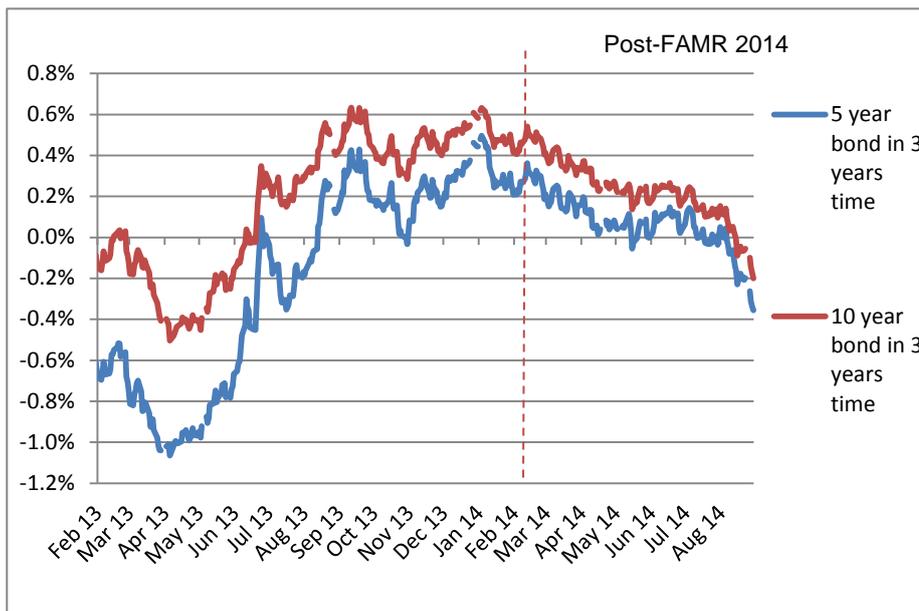
Source: Bank of England

In the FAMR 2014 statement, Ofcom stated that:

*“forward rates on a five- and ten-year index-linked gilt taken out in three years have increased over the last year.”*

However, Figure 5 shows that whilst the data available on forward rates at the time of the FAMR 2014 statement (denoted by the dashed line), had shown signs of increasing, forward rates have since declined significantly and are now actually negative for both five- and ten-year index-linked gilts taken out in three years.

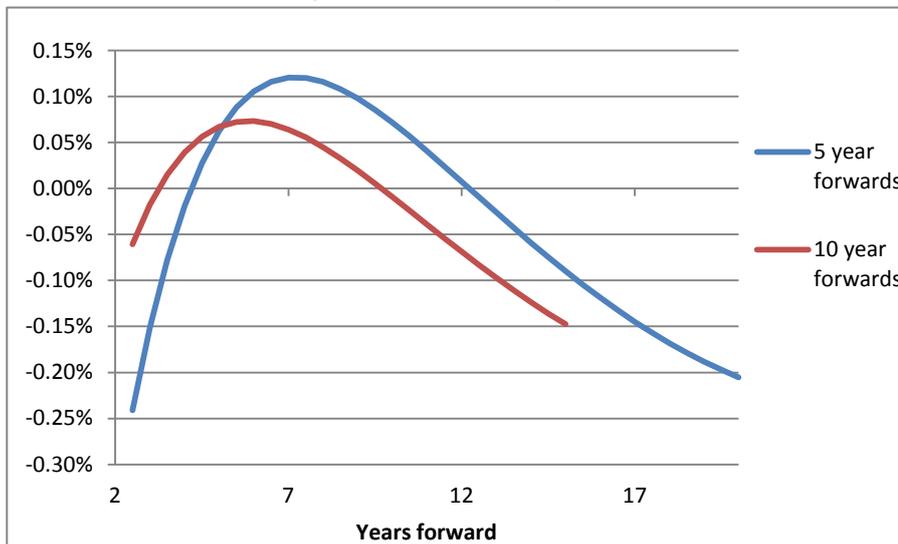
Figure 5 – Forward rates on 5 and 10 year gilts taken out in three years' time



Source: Bank of England

Figure 6 also shows that forward rates on five and ten year index-linked gilts for a range of years forward (which are calculated based on average spot rates for the month of August 2014 for bonds of different maturities) are expected to rise and then decline. The expected rise in real rates is only to around 0.1%, which is much lower than Ofcom's assumed real RFR of 1.3%.

Figure 6 – Index-linked yield curve



Source: Bank of England

The evidence presented above suggests that the market evidence previously relied upon by Ofcom to justify a RFR above the historical average and prevailing current gilt yields no longer supports the view that the real RFR is likely to be anywhere near as high as 1.3% over the next five years.

EE therefore considers that if Ofcom is minded to continue to estimate the cost of debt by reference to an estimate of the RFR and debt premium, then it should give weight to forward rates in its estimate of the RFR. Forward rates

indicate, over an extensive period of time, that the longer term RFR is likely to be well below 1.3% and Ofcom should revise its estimated RFR in light of this.

Notably, in arriving at its estimate of the RFR, Ofcom acknowledges that the latest market evidence on current and historic yields is unlikely to support a RFR as high as 1.3%. In the FAMR 2014 Ofcom seek to justify this divergence from the latest market evidence as follows:

*“We consider that it would be inappropriate to simply adopt the current low rates on index-linked gilts without considering the reasons why they could be depressed, for example, the wider macroeconomic environment in recent years and the significant bond market intervention by monetary authorities – such as via quantitative easing...We [Ofcom] are cautious when interpreting the data because of the level of uncertainty that has persisted and the potential impact of temporary distortions such as quantitative easing.”<sup>96</sup>*

*“There is no straightforward answer to the question of what interest rates will do in the future and we need to be mindful of current rates, historical rates and future expectations. Therefore, we do not mechanically weigh different sources of evidence but rather consider the available evidence and use our regulatory judgement to come to a view on what an appropriate forward-looking risk-free rate would be for 2017, the final year of the charge control.”<sup>97</sup>*

This position is, first of all, inconsistent with statements Ofcom makes in other parts of the FAMR 2014. For example, Ofcom state that “we [Ofcom] preferred to place more weight on evidence from observed yields on index-linked gilts and forward rates on those gilts”<sup>98</sup>. Clearly, based on the evidence we present above on both observed yields and forward rates it is simply not the case that these “preferred” benchmarks support Ofcom’s proposed RFR - indeed if Ofcom were to adopt a consistent approach and place weight on these benchmarks then the RFR estimate would be significantly below 1.3%, particularly when taking into account the recent fall in forward rates (as shown in Figures 5 and 6 above).

Second, Ofcom’s argument that low gilt yields and forward rates (which EE notes have persisted for at least five years) are potentially driven by temporary distortions is strongly contested by Dimson, Marsh and Staunton (“DMS”) in the 2013 edition of the Credit Suisse Global Investment Returns Yearbook. DMS state that many alleged “distortions” are likely to be permanent and any of these factors are all likely to be well-understood and already built into market rates.<sup>99</sup>

Third, by adopting the same RFR used in the FAMR 2014, Ofcom is failing to take into account relevant differences between the circumstances of the FAMR 2014 and the present case. Both Ofcom’s and the CC’s “NIE” price controls judgements on the RFR in relation to the FAMR were made in the context of

<sup>96</sup> Ofcom, FAMR 2014 , Annex 14, para A14.50.

<sup>97</sup> Ofcom, FAMR 2014 , Annex 14, para A14.45.

<sup>98</sup> Ofcom, FAMR 2014, Annex 14, para A14.32.

<sup>99</sup> Credit Suisse Global Investment Returns Yearbook 2013, February 2013, page 7.

estimating the overall WACC. That brings in considerations that are not relevant in the context of ALFs where the discount rate is the cost of debt. In the FAMR 2014 Ofcom states:

*“There may also be a relationship between the real RFR and the [equity risk premium (“ERP”)], so we would be reluctant to make a significant reduction to the real RFR without considering an increase in the ERP, but an increase in the ERP is not supported by the current evidence.”<sup>100</sup>*

Furthermore the CC’s estimate of the RFR (1.0% to 1.5%) was made entirely in the context of the cost of equity and not the cost of debt<sup>101</sup>. The CC’s estimate of the cost of debt was instead based on a weighted average of cost of embedded debt and the cost of new debt, and takes no account of the RFR<sup>102</sup>. EE therefore considers that Ofcom’s estimate of the RFR should not rely or be influenced by factors and considerations that are not relevant for ALFs.

Fourth, Ofcom suggests that given the uncertainty around interest rates and the possibility that temporary distortions could be depressing market data, regulatory judgement is required. We recognise that this is an approach that has been endorsed by the CC in its recent final determination for the NIE price controls. The CC stated:

*“we should not approach the cost of capital calculation mechanistically, but will need to exercise a degree of judgement when selecting our parameters, and similarly in evaluating the outcomes and reaching our conclusions.”<sup>103</sup>*

As noted above, Ofcom should exercise its regulatory judgment in estimating the cost of debt, including the RFR, in a conservative manner, taking into account the asymmetric risks involved in setting ALFs. Caution calls for different approaches in estimating the cost of debt for the purposes of setting termination charges and setting ALFs. In the context of mobile call termination, setting the RFR at the relatively high estimate of 1.3% is appropriate to ensure that mobile operators do not under recover their long run incremental costs (“LRIC”), since there is a relatively low probability of gilt yields exceeding 1.3%. However, in the context of ALFs, *the opposite is true*: if prevailing gilt yields remain below 1.3% then ALFs will be set too high raising the risk of distorting spectrum use.

In our view, based on the available evidence, it is undoubtedly the case that the probability of gilt yields being below 1.3%, over a 5-20 year period outweighs the probability of them being above Ofcom’s estimate. It is therefore apparent that Ofcom has failed to adopt a sufficiently conservative approach. We believe that the **RFR should be significantly lower than 1.3% and could be as low as 0.3%**, particularly given forward-looking rates (expected rise in real rates is

<sup>100</sup> Ofcom, FAMR 2014, Annex 14, para A14.50.

<sup>101</sup> CC, 2014 NIE Final Determination, pages 13-21.

<sup>102</sup> CC, 2014 NIE Final Determination para 13.8

<sup>103</sup> CC, 2014 NIE Final Determination para 13.20.

only to around 0.1%) and the need to take a conservative approach in the context of ALFs<sup>104</sup>.

## 5.6 Estimates of the debt premium

In estimating the debt premium for an average efficient mobile operator Ofcom considers the spread over gilts for parent companies of UK MNOs. Ofcom's estimate of 1.2% is based on the average spread for the parent companies, with greater weight placed on Vodafone. EE believes that this is an overestimate.

First, as noted above, averaging across operators is appropriate in the specific context of setting price controls where Ofcom needs to ensure that the cost level is achievable by all operators. However, in the context of ALFs, different considerations apply, which make this approach inadequate. As noted in section 5.4 above, EE considers that the average efficient operator is not the appropriate benchmark for the cost of debt in the context of setting the discount rate for ALFs.

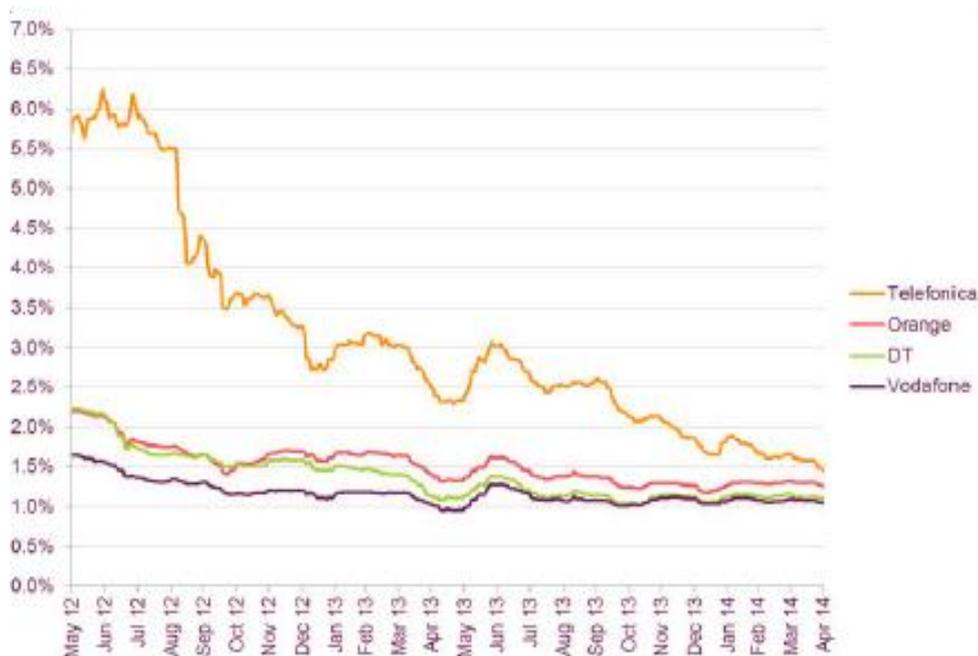
Second, Ofcom's estimate of both the debt premium and YTM fails to take account of the different payment profiles of ALFs compared to long-term bonds that have a principal repayment on maturity. Our analysis in section 5.4 shows that the yields on the series of zero coupon bonds, which are more equivalent to ALFs, are significantly lower than the yields on the UK MNO bonds. This analysis indicates that Ofcom is likely to be overstating its estimate of the debt premium (and YTM) by at least 0.39% (and potentially greater). Ofcom should therefore adjust down its debt premium range to between 0.6% and 1.3% (i.e. by 0.4%).

Third, Ofcom must take a conservative approach in estimating the debt premium. The case for taking a more conservative approach is made stronger by the fact that there appears to be a downward trend in the debt premium for MNOs over the last two years, as shown in Ofcom's own analysis in Figure 7. We believe that Ofcom should reflect the asymmetry of risk associated with setting ALFs by selecting a debt premium at the bottom of the range (i.e. 0.6% given the required adjustment to Ofcom's range).

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<sup>104</sup> We note that a RFR of 0.3% combined with our estimate of the debt premium (0.6%) results in a cost of debt of 1.3%, which is consistent with our cost of debt estimate using our preferred YTM approach.

Figure 7 – Average spread of sterling denominated debt over benchmark yields for European parents of UK mobile communications providers



Source: Ofcom analysis, *The Further Consultation*, Figure A10.1

## 5.7 Discount rate - summary

In summary, EE believes that Ofcom has made several serious errors in determining an appropriate discount rate in order to convert its lump sum estimates for 900 MHz and 1800 MHz into ALFs. In particular:

- EE considers that the underlying characteristics and risks of ALFs are broadly akin to a debt instrument. Ofcom's suggestion that ALFs are more risky than the cost of debt is simply unsubstantiated – Ofcom has failed to take account of several features of ALFs which in fact make them less risky from the Government's perspective than corporate debt, and inaccurately characterised corporate debt in several respects. Ofcom cannot therefore claim that it is conservative to use the cost of debt as the discount rate. This increases the importance of Ofcom taking a conservative approach when it estimates the cost of debt.
- In the context of ALFs the YTM is the appropriate benchmark for the cost of debt (i.e. Ofcom's Option B). Ofcom state that the discount rate should be such that an average efficient operator is indifferent between annual payments and a lump sum payment. Since the latter would require debt to be raised at the effective date of the ALF payments, the relevant comparator is the current cost of raising debt. The YTM approach reflects the expected rate of return on the debt if it was incurred today and held to maturity, which is acknowledged by both Ofcom and the CC.
- Ofcom's current estimate of the YTM must be adjusted to take account of the fact that the Government faces lower risks in receiving ALF payments than holders of the UK MNO parent company bonds, which Ofcom uses in its analysis, because under ALFs a greater proportion of

payments are received earlier (i.e. the Government faces lower payment term risk).

- Our proposed approach is to compare the yields on UK MNO bonds with a maturity of 20 years, with the yields on a series of zero coupon bonds with the principal payment on each of the bonds matching the annual ALF payment. The evidence using this approach suggests that a cost of debt range for ALFs of 1.0 to 1.9% (i.e. adjustment of 0.4%) would better reflect the payment profile of ALFs and therefore risk to Government. **We propose that Ofcom adjusts its estimated YTM of 1.7% down to 1.3%** to reflect the shorter Macaulay duration of ALFs.
- Even if Ofcom, incorrectly in our view, maintains its current approach based on the RFR and debt premium (i.e. Ofcom's Option A), Ofcom cannot legitimately rely on using its cost of debt estimate from the MCT 2014 on the basis that it needs to maintain consistency with the MCT, without recognising that the considerations in the context of ALFs call for almost the converse of the approach applied when setting MTRs. We believe that Ofcom's proposed RFR is a significant over estimate, and Ofcom's proposed debt premium suffers from the same flaws as its YTM in that it fails to reflect the different payment profiles of ALFs. We believe that the RFR should be significantly lower than 1.3% and could be as low as 0.3% (based primarily on forward rates), and that a value of 0.6% for the debt premium would be more appropriate. We therefore consider that the appropriate cost of debt under approach A (and in the context of ALFs) is between 1.3% and 2.1%<sup>105</sup>.

## 5.8 Terminal value

In our response to the October 2013 Consultation, we set out our view that Ofcom is wrong to simply convert lump-sum values based on the 4G auction to a 20 year annuity because the auction bids may include terminal value attributable to the period after the initial 20 year licence period, and that Ofcom should therefore adjust the lump sum values before inputting into the 20 year annuity formula. We suggested that, on the basis of evidence available to Ofcom, an adjustment of around one third would be appropriate.

[X]

In the Further Consultation, Ofcom continues to make a fundamental error by failing to acknowledge the need to take terminal value into account in the determination of ALFs. Ofcom merely states that:

*"For the reasons we set out in our October 2013 consultation we remain of the view that we should not make an adjustment for terminal value."<sup>106</sup>*

<sup>105</sup> The real, post-tax cost of debt is derived as the sum of the nominal RFR (based on RPI of 3.3%) and debt premium, less corporation tax of 20%, and then deflating by a CPI of 2.0% as prescribed by Ofcom.

<sup>106</sup> Ofcom, Further Consultation, para 4.4.

Regrettably, Ofcom does not elaborate any further on its reasons for apparently rejecting the arguments put forward in our previous response, providing EE (and other stakeholders) with no opportunity to respond. We do not repeat our earlier arguments here, but reiterate that we continue to reject Ofcom's position on the need to make an adjustment for terminal value.

In our view, in carrying out the requirements of the Government Direction to determine *annual* licence fees, Ofcom's calculations should reflect the market value of holding the relevant spectrum for the year in question (i.e. the year to which the fee relates).<sup>107</sup> The Government Direction neither states nor implies that licence holders should be required to pay ALFs which reflect the value of holding that spectrum at some point in the future.

The effect of Ofcom's current proposed approach will therefore be to make licence holders pay significantly more than market value for using spectrum subject to ALFs. The fact that a bidder may be willing to pay a sum in an auction context in the expectation that it will retain, and continue to extract value from, its licence in twenty years' time is not relevant to the question of the determining annual licence fees which reflect the market value of holding the licence in any particular year.

Ofcom characterises terminal value as an "option value", for the option of continuing to hold the licence in future periods, which it claims is included within the value of holding the licence over the initial (20 year) period.<sup>108</sup> However, the effect of Ofcom's approach is to force licence holders to pay this "option value" not only during the initial period, but multiple times over. Moreover, this overpayment effect will grow over time:

- Assuming (for the sake of argument) that Ofcom continues to set ALFs based on 20 year licence periods, under Ofcom's current proposals in years 1-20 the licence holder will pay ALFs based on the marginal operator's expected value of using the spectrum in that period, plus its expected (terminal/option) value of using the spectrum from year 21 onwards.
- In years 21 - 40, the licence holder would pay ALFs based on the marginal operator's expected value at year 20 of using the spectrum in that period, plus its expected (terminal/option) value of using the spectrum from years 41 and beyond. The licence holder will, however, already have paid for a portion of the value for using the spectrum in years 21-40 in the initial 20 year period, meaning *it must pay for that portion two times over, over 40 years*.
- In years 41 - 60, the licence holder would pay ALFs based on the marginal operator's expected value at year 40 of using the spectrum in that period, plus its expected (terminal/option) value of using the

<sup>107</sup> Note, we do however agree with Ofcom that the most pragmatic approach is to adopt a flat profile for ALFs, i.e. one which does not seek to match the changing value of the licence over, for example, a 20 year period.

<sup>108</sup> Ofcom, October 2013 Consultation, para 5.19.

spectrum from years 61 and beyond. The licence holder will, however, already have paid for a portion of the value for using the spectrum in years 41-60 in the initial 20 year period, and another portion in years 21-40, meaning *it must pay for that value in three periods, over 60 years*.

- This overpayment effect continues, and cumulates, again and again in years 61-80, 81-100, etc.

Licence holders will therefore be forced continually to pay significant amounts for expected future value from using spectrum, long before they may achieve it and multiple times over, inevitably resulting in licence fee payments in any given year which are in excess of market value. This is entirely disproportionate, inconsistent with Ofcom's statutory duties, and in our view is a serious error on Ofcom's behalf.

Ofcom's position is, furthermore, far from the conservative approach which it now alleges to be taking. Indeed, despite accepting the significant asymmetry of risk of setting ALFs too high, and the fact that the possibility of greater certainty of availability since the 4G auction of spectrum bands that may be substitutable for the ALF bands may have reduced the forward-looking value of that spectrum, in the Further Consultation Ofcom does not even consider whether these factors may warrant Ofcom changing its proposed approach in order to make some adjustment for terminal value.

These are both highly relevant considerations to the terminal value issue, and Ofcom therefore cannot simply continue to rely on the arguments set out in the October 2013 Consultation without further thought as to whether a properly conservative approach necessitates an adjustment to be made.

## 6. Cost benefit assessment

In our response to the October 2013 Consultation, EE previously provided detailed evidence and reasoning to Ofcom to support our view that Ofcom's cost benefit assessment ("CBA") was inadequate. In particular, we argued that Ofcom failed to properly identify – let alone quantify – the risks, costs and benefits of its proposed revised ALF levels.

Our fundamental concern with Ofcom's approach was (and remains) that as a result of not having undertaken a proper CBA, Ofcom has erred in not adopting a conservative approach to setting ALFs. As Ofcom has now acknowledged, a conservative approach is essential given:

- the potentially serious and negative consequences arising from the asymmetric risk of setting ALF fees too high; and
- the likelihood that the forward looking values of spectrum today are lower than at the time of the auctions from which Ofcom derives its key evidence, as a result of greater certainty over the availability of additional mobile spectrum in the future.<sup>109</sup>

EE also explained that Ofcom's analysis overstated the risk of setting fees too low as there was a complete lack of evidence that current spectrum allocations were inefficient or would be likely to be inefficient at lower fee rates.

We continue to believe that Ofcom's CBA is deficient, and that as a result (and as explained in the preceding sections of our response) Ofcom has proposed ALFs which are vastly inflated, in particular as regards 1800 MHz. Furthermore, Ofcom has failed to properly consider the appropriate phasing-in of revised ALFs. In this section we explain:

- Ofcom has failed to engage with EE's arguments and reasoning as to why Ofcom must undertake a CBA (see section 6.1);
- Ofcom has not undertaken sensitivity analysis to assess the full range of licence fees consistent with the requirement of the Government Direction to set ALFs in a manner reflective of full market value, some of which would clearly better reflect a conservative approach (see section 6.2); and
- Ofcom has not undertaken a CBA in relation to the implementation of revised ALFs set at full market value (see section 6.3).

### 6.1 Ofcom has not engaged with EE's arguments and reasoning as to why Ofcom must undertake a CBA

We are deeply concerned that Ofcom has failed to engage or respond to any of EE's arguments as to why Ofcom is required to undertake a CBA set in our response to the October 2013 Consultation, nor the evidence supporting those

<sup>109</sup> Ofcom, Further Consultation, paras 1.32 to 1.41.

arguments. For instance, we included in our submission a report prepared by Plum Consulting that explained why reports and analyses published in the lead up to the Government Direction (and as quoted by Ofcom) did not represent either individually or collectively valid impact assessments for implementing ALFs.

Ofcom simply comment in the Further Consultation as follows:

*“1.42 In response to our October 2013 consultation, a number of stakeholders said that we should carry out a full impact assessment of our proposals for revising ALFs. In essence, their view was that we should not revise ALFs to reflect full market value unless we could demonstrate that taking this approach to setting ALFs (and the specific levels of ALF that we propose) was necessary to promote efficient use of spectrum, and that the potential benefits in terms of spectrum efficiency would outweigh any potential adverse effects on consumer prices, investment in infrastructure, innovation and competition. They considered that unless we did carry out such an impact assessment any decision we made would be unlawful.*

*1.43 We do not agree with this view. We have been directed by the Government to revise ALFs to reflect full market value, and we are required to implement that direction. We do not have any discretion to decide whether or not to set ALFs at full market value. For this reason, we consider it is unnecessary for us to carry out an impact assessment of the type argued for by stakeholders (and to this extent this is a statement for the purposes of section 7(3)(b) of the Communications Act 2003).”<sup>110</sup>*

We do not consider it necessary at this point to re-state all the arguments we deployed previously as to why the existence of the Government Direction does not obviate the need for a CBA. However, it is our clear view that the passage quoted above is not a sufficient response to these arguments and we therefore consider it incumbent upon Ofcom to provide further reasoning in its final Statement.

In any event, we note that Ofcom does assert in the Further Consultation that:

*“In implementing the Government Direction we have considered the impact in those areas where we do have discretion and are exercising regulatory judgment in light of the evidence available to us and our statutory duties.”<sup>111</sup>*

It must surely be obvious at this stage in the debate about ALFs that “full market value” is a term the meaning of which is subject to debate and where there is considerable discretion that Ofcom must exercise. Given this, Ofcom should conduct CBAs at different levels of ALFs. This is particularly the case given the asymmetry of risk point associated with high and low ALFs which Ofcom now accepts (see below). Indeed, as set out in the preceding sections of this response, we believe that Ofcom has, at present, exercised its regulatory

<sup>110</sup> Ofcom, Further Consultation, paras 1.42 to 1.43.

<sup>111</sup> Ofcom, Further Consultation, para 1.44.

judgment in a manifestly erroneous manner in several areas, and as a result proposed a level of ALFs which is inconsistent with the requirements of the Government Direction, and which would be unlawful both as a matter of EU law and as a matter of English public law.

Were Ofcom to conduct a proper CBA we believe this would reveal the true extent of its current failings, and therefore provide further corroboration of our arguments that Ofcom must significantly reduce its proposed level of ALFs.

## 6.2 Ofcom must take a conservative approach to setting ALFs

EE welcomes the fact that Ofcom now concedes that it must take a conservative approach when setting ALFs, in particular given the asymmetric risk of setting fees too high. However, Ofcom has failed to consider the consequential analysis that follows from accepting this principle, including modelling relevant sensitivities around Ofcom's proposed licence fees within a CBA. In consequence, Ofcom fails properly to appreciate or consider alternative, and likely significantly lower, fee levels consistent with full market value and which better reflect a conservative approach.

In our view, whilst Ofcom makes reference at various stages of its analysis to taking a conservative approach, it has failed to do so in several key respects. A very notable example is Ofcom's selection of the MBA to estimate the UK market value of 800 MHz and 2.6 GHz spectrum (see section 3 above), but regrettably this is just one example among many we could list. A proper CBA applied at each stage of Ofcom's analysis would show that Ofcom's current proposals are far from conservative, in particular as regards 1800 MHz spectrum. We set out what we consider to be an appropriate level for ALFs in section 8 below.

## 6.3 Ofcom should have undertaken a CBA in relation to the implementation of full market value

Ofcom must equally take a conservative approach to the implementation path to the new level of ALF. This is due to the fact that there are inherent asymmetric risks of implementing significant and sudden increases in fees due to the potential for disruptive, adverse short-run financial impacts on stakeholders. Firms need sufficient time to be able to adjust and accommodate fee increases within their operations including existing investment plans, ongoing operating costs and the level and structure of consumer prices in downstream retail markets. We set our detailed arguments and reasoning on implementing revised ALFs in section 7 below.

## 7. Implementing revised fees

Irrespective of the level of ALFs chosen by Ofcom, there remains the question of the appropriate implementation path to the new level of ALF. In this respect, we welcome Ofcom's decision to abandon its previously proposed "claw back" mechanism which, as set out in our response to the October 2013 Consultation, would clearly have been unlawful.

Ofcom now proposes to adopt a two-stage phase-in of revised ALFs, consisting of one half of the increase from the current ALF rate to the new ALF rate coming into effect on the first common effective date, and the second half of the increase becoming effective one year later.

However, we continue to believe that the revised ALFs should be phased in over a longer period. In our view, such substantial fee increases – even if reduced to the level we propose in this response – have inherent risks of adverse short term adjustments and impacts on MNOs' businesses which must be taken into account by Ofcom when determining how to introduce those fees in an appropriate and proportionate manner.

In this section we set out several arguments in support of a longer phase-in period:

- The approach proposed by Ofcom fails to balance the costs of phasing in substantial fee increases over a number of years against benefits. While Ofcom are proposing a 50% adjustment to the increase in the fees in the first year, this proposal has not been based on a proper CBA, which includes consideration of other options such as phasing-in over several years in line with Ofcom's recent practice when setting spectrum fees based on opportunity cost (see section 7.1).
- The approach to the setting and implementation of spectrum fees in the maritime sector supports phasing-in over 3 years (in relation to similar fee increases exceeding 300%) (see section 7.2).
- In the maritime sector Ofcom commissioned extensive analysis of the impacts of higher fees on investments in and prices charges by ports and other organisations that would face higher fees – Ofcom should do the same for the mobile sector (see section 7.3).
- Ofcom has delayed applying administered incentive pricing ("AIP") to the digital terrestrial television ("DTT") sector on the grounds that DTT is currently subject to "a unique set of circumstance", including the need for coordination between all DTT operators across multiplexes and technology constraints that would have made it difficult for DTT operators to respond to the price signals of AIP before 2020. However, the mobile sector is also subject to a "unique set of circumstances" – demand for 4G mobile is growing at a phenomenal rate and all MNOs are incurring substantial costs of adding capacity. For this reason, MNOs are already strongly incentivised to use existing spectrum assets efficiently and Ofcom has not shown how higher ALFs, leading to lower profit and curtailed investments, would achieve the aim of promoting greater economic efficiency (see section 7.4).

## 7.1 Ofcom should have undertaken a cost benefit analysis of phasing in substantial fee increases

As referred to in section 6.3 above, EE considers that Ofcom has made a serious error in failing to carry out a proper assessment of different phasing-in options. If that omission is not rectified, Ofcom will have failed to take account of relevant considerations and/or will be acting in breach of the principle of proportionality.

The approach proposed by Ofcom in the further ALF consultation does not balance the costs of phasing in substantial fee increases over a number of years against the benefits. While Ofcom are proposing a 50% adjustment to the increase in the fees in the first year, this proposal appears arbitrary and ad hoc and has not been based on a proper CBA. Nor does it appear that Ofcom has considered potential alternatives such as phasing-in over several years, in line with Ofcom's recent practice when setting spectrum fees based on opportunity cost (see below).

Ofcom has avoided any sort of quantitative balancing of costs against benefits of full increase in the first year versus phased introduction over several years, as would be required in a proper CBA. Ofcom argues that there is a risk of setting fees too high (leading to lower investments and higher consumer prices – or in the extreme – spectrum being left fallow) that must be compared against the risk of setting fees too low (which may not provide incentive for efficient resource allocation).

Yet, given the asymmetric risk, including a lack of any evidence that spectrum would be misallocated between mobile operators at lower fee levels, it is unclear why Ofcom considers that a glide path over three years would not be an appropriate, conservative, response. Even where ALFs (set at full market value) reflect relevant opportunity costs, there remains a short run risk of disruption to (amongst others):

- making relevant operational changes;
- accommodating financial impacts, including on investments;
- operating costs; and
- consumer pricing.

In relation to consumer pricing impacts, EE notes that General Condition 9.6 now limits the extent to which MNOs can pass through unanticipated cost shocks into price increases on fixed term contracts (where such price increases would represent a material detriment). All PAYM contract customers are covered by General Condition 9.6 with the majority of these on 24 month contracts. This significantly raises the short run risk of disruption to mobile operators where fee increases simply cannot be passed through. Ofcom has not undertaken any analysis of these effects.

Furthermore, Ofcom's proposed ALF increases are clearly significant, both in absolute terms and relative to profitability. [X]

EE believes that whether MNOs have had the opportunity to earn a reasonable return on past investments will impact their willingness to invest in the future

and should therefore be taken into account in Ofcom's CBA. This should be of utmost concern to Ofcom, since continued low returns risk mobile operators limiting new investments in the UK industry and instead running down their existing assets.

EE believes that, in order to better understand the disruptive impact of significant fee increases, these should be considered by reference to individual operators (not on an industry-wide basis) and compared to each operator's EBIT, which is a more relevant measure for MNOs that have capital intensive businesses than revenues or EBITDA.

Ofcom fails to consider any of these highly relevant issues in Annex 5 of the Further Consultation, which considers the asymmetric risks associated with setting ALFs. However, Ofcom does argue that the Government Direction was made in 2010, and that operators have therefore had sufficient time to plan for ALF increases. This is despite the fact that this reasoning was not applied to phasing-in of spectrum fees in the maritime and broadcasting sector, where such policies were announced at least 5 years in advance (see further below).

Furthermore, the reality is that the Government Direction in no way prepared operators for the magnitude of the price increases which Ofcom proposes to impose.

## 7.2 Regulatory precedent supports a far more conservative approach

EE considers that Ofcom have ignored relevant regulatory precedent that should be followed when undertaking an impact assessment, and in doing so have failed to adopt a consistent regulatory approach. In consequence, Ofcom must consider an impact assessment in relation to phasing-in.

### 7.2.1 Determining spectrum fees in the maritime sector

Ofcom published its final proposals for setting spectrum fees in the maritime sector in 2010 following two detailed consultation documents.<sup>112</sup> In setting fees for the maritime sector, Ofcom set out its duties and broad policy framework as follows:

- The legislative framework for spectrum pricing, including:
  - Section 3 of the Communications Act 2003 and Ofcom's general duty to secure the optimal use of the radio spectrum taking account of all the interests of all who wish to access it; and
  - matters Ofcom can consider when prescribing fees under the Wireless Telegraphy Act 2006.

<sup>112</sup> Ofcom, Applying spectrum pricing to the maritime sector, and new arrangements for the management of spectrum used with radar and aeronautical navigation aids - Statement, 15 June 2010.

- Ofcom’s broad policy approach to setting spectrum fees (including the case for applying opportunity cost based licence fees, also known as AIP) - as set out in Ofcom’s Strategic Pricing Review.<sup>113</sup>
- The Government’s consideration of applying AIP to the maritime and aeronautical sectors in response to Professor Martin Cave (in the Cave Audit 2005).<sup>114</sup>

Ofcom then explained that it would undertake a CBA to assess both fee levels and the implementation from current fees of the new higher fees

*3.32 ... In this assessment, we evaluate the welfare effects of different fee options identifying impacts on both consumers and producers.*

*3.33 Further to this, we have undertaken an assessment of the potential financial impacts of the specific AIP fee level proposals. This aims to identify any distributional effects, to enable us to consider and propose measures to mitigate the risks of unintended consequences and of potential market failure.*

Critically, when setting spectrum fees, Ofcom set out relevant factors it would need to examine in any impact assessment. One of the most important factors related to the presence of asymmetric risk and the need for a conservative approach when setting fees:

*"3.26 The July 2008 consultation (paragraphs 2.18 to 2.29) summarised the various consultancy reports commissioned by Ofcom and government since 1996 which had been used to inform Ofcom’s thinking. It also set out (paragraphs 3.54 to 3.89)Ofcom’s consequent approach to fee setting, including an awareness of the potential asymmetry of risks and hence a need to be conservative in introducing significant fee changes, and the desirability in principle of setting fees which are consistent with fees and auction valuations set in other bands.*

A conservative approach must recognise both elements.

## 7.2.2 Phasing-in spectrum fee increases over 3 years

In relation to the financial impact assessment, Ofcom considered that phasing-in was an important element of a conservative approach to setting fees. Ofcom recognised that even fee levels consistent with long run opportunity cost could be highly disruptive in the short run if applied for the first time without any phasing-in. For instance, when consulting on spectrum fees for maritime users in 2009, Ofcom stated:

*"7.84 We consider that **the principle of phasing is particularly important for mitigating the risk of changing fee rates too rapidly, and thereby risking inefficient disruption to service provision. We consider that if fees increase too quickly before action can be***

<sup>113</sup> Spectrum Framework Review, June 2005.

<sup>114</sup> Independent Audit Of Spectrum Holdings, Government Response And Action Plan, March 2006.

*taken to reduce spectrum costs and if total cost changes cannot efficiently be passed through to service users, or temporarily absorbed within the business, the financial viability of licensees may be temporarily adversely affected, such that some marginal services could be put at risk and, in the most extreme cases, inefficiently withdrawn. In the extreme scenario, the value of the marginal services could then be forgone temporarily or even permanently, resulting in a loss of benefits for both citizens and consumers.*

...

**7.86 In considering these two potential, opposite risks – from changes implemented too fast and from changes implemented too slowly – we would generally, in light of our duties to consumers and citizens, place relatively more weight on the risks of disruption from phasing in fees too quickly.**

7.87 We also note that, if fees are subsequently observed to be significantly below the underlying opportunity costs of the spectrum, they can be reviewed and revised upward where appropriate in future as described above, although variations of this nature should generally be restricted to the availability of significant new evidence as set out above. In light of these considerations, **we generally adopt a conservative approach to phasing in increases. We believe that such an approach is appropriate in this case, and are therefore proposing phasing-in periods for significant fee increases.**<sup>115</sup> (emphasis added)

Ofcom then conclude the following:

*“2.102 We are proposing to introduce these changes during the first half of 2010, but we propose to phase in some fee changes over up to three years”*

*“7.105 While the changes are typically very small in the context of the licensees’ total annual variations in business costs, they represent sufficiently sharp signals that some users may wish to make efficient marginal changes in business structure (including spectrum usage) over time.”<sup>116</sup>*

A key issue raised in the above analysis is that disruptive short run effects could potentially be so great that at the margin, current or future services could be forgone temporarily or even permanently. This could then impact on Ofcom’s overall CBA, because the financial impacts are so great that they in

<sup>115</sup> Applying spectrum pricing to the maritime sector, and new arrangements for the management of spectrum used for radar and aeronautical navigation aids, A second consultation, 13 August 2009 (“Maritime spectrum pricing – second consultation”) (note, Ofcom rely on this reasoning in full in their final Statement of 2010).

<sup>116</sup> Ofcom, Maritime spectrum pricing – second consultation.

fact undermine competition and service provision in the market more broadly and reduce aggregate welfare.

Given there is no evidence of market failure or consumer harm from current spectrum fee levels, it is unclear why Ofcom cannot adopt a more gradual increase in ALFs over, for example, 3 to 5 years combined with monitoring to ensure that the level of ALFs chosen by Ofcom is in fact reflective of full market value. If Ofcom felt that there was an appreciable risk that fees were set too low over this period, Ofcom could then review fees over the implementation phase and could always revise fees upward if market conditions suggested that spectrum resources were misallocated. Equally, such a phase-in would provide Ofcom with the opportunity to revise ALFs downwards, if evidence during the phase-in period suggested that it had set ALFs too high, before the full impact of that error was felt by operators. Ofcom's approach to implementation does not appear to reflect a conservative approach and risks harmful impacts, including on investment and consumers.

In the context of the maritime sector, Ofcom considered that phasing in over 3 years was entirely appropriate where:

- the absolute level of fees before applying AIP was only one or two hundred pounds; and
- the proposed fee increases were significant – for instance Ofcom referred to one “extreme” example where a 300% increase would apply.<sup>117</sup>

It is therefore astonishing that under the current ALF proposals – where Ofcom are proposing that EE's annual 1800 MHz fees (currently £24.9 million a year) be increased to £96 million a year (representing over a 285% increase on already very substantial fees) – Ofcom has not even considered phasing over a similar 3 year or longer timeframe.

The fact Ofcom have not undertaken an assessment of phasing over a longer period means that Ofcom's CBA is wholly inadequate and clearly does not reflect a conservative approach. We consider that the risks of short run disruption when setting fees based on long run opportunity costs is also patently relevant in the context of ALFs for mobile spectrum where short run impacts on investment and consumer pricing are as important or more important than in the maritime sector.<sup>118</sup> For example, there would be a significant impact on the UK economy if 4G rollout was slowed or retail prices were increased.

### **7.2.3 Stakeholders in the maritime sector knew that ALFs would be set at market value back in 2010**

<sup>117</sup> Ofcom, Maritime spectrum pricing – second consultation, para 7.104.

<sup>118</sup> An example of the relatively low impact of the increase in fees in the maritime sector is the Port of London where it was estimated in 2007 that that fees would increase from £3,640 to £12,370 (an increase of 240%). This increase of £8,740 represented less than 0.1% of conservancy dues received in 2007 (a key revenue for the Port of London).

In the Further Consultation, Ofcom argue that there is no need for phasing-in ALFs because MNOs knew they would face fees based on full market value back in 2010 when the Government Direction was made (i.e. 4 years ago). Yet when Ofcom was setting AIP fees for the maritime sector in 2010, the Government's policy intention to apply AIP to the maritime sector had been made clear for over 5 years (i.e. back in 2005 when the Cave Audit was published). Ofcom did not consider this to be a relevant consideration mitigating the need for phasing-in for the maritime sector. Ofcom has not explained why mobile operators should face this additional test compared to maritime users (or indeed more recently in the broadcasting sector – see below). This is therefore another clear example of Ofcom failing to take a consistent regulatory approach.

### 7.3 Ofcom must undertake a detailed analysis of the short run disruptive impacts of higher ALFs

EE has previously highlighted Ofcom's analysis in the maritime sector as a useful guide as to how to undertake an impacts assessment in the mobile sector, including in relation to modelling adverse short run disruptive impacts on investments and consumer pricing. We refer Ofcom to the Plum Consulting report attached to our response to the Further Consultation.

### 7.4 Ofcom precedent supports phasing-in of higher ALFs over 5 or more years

Ofcom is also failing to apply a consistent regulatory approach as between the broadcasting sector and the mobile sector. In relation to the broadcasting sector, Ofcom's working hypothesis is to adopt a phased approach to the imposition of AIP for spectrum used by national DTT multiplexes, with the introduction of AIP delayed until around 2020 and with AIP-based fees then likely to be introduced gradually over five years.<sup>119120</sup>

EE notes the broadcasting sector has had since 2007 (when Ofcom published its initial Statement<sup>121</sup>) to prepare for the possible introduction of fees and yet, as in the maritime sector, Ofcom does not consider that this mitigates in any way the need for phasing-in. Given regulatory precedent in both the maritime and broadcasting sectors, it is clearly discriminatory against mobile operator stakeholders for Ofcom to claim that the Government Direction somehow precludes or mitigates the need for phasing-in for the mobile sector. In particular, The Government Direction places no requirement on Ofcom as

<sup>119</sup> Ofcom, Spectrum pricing for terrestrial broadcasting: Consultation on Implementation, 13 March 2013.

<sup>120</sup> For the avoidance of doubt, EE would like to make it clear that while EE disagrees in principle with applying AIP to tradeable spectrum licences, we support phasing-in of AIP on the basis that one set of regulatory principles must be applied consistently to all sectors.

<sup>121</sup> Ofcom, Future pricing of digital terrestrial broadcasting, 19 June 2007.

regards the timing of introducing revised ALFs other than that this must be done at some point following the UK 4G auction.

Ofcom justify the delay in applying AIP to the DTT sector on the grounds that DTT is currently subject to “a unique set of circumstance”, including the need for coordination between all DTT operators across multiplexes and technology constraints that would have made it difficult for DTT operators to respond to the price signals of AIP before 2020.

However, the mobile sector is also subject to a “unique set of circumstances”. Demand for 4G mobile is growing at a phenomenal rate and all MNOs are incurring substantial costs of adding capacity. For this reason MNOs are strongly incentivised to existing spectrum assets efficiently. EE set out these argument in our response to the October 2013 Consultation including in the Plum Consulting report. The alternative for MNOs is to buy more spectrum or deploy more sites both of which are costly. Ofcom has not explained why these factors do not also represent a “unique” set of factors which would equally justify a longer phased implementation of revised ALFs.

## 8. Conclusion

In this response we have set out several manifest errors in Ofcom's proposed approach to assessing the appropriate of ALFs, as set out in the Further Consultation, and explained that Ofcom has failed either to conduct a proper CBA or to take a sufficiently conservative approach.

EE believes that once the errors in Ofcom's approach are corrected for, this results in estimated lump sum values of £21m per MHz for 900MHz and £8m per MHz for 1800MHz spectrum respectively. This implies that the value of 1800MHz is around 38% of the 900 MHz value, which is consistent with international evidence on relative spectrum values in these bands.

Converting these lump sum values into ALFs using a discount rate of 1.3%, which reflects the underlying risk of ALFs to the Government, results in an estimated **base level ALF for 900 MHz of £1.26m / MHz per annum** and a **base level ALF for 1800 MHz of £0.48m / MHz per annum** (both in March 2013 prices). The combined effect of these corrections is to reduce the annual amount payable by EE from approximately £96m to £48m.

We note that these estimates do not include any adjustment for the terminal value, which as set out in section 5.8 above we continue to believe Ofcom must make in order to avoid significantly overstating the appropriate level of ALFs.

Finally, it is essential that Ofcom implements the new fee levels in a legal and proportionate manner. It would be consistent with precedent (and the Government Direction) for Ofcom to phase in higher ALFs over a longer period than is currently proposed.

## Appendix A

Differences in Macaulay Duration between 20 year bonds with and without a final principal payment (but with the same present value bond cashflow i.e. 100).

**Table A1 – 20 year bond with principal payment**

<b>Bond face value</b>	100			
<b>Bond coupon</b>	5.50%			
<b>Bond maturity</b>	20			
<b>Yield to maturity</b>	5.50%			
<b>Years</b>	<b>Coupon payment</b>	<b>Principal payment</b>	<b>Bond cashflow</b>	<b>Weighted duration</b>
1	5.50		5.50	5.21
2	5.50		5.50	9.88
3	5.50		5.50	14.05
4	5.50		5.50	17.76
5	5.50		5.50	21.04
6	5.50		5.50	23.93
7	5.50		5.50	26.47
8	5.50		5.50	28.67
9	5.50		5.50	30.57
10	5.50		5.50	32.20
11	5.50		5.50	33.57
12	5.50		5.50	34.71
13	5.50		5.50	35.65
14	5.50		5.50	36.39
15	5.50		5.50	36.95
16	5.50		5.50	37.36
17	5.50		5.50	37.63
18	5.50		5.50	37.77
19	5.50		5.50	37.79
20	5.50	100.00	105.50	723.16
<b>Present value</b>			100.00	
<b>Macaulay Duration</b>				<b>12.61</b>

Source: EE analysis

Table A2 – 20 year bond with no principal payment

<b>Bond face value</b>	100			
<b>Bond coupon</b>	8.37%			
<b>Bond maturity</b>	20			
<b>Yield to maturity</b>	5.50%			
<b>Years</b>	<b>Coupon payment</b>	<b>Principal payment</b>	<b>Bond cashflow</b>	<b>Weighted duration</b>
1	8.37		8.37	7.93
2	8.37		8.37	15.04
3	8.37		8.37	21.38
4	8.37		8.37	27.02
5	8.37		8.37	32.01
6	8.37		8.37	36.41
7	8.37		8.37	40.27
8	8.37		8.37	43.62
9	8.37		8.37	46.51
10	8.37		8.37	48.99
11	8.37		8.37	51.08
12	8.37		8.37	52.82
13	8.37		8.37	54.23
14	8.37		8.37	55.36
15	8.37		8.37	56.22
16	8.37		8.37	56.85
17	8.37		8.37	57.25
18	8.37		8.37	57.46
19	8.37		8.37	57.49
20	8.37		8.37	57.36
<b>Present value</b>				
<b>Macaulay Duration</b>				<b>8.75</b>

Source: EE analysis