Annual licence fees for 900MHz and 1800MHz spectrum

Response by EE Limited to Ofcom's provisional decision and further consultation of 19 February 2015

17 April 2015

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Contents

1. Introduction

This document contains the response by EE Limited ("**EE**") to Ofcom's provisional decision and further consultation on annual licence fees ("**ALFs**") for 900 MHz and 1800 MHz spectrum, published on 19 February 2015. Ofcom's provisional decision and further consultation is hereafter referred to as the "**PD&C**").

This response should be read in conjunction with EE's earlier responses to:

- Ofcom's consultation on ALFs for 900 MHz and 1800 MHz spectrum, published on 1 August 2014 (the "**August 2014 Consultation**");
- Ofcom's consultation on ALFs for 900 MHz and 1800 MHz spectrum published in October 2013 (the "**October 2013 Consultation**");
- Ofcom's consultation on the methodology to derive a discount rate consistent with CPI inflation published in April 2014);
- Ofcom's invitation for comments on European auctions that had taken place since the time of the October 2013 consultation; and
- Ofcom's 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**").

In preparing this response we have been mindful of the helpful clarification given to EE by Ofcom on 31 March 2015 that, whilst the PD&C sets out Ofcom's provisional decision on certain matters:

- it does not set out a final decision as to the revised level of ALFs; and
- that Ofcom will thus consider evidence and submissions in response to the PD&C that do not relate to the impact of the geographic coverage obligation on which Ofcom is expressly consulting.

Nevertheless, we also appreciate that the PD&C is based on matters on which Ofcom has previously consulted and takes into account the responses to its previous consultations. In this response, we have therefore concentrated on (i) the new errors we believe Ofcom to be making and (ii) the substantial new evidence that we believe to be relevant to Ofcom's decision. In those cases where we feel that Ofcom is simply wrongly continuing to make errors in setting ALFs to which EE has previously referred, we have refrained from reiterating those concerns in detail in this response. However, Ofcom should not consider these concerns to be any less strongly held nor any less valid for the lack of repetition.

2. Executive summary

In the period between the August 2014 Consultation and the present date, a number of factors that affect the value of EE's 1800 MHz spectrum have changed. The most important of these are (i) that the mobile network operators ("**MNOs**") have accepted a 90% geographic coverage obligation; (ii) that the commercial viability of new spectrum at 2.3 GHz and 3.4 GHz has been established beyond doubt; and (iii) that a new and important evidential input for the purposes of spectrum valuation has become available – namely Ofcom's cost modelling of new mobile technology costs, which Ofcom has considered sufficiently robust to use it for the purposes of setting wholesale mobile call termination ("**MCT**") rates. These and other changes are extremely important and must be taken into account by Ofcom before reaching its final decision on ALFs.

EE welcomes Ofcom's continued acknowledgement in the PD&C that, in order properly to balance the likely effects of ALFs, Ofcom must take an overtly conservative approach to interpreting the evidence regarding the level at which they should be set. However, EE has serious concerns that, by ignoring the changes mentioned above and in making several other important errors in spite of our previous representations, Ofcom's approach overstates forward-looking market value for 1800 MHz spectrum and thus sets the ALFs for this spectrum too high.

2.1 Harmful effects of Ofcom's proposals

EE remains very concerned that the impact of Ofcom's proposals in relation to ALFs will:

- Unduly raise prices for end-users: it should by now be a relatively uncontroversial expectation that the higher the level of ALFs, the higher will be prices for end-users as spectrum charges form part of the variable costs of the industry in supplying services.
- Heighten regulatory risk and deter investment through the resulting asymmetric profit shock:
    - The higher the level of ALFs the more likely that investment will be harmed. In particular, less than complete pass-through of ALF increases would lead to lower returns for the industry and reduce investment.
    - Ofcom has previously noted the importance for investment of avoiding asymmetric profit shocks:

      "*…it is generally good regulatory practice to avoid large, asymmetric profit shocks wherever possible, as they could be disruptive and contribute to perceptions of a less certain*

regulatory framework. This could potentially adversely affect incentives to invest in the sector more generally".[1]

- As we elaborate further in this executive summary and in the body of this response, a particular concern is that EE considers it highly unusual and deeply worrying that, in collaboration with Government and the regulator, private companies should be encouraged to agree to a costly new obligation (namely the geographic coverage obligation) which is designed to serve a public policy goal and is not aligned with a profit maximising strategy without it being considered necessary or appropriate to provide any form of compensation or adjustment in other obligations. This is particularly so when there appears to be no sound countervailing public policy reason for Ofcom *not* to adjust ALFs to reflect the costs to the 1800 and 900 MHz licensees of meeting the new coverage obligation that has been agreed, EE considers that Ofcom's failure to do so materially raises the regulatory risk to investing in the sector.

- Carry a risk of undermining efficient spectrum use:
  - Lower service prices support greater usage of the relevant spectrum and thereby support efficiency in its use. Conversely, unduly inflated ALFs such as Ofcom is proposing in the PD&C are likely to lead to higher prices and lower usage. They also tie up financial resources, diverting them away from more productive uses.
  - Inflated ALFs, which depart from actual market value, also increase the risk of spectrum being left fallow as a result of possible hand-back.

We are also extremely concerned that Ofcom's erroneously inflated view of the market value of 1800 MHz spectrum, coupled with its proposal to entirely disregard the impact of the material coverage cost obligations to which licence holders of this spectrum are now subject, will have a disproportionate and discriminatory impact on the holders of this spectrum, as compared with their competitors holding 900 MHz spectrum.

2.2 Core errors in Ofcom's approach

The cause of these harmful effects lies in the following core errors that persist in Ofcom's approach to setting ALFs:

UK Benchmark data

1. The analysis of UK benchmark data that Ofcom has used to set ALFs suffers from several problems: it relates to frequencies that are much lower and higher than 1800 MHz; it requires an assumption that the detailed design of the auction did not distort bidding; it produces a wide range of

[1] See Ofcom http://stakeholders.ofcom.org.uk/binaries/consultations/spectrumlib/annexes/annex8.pdf (para.A8.109).

estimates (including depending on the choice of increment); and it ignores UK developments since the time of the auction. Critically, when evaluating this data, Ofcom has also failed to properly consider the implications of much greater certainty of substantial new spectrum being made available for mobile services (except inconsistently to assume that the overall spectrum cap is no longer applicable).

Cost modelling

2. Ofcom has failed to properly consider estimating market value from cost modelling to inform the level of ALFs for 1800 MHz spectrum. Ofcom's proposed ALF level for 1800 MHz is more than double the forward-looking market value of the spectrum estimated by modelling the opportunity cost of the last increment of 1800 MHz spectrum, i.e. implied by an estimated narrow range for the lump sum value of £1.21m to £5.48m per MHz. EE believes that the estimate from cost modelling should be given more weight than the benchmarking based on 2013 auction values, because the cost modelling is specific to valuing the actual ALF spectrum bands in the UK and takes into account information on key drivers of spectrum that was not available at the time of the auction.

International benchmark data

3. Ofcom's selective reference to international benchmarking data is highly subjective. In its 1800 MHz international benchmarking, Ofcom gives greatest weight only to four countries, two of which it acknowledges carry significant risks in overstating UK market value. Correcting only the Austrian benchmark would lead to a reduction in Ofcom's lump sum result from the benchmarking from £13m to around £10.9m per MHz for 1800 MHz.

Discount rate for annualisation

4. Ofcom's proposal in the PD&C to move to setting the discount rate for annualisation at more than double the cost of debt due to the introduction of a new arbitrary link to the weighted average cost of capital used in the mobile call termination charge control represents a grave and manifest error, patently likely to inflate ALFs above their appropriate level.

Impact of the new coverage obligation

5. Ofcom has been unduly restrictive in its assessment as to whether and how it can and should take account of the new coverage obligation to which each of the 1800 MHz and 900 MHz licences is now subject when setting ALFs to reflect the market-value of this spectrum as required under the 2010 Direction[2]:

    - Even on the plain wording of the 2010 Direction, it is open to Ofcom to set ALFs which reflect full market value but which at the same time take into account other relevant factors, including the voluntary acceptance of a costly regulatory obligation. In addition to this, the fact that market value is not known with certainty but can only be

[2] The *Wireless Telegraphy Act 2006 (Directions to OFCOM) Order* 2010 (the "**2010 Direction**").

estimated to lie within a wide range further calls for the consideration of other factors in choosing an ALFs level from within the range.

- Evidence from international auctions and from the UK February 2013 auction indicates that coverage obligations *do* affect the market value of spectrum holdings.
- EE estimates that the additional costs imposed to meet the new obligation will be [✂] to 31 December 2017, with a present value of [✂] over the next 10 years. As a cross-check, we have used the asset costs and OPEX assumed in Ofcom's mobile cost model. The costs from the cost model would imply a present value of total costs to meet the coverage obligation over the next eight years of around [✂] and a [✂] value of around [✂] over twenty years. These numbers are highly material, with [✂] representing around [✂] of EE's Earnings Before Interest and Tax (EBIT) in 2014 and around [✂] of our EBITDA minus CAPEX.[3]
- The substantial cost required to meet this new obligation represents a significant asymmetric profit shock on EE and Hutchison 3G UK Limited ("**H3G**"), as both operators' existing networks are not optimised for sub 1 GHz spectrum and will require significant network investments to meet the obligation. EE and H3G will be required to allocate capital and additional operating costs to meeting the coverage obligation. In the context of making other relevant spectrum pricing decisions, Ofcom has noted that such shocks can cause inefficient input and output decisions and has thus sought to minimise them by phasing in changes very gradually. As noted in EE's response to Ofcom's October 2013 Consultation, higher costs can lead to EE's adjusting its planned investments, with inefficient implications for 4G rollout. A failure to make an allowance for the cost of this new obligation risks competitively disadvantaging EE and H3G relative to the other MNOs and involving Ofcom in regulatory inconsistency.
- Furthermore, the material costs associated with the coverage obligation are likely not only to impact the current licensees' private conduct and spectrum valuations, but also the present market-value of the spectrum – once it is properly factored in that any future trades of this spectrum could be to a new entrant, and that this new entrant would also be subject to the same costly licence condition.

2.3 Legal impact of Ofcom's errors

It is clear to EE that Ofcom's approach and proposed decision is not merely mistaken but is also unlawful and, if maintained in the final decision, will be liable to being set aside on judicial review.

3 EE's EBIT in 2014 of £407m is derived from adjusted EBITDA of £1,589m less amortisation and depreciation of £1,182m. CAPEX in 2014 was £596m.

Ofcom must work within the legal framework established by both EU and UK law. This requires the 2010 Direction to be interpreted and applied in the light of the wording and the purpose of the European Common Regulatory Framework ("**CRF**"), in particular Article 13 of the Authorisation Directive[4] and Article 8 of the Framework Directive[5].

The 2010 Direction cannot relieve Ofcom of its obligation to ensure that the ALFs which it determines satisfy the requirements of the CRF. Nor may Ofcom abdicate any discretion[6] which is permitted to it by the WTA 06[7] and CA 03[8] when setting ALFs: rather, it must give proper consideration to the exercise of the discretion permitted to it.

Contrary to these requirements, the requirements of UK public law and relevant principles of EU law, Ofcom's proposals in relation to ALFs for 1800 MHz spectrum set out in the PD&C:

- Misinterpret and misapply the 2010 Direction;
- Are not objectively justified and proportionate to the objective of ensuring optimal use of spectrum and the other objectives set out in Article 13 of the Authorisation Directive, Article 8 of the Framework Directive, s.3 of CA 03 and s.3 of WTA 06;
- Fail to consider how the relevant EU and statutory objectives are to be promoted and therefore fail to promote those objectives in particular the efficient use of frequencies, maximum benefits for end-users, investment and competition (indeed are liable to cause active harm in this regard) in contravention of Article 8 of the Framework Directive, s.3 of CA 03 and s.3 of WTA 06;
- Fail to have regard to relevant factors;
- Fail to have regard to a range of relevant evidence;
- Are not transparent, in particular as to the weighting of international benchmarks; and
- Fail to give effect to EE's legitimate expectations in relation to Ofcom's consideration of the large impact of the incremental costs of meeting the new coverage obligation on the appropriate level of ALFs, in spite of EE's heavy reliance on those expectations in signing up to this obligation.

2.4 Recommended adjustments to 1800 MHz ALFs

In light of the above, EE believes that there is a strong onus on Ofcom to:

i. Further lower the base level of the ALFs for 1800 MHz set out in the PD&C; and

4 Directive 2002/20/EC (the "**Authorisation Directive**").
5 Directive 2002/21/EC (the "**Framework Directive**").
6 I.e. any discretion within the confines of the 2010 Direction (properly interpreted) and EU law.
7 *Wireless Telegraphy Act* 2006 ("**WTA 06**")
8 *Communications Act* 2003 ("**CA 03**").

ii. Properly assess the range of options available to it to moderate the impact of the new costly coverage obligation, in particular a longer phase-in period for 1800 MHz ALFs.

Base level of ALFs

For the reasons set out above and in further detail in this response, in terms of the base level of ALFs, EE believes that ALFs for 1800 MHz spectrum should be based on taking into account the results of both the cost modelling (indicating a range for the lump sum value of £1.21m to £5.48m per MHz) and the corrected benchmarking (indicating a range of £5.6m to £16.0m). EE believes that ALFs should be set conservatively with regard to these ranges. We note that Ofcom has previously decided to choose conservative values as the mid-point of the lower half of the estimated range. Should Ofcom decide to apply the same approach to the overall evidence from the cost modelling and benchmarking, Ofcom may decide to set a lump value of £5.2m which represents the mid-point of the lower half of the range between the average value from the cost modelling of £3.34m and the value for the ALFs from the benchmarking of £10.95m implied from correcting only the Austrian benchmark. It would clearly not be appropriate for Ofcom to rely on cost modelling values above the maximum value of £5.48m per MHz.

Ofcom must therefore undertake additional work to further refine its analysis to determine the correct baseline 1800MHz fees in the range bounded by current 1800MHz fees up to a maximum level of **£0.37m per MHz**.[9]

In terms of the beneficial effects of this adjustment, EE considers that this would ensure the attainment of Ofcom's objectives under the CRF by ensuring that 1800 MHz ALFs:

- are proportionate to their intended purpose of ensuring optimal use of spectrum resources and encourage efficient use of frequencies;
- avoid discrimination against the holders of 1800 MHz spectrum by ensuring that the relativities between the ALFs that Ofcom is setting for 1800 MHz and 900 MHz spectrum and the values of that spectrum produced by cost modelling are maintained[10]; and
- maximise benefits for end-users and promote investment by helping to moderate the profit shock and investment risks arising from the new coverage obligation.

Phased implementation

In addition and in line with EE's previous consultation responses, EE remains of the view that Ofcom should provide for the ALFs on 1800 MHz to be phased in over 3 years. In particular, EE considers that it is now more important than ever for Ofcom to do this in view of the new expenditure requirements that will

9 Based on a cost model value of 1800MHz of £5.48m per MHz and a discount rate of 0.4% (EE's view of the maximum reasonable rate).

10 Ofcom has found its cost modelling of values for incremental 900 MHz spectrum to be generally higher than Ofcom's proposed ALFs for 900 MHz spectrum. By contrast, the cost modelling that EE has conducted for 1800 MHz spectrum values reveals Ofcom's proposed ALF levels to be far higher than these values. In light of these findings, it would be highly discriminatory for Ofcom not to reduce the ALFs for 1800 MHz.

confront EE and H3G over the next two years and thereafter in order to comply with the new coverage obligation that they have committed to in furtherance of the Government's public policy goals – allowing time for consumer prices and spectrum holdings to be adjusted as required.[11]

[11] While EE does not believe there are inefficiencies in current holdings, Ofcom's rationale for introducing ALFs must assume that there is some potential for efficient changes in holdings.

3. Legal framework within which Ofcom must work

For the reasons set out in this response, EE considers that Ofcom's approach and proposed decision is not merely mistaken but is also unlawful and, if maintained in the final decision, will be liable to being set aside on judicial review.

In this section of our response, EE outlines the legal framework within which Ofcom must work. In the following sections of our response, we set out the ways in which EE is concerned that Ofcom's proposed decision is unlawful by reference to that legal framework.

3.1 Overview

Ofcom must work within the legal framework established by both EU and UK law. EE considers that Ofcom has failed to take any or any proper account of a number of elements of this framework. Rather Ofcom has focussed exclusively on paragraph 6 of the 2010 Direction, and indeed has interpreted the 2010 Direction without proper regard to the statutory framework within which it was made. Although the 2010 Direction to Ofcom is a part of the relevant legal framework, it must be interpreted and applied in the context of the other relevant provisions with which Ofcom must comply and to which it must have regard when setting ALFs.

3.2 Ofcom's power to set ALFs is subject to Article 13 of the Authorisation Directive and Article 8 of the Framework Directive

As a matter of national law, Ofcom is empowered by ss.12 and 122 of the WTA 06 to prescribe by regulations the sums which holders of wireless telegraphy licences must pay to Ofcom. It must exercise that power with regard to the duties and purposes defined in s.3 of the WTA 06 and ss.3 and 4 of the CA 03, which are addressed in detail below.

As a matter of EU law, however, in setting fees for rights of use of radio frequencies, Ofcom must comply with Article 13 of the Authorisation Directive. Art.13 requires, first, that any fees for rights of use for radio frequencies must "*reflect the need to ensure the optimal use of these resources*". Secondly, Member States are required to ensure that such fees are "*objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose*" and that they take into account the objectives in Article 8 of the Framework Directive. Recital 32 to the Authorisation Directive makes clear that usage fees for the use of radio frequencies may only be employed "*as an instrument to ensure the optimal use of such resources*",[12] and must not be

[12] Although the Directive is without prejudice to the purposes for which the sums raised by such usage fees may be employed.

permitted to "*hinder the development of innovative services and competition in the market*".

When acting within the field harmonised by the CRF, and specifically when setting ALFs under Article 13 of the Authorisation Directive, Ofcom must take into account the objectives and regulatory principles in Article 8 of the Framework Directive (which are implemented into UK law via s.4 CA 03). The objectives and regulatory principles that are particularly salient in respect of the present issues are as follows:

- Under Article 8(2) of the Framework Directive, national regulatory authorities are required (i) to ensure that users derive maximum benefits from electronic communications networks and services "*in terms of choice, price and quality*"; (ii) to ensure that there is no distortion or restriction of competition in the electronic communications sector; and (iii) to encourage efficient use and ensure the effective management of radio frequencies.
- Under Article 8(5) of the Framework Directive, NRAs are required to apply objective, transparent, non-discriminatory and proportionate regulatory principles. Further they are required, inter alia, to promote regulatory predictability, to ensure that in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks and services, to safeguard competition, to promote efficient investment and innovation in new and enhanced infrastructure.

3.3 Ofcom is also required to have regard to its statutory duties in s.3 CA 03 and s.3 WTA 06

As a matter of national law, Ofcom must also have regard to its general statutory duties in s.3 CA 03 and when exercising its radio spectrum functions, also its duties under s.3 WTA 06. (Though where its EU duties are engaged (as they are in the present case) those must take precedence.) Those statutory duties required Ofcom to have regard in particular to the effect that an increase in ALFs will have on the cost to consumers of mobile telephony and data services, and the relevance of likely future changes in the demand for and supply of spectrum for mobile services:

- Ofcom's principal duties under s.3 CA 03 are "*to further the interests of citizens in relation to communications matters*" and "*to further the interests of consumers in relevant markets, where appropriate by promoting competition*".[13] When acting to further the interests of consumers, Ofcom is required have regard in particular to the interests of those consumers in respect of "*choice, price, quality of service and value for money*".[14] S.3(2) CA 03 provides that these duties require Ofcom to secure, in particular, "*the optimal use for wireless telegraphy*

13 See s.3(1) CA 03.
14 See s.3(5) CA 03.

of the electro-magnetic spectrum" and "*the availability throughout the United Kingdom of a wide range of electronic communications services*".

- Further, by s.3(3) of CA 03, Ofcom is required to have regard, in all cases, to "*the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed*". By s.3(4) of CA 03, Ofcom is also required to have regard (where relevant) to, inter alia, the desirability of promoting competition, encouraging investment and innovation in relevant markets and encouraging the availability and use of high speed data transfer services throughout the United Kingdom and the different needs and interests, so far as the use of the electro-magnetic spectrum for wireless telegraphy is concerned, of all persons who may wish to make use of it.
- Section 3(1) of WTA 06 requires Ofcom to have regard in particular to the extent to which the electromagnetic spectrum is available for use, or further use, for wireless telegraphy, the demand for use of the spectrum for wireless telegraphy and the demand that is likely to arise in future for the use of the spectrum for wireless telegraphy. Clearly, the requirement to have regard to demand and likely future demand includes a requirement to have regard to the extent of likely demand for a particular use (such as use for mobile telephony and data services). Further, EE would submit that it must connote a requirement to have regard to the extent of likely demand in relation to the likely available supply of spectrum for a particular use.
- Section 3(2) of WTA 06 requires Ofcom to have regard in particular to the desirability of promoting the efficient management and use of the part of the electromagnetic spectrum available for wireless telegraphy, the economic and other benefits that may arise from the use of wireless telegraphy; the development of innovative services; and competition in the provision of electronic communications services.
- It should be noted that nowhere in ss.3 or 4 of CA 03 or s.3 of WTA 06, nor in any of the relevant EU provisions, is any reference made to the raising of revenue by means of annual licence fees.

3.3 The Secretary of State's 2010 Direction was made, and must be read and applied, in the context of the EU and UK statutory scheme of which it forms part

The 2010 Direction requires Ofcom to revise ALFs "*so that they reflect the full market value of the frequencies in those bands*". Paragraph 6(2) of the 2010 Direction requires Ofcom specifically to have regard to sums bid in auction. However, even reading the 2010 Direction only its own terms, EE notes that the language of the 2010 Direction does not require that ALFs are set at any particular level, merely that they "reflect" market value. EE further notes that para 6(2) of the 2010 Direction does not *prevent* Ofcom from having regard to relevant factors other than sums bid in the auction.

It is clear that the provisions of EU law set out above are relevant both to the interpretation and application of the 2010 Direction, and that the 2010 Direction cannot require Ofcom to set licence fees in a way that is inconsistent with EU law. In that regard, EE notes two points in particular:

- First, the Secretary of State in making the 2010 Direction and Ofcom in setting ALFs in the present process are both implementing and acting within the scope of Article 13 of the Authorisation Directive. Accordingly, all relevant provisions of national law, including in particular the 2010 Direction, must be interpreted in the light of the wording and the purpose of Article 13 Authorisation Directive (and Article 8 of the Framework Directive to which Article 13 refers), in so far as it is possible to do so, so as to achieve the result pursued by those provisions: see Case C-106/89 *Marleasing SA v La Commercial Internacional de Alimentacion SA* [1990] ECR I-4135 ("**Marleasing**") at paragraphs 7-8.
- Secondly, the 2010 Direction cannot relieve Ofcom of its obligation to ensure that the ALFs which it determines to be payable satisfy the provisions of Article 13 of the Authorisation Directive and Article 8 of the Framework Directive. Member State bodies which are called upon to apply provisions of EU law are under a duty to give full effect to those provisions, if necessary refusing of their own motion to apply any conflicting provision of national legislation: see Case 106/77 *Amministrazione delle Finanze dello Stato v Simmenthal SpA* [1978] ECR 629 at paragraph 24. Moreover, it follows that Ofcom is required to consider explicitly whether the measure which it is proposing to adopt complies with Article 13 of the Authorisation Directive and Article 8 the Framework Directive: it cannot simply assume that ALFs which comply with the wording of the 2010 Direction also comply with the wording and purpose of the applicable EU provisions. For example, it may be that fees which are at the very upper end of estimates of a possible range of market prices could be said to "reflect market value", but that such fees would not be in the interests of consumers.

3.4 Relevant principles of UK public law

Further, Ofcom must ensure that its decision as to ALFs complies with general principles of public law. In particular, EE notes the Ofcom's substantive decision is constrained by the following principles:

- First, Ofcom must act within the powers conferred by s.12 of WTA 06 and Art.13 of the Authorisation Directive, and must comply with the duties imposed upon it by those provisions; Article 8 of the Framework Directive; ss.3 and 4 of CA 03 and s.3 of the WTA 06 as well as the 2010 Direction. EE's position in that regard is set out above.
- Secondly, Ofcom must not fetter or abdicate any discretion which is permitted to it under the relevant statutory rules. Rather, it must give proper consideration to the exercise of the discretion permitted to it by the aforementioned statutory provisions: *R v Secretary of State for the Home Department ex p. Fire Brigades Union* [1995] 2 AC 513].

- Thirdly, in setting ALFs, Ofcom must take into account all relevant considerations and must not take irrelevant or impermissible considerations into account: *Secretary of State for Education and Science v Tameside MBC* [1977] AC 1014. In that regard, EE's position is that the relevant and permissible considerations are those set out in Article 13 of the Authorisation Directive and Article 8 of the Framework Directive. National provisions (including ss.3 and 4 of CA 03 and s.3 of the WTA 06 as well as the 2010 Direction) are only relevant insofar as they are interpreted to be consistent with Article 13 of the Authorisation Directive and Article 8 of the Framework Directive. Accordingly, Ofcom must directly address each of the considerations set out at section 3.2 of this response above in reaching its decision as to the level of ALFs.
- Fourthly, Ofcom must exercise its powers to set licence fees under the WTA 06 only for proper purposes: *Congreve v Home Office* [1976] 1 QB 629. Again, those purposes are defined by the relevant EU provisions and do not include the raising of revenue *per se*.
- Fifthly, Ofcom must not act irrationally or unreasonably and the level of ALFs set must fall within the range of reasonable decisions open to a reasonable decision-maker: see *R v Home Secretary ex p Brind* [1991] 1 AC 696, HL and *R v Chief Constable of Sussex ex p International Trader's Ferry Ltd* [1999] 2 AC 418. In applying this principle, Courts may adopt a more intrusive standard of review if the nature of the case requires it. EE submits that it would be appropriate for any court to apply such a heightened scrutiny in the present case, given the terms of Article 4 of the Framework Directive, which require the merits of the case to be taken into account: see *T-Mobile (UK) Ltd v Office of Communications* [2009] 1 W.L.R. 1565 at paragraphs 12 to 31.
- Sixthly, Ofcom must give effect to any legitimate expectations which have arisen as to the manner in which it will exercise its power to set ALFs, unless circumstances entitle it to resile from those expectations: *R v North and East Deon Health Authority ex p Coughlan* [1999] EWCA Civ 1871 at para 57. As to whether it is permissible to resile from such expectations, relevant considerations include in particular: (i) the importance of the subject matter to the affected party; (ii) whether the affected party has relied upon the expectation, and with what consequences; (iii) the specificity of any representation; and (iv) the purposes for which any representation was made.
- Finally, given that Ofcom is acting in the field of EU law, it must comply with relevant general principles of EU law including in particular proportionality and the protection of legitimate expectations. Those principles are addressed above.

4. Flaws in Ofcom's general approach to setting the base level of ALFs

In this section of EE's response, we identify the major flaws in Ofcom's approach to determining the base level of ALFs for 1800 MHz spectrum. We explain that Ofcom is relying on only a subset of the relevant evidence available to it in setting ALFs and reveal important inconsistencies in Ofcom's approach in making specific adjustments for some relevant factors but not others.

EE submits that considering a broader range of evidence forcefully demonstrates that Ofcom's approach as proposed in the PD&C is not conservative and is highly likely to overstate the forward-looking value of 1800 MHz spectrum. In particular, in this section of our response, we show that:

- Ofcom's sole reliance on benchmarking for valuing 1800 MHz spectrum is heavily assumption driven, produces a wide range of estimates and ignores important UK developments bearing on market value that have arisen since the time of the auction (except inconsistently to assume that the overall spectrum cap is no longer applicable);
- Ofcom has failed to properly consider highly relevant and in fact more reliable estimates of market value from cost modelling to inform the level of ALFs for 1800 MHz spectrum; and
- Cost modelling shows that Ofcom's proposed ALFs for 1800 MHz is likely to substantially overstate the market value of the spectrum (in sharp contrast to the ALFs that Ofcom is proposing in the PD&C for 900 MHz spectrum, which is at the bottom end of the range of values Ofcom estimates using cost modelling).

4.1 Ofcom's exclusive reliance on benchmarking to set 1800 MHz ALFs is subject to a wide margin of error and ignores key relevant factors

The forward-looking market values of the 900 MHz and 1800 MHz bands in the UK that are required to set ALFs in accordance with the 2010 Direction are not (obviously) known; instead, these market values need to be estimated. Consistently with section 6(2) of the 2010 Direction, Ofcom has chosen to estimate market values by benchmarking to auction prices. In this regard, Ofcom states in the PD&C that:

> "*The available evidence is instead for the market value of **other bands** in the UK, or for these bands in **other countries** where they have been auctioned. Accordingly, we recognise there is therefore inherent uncertainty in deriving ALFs for the 900 MHz and 1800 MHz band at full market value*" (para 1.30).

In order to compensate for these methodological issues, Ofcom has sought to estimate market value for the purposes of setting ALFs by an elaborate exercise in which:

- First, Ofcom seeks to estimate what were the UK market values of 800 MHz and 2.6 GHz in 2013 from data on bids for various packages of spectrum in the 2013 auction and by making assumptions as to what the values would be assuming that there is no overall cap on the spectrum holdings of operators; and
- Second, Ofcom takes its 2013 values for 800 MHz and 2.6 GHz and estimates values for 900 MHz and 1800 MHz from the relative value of bids for different bands in various European auctions.

Problems with the assumptions used by Ofcom to derive market value based on the use of the UK 4G auction bids

Ofcom acknowledges that trying to infer the market value from the 4G auction is problematic.[15] Ofcom is forced to rely on making assumption-driven indirect inferences because it does not have values of direct relevance. For example, Ofcom states: "*the opportunity cost in the auction of EE's 2x5 MHz of 800 MHz spectrum to other bidders excludes EE's own bids (by definition) and as such it excludes the most informative value for the opportunity cost of sub-1 GHz spectrum*."[16] Further, Ofcom chooses not to rely on the actual auction prices but estimates higher values by making assumptions as to what would have happened had the overall spectrum cap that was integral to the auction not applied.

Ofcom's analysis also assumes that bidding in the auction accurately reflected the intrinsic value of the spectrum to the operators. In the 4G auction, bidding was constrained in the clock phase, inter alia, by the price increments chosen by Ofcom and by the activity rule. An ideal activity rule should assign to different spectrum band lots a relative "weight" (in terms of activity points) that is as closely aligned to the relative value of the different bands as possible. If the activity rule does not suitably capture such relativities, it constrains bidders' ability to express demand according to value. The greater the departure in the points ratio relative to economic value the most severe the constraint.

One of the original proponents of combinatorial clock auctions ("**CCAs**"), Lawrence Ausubel, and his co-author Oleg Baranov identify this problem with the UK 4G auction:

> "*One shortcoming of points-based activity rules is that it is impossible to make an assignment of points guaranteeing that bidders will always be able to bid straightforwardly according to their values. Moreover, the auctioneer will often miss the mark widely. One case in point is the 2013 UK 4G Spectrum Auction. There, the point ratio between A blocks and C blocks was set at 15-to-1. However, the effective price ratio ended up at about 4-to-1. In this auction, bidders were only able to switch from the A blocks to C blocks, and they were unable to*

15 Ofcom, PD&C, para. 2.185.
16 Ofcom, PD&C, para. 2.72.

> *switch back. In other forthcoming work, we show that in order to avoid constraining bidders from straightforward bidding in the actual auction, it appears that the point ratio would have needed to have been set at only about 2-to-1, quite different from what was used empirically*."[17]

As Ausubel and Baranov note, the activity rule in the UK 4G auction impeded switching back from 2.6 GHz to 800 MHz spectrum. The likely effect was that prices in the 800 MHz did not rise as they should and demand was kept artificially high for 2.6 GHz spectrum, inflating 2.6 GHz prices. While it is difficult to identify the precise impact, there is a clear danger that prices for 2.6 GHz spectrum overstate intrinsic value and that this may lead to Ofcom overstating the value of 1800 MHz spectrum.

Wide range of values produced by UK auction results

Even with the assumptions Ofcom makes, Ofcom is only able to identify a wide range for the potential value of 800 MHz spectrum. In particular, Ofcom states in the PD&C:

> "*First, the range between the opportunity cost in the auction of a 2x5 MHz and a 2x10 MHz increment is wide: the higher figure for a 2x5 MHz increment of £38.4m per MHz is about 45% and £12m per MHz above the lower figure of about £26m per MHz for a 2x10 MHz increment. Second, for reasons explained in greater detail below, the other information or analysis is either not sufficiently relevant or reliable to assist us in choosing an appropriate estimate of market value from within this wide range (e.g. we do not obtain a sufficiently reliable quantified estimate from our marginal bidder analysis)*" (para 2.81).
>
> "*In principle, we are interested in the marginal opportunity cost for the relevant increment, not an average*" (para 2.83).
>
> "*However, we consider that in neither case would we have a sufficiently reliable quantified estimate to use in place of the rejected market value figure. Therefore, in practice, the average opportunity cost in the auction of about £30m per MHz provides a better candidate market value than either of the marginal opportunity costs in the 4G auction*" (para 2.87).

As the assumed 800 MHz value is a key input in Ofcom's approach to setting the ALFs for both 900 MHz and 1800 MHz, the wide range in the potential value of 800 MHz results in a wide range for the implied values of both 900 MHz and 1800 MHz spectrum.

The use of a wide range of estimates for market values in order to set ALFs is not in and of itself a flaw. However, Ofcom has rejected the use of cost modelling for this purpose because of the claimed wide range of valuation estimates it produces.[18] Consistency with Ofcom's own internal logic as expressed in the PD&C requires Ofcom to have regard to methods for

17 Ausubel, L. and O. Baranov, "A practical guide to the Combinatorial Clock Auction", June 2014, p.13.

18 See further section 4.2 of this response, referencing Ofcom's comments at para A9.38 of the PD&C.

estimating market value that fluctuate less than Ofcom's auction based method. For the reasons set out below in section 4.2 of this response, EE submits that cost modelling the value of 1800 MHz spectrum achieves this.

Problems in the use of international auction benchmarks

In its second step, Ofcom uses information from international auctions on the relative value of different spectrum bands to estimate the value of 900 MHz and 1800 MHz spectrum, given its estimated values for 800 MHz and 2.6 GHz spectrum. This exercise is also heavily assumption driven including in relation to inferring values for particular bands from package bids, assumptions about whether the bidding in an auction reflects intrinsic value and assumptions about the relevance of the auction in a particular country to informing UK values (noting the multiple sources of differences between markets which impact on spectrum values). In Section 5 of this response, we show why we believe that Ofcom has erred in giving too much weight to international benchmark values that are likely to overstate intrinsic value and no or little weight to other relevant international benchmark values.

The outcome of Ofcom's international benchmarking exercise is a further wide range as to the relative value of 1800 MHz compared with the values of 800 MHz and 2.6 GHz bands. Table 3.4 in the PD&C shows that the estimated Y/X ratios range from 0% to 64%. Even excluding the lowest and highest values, the range would still be wide, i.e. from 2% to 38%.

Combining Ofcom's estimated range for 800 MHz and Ofcom's estimated range for the Y/X ratio leads to an estimated range for the value of 1800 MHz of **£5.5m to £28.5m per MHz** (or from £6.0m to £19.1m per MHz excluding the lowest and highest ratios). The top of Ofcom's range of evidence is over five times higher than the bottom of the range.

EE accordingly submits that Ofcom's regulatory duties require it when setting ALFs, in addition to having regard to such international benchmark based estimates, to have regard to other available information that can improve the accuracy of the market value estimate. For the reasons set out below, EE submits that cost modelling produces such information in relation to 1800 MHz spectrum.

Ofcom's failure to consider UK market developments since the auction (except to assume the overall cap should no longer apply)

Ofcom's reliance on the February 2013 auction bids means that Ofcom has ignored almost all new information on market developments since the auction. In effect, Ofcom is assuming that there is no value in using any information on the UK market that has become available over the last two years to obtain a better estimate of the market value of the spectrum today. This position is particularly irrational when it is recognised that the bids in the auction simply reflect the views of the market participants at the time in relation to relevant factors such as traffic forecasts, future spectrum releases and technology developments. If an auction were held today, the participants would have regard to the latest information on these factors. Without examining this information, Ofcom cannot know to what extent values today may differ from the time of the auction.

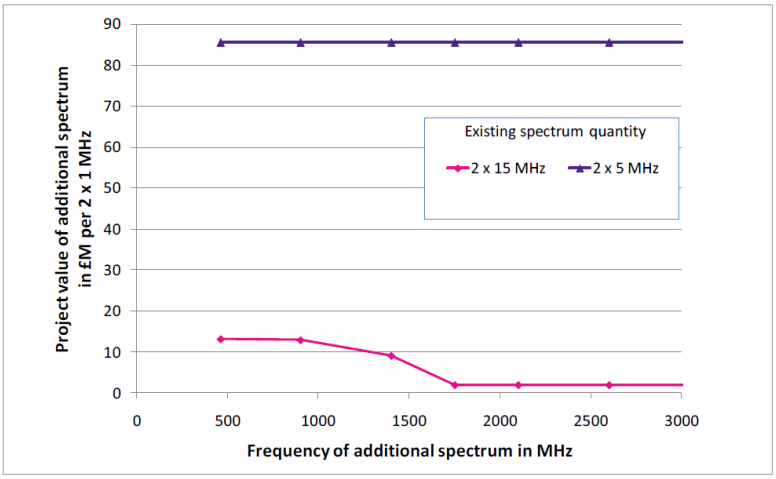
One change that Ofcom does make is to assume that the overall spectrum cap that applied at the time of the auction is no longer relevant "*because of the upcoming availability of additional mobile spectrum, including the 1.4 GHz, 2.3 GHz and 3.4 GHz bands*."[19] In particular, Ofcom uses this assumption to adopt higher values for spectrum than the prices paid at the 4G auction.

While Ofcom takes into account forthcoming spectrum releases in arguing that it will no longer apply the overall spectrum cap, Ofcom makes no attempt to quantitatively estimate the countervailing impact of the now greater certainty over forthcoming spectrum releases compared with the position in February 2013. EE submits that this factor clearly reduces the value of the 1800 and 900 MHz spectrum. As noted in a report by Aegis/Plum for Ofcom:

> "*the more spectrum available the fewer base station sites that will be needed to support the capacity required, and hence results in lower operating costs. However, the benefit declines with increasing amounts of additional spectrum resulting in a lower value per MHz as the amount of additional spectrum increases*."[20]

The Aegis/Plum report shows that the availability of other spectrum can have a dramatic impact on the market value of an additional increment of spectrum. For example, Figure 4-4 of the report shows that the value of an additional increment of spectrum to a modelled operator would fall from around £85m per 2x1 MHz to around £1m-£12m per 2x1 MHz if the operator is assumed to already hold 2x15 MHz rather than 2x5MHz of spectrum.

Figure 1 - Spectrum value variation by existing spectrum quantity (reproduction of Aegis/Plum Figure 4-4)[21]



Source: Plum analysis

While the precise numbers estimated by Aegis and Plum will be specific to the assumptions of their modelled operator, their analysis does show that the

19 Ofcom, PD&C, para 2.42.

20 AEGIS and Plum, "Estimating the commercial trading value of spectrum", 2 July 2009, p.41. Whilst dating from 2009, EE considers that the conclusions in this report regarding the relative impact on value of spectrum scarcity remain relevant.

21 AEGIS and Plum, "Estimating the commercial trading value of spectrum", 2 July 2009, Figure 4-4.

forthcoming spectrum releases have the potential to substantially lower the value of 1800 MHz spectrum.

Following early consultation, Ofcom published in November 2014 detailed proposals to release 190 MHz of additional spectrum suitable for providing additional capacity for mobile services with the auction to take place in late 2015 or early 2016. This release alone will increase the spectrum available for mobile services by around a third. 2.3 GHz and 3.4 GHz spectrum is particularly substitutable for 1800 MHz spectrum in providing medium to high frequency LTE services. This substitutability has recently been strengthened by the growing number of devices able to be used in each band. The ecosystem of devices for the 2.3 GHz band has been developing rapidly with over 60 new devices becoming available in the past six months (now 427 in total).[22] There are now 9 commercially launched 3.4 GHz networks and also a growing number of user devices supporting 3.4 GHz services.[23] There is significant momentum growing for the use of this band for mobile services owing to the push from operators in Asia, especially Japan's leading operators. These technical developments which will better enable the new spectrum to be used as an alternative means of meeting capacity will act to push down the value of 1800 MHz spectrum, even in the event that there was some delay to the current proposed timing for this auction.

In September 2014, Ofcom also proposed varying the technical conditions governing the use of the 1452-1492 MHz band to enable its use as Supplemental Downlink.[24] In the PD&C, Ofcom states that it is unclear whether this band will be a substitute for or complement to the ALF bands,[25] implying that Ofcom considers it unclear whether greater certainty regarding this potential variation of technical conditions would decrease or increase market value of the 1800 and 900 MHz bands.[26]

For the following reasons, EE in contrast considers it quite clear that the release of the 1452-1492 MHz band will reduce the value of 1800 and 900 MHz spectrum:

- First, the 3GPP specifications currently only cover the pairing of this band with the 800 MHz band (for LTE) and 2100 MHz band (for 3G), rather than 1800/900 MHz spectrum (and hence it is not currently complementary to the ALFs spectrum).
- Second, the key application of this spectrum is to provide additional downlink capacity. For an operator this provides a highly spectrally efficient substitute for additional 1800/900 MHz spectrum – as it is downlink only, this spectrum helps operators to meet their very high ratio of downlink to uplink traffic. In contrast, dedicating additional spectrum to uplink would be likely to be under-utilized.

22 Global Mobile Suppliers Association, Status of the Global LTE IDD Market, 8 August 2014, 4G/LTE Market/technology Update, 7 January 2015.
23 Ibid.
24 Ofcom, Variation of the Spectrum Access Licence for 1452-1492MHz and changes for fixed link use in the paired bands 1350-1375 MHz and 1492-1517 MHz.
25 Ofcom, PD&CConsultation, para A9.6(c).
26 Ofcom, PD&C, para A9.6(c).

- Third, each of the operators already holds some 1800/900 MHz spectrum. As such, the enablement of bonding with 1.4 GHz (which Ofcom regards as the complementary aspect of its value), would not be likely to materially increase its market value because no operator would obtain any incremental benefit from enablement as a result of acquiring additional 1800/900 MHz spectrum which it could not already achieve through its existing holdings.

Table 1 shows that the 2.3/3.4 GHz and the 1452-1492 MHz releases will increase spectrum available for mobile downlink services by around 1.7 times[27] the spectrum available in 2013/2014.

Furthermore, EE notes that in May 2014, Ofcom consulted on whether there would be net benefits from changing the use of some of the 700 MHz band to mobile services and that, in November 2014, Ofcom announced its decision to release spectrum in the 700 MHz band for mobile data use.[28] Table 1 shows that, in conjunction with the planned release of the 2.3/3.4 GHz and the 1452-1492 MHz spectrum, the further planned 700 MHz spectrum releases for mobile services will increase the (downlink) spectrum available in 2022 by 2.3 times the available spectrum of 2013/2014.

Table 1 – Illustrative implications of Ofcom's mobile data strategy for spectrum availability and mobile network capacity[29]o2

Scenario	Bands available for mobile data	Total MHz available for mobile data (downlink)	% of total spectrum < 1 GHz	Spectrum increase over 2014? (downlink)	Total potential capacity increase over 2014
2012	900 MHz,1800MHz 2.1 GHz	162 MHz	19%	-	-
2014	*As 2012 plus:* • 800 & 2600 MHz	290 MHz	21%	-	-
2016	*As 2014 plus:* • 2.3, 3.4 GHz • 1452–1492 MHz	491 MHz	12%	x 1.7	*x 1.7*
2022	*As 2016 plus:* 700 MHz • 2 GHz MSS • 3.6-3.8 GHz • 1427-1452 MHz	671 MHz	13%	x 2.3	*x 5.1*
2028	*As 2022 plus:* • 2.7-2.9 GHz • 3.8-4.2 GHz • 1492-1518 MHz	941 MHz	10%	x 3.2	*x 13.4*

In the PD&C, Ofcom pays lip service to "*the possibility that forward-looking market values today are lower than at the time of the 4G auction in 2013 due to greater certainty of availability of mobile spectrum in the future, compared to*

27 Ofcom's Table focuses only on spectrum for downlink, with 2.3/3.4 and 1452-1492 increasing downlink spectrum by around 70% (i.e. c. 1.7 times). Total spectrum (i.e. doubling paired spectrum) increases by around 40%.

28 Ofcom, Decision to make the 700 MHz band available for mobile data – Statement, 19 November 2014.

29 This is a reproduction of Table 4 from Ofcom's Mobile data strategy, 28 May 2014.

expectations at the time of the auction" (2.42b). However, Ofcom does not seek to directly estimate the impact of the large increase in spectrum becoming available for mobile services – it simply states this as a reason for adopting the same conservative approach to setting ALFs that it had already endorsed in the October 2013 Consultation, prior to this additional information on future spectrum releases becoming available.[30] That is simply not good enough and EE considers it represents a clear error in Ofcom's approach to estimating the current market value of 1800 and 900 MHz spectrum for the purposes of setting ALFs as required by the 2010 Direction.

In failing to consider the potential quantitative impact of its own announcements in relation to the spectrum releases or of the technology changes that have strengthened the substitutability of the new spectrum for 1800/900 MHz spectrum, it is manifest that Ofcom cannot know how conservative it would need to be to properly reflect their impact. Clearly, it is an inadequate justification for Ofcom's dismissive approach of this impact that its method for estimating value based on the 2013 auction bids may be ill-suited to properly taking into account more recent developments. Given the asymmetric risks of setting ALFs too high acknowledged by Ofcom in the PD&C, it is paramount that Ofcom rigorously ensures its estimations do not create such risks.

Finally, we note that Ofcom's approach based on 2013 bidding also ignores other new developments that would be relevant to operator valuations of spectrum. As set out below, the benefit of using cost modelling to estimate market value for setting ALFs is that many of these factors are already captured in Ofcom's MCT cost model, such as changes in traffic and traffic off-load forecasts, some technology developments (e.g. the increased use of S-RAN technology, VoWiFi and the imminent introduction of VoLTE) and changes in equipment costs and the cost of capital.

Ofcom has failed to recognise that ALFs calculated by reference to current, spectrum holdings risks overstating efficient long-term ALFs

At the outset of the PD&C, Ofcom accepts that there are "*effects on spectrum efficiency from inadvertently setting ALFs either above or below market value*".[31]

However, Ofcom then goes on to state in the PD&C that "*for the purpose of ALF we are most interested in the opportunity cost* ***relative to existing, post-auction spectrum holdings***"[32] and that "…*some of the analysis proposed by stakeholders in their responses involves estimating opportunity cost relative to a different assumed allocation of spectrum in the 4G auction than the actual winning packages…A disadvantage of such analysis is that it takes us away from the* ***reference point of the existing, post-auction spectrum holdings***."[33]

While EE believes that there is no evidence that 1800 MHz spectrum is presently inefficiently distributed, Ofcom's approach of focusing only on existing holdings carries a material inherent risk that, if there are inefficiencies in those

30 Ofcom, PD&C, para. 1.41.
31 Ofcom, PD&C, para 1.41.
32 Ofcom, PD&C, para. 2.63.
33 Ofcom, PD&C, para. 2.38.

current holdings, Ofcom will have set ALFs on the wrong basis (i.e. one that could undermine efficient future use of spectrum).

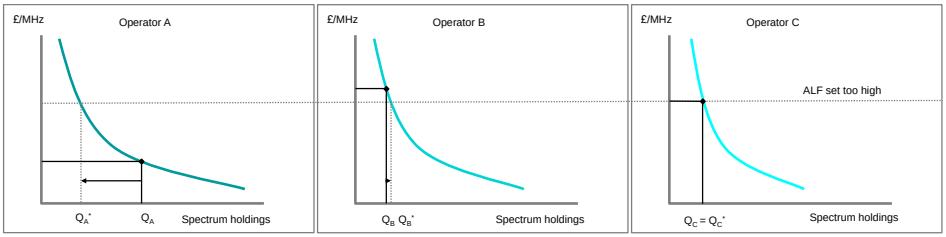
In contrast, EE considers that if Ofcom were to adopt a forward-looking approach to set long-term ALFs taking into account the potential for efficient re-arrangements of operators' spectrum holdings, this risk would be averted.

Consistent with its statutory duties, one of Ofcom's stated rationales for ALFs is to encourage efficiency, which Ofcom claims ALFs have the potential to do by improving spectrum trades over and above the commercial incentive that already exists for such trades. As Ofcom noted in its August 2014 Consultation: "*In principle, operators have an incentive to trade spectrum if there is a higher-value user. This will tend to reduce the risk that they will hold spectrum inefficiently (i.e. when they are not the highest-value user). However, we consider that operators may be less responsive to foregone receipts from trading spectrum than they would be if faced with a direct cost of ALF*" (A5.15).

Efficient spectrum use is supported by assessing forward-looking long-term market value assuming efficient assignments of spectrum. The problem with estimating ALFs on the basis of current holdings arises if they are unbalanced relative to operators' capacity and coverage needs. This would mean that some operators would have significantly higher valuations than others. Setting ALFs with regard to these high valuations may support the trade of an initial increment of spectrum. However, the ALFs would then be too high as the operator gaining the increment would not value gaining any more spectrum at the same value (i.e. operators can be expected to have diminishing marginal values for additional spectrum as also illustrated by the Aegis/Plum results In Figure 1 above. After the initial trade, the ALFs would become a barrier to efficient spectrum use deterring operators from acquiring additional spectrum because of the ALF payable even though they would generate greater value from the spectrum than another operator with relatively large holdings.

This is illustrated in Figure 2. In this figure, we assume inefficient initial holdings with one operator, Operator A, having a low value for additional spectrum while the other operators with much less spectrum have relatively high values. In this example, setting ALFs based on the second highest valuation (that of Operator C) would support Operator B acquiring marginally more spectrum but would lead to Operator A substantially reducing its spectrum holdings. There is a clear risk that the ALF level would then be too high and lead to under-utilisation of spectrum overall.

Figure 2 – ALFs based on inefficient current holdings would undermine long term efficient spectrum use

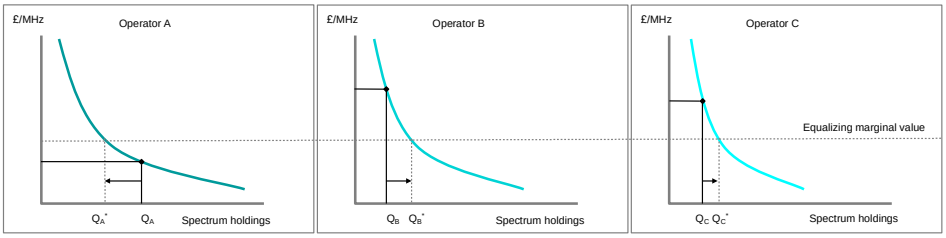


If ALFs had instead been calculated with reference to efficient holdings of spectrum they would be consistent with supporting efficient spectrum trades. Moreover they will continue to support efficient spectrum trades even as such

trades take place. This is illustrated in Figure 3 where ALFs are instead set at the marginal value of spectrum assuming that all the relevant spectrum has been assigned efficiently. Efficient spectrum trades will be supported and ALFs would not become a barrier to the efficient use of spectrum.

As such, calculating ALFs with regard to efficient spectrum holdings is much more consistent with the rationale for ALFs. To instead set ALFs based on inefficient holdings would, if effective in leading to an initial trade, undermine efficient spectrum assignment subsequently.

Figure 3 – ALFs based on efficient spectrum holdings



The effect of estimating ALFs with reference to efficient spectrum holdings is to reduce the high valuations caused by some operators in our illustrative example (just as trade more generally leads to price convergence). Thus if, as Ofcom presumably believes, current spectrum holdings are inefficient then Ofcom's ALFs based on current spectrum holdings will overstate the efficient long-term level of ALFs and have a high risk of becoming outdated, such that it acts to undermine rather than promote efficient spectrum use.

The Indepen/AEGIS/WBS 2004 report to Ofcom setting out the basis for spectrum pricing makes precisely this point:

> "*Given the current assignment and allocation of spectrum is likely to be inefficient, it is unlikely that spectrum prices based on currently observed marginal opportunity costs would achieve efficiency in the medium term*."[34]

There is thus a significant risk of error in Ofcom's approach of relying only on market values estimated with respect to the current spectrum holdings and the 2013 auction bids.

In contrast, as we explain below, the alternative approach of estimating market value with respect to cost modelling that is also available to Ofcom provides a solution to overcome this flaw. In particular, cost modelling enables value to be assessed *under a range of different spectrum assignments*, including the ability to take into account forthcoming releases of spectrum (which are likely to further promote efficient spectrum allocation through allocation by auction to those with the highest valuations for additional spectrum). We turn to consider the role of cost modelling and the results of modelling in the next sections.

34 Indepen/Aegis/WBS, "An economic study to review spectrum pricing", 2004, p.30.

4.2 Ofcom has failed to properly consider cost modelling to determine 1800 MHz value

In the PD&C, Ofcom has had regard to cost modelling estimates when setting the values of ALFs for 900 MHz spectrum, but has declined to do so when setting ALFs for 1800 MHz spectrum. In this section, we explain why the justification put forward by Ofcom for this discrepancy is invalid, and why it would be a clear legal error for Ofcom to continue to fail to have regard to this highly relevant evidence when estimating the forward looking value of 1800 MHz spectrum for the purposes of setting the ALFs for this spectrum band.

Ofcom generally recognises the benefits of modelling to value spectrum

Licence fees for ALFs spectrum has been set to date on the basis of cost modelling and it has been used by Ofcom to set Administrative Incentive Pricing ("**AIP**") for other spectrum bands and also by other national regulators.[35] Ofcom has already recognised during the consultation process on ALFs that, where the analytical issues relevant to setting fees are the same, Ofcom should take the same approach to setting ALFs as it would for setting AIP under the *SRSP: The revised Framework for Spectrum Pricing* (17 December 2010) ("**SRSP**").[36] In 2009, Ofcom clearly stated its expectation that cost modelling would play a role in the setting of future mobile spectrum charges for 1800 MHz and 900 MHz spectrum:

> "*When we do so, we will **use the best information available to us at the time as to the opportunity cost of the spectrum**. We expect this to include **the results of economic modelling, analysis of the costs of alternative means of delivering mobile and other services, and the results of spectrum auctions** completed up to that time.*
>
> *This should include the results of the 2.6 GHz auction that we expect to hold within the next few months, and could also include the results of any auction for released 900 MHz spectrum, and for the cleared digital dividend spectrum, if completed by then. These auctions should provide a good indication of the market value of the spectrum being awarded at that time, but it must be recognised that the spectrum being awarded may have both advantages and disadvantages relative to 900 MHz and 1800 MHz spectrum, and that the specific circumstances of the auctions may mean that auction prices are not a true reflection of long-run opportunity costs. For these reasons **we expect to use the results of such auctions as one input to our decisions about the future level of AIP, but not to be entirely determinative**."*[37]

35 For example, see PWC/NZIER, Renewal of Spectrum Rights for Cellular Services pricing methodology, Discussion paper, July 2006.

36 Ofcom, October 2013 Consultation, para 3.36.

37 Ofcom, *Application of spectrum liberalisation and trading to the mobile sector*, February 2009, para. 8.34-8.35.

In the SRSP, Ofcom's general statement about its approach to spectrum pricing published in December 2010, Ofcom sets out its general approach of determining market-value of spectrum according to the opportunity cost of that spectrum, and determining the opportunity cost primarily according to the "least cost alternative" ("**LCA**") method. In particular, Ofcom states that:

> "*In a well-functioning market, the price of spectrum would be equal to the value of that spectrum in the next highest value use, rather than the value that the current user (for example, a company) might place on the spectrum*"[38]
>
> "*we currently primarily use the 'least cost alternative' (LCA) method to estimate the opportunity cost of spectrum …. The LCA method estimates the value to an average user of a small additional block of spectrum in the band, in terms of avoidable cost, based on the choices that are available in the long-term*".[39]

In the SRSP, Ofcom concluded that the LCA method is generally fit for purpose and that it will in general expect to continue using it.[40] In particular, Ofcom notes that this method is useful as technology generally allows for input substitution and that only in a small number of applications would it be necessary to consider indivisible large non-marginal blocks of spectrum.[41]

The SRSP does note that observed market prices may also be used to help inform the value of spectrum. However this was subject to the clear caveats that use of this data would require Ofcom to determine:

"*whether traded **spectrum is comparable** to the spectrum for which reference rates are sought, and for which we intend to set fees, and whether the **circumstances surrounding a specific trade or auction** at a particular point in time **are representative** of the general position going forward*."[42]

and to be mindful that:

"*auction valuations are in practice **affected significantly by the specific circumstances of the award**, including how much spectrum is available*"[43] and "*the more time that has elapsed between an auction and a fees review the greater the degree of caution required when interpreting it.*"[44]

As noted in the previous section, cost modelling of 1800 MHz spectrum opportunity costs offers key advantages over Ofcom's current exclusive reliance on benchmarking in the PD&C. Specifically, cost modelling offers an ability to consider the long-term value of spectrum taking into account how future spectrum releases will lead to a greater availability of spectrum and potentially a more efficient assignment of spectrum between operators (to the extent that Ofcom considers current assignments to be potentially inefficient). In addition, cost modelling can focus on the factors specific to the current forward-

38 Ofcom, SRSP, para 1.9.
39 Ofcom, SRSP, para 5.85.
40 Ofcom, SRSP, para 5.88.
41 Ofcom, SRSP, Appendix A, paras 1.59-1.60.
42 Ofcom, SRSP, para 4.264.
43 Ofcom, SRSP, para 4.265.
44 Ofcom, SRSP, para 4.301

looking value of the 1800 MHz and 900 MHz spectrum bands in the UK as well as avoiding being distorted by differences between the UK and international markets. Ofcom's approach instead focuses on the value of other bands in early 2013 and of the value of spectrum in other countries. Ofcom has therefore erroneously opted to look at data which it has used in earlier consultations and has previously interpreted, rather than using new but much more relevant data.

Ofcom's arguments for not using modelling to value 1800 MHz spectrum do not stack up

In contrast to Ofcom's statements on its general approach to pricing spectrum in the SRSP (and in contrast to its approach in relation to valuing 900 MHz spectrum), in the PD&C Ofcom proposes to set fees for 1800 MHz spectrum entirely on the basis of auction results and to not consider *any* economic cost modelling. We are aware of no compelling justification for this approach. As in the case for 900 MHz spectrum, the 2010 Direction and Ofcom's broader EU duties require that Ofcom takes into account *all factors* relevant to assessing market value, notwithstanding Ofcom being required by the Direction to have particular regard to the sums bid in the auction. As noted in Ofcom's SRSP, market value can generally be measured by considering the network cost savings from additional spectrum.

As part of the process to determine the new level of ALFs, EE and Vodafone have each submitted that cost modelling should be used in addition to auction benchmarks. The Plum report submitted by EE states "*Avoided cost modelling is a valuable source of information which should be considered alongside auction values.*"[45] The Plum report also noted that evidence from cost modelling suggested that Ofcom's auction benchmarks were overstating forward-looking value.

In the PD&C, Ofcom has presented three key arguments for its decision not to use cost modelling for setting ALFs. Below, we consider and reject the validity of each of these arguments.

Uncertainty as to parameter assumptions leading to a large variation in estimates

First, Ofcom has argued that "*any such cost model will be subject to* ***significant uncertainty about appropriate parameter assumptions****, leading to* ***valuation estimates that vary over a wide range***."[46] It should be noted that the significant uncertainty over parameter values is not in relation to current network costs. Ofcom clearly believes that it can accurately model cost factors impacting on the UK networks over the next few years to be able to use its termination model to set regulated termination charge levels. Rather, the uncertainty relates to longer term factors impacting on costs such as traffic forecasts and technology changes. For example, in 2012, Cisco was forecasting a five year compound annual growth rate (CAGR) of 78% in global

45 Plum, "Annual licence fees – you cannot have your cake and eat it", January 2014.
46 Ofcom, PD&C, para A9.38.

mobile data, whereas Cisco's latest forecast is a much lower five year CAGR of 57%.[47]

Uncertainty over factors such as traffic forecasts and technology changes is *inherent* to the process of seeking to establish the market value of mobile spectrum. It means that valuation on any approach is likely to be highly sensitive to new information impacting on these factors. Ofcom's approach of relying on February 2013 auction values does not mean that Ofcom has found a way to identify the current market value of spectrum free from such uncertainty. Rather, Ofcom's approach simply ignores this uncertainty by fixing on values based on market participants' views at the time of the auction. In fact, Ofcom's approach is actually worse than cost modelling because Ofcom has no way of knowing just what margin of error surrounds its estimates. In contrast, cost modelling offers the benefit of enabling parameter values to be varied to reveal the actual uncertainty in valuation arising from the uncertainty over the factors that drive valuations. It enables the regulator to then choose a value from within the estimated range taking into account the cost of erring too high or too low.

In terms of network costs uncertainty, Ofcom's primary reason for originally declining to place weight on cost modelling to value the 1800 MHz spectrum back in March 2011 was that:

> "*Estimates derived from technical and cost modelling may be feasible, but they are subject to a* ***considerable margin for error, especially in relation to technologies that are in the early stages of commercial deployment such as LTE.*** *Accordingly, our view is that we should only use them alone if there is no credible alternative*."[48]

Some four years later, this concern is no longer valid. Specifically, EE notes that Ofcom has now published a new MCT cost model that includes LTE. Presumably, Ofcom believes that its modelling of a network with LTE is robust as it uses this model to set the level of regulated termination charges. As we show in the next section, estimates of the value of 1800 MHz spectrum produced using this model are much lower and subject to much less uncertainty and variance associated with them than the estimates produced by Ofcom's benchmarking approach.

In contrast to its approach of entirely disregarding cost modelling when valuing 1800 MHz spectrum, Ofcom has undertaken some modelling of the value of 900 MHz spectrum by adapting a model used to assess the costs and benefits of making 700 MHz spectrum available for mobile services (the **700 MHz model**). Using this approach, Ofcom found a large range for the estimated value of 900 MHz spectrum. However, Ofcom should have recognised that the range for the value of 900 MHz spectrum reflected assumptions relevant to 900 MHz spectrum that are not relevant to valuing 1800 MHz spectrum.

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47 See Brookings, Forecasting mobile data traffic growth, 18 April 2014 and Cisco Visual Networking Index, Global Mobile Data Traffic Forecast Update 2014-2019.

48 See para. A11.11 at http://stakeholders.ofcom.org.uk/binaries/consultations/combined-award/annexes/Annexes-7-13.pdf.

In particular, Ofcom's modelling for 900 MHz spectrum assumes that a particular percentage of traffic must be served with sub 1 GHz spectrum. The particular percentage is varied between the different scenarios. This assumption makes the estimated value of 900 MHz highly sensitive to overall traffic forecasts, as the modelled operators (EE and H3G) have low holdings of sub 1 GHz spectrum. Accordingly, the addition of an increment of 900 MHz spectrum makes a very large difference to the network costs incurred in meeting the high traffic forecasts given that a significant share of this traffic must be served by sub 1 GHz spectrum. As this assumption does not apply to 1800 MHz spectrum, the value of this spectrum is not as affected by traffic forecasts. As discussed in section 4.3 of this response below, changing from the Mid Case traffic forecasts to the High Case forecasts presented in the Analysys Mason report, *Assessment of the Benefits of a Change of Use in the 700 MHz Band to Mobile* (October 2014), increases the estimated value of 1800 MHz by less than £1m per MHz.

In summary, Ofcom should recognise that the ability to estimate the range of uncertainty over current market value is an advantage not a disadvantage of cost modelling compared with relying on the 2013 auction and auction benchmarks from other countries. Furthermore and, in any event, the uncertainty and variance in results in relation to cost modelling estimates of the value of 1800 MHz is considerably lower than that surrounding Ofcom's benchmark values.[49]

Cost modelling produces higher results than benchmarking

Second, Ofcom has found that its modelling in relation to 900 MHz spectrum produces values that are generally higher than the values that Ofcom has estimated from benchmarking. Ofcom attributes the high values to the assumption that a significant proportion of traffic can only be served by sub-1 GHz spectrum (i.e. a factor relevant to 900 MHz and not 1800 MHz).[50]

Whilst these high values might seem to support Ofcom's view that it is being very conservative in relation to its proposed benchmark based values for 900 MHz spectrum, by contrast, as shown in section 4.3 of this response below, the use of cost modelling for 1800 MHz spectrum shows that Ofcom is likely to be *substantially overstating* the value of 1800 MHz spectrum.

Benefits of sub 1 GHz spectrum

Third, Ofcom notes that in the 700 MHz model it also considered the additional performance benefits that the spectrum may deliver (such as greater coverage and new services) and that "*for operators that hold relatively little sub 1 GHz spectrum, EE and H3G, the benefit of being able to serve more traffic could be more important than the network cost savings that low frequency spectrum can deliver*."[51] In the PD&C, Ofcom states that these additional benefits would imply

49 As noted in Section 4.1 of this response, combining Ofcom's estimated range for 800 MHz and Ofcom's estimated range for the Y/X ratio leads to an estimated range for the value of 1800 MHz of £5.5m to £28.5m per MHz. As we show in section 4.3 of this response, the estimated range for the value of 1800 MHz from our cost modelling is within +/- £5m per MHz when focusing on the values most relevant to setting ALFs.

50 Ofcom, August 2014 Consultation, para A9.17.

51 Ofcom, August 2014 Consultation, para A9.19.

that Ofcom's proposed ALFs for 900 MHz spectrum are even further below the likely value of 900 MHz given the results of Ofcom's cost modelling (hence conservatively set).

EE has reviewed the list of benefits from 700 MHz identified by Ofcom in the 700 MHz award statement (para. 4.2). The benefits that are additional to savings related to network costs for capacity, i.e. benefits related to extended coverage and the introduction of new services and technologies, are not relevant to the commercial valuation of an additional increment of 1800 MHz spectrum to the UK mobile operators. [✂]. Rather the modelling of 1800 MHz spectrum falls within the general category identified in Ofcom's SRSP where least cost alternative modelling can be reasonably applied assuming output is constant.

We conclude that Ofcom's arguments against taking cost modelling into account do not apply to 1800 MHz spectrum. This suggests that there is no reasonable basis for Ofcom's opposite conclusion:

> "*We have not attempted to model the value of 1800 MHz spectrum or the relative values of different frequencies as the 700 MHz model is not immediately suited to these tasks. Adapting the existing model or developing a new model to look at these questions would face similar issues as those identified above*."[52]

In the following section, we show that there is already a model available (the MCT model) that can be used to value spectrum and that modelling the value of 1800 MHz spectrum further demonstrates Ofcom's stated concerns regarding the use of 1800 MHz spectrum modelling to be invalid.

4.3 Cost modelling shows Ofcom is highly likely to overstate the value of 1800 MHz spectrum and understate the value of 900 MHz spectrum

As explained earlier in this section of our response, EE has previously urged Ofcom to have due regard to cost modelling evidence when estimating the market value of spectrum for the purpose of setting ALFs.

EE accepts that during most of the consultation process regarding the new ALFs, there has not been a cost model that would have enabled the value of additional ALFs spectrum to the 1800 MHz operators to be readily modelled. However, this changed on 17 March 2015, when Ofcom published its 2015 MCT cost model - which has the capability to model costs for operators with different spectrum holdings including both 900 MHz and 1800 MHz. In particular, the parameters in the model can be adjusted to reflect the spectrum holdings of each of the UK operators.

As Ofcom notes in its MCT Statement: "*the model projects the least cost means of delivering existing services using known technology, but recognising where*

52 Ofcom, August 2014 Consultation, para A9.27.

an efficient national network would start from in terms of legacy network deployments."[53] By examining how the present value of total costs change in the model when an operator gains or loses an increment of 1800 MHz (or 900 MHz) spectrum, it is possible to estimate the value of the spectrum by means of the LCA method (i.e. the costs that would be avoided). This measures the opportunity cost of an operator holding the spectrum, rather than the last increment of spectrum being re-assigned to the operator that would be able to save the most costs from acquiring it.

It is also relevant to consider the additional costs that operators would incur if they were to lose an increment of spectrum. Efficiency in spectrum use will only be able to be increased where the value to one operator in gaining an increment of spectrum is greater than the value to another operator in losing that increment of spectrum. If current spectrum assignments were inefficient, then ALFs set just above the lowest value of any operator in losing an increment of the relevant spectrum would encourage that operator to release the spectrum. The operator that gains that increment of spectrum would then have a lower value for any further additional spectrum. Potentially, an iterative approach could be applied to identify the ALF level that would be consistent with exhausting all potential efficiency-enhancing spectrum trades.[54]

The 2015 MCT model reflects up-to-date assumptions in relation to costs including equipment prices and traffic forecasts. The model also includes LTE technology and includes the deployment of VoLTE from later in 2015/16.

The published 2015 MCT model is nonetheless not particularly forward-looking. As Ofcom notes: "*we model the current network based on the technology of the day with no further technological changes beyond evolutions of existing technologies within the control period (and partly related to this, no changes in spectrum either)*."[55] Ofcom also notes that the traffic forecasts in the MCT model "*are constrained by the technology and spectrum we are using*".[56]

A more forward-looking approach is thus required, in order to make assumptions about likely future spectrum releases, technology changes and forecasts of traffic that would be enabled by that spectrum and technology. This is the approach that is applied in the 700 MHz CBA model developed by Analysys Mason ("**AM**") for Ofcom. Ofcom notes that "*the traffic forecasts in the 700 MHz CBA modelling do not have the same technological and spectrum constraints placed on them as the forecasts in the 2015 MCT model*."[57] As noted above, Ofcom chose to adapt the 700 MHz model to estimate the value of 900 MHz spectrum.

When modelling further into the future, there is greater uncertainty over the precise assumptions to be made. EE together with our economic consultants CEG has therefore estimated the value of 1800 MHz spectrum to each of the UK operators under a range of scenarios (CEG's detailed analysis is provided

53 Ofcom, MCT review 2015-18 Statement, para A7.13.
54 This is the practical approach recommended in the Indepen/Aegis/WBS, "An economic study to review spectrum pricing", 2004, p.35.
55 Ofcom, MCT review 2015-18 Statement, para A7.198.
56 Ofcom, MCT review 2015-18 Statement, para A7.198.
57 Ofcom, MCT review 2015-18 Statement, para A7.200.

in Annex 2 of this response). In particular, we have started with the 2015 MCT model and included in this model the 2.3 GHz and 3.4 GHz spectrum (assumed to be released at the start of 2016) as well as the 1452-1492 MHz (assumed to be released in 2018)[58]. We have included the 2.3 GHz/3.4 GHz spectrum in the model as additions to the 2.6 GHz spectrum already in the model.[59] Ofcom has noted that 2.3 GHz spectrum is very similar to the 2.6GHz spectrum[60] and we note that the model is not particularly sensitive to the bandwidth of additional spectrum where it is used for capacity reasons. We have shown results with and without 3.4 GHz spectrum – while 3.4 GHz spectrum will act to reduce 1800 MHz value, the precise modelling of 3.4 GHz spectrum is likely to require further development. The results without 3.4 GHz spectrum should be considered noting that they will overstate the value of 1800 MHz. We have modelled the 1452-1492 MHz spectrum as additions to the 1800 MHz spectrum already in the model.

We have assumed that the new spectrum is assigned so that the operators with the highest values for additional spectrum receive somewhat more spectrum than the other operators. In particular, we have assumed that each operator receives 5 MHz of spectrum in the 1452-1492 MHz band[61] and that H3G and Telefonica receive 2x35 MHz each of spectrum in the 2.3/3.4 GHz bands while EE and Vodafone receive 2x10 MHz each of spectrum in these bands. In the scenarios without 3.4 GHz spectrum, we assume that H3G and Telefonica each receive 2x10 MHz of 2.3 GHz and EE and Vodafone none. While this differs to the assumption of equal shares of new spectrum used by Ofcom in valuing 900 MHz spectrum, we believe our approach is reasonable as it should be the outcome of an efficient auction (with the particular outcomes reflecting our assumptions such as in relation to long term market shares discussed below). Our approach also has the consequence of reinforcing efficient overall assignment of spectrum over time.

We have estimated the cost savings to each of the UK mobile operators from gaining an increment (2 x 5MHz) of 1800 MHz spectrum from 2015. In common with the approach undertaken by Ofcom in using the 700 MHz model to estimate the value of 900 MHz spectrum[62], we have modelled the cost savings over the period 2015-2034, assumed a long-run market share for each operator of 25%[63], applied the WACC of 9.1% from the MCT model and started

58 This date is consistent with the assumption in the Analysys Mason modelling of the costs and benefits of changing the use of 700 MHz spectrum.

59 Modelling this spectrum as 2.6 GHz will tend to overstate the amount of costs saved/gained by adding/taking 1800 spectrum to the extent that the 3.4 GHz spectrum is used for lower cost small cell deployment and as a consequence overstate value.

60 See PSS November 2014 consultation, para 4.13 and para 4.18: ""*The 3.4 GHz band may be valuable in providing additional options for network operators facing capacity pressures in other frequencies*."

61 Assuming only 5 MHz to each operator of the 40 MHz spectrum becoming available in the 1452-1492 MHz band will understate the downward impact on the value of 1800 MHz. However, it simplifies the modelling of this spectrum. As the spectrum will be downlink only, it would overstate value to assume all of the spectrum was available in the same way as if it had been paired. The actual impact will be somewhere in between our assumption and assuming all was paired

62 The approach is described in Table A9.1 of Ofcom's August 2014 Consultation.

63 The MCT Model can also be readily used to model different market share assumptions. We note that assuming that current market shares are maintained into the future would still lead to

with the assumption of each operator's current spectrum holdings before including the forthcoming spectrum awards as noted above.

We have also estimated the increase in costs to each operator if they were to lose an increment of (2x5MHz) of 1800 MHz spectrum from 2015. We note that there is the potential for some of these results to overstate value for operators with little 1800 MHz spectrum because of the assumptions in the MCT Model relating to the assumed use of 1800 MHz for 4G coverage in the urban areas. This does not affect the results for EE given its relatively large 1800 MHz holdings. As EE has the largest holdings of 1800 MHz spectrum and the largest current holdings of spectrum, it will have the lowest value for losing an increment of this spectrum. The difference between EE's value for losing an increment of spectrum and the highest value for an operator gaining an increment of spectrum will show the maximum potential gain from trading an initial increment of spectrum (with the gain from any subsequent trade being lower).

The estimated value of gaining and losing an increment of 1800 MHz spectrum to each operator under this First Scenario is shown in the second column of Table 2. This scenario can be considered as making assumptions relating to spectrum awards with the highest degree of certainty, i.e. only the spectrum awards of the next few years are included. However, we assume the full traffic forecasts of the Mid Case of AM's cost benefit assessment in relation to the 700 MHz spectrum.[64] In practice, this will tend to overstate value because the Mid Case traffic forecasts reflect significant additional spectrum including the 700 MHz band rather than only the bands being made available in the next few years. This First Scenario might suggest a lump sum value of between £2.91m and £5.48m per MHz to be used to calculate ALFs. In particular, such a value would over time lead to the release of at least one increment of 1800 MHz from the operator with the lowest value for retaining an increment while it would not prevent the operators with the highest values for acquiring additional increments from doing so. The value should not be set above that consistent with a lump sum of £5.48m because of the risk that two increments of spectrum may be released but only one increment would be demanded, i.e. leaving some spectrum fallow.

values significantly below those proposed by Ofcom. However, such an assumption would be inconsistent with the approach Ofcom has taken to MCT modeling.

64 See Analysys Mason, Assessment of benefits of change of use of the 700 MHz band to mobile, Figure 3.9.

Table 2 - Value of gaining or losing an increment of 1800 MHz spectrum (£m per MHz) under different scenarios

Scenario	(i)	(ii)	(iii)
Description	MCT Model +1.4 GHz + 2.3/3.4 GHz + AM Mid traffic	+ 700 MHz + AM Mid Case spectral efficiency	(ii) excluding 3.4
Value of gaining an increment			
EE	2.76	1.03	1.57
H3G	5.48	1.47	2.84
Telefonica	5.53	1.46	2.81
Vodafone	5.15	1.52	2.31
Value of losing an increment			
EE	2.91	1.21	1.77
H3G	7.00	2.19	4.74
Telefonica	6.45	2.23	4.00
Vodafone	5.77	2.45	3.31

In the third column of Table 2, we present the results of the cost modelling under the Second Scenario, which we believe forms a reasonable basis on which to set ALFs for 1800 MHz spectrum. This scenario differs from the First Scenario by two factors. We now include the assumption that 700 MHz is made available in 2022 (the latest by which Ofcom has committed to do so). In addition, we include AM's Mid Case assumptions as to the likely improvements in spectral efficiency over time.[65] We assume that EE and Vodafone receive 2 x 5 MHz each of the 700 MHz spectrum and that H3G and Telefonica receive 2 x 10 MHz each of the spectrum. We use the AM Mid Case traffic forecasts and assume the release of 2.3/3.4 GHz and 1452-1492 MHz spectrum in the same way as the First Scenario.

The Second Scenario shows a narrow range between the lower values of operators losing an increment of spectrum and the higher values for operators gaining an increment of spectrum. Effectively, the assumption that new spectrum releases will be acquired disproportionately by operators with the highest value for additional spectrum results in an outcome with marginal valuations becoming very similar. This in itself highlights that there is little value in introducing ALFs even if spectrum trading between operators is assumed to operate inefficiently (and there would certainly be no material harm from a more gradual introduction of ALFs). If revised ALFs are nonetheless applied, an ALFs level for 1800 MHz based on a lump sum value between £1.21m and £1.47m per MHz could be considered appropriate from the modelling as it would be consistent with encouraging the transfer of spectrum over time from the operator with relatively low value for incremental spectrum (i.e. EE) to the operators with slightly higher values. The ALFs should not be set above that consistent with a lump sum value of £1.47m because of the risk that more than two increments are released and that some spectrum is then left idle because there is demand for only one increment with a value marginally above that consistent with a lump sum value of £1.47m (and there would be no demand for additional spectrum with higher ALFs).

65 [✂].

We have noted the need for further refinement of the modelling of 3.4 GHz spectrum. While we expect that the 3.4 GHz release will reduce the value of 1800 MHz, its deployment may differ to other spectrum in the model. To be conservative, we have shown a Third Scenario which is the same as the Second Scenario but excludes 3.4 GHz spectrum altogether. This suggests a value for ALFs based on a lump sum value for 1800 MHz of between £1.77m and £2.81m per MHz.

Our modelling results suggest that a reasonable range for ALFs based on a lump sum value for 1800 MHz of between £1.21m and £5.48m per MHz.

We would argue for an ALF level from the lower part of the implied range to be conservative, given inherent uncertainty when valuing spectrum under any method in relation to the factors impacting on value such as traffic forecasts. In addition, we note that our modelling approach does not include additional aspects of the 700 MHz model that the AM model shows will each push down the value further. These are: (i) the release of spectrum in the 3.6 – 3.8 GHz band; and (ii) some use of 6 sector sites.

We note that Ofcom found a large range when varying assumptions in using cost modelling to value the 900 MHz spectrum. We find a much smaller range in relation to valuing 1800 MHz spectrum. Table 3 presents the results when we use Scenario 2 above and vary the traffic forecasts, the assumed release of 700 MHz spectrum, the inclusion or exclusion of 3.4 GHz spectrum, and the assumed spectral efficiency gains over time. In particular, the second column shows an extreme low case in which we assume AM Low Case Traffic, the release of 700 MHz, 1452-1492 MHz and 2.3 GHz/3.4GHz spectrum and the AM High Case for spectral efficiency gains. The third column reproduces Scenario 2 from Table 2. The right hand column shows an extreme high case of AM High Case Traffic, the release of only the 1452-1492 MHz and 2.3 GHz spectrum, excluding 3.4 GHz from the model and the AM Low Case for assumed spectral efficiency gains over time. Table 3 shows that the lump sum values generally change by less than £5m per MHz in going from the Mid Case traffic to either the Low Case or the High Case traffic, and that the highest change is less than £8m per MHz. However, more relevant to setting ALFs are (i) EE's values for losing an increment of 1800 MHz spectrum which range from £0.96m to £2.83m and (ii) the second highest values for gaining an increment which range from £1.09m to £5.91m). The low and high ends of the range change by less than £5m per MHz.

Table 3 - Sensitivity analysis of the value of gaining or losing an increment of 1800 MHz spectrum (£m per MHz)

Scenario	AM Low Case traffic + 700MHz, 1.4GHz, 2.3/3.4 GHz +AM high spectrum efficiency	AM Mid Case traffic + 700MHz, 1.4GHz, 2.3/3.4 GHz + AM Mid spectrum efficiency	AM High Case traffic + 1.4 GHz and 2.3 GHz only + AM low spectral efficiency
Value of gaining an increment			
EE	0.89	1.03	2.48
H3G	1.09	1.47	6.47
Telefonica	1.09	1.46	5.91
Vodafone	1.10	1.52	3.69
Value of losing an increment			
EE	0.96	1.21	2.83
H3G	1.92	2.19	10.09
Telefonica	1.85	2.23	8.38
Vodafone	1.93	2.45	5.21

While AM also vary other factors (such as the share of six sector sites), we have not generally modelled these factors, so that the results we show already reflect a high case scenario in that regard. Our modelling shows that the value of 1800 MHz can be estimated within a fairly narrow range. Our forward-looking approach suggests that the value of 1800 MHz spectrum in the UK is likely to have fallen significantly since 2013 particularly taking into account the increased certainty of forthcoming significant spectrum releases and ongoing spectral efficiency improvements.

In conclusion, there is now no compelling reason for Ofcom not to have taken into account cost modelling evidence in estimating the value of 1800 MHz spectrum and we consider that it would be a clear legal error for Ofcom to now fail to do so. Ofcom's main concern that modelling would result in the wide range that may be applicable to 900 MHz spectrum is shown not to be applicable to an 1800 MHz valuation using this approach. Importantly, our modelling of the value of the 1800 MHz spectrum also shows that Ofcom's proposed ALFs for 1800 MHz spectrum using benchmarking alone to estimate market value is likely to *substantially overstate* the forward-looking value of the 1800 MHz spectrum. Ofcom's proposed ALF level is more than double the appropriate value of the 1800 MHz spectrum derived using the cost modelling approach that we propose.

Given the serious risk of error now revealed in Ofcom's current approach, we believe it to be imperative that Ofcom assesses the evidence on the value of 1800 MHz spectrum derived from the cost modelling alongside the evidence from benchmarking, weighing the evidence taking into account the reliability of each approach. In this regard, we would expect Ofcom to place stronger weight on the cost modelling evidence, noting the submissions we have made that cost modelling offers significant advantages over Ofcom's benchmarking in terms of being specific to the UK market and fully taking into account the likely impact of forthcoming spectrum releases in ensuring efficient assignment of spectrum.

4.4 Summary of legal errors Ofcom will make if it continues with its current approach to setting the base level of ALFs

For the reasons set out above, EE considers that if Ofcom continues with its current approach to setting the base level of ALFs, it will be acting unlawfully in that:

- It will be failing to have regard to a range of relevant evidence which suggests that Ofcom's benchmarking approach overstates the value of 1800 MHz spectrum, contrary to UK public law. In doing so, Ofcom will also fail to apply objective and proportionate regulatory principles as required by Article 8(5) of the Framework Directive and s.3 CA 03. It will also be breaching its duty of regulatory predictability, its duty to adopt the principles which represent best regulatory practice, and its duty to adopt objective and proportionate regulatory principles.
- Its reasoning would be irrational and unlawful as a matter of UK public law, insofar as it suffers from an inconsistency as regards the effect of the future release of additional spectrum. By adopting flawed and inconsistent reasoning, Ofcom is also failing to apply objective and proportionate regulatory principles as required by Article 8(5) of the Framework Directive and s.3 CA 03.
- It will be failing to take into account a relevant factor, namely the scope for efficient spectrum trades, contrary to UK public law, contrary to its duty to apply objective and proportionate regulatory principles and contrary to its duty under the 2010 Direction to set ALFs which reflect forward-looking market value.
- Further insofar as the errors identified above are likely to lead to ALFs for 1800 MHz being set at a materially incorrect level in absolute terms, or at a level which is materially incorrect relative to ALFs for 900 MHz spectrum, Ofcom will be breaching its duty under Article 13 Authorisation Directive, Article 8 Framework Directive, s.3 CA 03 and s.3 WTA 06 to ensure the optimal use of spectrum resources, its duties under Article 8 Framework Directive and s.3 CA 03 to further the interests of consumers in relation to choice, price and quality and to encourage investment and innovation, and/or its duty of non-discrimination and its duty to avoid causing distortions of competition, which arise under Article 8 Framework Directive and s.3 CA 03.

Each of these is explained in more detail below.

Ofcom's approach to setting 1800 MHz ALFs exclusively according to benchmarking spectrum values is legally flawed in that it fails to have regard to relevant evidence

Ofcom's approach to setting the base level of ALFs for 1800 MHz spectrum is legally flawed in that it fails to take into account relevant matters and evidence going to the market value of the spectrum, including in particular evidence as to the costs which are likely to be saved by the use of the spectrum and evidence which contradicts the assumptions on which Ofcom bases its analysis. When that broader range of evidence is taken into account it is evident that Ofcom's

approach is not conservative and is highly likely to overstate the forward looking value of 1800 MHz spectrum.

As set out above, Ofcom's benchmarking approach is heavily assumption driven and produces a wide range of estimates. In that context, it is particularly striking that Ofcom fails to take into account specific facts and evidence which suggest that Ofcom's benchmarking approach overstates the value of 900 and 1800 MHz spectrum, namely:

- academic commentary which should lead Ofcom to question its assumption that the values achieved in the UK 4G auction are likely to reflect the intrinsic value of the spectrum; and
- market developments and new information which has become available since the auction, in particular (i) new information which creates greater certainty over the increased supply of spectrum for use by mobile networks as a result of forthcoming spectrum releases, (ii) updated traffic forecasts.

It is not sufficient to mitigate this risk of overstatement for Ofcom simply to assert that it has adopted a conservative approach. Ofcom has failed to undertake any quantitative analysis of what it would mean to adopt a properly conservative approach. As explained in section 8 of this response below, the purportedly conservative elements in Ofcom's analysis have only a marginal impact on the estimated value for 1800 MHz spectrum and are likely to be more than offset by the failure to calculate prices based on efficient spectrum holdings and features of the approach to international benchmarking which are likely to lead to ALFs being overestimated. In the absence of a quantitative method, or cross-check, to underpin its claimed conservative approach, Ofcom cannot know how conservative it would need to be to properly reflect the impact of the uncertainties that it identifies.

In failing to have regard to relevant evidence, Ofcom is also failing to apply objective and proportionate regulatory principles as required by Article 8(5) of the Framework Directive and s.3 of CA 03.

Ofcom's approach to setting 1800 MHz ALFs is legally flawed in that it fails to have regard estimates of spectrum values by reference to cost-modelling

Ofcom fails to take into account the information that can be gleaned from alternative approaches to valuing 1800 MHz spectrum, other than benchmarking, in particular from cost modelling. For the reasons set out above, that information is plainly a relevant matter, and Ofcom is therefore obliged to have regard to it both as a matter of UK public law and under EU law. The failure to consider it in relation to 1800 MHz spectrum is particularly striking in the light of the facts that Ofcom's benchmarking approach relies so heavily on assumptions (including questionable assumptions) and produces a wide range of estimates.

It is clear that paragraph 6(2) of the 2010 Direction does not limit Ofcom to having regard *only* to auction bids when determining the lump sum value of the relevant spectrum. Ofcom is required to have particular regard to the sums bid in the auction, but it is not prevented from having regard to any other relevant information.

Ofcom has in the past recognised that an analysis of the costs of alternative means of delivering capacity for mobile services is part of the best information available as to establishing market value according to the opportunity cost of the spectrum in question, and that the results of auctions should be but one input into market value estimates for the purpose of making decisions about the level of fees for spectrum.

Further, as explained above, the reasons put forward by Ofcom as to why the LCA method should not be used in respect of 1800 MHz spectrum are plainly flawed and in any event are insufficient to warrant ignoring cost modelling for 1800 MHz spectrum even as a cross-check on the benchmarking approach. As set out above, such cost modelling may now be carried out in a relatively straightforward manner and within a reasonable timeframe by adapting Ofcom's 2015 MCT cost model.

It follows that the results of cost modelling for 1800 MHz spectrum would plainly be a relevant consideration and Ofcom has not justified its failure to have regard to them. Moreover, it is also evident that that failure will lead to the value of 1800 MHz spectrum being set at a materially incorrect level. As set out at section 4.3, if the results of cost modelling for 1800 MHz spectrum are taken into account, it is evident that Ofcom's proposed ALFs for 1800 MHz spectrum are likely substantially to overstate the value of 1800 MHz spectrum, potentially by more than a factor of two. It follows that Ofcom proposed decision would be unlawful as a matter of UK public law, in that it is likely to be materially incorrect by reason of a failure to have regard to a relevant consideration.

Further, in failing to have regard to the relevance of cost modelling:

- Ofcom will breach its duty of regulatory predictability (which arises under Article 8(5) of the Framework Directive and s.3 CA 03) and its duty to adopt those principles which appear to Ofcom to represent best regulatory practice (which arises under s.3(3)(b) CA 03). In failing to have regard to cost modelling, in the absence of a valid reason to do so, Ofcom is adopting an approach which differs from that which it has adopted previously in relation to AIP, and which it has concluded represents part of the best available information as to spectrum value.
- Ofcom will breach its duty to adopt objective and proportionate regulatory principles (which arises under Article 8(5) of the Framework Directive and s.3 CA 03), in that it has not justified its failure to have regard to relevant information which may readily be made available by the use of the 2015 MCT cost model.

<u>Inconsistency as regards the future disapplication of the spectrum cap and the release of future spectrum</u>

Ofcom's reasoning as set out in the PD&C is also irrational and unlawful insofar as it suffers from an inconsistency as regards the effect of the future release of additional spectrum.

As set out above, in setting ALFs by reference to the prices achieved in the UK 4G spectrum auction, Ofcom has chosen to adjust the auction prices to reflect its view that the cap imposed on overall spectrum holdings is no longer relevant. It has done so on the basis that such caps are not expected to be binding in the future due to the release of other spectrum. However, if Ofcom

considers that the release of other spectrum is sufficiently likely and imminent that it will indirectly affect the valuation of spectrum in this way, in order to be consistent, Ofcom must also take account the direct impact that the release of additional spectrum will have on the market prices for 900 MHz and 1800 MHz spectrum. As set out at section 4.1 above, the greater certainty over the increase in supply of spectrum is likely to have a very material impact on the market price of 1800 MHz spectrum. Yet Ofcom does not attempt to estimate this effect.

EE considers that there is no rational basis for the inconsistency in Ofcom's position, and that Ofcom's approach is accordingly unlawful as a matter of English public law.[66] Further Ofcom is failing to apply a consistent regulatory approach as required by Article 8(5)(a) Framework Directive and s.3(3)(a) CA 03, and objective and proportionate regulatory principles as required by Article 8(5) of the Framework Directive and s.3 CA 03.

Ofcom has failed to take into account of the scope for efficient spectrum trades

EE also considers that Ofcom's approach to the setting of ALFs is vitiated by a failure to take account of the fact that calculating market value only by reference to current spectrum holdings is susceptible to a risk of leading to ALFs being set above the long-term efficient level.

As set out at section 3 above, under Article 13 of the Authorisation Directive and Article 8 of the Framework Directive, Ofcom is required in setting ALFs to promote the optimal and efficient use of spectrum, and the 2010 Direction must be interpreted and applied consistently with that objective. Further, Ofcom's own rationale for ALFs is to encourage efficiency by encouraging trading and efficient re-arrangements of operators' spectrum holdings.[67]

As set out in section 4.1 of this response above, that rationale and that statutory objective require ALFs to be set by reference to the market value of spectrum on the basis of efficient spectrum holdings. To the extent that there is a residual risk that the present, unbalanced, spectrum holdings might not be efficient, setting ALFs exclusively with regard to these existing holdings may, after an initial round of trading, result in ALFs that are subsequently too high relative to the then market value of the spectrum, which could create a barrier to efficient spectrum use (by discouraging the buying of spectrum). By contrast setting ALFs with reference to forward looking efficient holdings of spectrum (which can be achieved through cost modelling) assists to ensure that ALFs continue to provide incentives for efficient spectrum trades.

The 2010 Direction, properly interpreted, does not require Ofcom to set ALFs only by reference to present market value. On the contrary, the 2010 Direction permits, and when interpreted consistently with Article 13 Authorisation Directive and Article 8 Framework Directive, positively *requires* Ofcom to take account of the future evolution of market value in order to support efficient spectrum use. In that context, the scope for spectrum trades to reduce

66 EE also contends that Ofcom is unlawfully failing to have regard to the future release of spectrum, as set out at 4.1 of this response above.

67 See August 2014 Consultation at para A5.15.

imbalances in spectrum holdings, and thereby reduce market value, is plainly a materially relevant factor.

Consequently, in failing to take account of the scope for future efficient spectrum trades:

- Ofcom will be acting unlawfully as a matter of English public law by failing to take account of a relevant factor;
- Further or alternatively, Ofcom will breach its duties under Article 13 Authorisation Directive, Article 8 Framework Directive and s.3 CA 03 to set ALFs which are objectively justified and proportionate to the objective of ensuring optimal use of spectrum the objectives set out in Article 8. Further such ALFs would be more restrictive than is necessary to pursue those purposes.
- Further, Ofcom will breach its duty under paragraph 6 of the 2010 Direction properly interpreted in accordance with Article 13 Authorisation Directive and Article 8 Framework Directive, to set ALFs which reflect forward-looking full market value.

5. Assessment of lump-sum values from international benchmarks

5.1 Overview of Ofcom's international benchmarking errors

It is unclear from the PD&C exactly how Ofcom has arrived at its proposed international benchmark values. However, in deriving the value from international benchmarks that Ofcom uses to set the ALFs for 800 MHz spectrum, Ofcom appears to have put the most weight on its small selection of Tier 1 benchmarks[68].

EE considers this to be a clear error, as at least two of Ofcom's Tier 1 benchmarks (Ireland and Austria) are acknowledged by Ofcom as being at serious risk of significantly overstating UK values. In the case of Austria, EE considers the risk to be far more material than acknowledged by Ofcom in the PD&C. For the reasons set out below, EE considers that, as a result of strategic bidding, it is much more likely than not that the Austrian benchmark is overstated – potentially by more than two and a half times.

There are two key adjustments that Ofcom should apply to ensure that it does not overstate UK market values on the basis of the two overstated Tier 1 international benchmarks:

- First, Ofcom should use a corrected value for Austria of £8.8m per MHz, which would result in an absolute UK value of around £10.9m per MHz[69].
- Second, Ofcom should put more weight on the non-Tier 1 benchmarks. For example, taking a straight average of the overall international benchmark set would produce a value of £11.6m per MHz, rather than Ofcom's proposed value of £13m per MHz).

The making of these adjustments would also have the benefit of correcting the relativity between Ofcom's international benchmarking values and the results of the Irish auction (i.e. the value produced would be substantially lower than the acknowledged inflated Irish auction value, rather than only just below as per the international benchmark values currently proposed by Ofcom in the PD&C).

The unreliability of Ofcom's international benchmarking exercise also lends further weight to EE's submissions above in section 4 of our response as to the importance of Ofcom not solely relying on this evidence to set 1800 MHz ALFs but rather also placing weight on the more reliable results able to be produced by cost modelling.

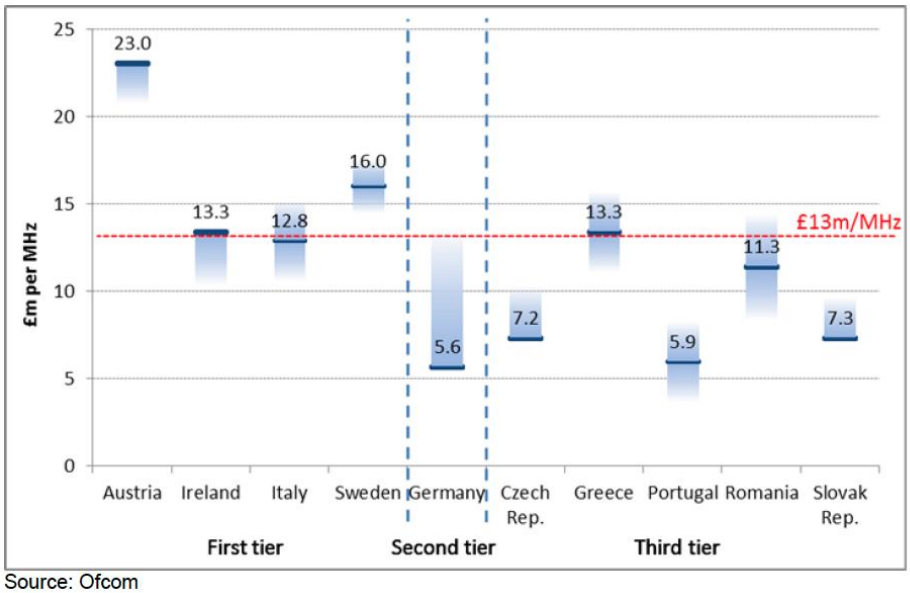
68 While Ofcom has not presented specific weights for each tiers, we get close to Ofcom's proposed ALFs with weights of 5/3/2 for tiers 1, 2 and 3 (noting however that it may be as we set out in our response to the August 2014 Consultation that Ofcom has given no weight to Tier 3).

69 For the purposes of this analysis, EE has assumed the 5/3/2 weighting in the footnote above. The value would be even lower (i.e. around £10.7m-£10.8m) if the Irish benchmark was then relegated to Tier 2 or 3.

5.2 Ofcom's weighting error

Figure 3.2 of the PD&C (reproduced below) presents the international auction prices Ofcom uses in calculating a lump sum value for 1800 MHz spectrum.

Figure 4 – Ofcom's 1800 MHz benchmarks (reproduction of Figure 3.2)



Source: Ofcom

From this wide range of £5.6m to £23.0m per MHz, Ofcom chooses a value per MHz for the benchmarking of £13m, which is above the straight average of £11.6m.

It is unclear how Ofcom has arrived at its proposed value. The lack of transparency as to how Ofcom has arrived at its proposed value is concerning and represents an error in itself, as it limits operators' ability to identify errors in Ofcom's approach. In this context in EE's response to the August 2014 Consultation (and the accompanying Analysys Mason/Aetha report), we argued that Ofcom should recognize the uncertainty over the appropriate tiers and weightings by carrying out a sensitivity analysis of the impact of varying Ofcom's assumptions. Ofcom's only response in the PD&C (para A7.158) is to state that it has given the reasons for its choice of tier (albeit Ofcom has not even stated the weightings used) and that it has carried out sensitivity analysis in relation to other factors. Clearly this does not address the concerns EE has raised.

In spite of this lack of transparency, it appears to EE that Ofcom has placed minimal weight on the Tier 2 and 3 benchmarks (which have an average value of £8.4m per MHz – well below Ofcom's proposed ALFs level for 1800 MHz spectrum). Ofcom's statement in the PD&C in relation to Tier 2, that "*we do not consider there is a strong basis to modify the view we derive from the first-tier benchmarks*",[70] suggests that Ofcom has made little if any adjustment to the value it chose based on the Tier 1 benchmarks. For the reasons set out below,

[70] Ofcom, PD&C, para 3.70.

EE considers the weightings adopted by Ofcom to reflect a number of material legal errors.

5.3 Ofcom's erroneous reliance on the Austrian auction results

EE considers the large weight that Ofcom has attached to the Tier 1 benchmarks (and little weight placed on the other benchmarks) is particularly concerning given Ofcom's acknowledgement in the PD&C that two of the four Tier 1 benchmarks on which it places such great weight are likely to be significantly overstating UK values.

In relation to the reliance placed by Ofcom on the Austrian auction results in the PD&C, EE considers that it is clear that evidence beyond that considered by Ofcom demonstrates that an adjusted value for Austria should be adopted (or Austria should be relegated to Tier 3).

Strategic bidding and price driving in Austria

In relation to Ofcom's estimated 1800 MHz benchmark for Austria, Ofcom's overall position is set out as follows in the PD&C:

> "*In the case of Austria, our view now is that there is* ***an additional source of risk of strategic bidding relevant to the 1800 MHz band compared to the 800 MHz band. On balance we consider there is a risk that this benchmark overstates UK market value****, but we cannot be sure of the scale of this possible overstatement or the likelihood (other than that intrinsic value bidding is at least as likely)*."[71]

Even casual inspection of Figure 3.2 in the PD&C shows that Austria appears at significant risk of being an outlier. Table 3.4 in the PD&C also shows that the relative value of Austria and the Y/X ratio (used to derive the 1800 MHz value) is also out of line with the other European observations (i.e. the Y/X ratio for Austria is more than two thirds higher than the next highest ratio). This very high ratio suggests that Ofcom should be particularly cautious about factors that may have led to 1800 MHz prices in the 2013 multiband auction being inflated above intrinsic values (particularly by comparison with the prices set in the earlier 2.6 GHz auction).

The Austria 2013 multiband auction raised €2.01 billion, almost four times the amount expected.[72] There is a weight of evidence now suggesting that these results were driven by factors specific to the Austrian auction:

- The Austrian regulator has noted the likelihood and impact of price driving in doubling the prices in the auction:

  "*More than 65% of these supplementary bids were submitted for the largest permissible combinations of frequency blocks, with a share of some 50% of available frequencies. In addition, the bidders utilised almost to the full the price limits that had applied to these large packages during the sealed-bid stage. …These supplementary bids*

71 PD&C, para 3.65(b).
72 Reuters, "Austria raises 2.01bln euros in 4G telecoms auction", 21 October 2013.

submitted on large frequency packages had a significant effect on the prices offered by the other bidders. ***At the same time, such bids generally only have a marginal likelihood of winning out in the end. If these bids for very large numbers of frequencies had been ignored when determining the winners and prices, the revenue from the auction would have settled at a level of about EUR 1 billion***" (emphasis added).[73]

- A recent paper by Janssen and Karamychev shows that, assuming bidders have a secondary preference for raising rivals' costs (whether for effects in the downstream services market or because shareholders/managers are concerned with relative performance), bidders in CCAs can find it optimal not to bid according to their intrinsic preferences, resulting in very high auction prices.[74] In particular, bidders are modelled as first caring about their intrinsic values, and only if the intrinsic pay-offs are identical, do they then prefer the strategy which raises the sum of rivals' costs most. The authors cite the pattern of bidding in the Austrian 2013 auction (including relatively few bids on smaller packages) as fully in line with the predictions of their paper. Salant also makes the point that bidders' concern for what their rivals pay can lead to departures from truthful bidding in CCAs, although these can be addressed by modifications to the CCA design.[75]
- Another recent paper by Levin and Skrzypacz makes a similar finding in relation to the 2013 Austrian multiband Austrian auction. The authors find that the bidding in the Austrian auction was consistent with a predatory strategy aimed at raising what rivals pay while not affecting the operators' own profit. They state:

  "*A remarkable feature of the Austrian auction is that the final revenue ended up quite close to the total license prices at the end of the clock phase, which were €2.07 billion. Had the bidders submitted no final round bids (i.e. been quiet), the winners would have paid €765 million. Instead they paid €2.01 billion. If bidding in both stages of the auction was truthful, average license prices under the Vickrey formula only would be as high as prices at the end of the clock phase if bidders were willing to pay for all their incremental spectrum at the same rate as for a marginal license*."[76]

While Ofcom has stated that it is unsure of the possible scale of the overstatement, the analysis of Levin and Skrzypacz suggests that the Austrian prices may have overstated true valuations *by more than two and a half times*. If truthful prices under the second price rule had been €765m rather than €2.01

73 RTR press release, "Result of the 2013 multiband auction driven by consistently offensive bidding strategy on the part of all three contenders", 28 October 2013.

74 Janssen, M. and V. Karamychev, "Gaming in combinatorial clock auction", Tinbergen Institute Discussion Paper, 2013, p.4 (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2215812).

75 Salant, D., "A primer on auction design, management and strategy", 2014.

76 Levin, J. and A. Skrzypacz, "Are Dynamic Vickrey Auctions Practical?: Properties of the Combinatorial Clock Auction", 2014, p.12.

billion, then the Austrian 1800 MHz benchmark for the purposes of ALFs would be closer to £8.8m per MHz rather than the £23m per MHz assumed by Ofcom.

Despite its view that there is a risk of strategic bidding impacting the reliability of the Austrian 2013 auction results[77], Ofcom incongruously continues to give Austria Tier 1 weighting for the calculation of ALFs. The justification given in the PD&C is limited, but appears to be based on Ofcom's view that bidding according to intrinsic value is "*at least as likely*" as strategic bidding having been the driver for the values achieved in that auction. EE notes that even on this spurious logic, a 50% chance of overstatement would itself imply *some overstatement* of the Austrian auction results on an expected (i.e. probability-weighted) basis – whereas Ofcom appears to have made no adjustment to the weight given to the Austrian results as a result of the risk of strategic bidding.

In spite of the weight of academic evidence against this view, Ofcom puts forward a number of arguments to support its position that bidding according to intrinsic value was at least as likely to strategic bidding in the Austrian auction. EE considers that none of these provide objective justification for Ofcom's manifestly unreasonable approach:

- In para A8.121(a) of the PD&C, Ofcom argues that there might have been little prospect of completely eliminating a competitor from the downstream market in the Austrian auction. However, as recognised generally in competition law, competition can be harmed even if competitors are weakened. For example, the outcome of the auction was that two players acquired more than 80% of the auctioned spectrum. It would be expected that the third player, with much less spectrum particularly below 1 GHz, would be at a cost disadvantage to the larger players. While H3G could achieve a small amount of capacity across a wide coverage area, H3G would need to use many more sites in areas where capacity goes beyond the capacity of the coverage network. In contrast, Telekom Austria and T-Mobile, with more sub 1 GHz spectrum, would be able to achieve a lower cost network across these medium density areas. Recognising this, the outcome of the auction is consistent with successful strategic bidding to weaken a competitor – this is the opposite of Ofcom's conclusion in A8.125.
- In para A8.121 of the PD&C, Ofcom argues that the relatively concentrated nature of the market in Austria could limit the potential gains from eliminating or weakening a competitor.[78] However, in contrast with Ofcom's supposition, merger regulation generally recognises that the greater the degree of concentration in the market, the *greater* the risk of competitive harm if a competitor is eliminated (i.e. the acquisition of a small rival is much less likely to be allowed in relatively concentrated markets).

77 Ofcom, PD&C, para 3.65(b).

78 Ofcom incorrectly refers to a merger between H3G and T-Mobile rather than between H3G and Orange.

- In paras A8.122 to A8.124 of the PD&C, Ofcom argues that the rationale for CCA and the bidding in the Austrian auction support consistency with bidding based on intrinsic valuations. However, as noted in the recent academic papers discussed above, where bidders have a preference for their rivals paying more, the CCA format is vulnerable to bidding exceeding intrinsic value and the particular pattern of bidding in the Austrian auction is consistent with the predictions of the model[79]. That is to say, in contrast to Ofcom's claim at para A8.45 of the PD&C, the outcome of forcing rivals to pay more is achieved in the model without any need for coordination between bidders.
- Ofcom's conclusions also fly in the face of the statements made by the Austrian regulator itself regarding its belief that prices in the auction it conducted were inflated (doubled) by offensive "*supplementary bids submitted on large frequency packages [that] had a significant effect on the prices*" while "*such bids generally only have a marginal likelihood of winning out in the end.*" The PD&C does not in EE's view disclose any reason why Ofcom's views should be preferred to those of the regulator that ran the auction concerned.

Proposed adjustments for Austria

Given these concerns, EE believes that it is simply not a reasonable for Ofcom to continue to assign Tier 1 weighting to the Austrian benchmark without any adjustment. EE therefore believes that an adjusted value for the Austrian benchmark of £8.8m per MHz should be adopted by Ofcom in its international benchmarking.[80]. This would suggest a new overall range from the benchmarking for the 1800 MHz lump sum value of £5.6m to £16.0m.

5.4 Ofcom's relativity error in relation to the Irish auction results

In examining its Tier 1 countries, Ofcom notes that a value per MHz of less than £14.6m is appropriate given the relatively large risk than the Irish benchmark of £13.3m is overstated, due to the unavailability of 2.6 GHz spectrum in Ireland.[81] In contrast to the position in Ireland, 2.6 GHz spectrum represents a major substitute in the UK to 1800 MHz spectrum for mobile capacity and accounts for over a third of supra-1 GHz spectrum for UK mobile services. As shown by EE's cost modelling in section 4 of this response above, spectrum value is highly sensitive to the availability of substitute spectrum. EE considers that this should suggest a UK value *well below* the Irish benchmark of £13.3m per MHz, rather than a value close to the benchmark as Ofcom has chosen.

79 EE notes that had modifications been made to the Austrian CCA design prior to the auction then the departures from truthful bidding may have been prevented (i.e. CCAs can incentivise truthful bidding if the necessary modifications are made to the design). However what matters for the purpose of setting ALFs is that in this case these modifications were not made.

80 Alternatively, Austria could potentially be relegated to Tier 3, although this could still create distortions if the result is not adjusted.

81 See Ofcom, PD&C at paras 3.67-3.69.

As set out in section 5.1 of this response, Ofcom could achieve this result by adopting a more balanced weighting of the Tier 1, 2 and 3 international benchmark results. As recommended in our response to the August 2014 Consultation, the risk of error in estimating the unknown UK value will be reduced by giving proper weight to the larger sample of informative benchmarks. In particular, this will reduce the danger of Ofcom's chosen value being distorted by factors specific to an individual country that are not relevant to the UK value. In addition, Ofcom should also apply an adjusted benchmark for Austria (as we have suggested above).

However, for the reasons set out in section 4 of this response, EE believes that it would still be wrong for Ofcom to choose a specific value for 1800 MHz spectrum only with regard to UK and international benchmarking and without regard to the market value estimates produced by cost modelling. While Austria and Ireland are particularly concerning, any international benchmark will have a significant margin for error because of the inability to control for all factors leading to differences in spectrum values between countries.

As noted above, the range for the benchmarking when a corrected value for Austria is applied is £5.6m to £16.0m. Given a narrow range for lump sum values appropriate for setting ALFs produced by cost modelling around £1.21m to £5.48m and the importance of taking a conservative approach, EE believes that Ofcom should adopt an overall lump sum value for 1800 MHz that properly takes into account the overall range produced from the cost modelling and the benchmarking. We believe that ALFs should be set conservatively within this range. We note that Ofcom has previously decided to choose conservative values as the mid-point of the lower half of the estimated range. Should Ofcom decide to apply the same approach to the overall evidence from the cost modelling and benchmarking, Ofcom may decide to set a lump value of £5.2m which represents the mid-point of the lower half of the range between the average value from the cost modelling of £3.34m and the value for the ALFs from the benchmarking of £10.95m implied from correcting only the Austrian benchmark.

5.5 Summary of Ofcom's legal errors

For the reasons set out below, EE considers that if Ofcom's reasoning in respect of its use of international benchmarks is flawed and unlawful as a matter of EU and UK law, in that:

- **Ofcom is not transparent** as to the weight which is given to the benchmarks in each tier:
    - Ofcom does not adopt any formal system for weighting each tier of benchmarks against the others. It states only that it will "*place most weight on benchmarks which are in Tier 1, some weight on benchmarks in Tier 2, and that benchmarks that are in Tier 3 should be considered as having relatively little informative value*".[82] However, Ofcom's express reasoning is in fact inconsistent with

[82] See Ofcom, PD&C, para 3.50.

that statement. At paragraph 3.70 of the PD&C in considering Tier 2 (the German benchmark of £5.6m) Ofcom concludes that it does "*not consider there is a strong basis to modify the view we derive from the first tier benchmarks*". This implies that it is the view derived from the first tier benchmark which prevails and that Tier 2 and Tier 3 benchmarks are not given weight. It is therefore, at best, wholly unclear what weight Ofcom has given to each tier of benchmarks.

- Such a failure of transparency is, in itself, contrary to the requirements of Article 13 of the Authorisation Directive, Article 8(5) of the Framework Directive and s.3(3) CA03. Moreover, it is of particular concern in circumstances where, as set out above, there are concerns as to whether Ofcom is properly taking account of doubts as to the reliability of certain benchmarks, and where the result which Ofcom ultimately obtains appears to be inconsistent with aspects of its own reasoning.

- Ofcom **fails to take into account relevant evidence which indicates that prices in the Austrian auction are likely to have been inflated** above bidders' intrinsic valuations:
  - On Ofcom's own approach, when deciding what weight is to be given to particular auction results, it is relevant to consider whether the prices set in those auctions are likely to reflect bidders' intrinsic valuations of spectrum or whether they reflect strategic bidding.[83]
  - As regards the Austrian auction, Ofcom's analysis consists of a discussion of reasons why, in principle, the results of the auction might or might not have been consistent with intrinsic valuations. Ofcom concludes that it may be as likely that prices in the Austrian auction were based on strategic bidding as on bidders' intrinsic valuations[84]. Clearly, the possibility that the results of the auction *might* be consistent with intrinsic valuations does not mean that it is more likely than not that the results *are* consistent with intrinsic valuations (or that the expected true valuation for Austria would be the Austrian prices).
  - In that context, it is therefore clearly relevant to consider any and all available evidence as to the reliability of the Austrian benchmark. Moreover, it is equally clear that Ofcom's decision to allocate Tier 1 weight to the unadjusted Austrian benchmark is very material to the overall result of the ALF calculation (which is above the average of the overall set of benchmarks), as the Austrian benchmark is much higher than any of the others considered by Ofcom.
  - As set out above, relevant and reliable evidence is now available that indicates that the Austrian auction is likely to have been subject to strategic bidding which substantially inflated the prices

83 See Ofcom, PD&C para 3.48(b).
84 See Ofcom, PD&C para A4.126.

achieved, in particular for 1800 MHz spectrum. That evidence consists both of analysis from independent academic commentators, and of statements by the Austrian regulator itself. It is clearly both impartial and cogent. However, Ofcom fails to have regard to that evidence. If that evidence were properly taken into account the results of the Austrian auction (in their unadjusted form) could not reasonably be given the weighting that Ofcom has proposed.

- If Ofcom's final decision fails properly to have regard to the evidence set out above, and maintains the Tier 1 weighting given to the unadjusted Austrian benchmark, Ofcom will be acting unlawfully:
  - as a matter of English public law, in that it will have failed to have regard to a relevant consideration;
  - under Article 13 of the Authorisation Directive, Article 8(5) of the Framework Directive and s.3(3) CA 03, in that Ofcom will have failed to ensure that ALFs are objectively justified;
  - under Article 13 of the Authorisation Directive, Article 8(5) of the Framework Directive, and s.3 CA 03 insofar as the error leads Ofcom to set the price of 1800 MHz spectrum too high relative to 900 MHz spectrum and thereby discriminate and distort competition between network operators; and
- Under Article 8(5) of the Authorisation Directive, Articles 8(2) and 8(5) of the Framework Directive, s.3 CA 03 and s.3 WTA 06 insofar as the error leads Ofcom to set ALFs for 1800 MHz spectrum too high and thereby fails to ensure optimal and efficient use of radio frequencies, harms investment and fails to secure maximum benefits for consumers in terms of choice, price and quality.

- Ofcom's **reasoning in respect of the Irish auction is inconsistent with the level at which it sets the base value of the licensed spectrum**. This is irrational and hence unlawful:
  - At paragraphs A8.335(b) and (f) of the PD&C, Ofcom concludes that the absolute and distance method 1800 MHz benchmarks derived from the Irish auction have a relatively large risk of overstating UK market value. At the same time, Ofcom ostensibly acknowledges the need to adopt a conservative approach when considering the risks of setting ALFs too high [85].
  - However, as set out at above, Ofcom sets the base value for 1800 MHz spectrum *very close to* the Irish benchmarks: at £13 million per MHz as compared to the Irish benchmark of £13.3 million.
  - EE considers that a consistent application of Ofcom's own stated reasoning requires it to set a value for *significantly below* the Irish

[85] See Ofcom, PD&C paras 1.41-1.42.

benchmark of £13.3 million per MHz. If Ofcom's final decision fails to do this, EE submits that Ofcom will be acting unlawfully:

- as a matter of English public law, in that it will be acting in a manner which is inconsistent with its own reasoning, and hence in a manner which is irrational;
- under Article 13 of the Authorisation Directive, Article 8(5) of the Framework Directive and s.3(3) CA 03, in that Ofcom will have failed to ensure that ALFs are objectively justified;
- under Article 13 of the Authorisation Directive, Article 8(5) of the Framework Directive, and s.3 CA 03 insofar as the error leads Ofcom to set the price of 1800 MHz spectrum too high relative to 900 MHz spectrum and thereby discriminates and distorts competition between network operators; and
- under Article 8(5) of the Authorisation Directive, Articles 8(2) and 8(5) Framework Directive, s.3 CA 03 and s.3 WTA 06 insofar as the error leads Ofcom to set ALFs for 1800 MHz spectrum at too high a level and thereby fails to ensure optimal and efficient use of radio frequencies, harms investment and fails to secure maximum benefits for consumers in terms of choice, price and quality.

6. The discount rate

6.1 Summary

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 PD&C 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 so doing, Ofcom states that its primary objective is to ensure that the Government and an average efficient mobile operator are indifferent between an upfront lump sum payment and ALFs.[86] In order to do that, Ofcom needs to select a discount rate reflecting the riskiness of the annual licence fee payments as compared with a single lump sum payment, which appropriately balances the risk between the Government and an efficient operator in order to achieve the desired indifference. If this is not the case then 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).

As per EE's previous consultation responses, EE considers both Ofcom's proposed process and stated objective to be correct. However EE believes that the new discount rate that Ofcom has proposed in the PD&C is manifestly wrong. If Ofcom proceeds to apply its erroneous discount rate (i.e. a discount rate amounting to more than double its estimate of the relevant cost of debt), ALFs will be set too high relative to their lump sum value. Insofar as this error significantly inflates the levels of ALFs, it will lead to ALFs which are disproportionate to the Article 8 objectives, as set out at section 8 of this response.

EE appreciates Ofcom's statement in the PD&C that "*if parties…wish to comment on our revised approach to deriving the discount rate we will consider any such comments carefully*".[87] EE sets out below the many important reasons why Ofcom should reconsider its current proposals and rather set the discount rate at a level between the current observed risk-free rate (**RFR**) (with a relatively small uplift to take account for the relatively low level of risk of a fallow period) and the cost of debt (based on the most up to date Yield to Maturity on MNO corporate bonds).

6.2 Overview of flaws with Ofcom's process for selecting the discount rate

In the PD&C, Ofcom selects the discount rate from within a range of potential discount rates. Ofcom has chosen as the low end of this range (its "lower hypothetical polar case") a discount rate reflecting the real, post tax cost of debt (adjusted for the inflation risk premium), estimated at 0.9%.[88] Ofcom has chosen as the high end of this range (its "upper hypothetical polar case") a discount rate reflecting the real, post-tax weighted average cost of capital

86 Ofcom, PD&C, para 4.15; Ofcom, August 2014 Consultation, para 4.12.
87 Ofcom, PD&C, para 4.68.
88 Ofcom, PD&C, para 4.38.

"**WACC**" of the mobile operators calculated for the purposes of Ofcom's most recent MCT charge control, estimated at 5.2%.[89]

From within this range, Ofcom has then – based on the possibility of an ALF review which Ofcom acknowledges is "*essentially hypothetical since there is no certainty as to whether and when any reviews will be undertaken*"[90] - chosen its proposed discount rate by uplifting its cost of debt estimate by a highly arbitrary percentage calculated on the basis of a formula which incorporates its upper polar case, the MCT WACC, resulting in its proposed discount rate of 2.0%, more than twice the level of Ofcom's cost of debt estimate.[91]

EE considers that the discount rate that Ofcom is proposing is wrong because the range from within which Ofcom has selected it is wrong. Most particularly, EE considers that the proposed discount rate level is inflated because Ofcom has chosen the wrong upper end for its range, which results in the uplift Ofcom applies to its cost of debt estimate being far too high. Ofcom has admitted in the PD&C that:

> *"…our approach is to set the ALF as a fixed annual fee in real terms and it will remain at this level unless and until it is changed following a future ALF review. As a consequence* ***ALF will not vary each year with the revenues earned from the spectrum (or be linked to drivers of spectrum value in real terms in any other way). As the upper polar case represents a situation in which the Government bears all of the systematic risk associated with changes in spectrum market value from year to year, it is not an appropriate representation of our approach to fee reviews****"* (para 4.41)

Further, the upper end of the range chosen by Ofcom, i.e. the MCT WACC, is plainly far higher than any correct discount rate and using this limit does not give any useful indication of the correct level of the discount rate and appears to mislead Ofcom into believing that it is adopting a conservative approach. The MCT WACC is more than five times Ofcom's estimate of the cost of debt. For the reasons set out below, EE submits that there is no basis on which this estimate can be considered a reasonable proxy for the discount rate and that, even as a hypothetical upper limit, the estimate would first need to be adjusted materially downwards if its value were considered to be relevant to the ultimate level of the discount rate. In preference to doing this however, EE submits that – as there are many good reasons to consider that ALFs pose risks akin to but lower than those associated with debt, the more robust upper limit to Ofcom's range should be the cost of debt (accurately and conservatively estimated). On this basis, the cost of debt (0.4% based on updated analysis) would reflect the upper end of Ofcom's range for the potential discount rate.

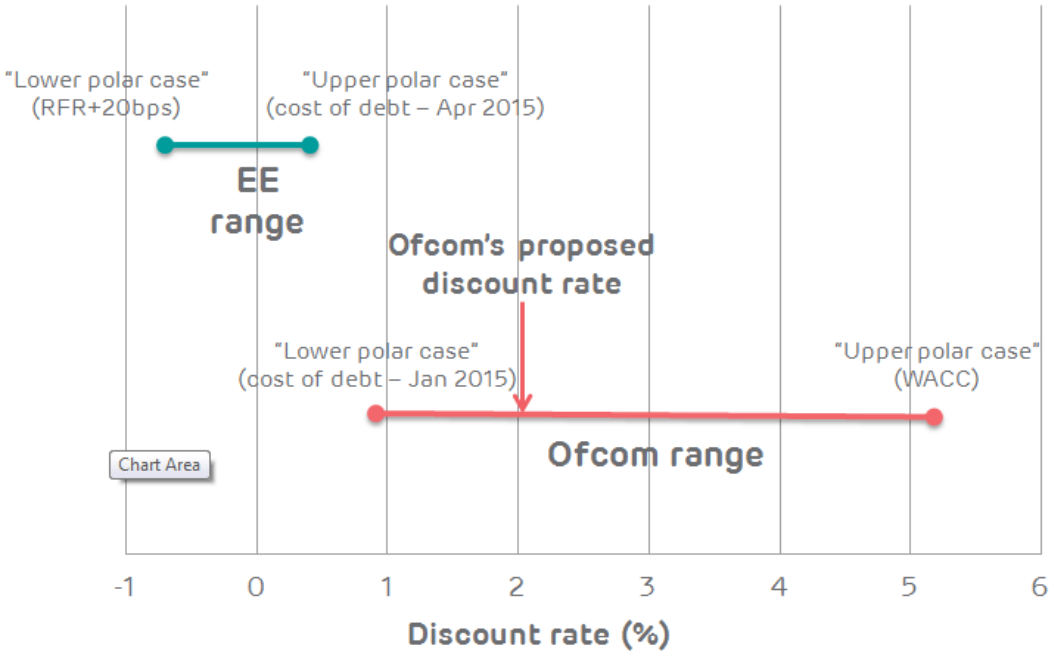
In terms of the lower end of the range, for the reasons set out below, EE submits that this should reflect the observed risk free rate ("**RFR**") of return

89 Ofcom, PD&C, para 4.33.
90 Ofcom, PD&C, para 4.59.
91 Ofcom, PD&C, paras 4.62-4.67.

(based on latest 12 month average yields on UK gilts[92]) with an uplift to reflect the (relatively low) risk of a fallow period (providing an estimate of -0.7%).

Ofcom's error is graphically depicted in Figure 5 below.

Figure 5 - Range of estimates of the discount rate for ALFs



6.3 Outcome of Ofcom's process is irrational and disproportionate

Ofcom's erroneous process adopted in the PD&C results in a proposed discount rate that is more than double its estimated cost of debt. Ofcom's new proposals represent a significant departure from Ofcom's previous proposal in the August 2014 consultation, in which Ofcom proposed to set the discount rate *at* its estimate of the cost of debt.

As explained in further detail in section 6.5 of this response below, Ofcom's revised approach could only be appropriate if the Government faced more than twice the level of risk faced by a corporate bond holder. However, there is simply no evidence that this is the case. Since the August 2014 Consultation, Ofcom has not identified in the PD&C any new risks to which the Government is exposed through ALFs. It is very difficult to reconcile this with Ofcom's new proposal to move from setting the discount rate at the cost of debt as per the August 2014 Consultation to over double the cost of debt as per its current proposals.

92 Ofcom uses the yields on 5-year and 10-year UK gilts to estimate the RFR for a number of market reviews, including the MCT review. In the PD&C Ofcom also acknowledges that there is "*a valid distinction between ALF and the charge controls for which we [Ofcom] usually use WACC figures derived from long-run average data*" [para A10.9]. Taking this into account Ofcom bases its yield analysis on "averages over twelve months" or "at the extreme, this could mean relying on spot rates" [A10.14 – footnote 58]. EE notes that, as at 31 March 2015, spot rates on 5 and 10 year UK gilts were -1.3% and -1.0% respectively, whilst the 12 month average yields were -1.1% and -0.6% respectively.

On any view, Ofcom's proposal to apply a discount rate more than double the estimated cost of debt cannot be considered either objectively justified or conservative and would be open to review on this basis.

The impact of Ofcom's error is highly material. Using Ofcom's selected discount rate, results in (all other things being as set out in the PD&C) ALFs for 1800 MHz of £0.84m per MHz. Adjusting for the errors in the discount rate as proposed by EE would, on its own, result in this value being reduced to between £0.62m and £0.71m per MHz (i.e. by between 15% and 26%). EE accordingly strongly urges Ofcom to reconsider its position on this important issue.

6.4 The MCT WACC should not form a part of Ofcom's range

Under Ofcom's previous August 2014 Consultation proposals, Ofcom's erroneous choice of the MCT WACC as its hypothetical upper polar case was of little practical consequence, given Ofcom's proposal at that time to set the discount rate for annualisation at the cost of debt, with no express linkage to the level of the MCT WACC. Under the PD&C the impact of the error is now much more grave, with the discount rate proposed to be directly linked to the MCT WACC – and this figure thus having a direct inflationary impact on ALFs.

Previously, a key area of focus in Ofcom's August 2014 Consultation, and thus of the responses to that consultation, was on whether Ofcom should choose as its estimation for the cost of debt either (i) the cost of debt as estimated by Ofcom for the purpose of calculating the MCT WACC – which was Ofcom's then stated preference, or (ii) an estimation for the cost of debt based on the yield-to-maturity ("**YTM**") approach – which was what a number of respondents including EE advocated.

In its response to the August 2014 Consultation, EE argued that it would be an error for Ofcom to use the same cost of debt estimation as for the MCT WACC because, inter alia[93]:

- Ofcom had 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. The principle of equal treatment (or non-discrimination) to which Ofcom is required to have regard in exercising its functions 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 reasonable rate of return on adequate capital employed.

93 See EE's response at pages 51-53.

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 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.

Ofcom has expressly acknowledged the validity of these arguments in (rightly) deciding in the PD&C to use the YTM approach to estimate the cost of debt rather than the cost of debt estimate used in setting the MCT WACC. Specifically, Ofcom has stated:

- "*in contrast to our position in the August 2014 consultation, we now recognise that, as the MNOs highlighted, there is a valid distinction between ALF and the charge controls for which we usually use WACC figures derived from long-run average data*"[94]
- *"The analogy of a financing lease is that the borrowing for ALF is hypothecated (i.e. associated with a particular asset, in this case spectrum). By contrast, the WACC calculated for a charge control is not concerned with the financing of a particular asset, but the financing of all assets used by the regulated firm(s) in price controlled markets. The majority of this financing comes from equity rather than being secured through debt issuance. It is therefore important to consider the estimation of both sources of funding, including their common components, in coming to an estimate of the WACC for a charge control"*[95]
- *"Further, while the ALF annualisation exercise starts from a notional one-off transaction, Communications Providers (CPs) need to finance regular on-going capex programmes (which the WACC within a charge control has to support). CPs smooth financing decisions through time to support capex investment. The costs of financing in the long run are therefore relevant in ensuring appropriate investment signals are sent through the charge control"*[96]

Having decided for good reason to correct for this error, it is somewhat surprising that Ofcom has now in the PD&C sought to draw a stronger (indeed direct) linkage between the ALF discount rate and the level of the MCT WACC, through its new proposal to uplift the discount rate by 25% of the difference

94 Ofcom, PD&C, para A10.9.
95 Ofcom, PD&C, para A10.10.
96 Ofcom, PD&C, para A10.11.

between the YTM cost of debt and the MCT WACC (as its upper polar case). The justification now given by Ofcom for so doing is that:

> "*the MCT WACC is the appropriate upper bound for the discount rate in the hypothetical upper polar case where ALF changes frequently enough to reflect real-time changes in value, or is directly linked to MNOs' net revenues*"[97]

However, this justification is very difficult to reconcile with Ofcom's subsequent acknowledgements that "… *the discount rate used to annualise the lump-sum value should reflect the risk of the cash flows coming from licensees to the Government through the ALF, rather than the risk to the licensee of the cash flows associated with using the spectrum*"[98], that "*ALF will not vary each year with the revenues earned from the spectrum (or be linked to drivers of spectrum value in real terms in any other way)*" [99], and that "*the WACC calculated for a price control is not concerned with the financing of a particular asset, but the financing of all assets used by the regulated firm(s)*".[100]

Ofcom concedes that this means that "*the WACC is not relevant in all circumstances, but only as the upper polar rate*". [101] In contrast, for the following important reasons EE considers that even when used in this context the unadjusted MCT WACC is an inappropriately distortive parameter – particularly when so directly linked to the final value of the discount rate as is currently proposed.

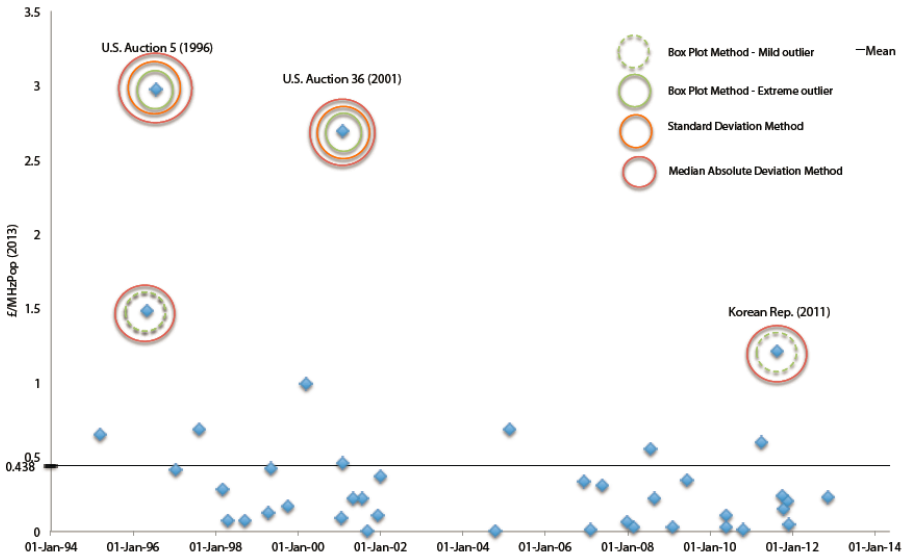
EE strongly disputes that the MCT WACC (which is applicable to the overall business of an average UK mobile operator) is likely to reflect correctly the systematic risks which would apply to the ALFs licences:[102]

- First, this ignores the fact that spectrum demand is based on long-term network planning and long-term forecasts and is therefore much less affected by macroeconomic cycles than consumer demand for mobile services. For example an economic downturn can lead to significant changes in the forward-looking cash flows of operators (as mobile customers are able to reduce their call volumes and data use). However, largely because spectrum demand is based on long-term network planning and long-term forecasts, which extends far beyond even the length of the most recent economic downturn, mobile operators would not be expected to cut back on their spectrum holdings during a recession and hence there would be no need for a hypothetical company holding only spectrum assets to reduce their charges for the use of spectrum in response to macroeconomic economic cycles.
- Spectrum pricing, in contrast, is determined by long-term expectations in relation to the demand and supply of spectrum. Ofcom already has available to it information supporting this view, and thus suggesting the

97 Ofcom, PD&C, para 4.29.
98 Ofcom, PD&C, para 4.31.
99 Ofcom, PD&C, para 4.41.
100 Ofcom, PD&C, para A10.10.
101 Ofcom, PD&C, para 4.31.
102 Ofcom, PD&C, para 4.85.

unsuitability of the WACC as a potential discount rate. In particular, EE notes that in its 2015-2018 MCT Review, Ofcom found that mobile operators' share prices were *significantly correlated* with movements in the general share market.[103] While spectrum pricing data is more limited, we note that in DotEcon's report for Ofcom's 2013 Consultation there is *no obvious link* between the auction prices and general share market movement over the past decade, as illustrated for 1800MHz spectrum in Figure 6 below.[104] For example, there is no noticeable impact of the global financial crisis on spectrum prices.

Figure 6 - Average 1800MHz spectrum prices over the period 1994-2013



Source: DotEcon report on International benchmarking of 900MHz and 1800MHz spectrum value, September 2013, Figure 6

- Secondly, as also acknowledged by Ofcom in the PD&C, the MCT WACC is a highly imperfect substitute for the cost of capital of a pure play spectrum holder. Ofcom states in this regard that "*there is a lack of evidence that can be used to assess the suggested variations in risk*"; citing the lack of a 'pure play' spectrum holder or disaggregated MNO accounts[105], and also noting that "*Disaggregating part of the mobile business from the rest of the mobile business would likely be equally, if not more, challenging [than disaggregating betas for mobile from the wider parent companies]*". EE accepts these difficulties, but does not accept that they justify Ofcom in simply adopting the un-amended MCT WACC as its upper polar case. EE considers this to be a plain error.

103 In Ofcom's 2015-2018 MCT review Ofcom estimates an asset beta of 0.6 [Annex 10] for the average efficienct MNO, which reflects the fact that movement in mobile operators' share prices largely reflects movements in the general share market. An asset beta of 1 indicates that the MNO's share price can be entirely explained by movements within the share market. A beta of less than 1 means that the MNO will be less volatile than the share market.

104 DotEcon, International benchmarking of 900MHz and 1800MHz spectrum value – Final report for Ofcom, September 2013, Figure 6 and 11.

105 Ofcom, PD&C, para 4.28.

> The fact that it is too challenging to amend a parameter to make it accurate and relevant due to a lack of benchmarks or data is not a sufficient ground simply to assume that the parameter is capable of correctly reflecting systematic risk, as Ofcom has done in adopting the MCT WACC as its upper polar case. EE submits that this represents a clear abrogation of Ofcom's duties to apply objective and proportionate regulatory principles. Given the evidence provided above, it is clear that the systematic risk of ALFs is likely to be lower than that of the average efficient MNO, and thus that the MCT WACC is too high to form a relevant upper polar case for the discount rate used for the purpose of setting ALFs.

For all of the reasons set out above, EE considers that even when used only as an "upper polar rate" in the manner proposed by Ofcom in the PD&C (i.e. one which causes a direct uplift to the discount rate and thus ALFs), the unadjusted MCT WACC is an inappropriately distortive parameter.

Potentially the magnitude of the impact of this error may be reduced if Ofcom at least exercises its regulatory judgement to make some adjustments to this distortive parameter (otherwise Ofcom would be basing the discount rate on a value it has itself admitted is not appropriate for ALFs). One potential way to reduce the likely distortive effect would be to adopt a lower asset beta than that used in the MCT WACC, and which is more reflective of the beta for a pure-play spectrum holder. For example, an asset beta of half of that of a mobile operator (i.e. 0.3) could be chosen, representing a value just below the bottom end of the range of potential mobile operator asset betas recommended to Ofcom by its consultants Brattle[106]. Alternatively, Ofcom could reduce its proposed uplift to the cost of debt below the current proposed 25% level to reduce the distortive effect.

However each of these adjustments would still involve Ofcom's "upper polar case" inappropriately reflecting a purely hypothetical case whereby ALF payments varied in line with the future after-tax cash flows of a spectrum holder – which Ofcom has itself repeatedly acknowledged does not reflect reality.[107] For the reasons set out below, EE therefore considers that Ofcom should estimate the discount rate on the more reliable basis of assuming that the cost of debt (estimated using the YTM approach) forms the upper parameter of potential values at which the discount rate level could be set.

6.5 The cost of debt should form the upper point of Ofcom's range

Both for the reasons set out in EE's previous consultation responses and for the further reasons set out below, EE considers that Ofcom is wrong to assume that ALFs, if correctly set by Ofcom so as to accurately reflect the forward

106 Ofcom, MCT Review 2015-18 Final Statement, March 2015, Annex 13, page 40. This would be one way to reflect the available evidence which suggests spectrum values are less correlated with the business cycle than mobile operators' share prices.

107 Ofcom, August 2014 Consultation, para 4.17

looking market-clearing rate as per Ofcom's stated intention, would expose the Government to more risk than a debt instrument.

In the PD&C, Ofcom adopts the cost of debt as its hypothetical "lower polar case" for the discount rate.[108] Ofcom fails to explain in the PD&C why, when it is content to adopt a hypothetical upper point for its discount rate range that is clearly *above* the level at which Ofcom believes the actual ALF discount rate could or should lie[109], Ofcom does not adopt a hypothetical lower point that is equally clearly *below* this level. The argument for this alternative approach is particularly strong, given factors that would tend to make ALFs less risky than corporate debt. For the reasons set out in section 6.7 below, EE considers this to be a material flaw in Ofcom's analysis.

Instead in the PD&C Ofcom focusses on explaining the reasons why Ofcom has moved away from its August 2014 Consultation proposal to setting the discount rate *at* the cost of debt to its new proposal to set the discount rate *above* (over double) the cost of debt. Given the materiality of the change this represents, Ofcom provides relatively little detail supporting its new proposal. However, in essence, Ofcom's radical change in approach appears to have been motivated by two key reasons why it considers that ALFs may prove more risky to the Government than debt. These are:

1. That in the event of financial difficulties, licensees would be more likely to default on their ALF payments than on their debt payments.
2. That there could be a dramatic change in the value of 1800/900 MHz spectrum, causing its market value to fall below or rise above the level of ALFs and thus triggering a risk to Government greater than that of a bondholder in the form of:
    a. A review of the ALF level, impacting on the level of returns to Government; and/or
    b. Licensees to hand back their 1800/900 MHz spectrum to the Government if market value falls below the level of ALFs, creating a risk of a fallow period and potentially also a lowering of the ALF level.

For the reasons set out below and as per our previous consultation responses, EE considers that Ofcom's reasoning materially overestimates the potential risks associated with ALFs, at the same time as continuing to underestimate the potential risks associated with debt. EE submits that the best view of the available evidence is that the risks associated with ALFs are in very many respects *akin* to those associated with debt, but that in several respects ALFs are in fact likely to prove *less* risky than debt. EE therefore considers that the cost of debt should form the upper point of Ofcom's range for selecting the appropriate discount rate.

EE elaborates on these points below, taking each of the potential risks identified by Ofcom in turn.

108 Ofcom, PD&C, paras 4.27 - 4.38
109 See for example, Ofcom, PD&C at para 4.41.

Risk that licensees would be more likely to default on their ALF payments than on their debt payments

In the PD&C, Ofcom appears to place significant weight on the "*risk that the Government does not receive the payments due to the risk that the licence holder may default on its payments, reducing the expected value of ALF".*[110] For the reasons set out below, EE considers it extremely unlikely that this risk would transpire, and less likely than a default on debt payments:

- First, under the terms of the 1800/900 MHz spectrum licences, any failure to pay the licence fees on or before the due date triggers a right for Ofcom to revoke the entire licence. Ofcom accepts in the PD&C that "*the importance of spectrum to the MNOs' business*" would probably make the voluntary handing back of its spectrum a "*last resort*".[111] It is entirely inconsistent with this acknowledgement for Ofcom to consider that in the event of financial difficulties a licensee would be more likely to default on its ALFs, triggering this severe "last resort" consequence, than on its debt repayments, which would not lead to such repercussions.
- Second, and fundamentally, in suggesting that a default on ALF payments could be more likely than a default on debt payments, Ofcom fails to appropriately recognise that the ramifications of defaulting (or failing to make payment in full) on ALFs go beyond simply negatively impacting market sentiment and a licensee's creditworthiness. Default on ALF payments would permanently weaken an operator's ability to generate earnings and meet other financial liabilities, due to the fact failure to make ALF payments in full would trigger a revocation of the entire licensed spectrum. Defaulting on ALFs is therefore likely to have ramifications for a licensee's core ability to generate earnings, which would be permanently impaired. In a simple case of mere financial difficulties, it may be assumed that the 1800/900 MHz spectrum licence remains critical to the licence holder's ability to provide core business services and thus to its ability to generate the income required to remain solvent – otherwise the licence would already have been traded on. Accordingly, retaining the licence and thus its ability to generate earnings is likely to be of the utmost importance to any licensee seeking to keep trading to avoid an insolvent liquidation. Indeed, retaining the spectrum is likely also to be central to the licensee's ability to raise the revenue to repay other financial obligations, including its debt. In the event that a licensee had difficulty in meeting its financial obligations, it is therefore scarcely believable that it would opt to forgo arguably the single most important asset that enables it to generate revenue to meet its financial commitments.
- Third, 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

110 Ofcom, PD&C, para 4.35.
111 Ofcom, PD&C, para 4.45.

private value to its licence than the pure market value of relevant increments of spectrum held under the licence. Therefore even if the market value for spectrum were to fall, the operator would not be likely to default on ALFs or hand back the spectrum.

- Fourth, even if an operator found itself in financial difficulty, but remained a going concern, it would first have the option of trading any surplus / marginal increments of its spectrum to generate cash – the encouragement of such efficient trading being precisely the objective of Ofcom setting ALFs at the market-clearing rate. In the event of more severe financial difficulties, as a "first resort", a rational operator would be expected to seek to realise value from trading the licence on (potentially together with its optimised network assets) rather than to simply hand back the spectrum (or default on ALFs which would have the same result and have far reaching consequences), which would achieve no return in value for the licensee whatsoever. In neither of these instances would there appear to be any significant risk to the Government's return on ALFs.
- Fifth, in the PD&C, Ofcom suggests that "*Failing to repay a debt can have significant repercussions for a firm … on the market's perception of the firm's creditworthiness and financial security*" and that the "*knock-on effect this can have on its ability to raise new financing…are less likely to arise from a firm handing back a spectrum licence*".[112] EE strongly disputes the suggestion that failure to repay other large financial obligations such as ALFs would be less likely to affect the market perception or creditworthiness of a licensee, and therefore the licensee's ability to raise new debt. As credit rating agency, Moody's note: "*For operating leases, companies don't recognise debt even though they are contractually obligated for lease payments and a failure to make a lease payment often triggers events of default, as if the obligation were debt*".[113] Ofcom previously argued in the August 2014 Consultation that bonds inherently contain a cross-default clause, which means that the repercussions of defaulting on debt would be more far reaching than defaulting on ALFs.[114] In EE's response to this consultation we referenced a study on "*default clauses in debt contracts*", which showed that only around half of bond agreements (51.5%) contained a cross-default clause[115] establishing that these clauses cannot be said to be a standard feature of debt instruments.[116] EE notes that in the PD&C, Ofcom now appears to acknowledge that cross default clauses are not an inherent feature of a large proportion of debt instruments.[117] Accordingly, Ofcom can no longer rely on such

112 Ofcom, PD&C, para 4.48.
113 https://www.moodys.com/research/Moodys-downgrades-Petrobras-ratings-to-Baa3-maintains-review-for-further--PR_316803
114 Ofcom, August 2014 Consultation, para 4.18
115 https://business.rice.edu/uploadedFiles/Faculty_and_Research/Academic_Areas/Accounting/papers/Vasvari%20paper%20.pdf
116 EE, response to Ofcom's August 2014 Consultation, p 48.
117 Ofcom, PD&C, para 4.48.

clauses as evidence that licensees would be more likely to default on debt than on ALF payments. Ofcom suggest that this is just one example of the ramifications of defaulting on debt; however it is the only point of evidence which Ofcom can point to which differentiates debt from ALFs, and one on which Ofcom's conclusions rely heavily. In selecting the upper and lower points for its discount rate range, EE considers that it is accordingly now incumbent on Ofcom to take into account the fact that this point is no longer substantiated by empirical evidence.

- Lastly, EE notes that licensees are able to *restructure or renegotiate debt payments*. This is a common occurrence for firms facing financial stress, and should thus be considered by Ofcom far more likely than a default on ALFs in the same circumstances. It would of course be open for a licensee to request a revision to its ALFs. However Ofcom could only consider such a request if granting it would comply with Ofcom's statutory duties – including its obligations of non-discrimination against other licensees. Ofcom would also need to continue to comply with any Government directions regarding the level of the ALFs. A reduction in Government returns from ALFs through bilateral "restructuring" negotiations is thus a significantly lower likelihood than in the case of debt.

Furthermore, it is not obvious that there is likely to be any material negative impact on the Government (certainly not worse than that suffered in relation to a debt default) even if a licensee did default on its ALFs:

- ALFs are highly secured against an asset and the Government in effect has priority over that asset: in the event of default the spectrum licence may be revoked and the spectrum is once more in the gift of Government. Ofcom acknowledges this in PD&C.[118] However Ofcom still claims in the PD&C that "*it is not correct that unpaid ALFs would rank higher than other debts in the event of insolvency*".[119] Whilst we accept that ALF payments may not rank higher than other general unsecured indebtedness in the event of insolvency (which suggests ALFs are akin to debt), the Government would still have a de facto priority and exclusive claim on the spectrum held by the insolvent licensees. In particular, under the 1800 MHz and 900 MHz licence terms, as soon as the licensee failed to make any part of its ALF payments, Ofcom would be entitled to require the entire licence to be handed back. Unsecured debtors are generally ranked pari passu (i.e. on equal terms) and therefore the Government de facto exclusive claim on the spectrum sets it clearly aside the general creditors group. This does suggest that ALFs are less risky than debt.
- In this case, Ofcom would be entitled to revoke the licence and the spectrum would revert to the Government. Spectrum is non-depleting

118 See PD&C para A10.30 where Ofcom states that "*We noted in the August 2014 consultation that ALF is more akin to a secured debt, and that it is likely that a secured debt would attract a lower rate than an unsecured debt*".

119 Ofcom, PD&C, para A10.32.

and re-sellable. In contrast, as noted in our response to the August 2014 Consultation, bondholders face far greater risk of complete or partial default on repayment the principal, even if the bond is secured against an asset (as most commercial assets are depleting or not readily saleable) – again suggesting that the risk to the government is less than that faced by a bondholder.

Risk of a dramatic misalignment between ALFs and market value

The primary driver of Ofcom's new decision in the PD&C to set the discount rate at more than double the cost of debt (i.e. 25% of the way between its lower and upper polar cases) is the perceived risk to Government returns in the event of a review of ALFs.[120] The view that this perceived risk needs to be quantitatively taken into account by Ofcom when setting the discount rate in turn appears to have been driven by BT's submissions in response to the August 2014 Consultation that it would be an error for Ofcom to set this rate "*at the bottom extreme of the range which is guaranteed to be below the right value with complete certainty*".[121]

Proceeding on the critical assumption that, before turning to the discount rate, Ofcom has set the ALF at an appropriately conservative market-clearing rate,[122] EE considers both of the drivers behind Ofcom's new approach to the discount rate to be fundamentally flawed.

Ofcom has important regulatory obligations under the CRF to promote investment and regulatory predictability and certainty[123]. In view of these duties, Ofcom has chosen to set ALFs for an indefinite period and has consistently stated that: "…*we currently are not minded to review ALF within the next five years, and thereafter we would be likely to review ALF only if there were grounds to believe that* ***a material misalignment had arisen between the level of these fees and the value of the spectrum***."[124].

In the PD&C Ofcom has for the first time stated that it is possible there could be grounds for review following an award of the 700 MHz spectrum and/or the review that Ofcom would need to undertake of the fees for the 2.1 GHz licence, depending on the evidence of a material misalignment between ALF and market value around these times.[125] For the reasons set out in section 4 of this response, EE considers that this suggestion reveals a material error in Ofcom's present approach to setting the current level of ALFs – in particular, its failure to duly factor in the quantitative impact on the present value of ALFs of future spectrum releases.

120 See Ofcom, PD&C paras 4.42-4.45; 4.49-4.63.
121 Ofcom, PD&C para 4.21(e).
122 By this EE means ensuring that where the evidence offers choices, Ofcom consistently prefers a view that is more likely to understate than overstate full market value and that Ofcom when setting ALFs has duly taken into account the lowering impact on forward-looking market values of greater certainty of availability of mobile spectrum in the future. This is as per Ofcom's stated policy approach at paras 1.41 and 1.45 of the PD&C.
123 See Article 8(5)(a) Framework Directive and s 3(3) of CA 03. 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*".
124 See Ofcom, PD&C paras 4.43; 7.39-41.
125 Ofcom, PD&C para 7.41.

If Ofcom sets ALFs appropriately conservatively, there should not be any present reason for Ofcom to consider a material misalignment between ALFs and market value to be "likely". Accordingly, the risk of such an event triggering a material review of ALFs should retreat back into the realms of the purely hypothetical – namely, one which Ofcom acknowledges "*there is no certainty as to whether and when any reviews will be undertaken*".[126] Furthermore, EE notes that any such residual hypothetical risk would be one that the Government would have a unique ability to manage, through its powers to give directions to Ofcom regarding spectrum licence fees under section 5 of the *Wireless Telegraphy Act* 2006.

Importantly, given that Ofcom's exercise in setting the discount rate is not to ensure that Government is protected from any risk through ALFs but rather merely that the level of risk sharing should leave both Government and licensees indifferent between ALFs and a lump sum payment, Ofcom must keep in mind that the returns from debt are also subject to the potential for review and fluctuation. Specifically, EE draws Ofcom's attention to the fact that:

- In the August 2014 Consultation, Ofcom suggested that ALFs are more risky than debt because ALFs may change in the future[127], whereas debt is fixed and bondholders therefore face no such risk.[128] In response, EE argued that it is inaccurate to characterise debt as being an entirely fixed instrument itself, which is unaffected by the performance of the bond issuer, and therefore that assumption should not be used when assessing the appropriate discount rate. EE submitted evidence that showed that a number of bonds, including the Deutsche Telecom (**DT**) bond that Ofcom uses in its yield analysis to estimate the cost of debt, contained a clause which initiated a change in the coupon rate of the bond following a downgrade in the credit rating of the bond issuer.[129] This demonstrated that the assumption that debt is by definition entirely fixed and non-performance related was unfounded and did not reflect reality. Ofcom has accepted this point in the PD&C, without appearing to take it into account in its proposed discount rate.
- Ofcom, however, also note that these performance clauses only allowed for a change in the coupon rate and not the principal, whereas the value of ALFs could be reviewed and changed in its entirety.[130] Whilst EE acknowledges this, it is still the case that bondholders are exposed to at least some level of market risk (i.e. risk of changes in the value of the principal as well as the coupon rate). In reality not all bondholders retain bonds until maturity, and given that bond prices fluctuate, a bond holder is subject to market risk when trading a bond, which may lead to capital losses on disposal should the bond price go down.

126 Ofcom, PD&C, para 4.59.
127 Ofcom, August 2014 Consultation, para 4.18.
128 Ofcom, August 2014 Consultation, para 4.13.
129 EE, response to Ofcom's August 2014 Consultation, page 49.
130 Ofcom, PD&C, para 4.49.

- In addition, while a bondholder that retains a bond until maturity would be expected to receive the principal in full (subject to the bond issuer being solvent), the bondholder would still be exposed to mark-to-market risk throughout the life of the bond.[131] Bondholders have to account for losses in the market value of a bond even if they wish to hold the bond until maturity. This means that any change in the value of a bond held would have to be reported in the bondholder's profit and loss account, and therefore the bondholder is exposed to changes in the price of its bonds. One example of this is where the loss on a bond exceeds a certain threshold (i.e. maintenance margin) which leads to a bondholder facing a margin call.[132] This suggests that bondholders may be subject to changes in bond prices in a similar way to how Ofcom considers Government is subject to changes in spectrum value, where they are considered material. On this basis ALFs should be considered more akin to debt than Ofcom suggests.

The true situation is thus very different to the way in which the BT response to the August 2014 Consultation has painted it, on which submission Ofcom has erroneously relied in changing its approach in the PD&C. Specifically, to the extent that Ofcom has any present remaining reason to believe that a material misalignment between ALFs and market value triggering a review is "likely", then Ofcom should adjust its ALFs estimate to allow for this. Once this is done, the risk of review due to material misalignment between ALFs and market value moves from being a probability to a mere a theoretical possibility. It cannot be said, as BT has suggested, that Ofcom's failure to quantitatively reflect such a mere possibility would amount to setting a rate at a level "*guaranteed to be below the right value".* The position is a much more balanced one, with remaining theoretical possibilities for the level to be either too high or too low. In contrast, the net result of Ofcom's proposed approach to setting the discount rate in the PD&C will be to value this merely theoretical risk by setting the discount rate at more than double Ofcom's estimate of the cost of debt. This would only be appropriate if it could be said by Ofcom that it was likely that the Government would face over double the risk from ALFs than from debt. However, in fact, Ofcom has no basis upon which it can legitimately draw any such conclusion.

In the PD&C Ofcom has not accurately captured or attempted to quantify at all the impact on the Government of an ALF review or hand-back in the event of a material fall in market value. Ofcom has merely operated on the assumption, without seeking to put any values to the implications of this assumption, that in this event there would be a review to lower the ALF and/or that there may be hand-back followed by some form of fallow period following reallocation of the

131 Mark-to-market losses are generated through an accounting entry rather than the actual sale of a security. These losses can occur when bonds or other financial instruments held are valued at the current market value rather than the market price at purchase. If a bond was purchased at a certain price and the market price of that bond falls, this would result in a mark-to-market loss for the bondholder.

132 A margin call describes a situation whereby a bond or other security purchased with borrowed money decreases in value to the extent that the bondholder would be forced either to deposit more money in the account or to sell off some of their assets which might include its bonds.

spectrum, which may be at a lower ALF,[133] resulting in losses which could be "significant". [134]

In these circumstances and mindful of the overall asymmetric risks to spectrum efficiency and its other regulatory objectives, if Ofcom sets ALFs too high rather than too low, EE does not believe that Ofcom should make any express quantitative adjustment for this risk.

Whilst it would only mitigate but not alleviate the harm, in the event that Ofcom felt that it must make some adjustment to the discount error for this risk, then EE considers that Ofcom must try much harder than it has done in the PD&C to ensure that the magnitude of this adjustment is not too great.

In response to Ofcom's August 2014 Consultation, Economic Insight on behalf of H3G attempted to quantify the maximum financial impact that Government would likely face from a fallow period. Economic Insight's analysis indicated that Ofcom could factor this in through an upward adjustment of approximately 20 basis points (bps) to the RFR. [135] In the PD&C Ofcom dismisses this analysis on the basis that Economic Insight does not sufficiently justify its assumptions, at the same time as accepting that such an exercise "*requires a number of assumptions for which there is little available evidence*"[136] and that the adjustment figure Ofcom itself proposes in the PD&C to cater for this risk has been chosen almost entirely at random in a context where Ofcom has "*not identified clear reasons to prefer any particular figure*".[137]

Whilst accepting the inherent uncertainties associated with the exercise, EE considers H3G's assumption of a maximum fallow period of 18 months to be entirely reasonable, when considering the time taken for Ofcom to auction other auction bands (e.g. 2.3 GHz and 3.4 GHz, which Ofcom consulted on in November 2014 and are due to release at the end of 2015 / early 2016 i.e. less than 18 months after consulting[138]), which arguably involve greater complexity. EE also notes that Ofcom has not provided any evidence to suggest that Economic Insight's analysis is *not* robust or accurate. Even if Ofcom considered that Economic Insight's method lacked merit or its assumptions were not credible, this should not prevent Ofcom from attempting its own analysis and using the results at least as a benchmark to inform its regulatory judgement. Instead Ofcom adopts an arbitrary uplift of 110bps to its cost of debt estimate, which is more than five times the uplift estimated by Economic Insight's analysis and represents more than a 100% increase on Ofcom's cost of debt estimate. Ofcom acknowledge that they have no evidential basis for the level of uplift imposed.[139] In the circumstances, EE considers that Ofcom's current approach is manifestly unreasonable and would be clearly susceptible to judicial review.

133 Ofcom, PD&C, Annex 10, para A10.32.
134 Ibid.
135 Economic Insight estimate an uplift of 17 basis points, which we round up to 20 basis points. See H3G response to the August 2014 Consultation, Annex C, pp 13-15.
136 Ofcom, PD&C, para A10.31.
137 Ofcom, PD&C, para 4.62.
138 Ofcom, Public Sector Spectrum Release (PSSR) Award of the 2.3 GHz and 3.4 GHz bands consultation, p 1.
139 Ofcom, PD&C, para 4.55.

6.6 The cost of debt needs to be appropriately, accurately and conservatively estimated

Irrespective of whether the cost of debt forms the upper point of Ofcom's discount rate range (as proposed by EE), the actual discount rate (as proposed by Ofcom in the August 2014 Consultation), or the lower point of the range (as currently proposed), it is imperative that Ofcom's estimate of this cost is appropriate; as accurate as Ofcom can make it; and, consistent with the overall approach Ofcom has accepted it must adopt in setting ALFs, conservatively..

For all of the reasons set out in EE's response to the August 2014 Consultation[140], EE considers that the yield to maturity (**YTM**) approach for estimating the cost of debt now adopted by Ofcom is the most appropriate approach given the specific context in which this estimate is being used. EE accordingly welcomes Ofcom's choice of this approach in its PD&C.

Using its yield analysis, Ofcom estimates a cost of debt range of 2.9% - 4.7% (nominal, pre-tax) based primarily on the 12 month average YTM on MNO bonds, and then selects a point estimate of 3.8%.[141] This is equivalent to a cost of debt (real, post tax) of 1.0% (which Ofcom adjusts by a further 10 bps to reflect the fact that Government would not bear any inflation risk due to the indexation of ALFs). Ofcom therefore arrives at an estimate of 0.9% for the cost of debt. EE has two concerns with this estimate:

- **Ofcom needs to adopt a more conservative point estimate:** EE does not believe that Ofcom's proposed cost of debt represents a conservative estimate. EE notes that Ofcom has selected a point estimate which is at the mid-point of its range. In Ofcom's August 2014 proposals, Ofcom selected a point estimate which it noted was "slightly below the mid-point".[142] EE considers that if Ofcom is to take a conservative approach consistent with its statutory duties, then it should select a point estimate towards the lower end of its newly proposed range of point-estimates. EE accepts that the making of such a choice involves the exercise of Ofcom's regulatory discretion. However, EE considers that the choice of a point lower than the mid-point is the best (if not the only) way to ensure that Ofcom has exercised its discretion in this case consistently with its statement at the beginning of the PD&C that:

  "Where there are alternative approaches to interpreting the available evidence that we consider could be appropriate for the purpose of deriving revised ALFs that reflect full market value, we will take into account whether the alternative approaches are more likely to understate full market value or to overstate it. We will generally prefer

140 EE response to August 2014 Consultation, Section 5.3
141 Ofcom, PD&C, para A10.56.
142 Ofcom, August 2014 Consultation, para A10.86.

approaches which we consider are more likely to understate full market value than to overstate it, where such a choice arises"[143]

In particular if Ofcom declines to select the cost of debt as the upper end of its discount rate range as proposed by EE but rather uses it as the actual discount rate or low point of its range, choosing a lower point-estimate for the cost of debt would help to at least somewhat reduce the risk of the discount rate and thus ALFs being inflated.

- **YTM estimate needs to be updated before ALFs are set:** EE's second concern is a straightforward and we hope uncontroversial one. Quite simply, EE considers that it is incumbent on Ofcom to update its yield analysis and corresponding cost of debt estimate, prior to setting ALFs, in order to take account of the latest available evidence and as a matter of good regulatory practice.

  Ofcom's yield analysis is based on the YTM of a selection of long dated MNO bonds as at 14 January 2015. This YTM analysis needs to be updated prior to setting ALFs to take account of the latest available evidence, especially given the need to reflect the returns actually observed in the market today[144] (i.e. to ensure that the Government and licensee are indifferent between a lump sum payment and an ALF at the ALF effective date).

  To do so is also necessary to ensure best regulatory practice and to maintain regulatory consistency in accordance with Ofcom's statutory duties. In other contexts, Ofcom has historically updated its analysis of financial market data between the consultation phase and the issuance of its final decision. A recent example of this is Ofcom's MCT review 2015-2018, during which Ofcom updated its WACC parameters between its final consultation and the final statement.[145] In this instance, the gap between the date of the yield analysis used (e.g. for the debt premium) in its final consultation and the final statement was approximately six months (i.e. April 2014[146] to October 2014[147]). For ALFs the likely time lapse between the date used for the YTM analysis and the final statement is likely to be at least this long (i.e. a gap from January 2015 to "late summer" 2015 when Ofcom's final statement on ALFs is currently expected).

  EE has updated Ofcom's yield analysis to reflect the YTM on Ofcom's selected MNO bonds up until April 2015. The 12 month average YTM on MNO bonds, which Ofcom uses to inform its cost of debt range, is shown in Table 4. The latest data shows that the YTM has fallen by around 30 to 40 bps on all the MNO bonds since January 2015 (i.e. when Ofcom last updated its estimate). Updating Ofcom's cost of debt range by conservatively deducting 30 bps (to reflect the YTM up to April 2014) leads to a cost of debt range of 2.6% - 4.4% (nominal, pre-tax).

143 Ofcom, PD&C, para 1.45.
144 Ofcom, PD&C, para A10.13.
145 Ofcom, MCT Review Final Statement, March 2015.
146 Ofcom, MCT review consultation, June 2014, Table A14.5.
147 Ofcom, MCT review Final Statement, March 2015, Table A10.18.

This is equivalent to a cost of debt range of 0.0% - 1.4% (real, post-tax), which includes Ofcom's adjustment of 10 bps for the inflation risk premium. EE considers that based on this updated range, and given the need to take a conservative approach, a cost of debt estimate of 0.4% would be appropriate (i.e. the mid-point of the lower half of the updated range).

Table 4. Yield to Maturity (YTM) on long-dated MNO corporate bonds, April 2015

	Debt maturity	Years to maturity	S&P Bond Rating	12 month average		Movement since Ofcom PD&C
				January 2015	April 2015	
Vodafone	2025	11	A-	3.8%	3.5%	-0.3%
Telefonica	2026	11	BBB	4.3%	3.9%	-0.4%
Orange	2025	11	BBB+	3.9%	3.6%	-0.3%
Orange	2028	14	BBB+	4.3%	3.9%	-0.4%
Deutsche Telekom	2028	14	BBB+	4.1%	3.7%	-0.4%

Source: Bloomberg, Ofcom, EE analysis as at 10 April 2015

6.7 Lower point of Ofcom's range should be the observed and adjusted risk free rate

In EE's response to Ofcom's August 2014 Consultation, we set out many reasons why ALFs (correctly set) may be considered less risky than debt. In the PD&C, Ofcom has accepted the validity of many of the points we made regarding the risks to which the bond-holders of debt are exposed. However, Ofcom's potential range for the discount rate as proposed in the PD&C does not take into account any possibility that ALFs could be less risky than debt. EE considers this to be a clear error in Ofcom's process for setting the discount rate.[148]

In proposing to set the discount rate above the cost of debt, Ofcom states in its PD&C that "*it is not appropriate to assume that the Government bears zero risk and the licensees all of the risk*". By going on to set the cost of debt as its "lower polar case" in the PD&C, Ofcom's methodology implicitly assumes that the cost of debt parameter chosen as this lower polar case reflects a case where the Government faces "zero risk". This assumption is simply incorrect. It is a discount rate in line with the current RFR which would reflect a case where the Government bears "zero risk". By contrast, the cost of debt does reflect a number of risks faced by bondholders (e.g. the risk of default on repayment of the principal), which are contained within the "debt premium" element of the cost of debt and which Ofcom itself has acknowledged in the August 2014

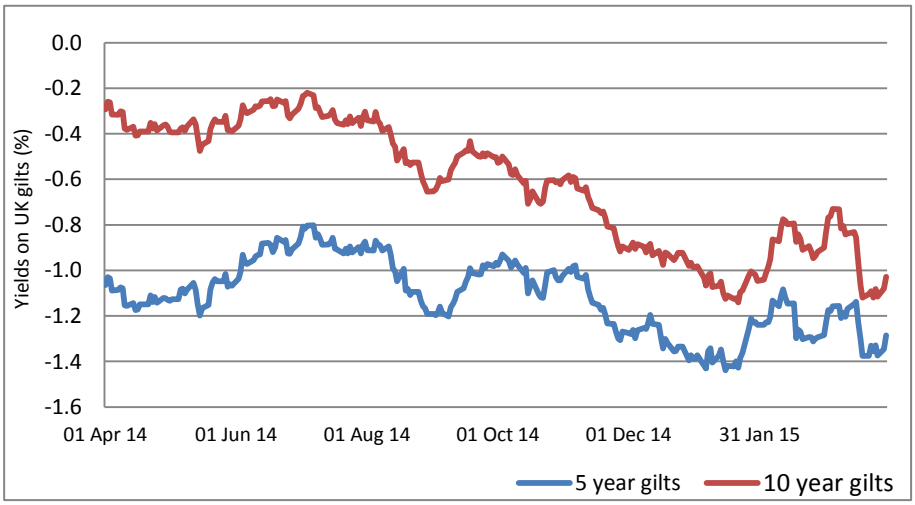
148 Presently, this error is also compounded by the asymmetry of Ofcom also having chosen an upper point in its range that is clearly above Ofcom's estimation of where the discount rate should lie.

Consultation.[149] There is therefore significant room below the cost of debt for a discount rate to be set which still reflects the existence of some risk.

For the reasons set out in section 6.5 of this response, EE considers that ALFs are no more risky than debt and in some respects significantly less risky than debt. On this basis the discount rate should be no higher than the cost of debt, and the "lower polar case" should lie somewhat closer to the observed RFR. EE considers that the observed RFR, with some uplift to reflect the relatively small risk borne by Government (e.g. risk of a fallow period), should form the lower point of Ofcom's range for the discount rate.

Figure 7 below shows that the spot rate on long-dated index-linked yields (a proxy for the observed RFR) is currently below -1.0%. Furthermore the 12 month average yields on these gilts, which Ofcom prefers to rely on over spot rates[150], are between -0.6% and -1.1%, as illustrated in Figure 7.

Figure 7 - Spot rates on 5 and 10 year UK index-linked gilts



Source: Bank of England, April 2015

Table 5 - Yields on UK index-linked gilts

Observed RFR (%)	5 year UK gilts	10 year UK gilts
Spot rate	-1.3%	-1.0%
12 month average	-1.1%	-0.6%

Source: Bank of England, April 2015

Based on the observed RFR of -0.9%, which reflects the midpoint of the latest 12 month average yield on UK gilts, and an uplift of 20 bps for the small risks borne by Government (reflecting Economic Insight's estimate of the maximum financial impact that Government would likely face from a fallow period) EE proposes that Ofcom's lower point in the range should be -0.7%.

149 Ofcom, August 2014 Consultation, para 4.14.
150 Ofcom, PD&C, Annex 10, footnote 58.

6.8 Concluding recommendation

If Ofcom were to set the discount rate at the cost of debt, this would be reflective of the fact that Government does bear risk, and this risk is akin to, but likely to be lower than, that held by a bondholder. For the reasons set out above and in EE's previous submissions, EE submits that there are good reasons to consider the risks associated with ALFs to be akin to those associated with debt – but also several important reasons to consider ALFs less risky than debt.

EE therefore considers that Ofcom should chose the ALF discount rate from a point lying somewhere between the cost of debt (updated estimate of 0.4%) and an adjusted RFR of -0.7% (which reflects the observed RFR plus an uplift of approximately 20 bps to take account for the relatively low level of risk of a fallow period).

Which precise point is clearly a matter for Ofcom's regulatory discretion, but at the maximum the discount rate should not be above the cost of debt (0.4%), and a truly conservative approach would be to set the discount rate somewhat closer to the observed adjusted RFR (-0.7%).

7. The new coverage obligation requires a reduction in ALFs for 1800 MHz spectrum or other adjustment in implementation

7.1 Background – EE's expectations on this issue

It is important for EE to give its view of the background to this consultation issue because this background creates some obligations on Ofcom which, in EE's view, it has not yet properly reflected in its proposals.

The commitment on Ofcom to ensure that the fees charged to the MNOs for 900 MHz and 1800 MHz spectrum are set at a level reflecting full market value was laid out in the 2010 Direction. Ofcom set about setting the new rates after the so-called '4G' auction of 800 MHz and 2.6 GHz spectrum and has, so far, consulted five times on the issue from 2011 to the current consultation released on 19 February 2015.

The current PD&C has a particular circumstance attached to it, namely its link to the coverage obligation agreed with the Secretary of State in principle in December 2014 pursuant to a Statement of Commitment and reflected in voluntary licence variations to each of the current 1800 MHz and 900 MHz licences effected by Ofcom on 31st January 2015. Notably, whilst this coverage obligation for reasons of flexibility and pragmatism allows the 1800 and 900 MHz licensees to fulfil the obligation using also any 2.1 GHz or 800 MHz spectrum which they may additionally hold, it is only a binding term of the 1800/900 MHz licences. It is thus uniquely binding only in relation to the 1800 and 900 MHz spectrum (and accordingly only on anyone who currently or in future may come to hold that spectrum under the present licence terms).

The coverage obligation has incremental costs associated with it – these costs are very substantial for EE and for H3G in particular (the particularly high costs affecting these two companies in meeting the obligation are explained by a number of factors, including their relatively trivial holdings of the low frequency spectrum particularly suited to covering large geographic areas).

At the behest of the licensees, the Government acknowledged that it should bring the commitments to the attention of Ofcom, in the context of its work to revise ALFs (in accordance with previous Government Directions to Ofcom) and this formed an explicit part of the discussions with Government about the coverage obligation. In that connection, an exchange of letters between the Secretary of State for Culture Media and Sport and the Chief Executive of Ofcom were annexed to the Statement of Commitment dated 17 December 2014.

The letter from the Secretary of State issued on the same date noted that the coverage commitment "*will require an incremental increase in investment from MNOs*" and that "*in these circumstances it must be right to extend your current work to revise annual licence fees*" and noted an expectation that all interested parties should have a reasonable opportunity to comment on whether the new commitment, taking account of the associated incremental costs, should impact on future ALFs. [✂].

The response from Ofcom, also dated 17 December 2014, confirmed that Ofcom agreed that all interested parties should be given a reasonable opportunity to comment on whether they consider that this new commitment, taking account of the associated incremental costs incurred by the MNOs, should impact future ALFs.

After the agreement in principle in December, there was a period of a month and a half (to 31st January 2015) during which the MNOs and Ofcom had committed to exercise their 'best efforts' to agree the licence variations. EE was absolutely clear in this period – in meetings and in a letter to the Secretary of State – that it wanted greater clarity from Ofcom on the issue of how it was proposing to think about the incremental costs of meeting the coverage obligation in setting ALFs.

EE's concern, articulated in a meeting with Ofcom [✂].

The concern expressed by EE was of sufficient gravity that EE was unwilling to accept the licence variations without further reassurance from Ofcom. Such reassurance was provided in a letter to EE from Ofcom's acting Chief Executive, sent on 27 January 2015. The most pertinent passage in this letter [✂] was as follows:

[✂]

[✂].

[✂], EE indicated to Ofcom that it consented to the variation of its 1800 MHz spectrum licence to include the coverage obligation. Had EE declined to give that consent, the licence variation could not have been made by Ofcom and EE would not have been obliged to comply with the coverage obligation. Accordingly by accepting the licence variation in reliance on Ofcom's letter of 27 January, EE has encumbered its spectrum licence and bound itself to incur the very substantial costs of complying with the geographic coverage obligation.

EE's position is that, by reason of the above matters, it had a legitimate expectation that Ofcom would consider in the light of all relevant factors whether it should adjust ALFs so as to take account of the incremental costs of complying with the new geographical coverage obligation which now encumbers the 1800 MHz and 900 MHz spectrum, if it thought it right to do so.

The PD&C does not do this. Instead, [✂], Ofcom wrongly argues that the extra costs of extending coverage do not affect the value of the spectrum to which the coverage obligation is attached. Ofcom has, in effect, decided that, in order to reflect full market value, ALFs must be equivalent to its chosen estimate of the market clearing price, and therefore, because the geographical coverage obligation does not in its view change the market clearing price, it should be disregarded entirely when setting ALFs.

[✂].

In light of this background, EE considers it *imperative that Ofcom demonstrates its open-mindedness in the next stages of its consultation process*.

In the remainder of this section of our response, we first show that onerous coverage obligations generally reduce the value of spectrum licences. We then detail the substantial additional costs that are imposed on EE as a result of the Government's new coverage obligation and explain why the [✂]. Next, we

identify flaws in Ofcom's assumptions underlying its conclusion that the coverage obligation would not impact the market value of the ALFs spectrum. Finally, we examine alternative ways in which Ofcom could take into account coverage costs in setting ALFs for EE and H3G in a manner consistent with its duties. In particular, EE believes that this change in the regulatory environment makes it imperative for Ofcom to phase-in ALFs for 1800 MHz over a longer period than currently proposed under the PD&C.

7.2 Onerous coverage obligations generally reduce spectrum value

EE strongly disagrees with Ofcom's assertion in the PD&C that "*As far as we are aware, there is no market information currently available that we can use to assess the market value in the presence of the geographic coverage obligation*".[151]

In its October 2013 Consultation, Ofcom put forward a general principle for assessing auction price evidence:

> "*Coverage/access obligations tend to reduce the value of spectrum to bidders as they involve a cost commitment to meet said obligation. In practice the scale of the effect depends on whether the obligations are seen as onerous*."[152]

In the PD&C, Ofcom also recognises the potential for onerous coverage obligations to reduce the market value of spectrum.

> "*As part of our analysis of individual awards in Annex 8 we set out coverage obligations by band. In principle, were we to consider that such obligations are likely to require deployments significantly in excess of commercial levels then we would consider that the auction price could risk understating the value of that band in the UK in our assessment*".[153]

Ofcom has found that in practice the UK auction price for the lot of 800 MHz spectrum that included a coverage obligation was discounted by £31m for the coverage obligation.[154] In other words, the market-clearing rate operators would be prepared to pay for a licence which required the fulfilment of a costly obligation was lower compared with the market-clearing rate they would be prepared to pay for equivalent spectrum but excluding the obligation.

International auction prices similarly show that coverage obligations cause significant reductions in market value. An econometric study of 3G auction prices found that a 1 percentage point increase in the proportion of the population that is required to be covered reduces winning bids by 0.86 per cent.[155] The average coverage obligation in the study was to cover only 55% of the population. The costs of covering additional shares of the population

151 Ofcom, PD&C, para 6.13.
152 Ofcom, October 2013 Consultation, para. A7.2.
153 Ofcom, ALFs consultation, August 2014, para. A7.34.
154 Ofcom, PD&C, para. 2.53.
155 Bohlin, E., G. Madden and A. Morey, "An econometric analysis of 3G auction spectrum valuations", EUI Working Papers, 2010.

escalates exponentially as coverage is extended to remaining shares of the population in increasingly remote or difficult to cover areas.

Nor is it the case that spectrum value is affected only where the coverage obligation applies to some but not all licences in a band. We note that Ofcom's review of international auction evidence identified two countries where coverage obligations were applied to all the licences in the 800 MHz band: Denmark and Romania.[156] The DotEcon report for Ofcom's 2013 Consultation found that Denmark had one of the lowest 800 MHz prices in Europe and identified one potential contributing factor as "*In addition, Denmark imposed an onerous coverage obligation on licensees to provide a 10 Megabit per second service (Mbps) to areas currently lacking these speeds (although bidders could bid for exemptions).*"[157] In the Romanian 4G auction in 2012, the regulator failed to sell all of the available 800 MHz spectrum. This outcome is highly unusual in Europe. Coverage obligations were attached to the 800 MHz licences and it is reasonable to infer that they reduced the market value of the spectrum below the reserve price, particularly given Romania's low population density.

The general observation that coverage obligations tend to reduce the value of spectrum licences does not imply that the new coverage obligation that has been inserted into the 1800 and 900 MHz licences will *necessarily* reduce the value of the frequencies in the licensed bands. However, it is strong evidence suggesting that, all other things being equal, the market clearing rate should logically be lower, unless the market is likely to consider compliance with the obligation as being costless.

In the next sections, we show that the coverage obligation is very costly for EE (and we would expect for H3G and new entrants), albeit that it may be expected to be less onerous for Telefonica and Vodafone given their networks were designed while having access to sub 1 GHz spectrum. We then build on this analysis to explain why market value of 1800 MHz spectrum today would be expected to be reduced because potential buyers for the licences would not be prepared to pay as much for the licences.

7.3 EE's additional costs in meeting the coverage obligation are substantial

The coverage obligation now included in EE's 1800 MHz spectrum licence imposes substantial additional costs on EE. The areas of not-spots or partial not-spots currently do not have coverage precisely because of the difficulties and costs in establishing base stations in those areas. These difficulties are particularly acute for operators (such as EE and H3G) that have not had access to low frequency bands during the mobile network site build phases.

Extending coverage further to areas without outdoor coverage today cannot readily be achieved with a small number of high coverage sites owing to a

156 Ofcom, PD&C, para A7.80.

157 DotEcon, International benchmarking of 900 MHz and 1800 MHz spectrum value – Final report for Ofcom, 2013, para 79.

number of practical challenges in such areas, typically dominated by hilly terrain. In this regard, we note:

- Terrain limits the achieved coverage significantly below the coverage that would be expected from a simple flat-terrain signal propagation model, raising significantly the number of sites required to extend coverage in such terrain;
- 'Ideal' sites from a coverage delivery point of view are often not permitted in protected rural areas, or face strong resistance to applications for planning permission to build sites on the hilltops more generally;
- There are limited opportunities for backhaul or power supply to these prime locations; and
- Stretches of uncovered road – the most useful targets for consumers regarding coverage in open areas - tend to be in small terrain-restricted segments requiring multiple individual sites rather than in long open stretches that could be covered with few sites.

EE has estimated its costs in extending geographic coverage for a voice service to 90 per cent [✂]. In so doing, we have been mindful of the public policy objective behind the commitment made by the operators to Government in agreeing to this obligation, and have sought to strike an appropriate balance between targeting specific coverage holes and the overall cost of delivering the obligation. [✂]

- [✂].
- [✂].
- [✂].
- [✂].

Accordingly, EE's initial assessment provides an indication of the amount of site engineering and associated costs required to meet the coverage obligation. [✂]. However, clearly the obligation as an ongoing obligation to maintain the stated level of coverage from 31 December 2017 onwards will entail costs for at least the twenty year period considered by Ofcom when assessing the risks of an ALF review for the purposes of setting the discount rate, and beyond.

We also note that the final combination of approaches employed may change somewhat from the example used in building our initial estimates and that the licensees will bear risks that the costs of meeting their obligations could exceed this estimate. In particular, the final approach will depend on factors outside of EE's control such as the feasibility of building or sharing sites in particular locations, [✂].

As a cross-check on EE's own estimate, we have also calculated the implied total cost using Ofcom's MCT cost model. Using the model's assumed 2014/15 unit CAPEX and OPEX [✂], we estimate a total present value of the incremental cost in meeting the coverage obligation of around [✂]. This is a long-term estimate that includes the upfront equipment costs and annual operating expenses associated with meeting the obligation, as well as ongoing

costs required to replace and operate the assets into the future. The costs in the initial two years are estimated at [✂]. Over an 8 year time frame[158], in which none of the new assets are required to be replaced under Ofcom's asset life assumptions, the present value incremental cost of meeting the obligation is around [✂]. EE's costs over the comparable initial 8 year period would be [✂]. [✂].

Table 6 – Estimated cost of coverage based on Ofcom's asset and opex costs

[✂] [Table redacted]

7.4 Why EE and H3G face substantial costs not borne by Telefonica and Vodafone

[✂].

[✂].

[✂].

While Telefonica and Vodafone are expected to pay higher ALFs for their 900 MHz spectrum than the ALFs for the 1800 MHz spectrum, the difference in ALFs payments are a small proportion of the ongoing cost advantage they enjoy from having been able to roll-out their networks with access to sub 1 GHz spectrum, both in terms of ongoing OPEX on fewer sites and CAPEX needed to upgrade fewer sites as technology progresses.

For example, Ofcom is proposing ALFs for 900 MHz spectrum that are £0.64m per MHz higher than the proposed ALFs for 1800 MHz spectrum. Thus, for access to their 2x17.5 MHz of 900 MHz spectrum, Telefonica and Vodafone would pay around £22m per annum more than EE pays for a similar amount of 1800 MHz spectrum. This is a fraction of the difference in overall site costs between EE and the operators with 900 MHz spectrum. Taking Ofcom's estimate of OPEX alone of around £12,000 per site, then £22m would be equivalent to the annual OPEX of only around 1,825 sites. For a network providing similar outdoor coverage, EE had over [✂] more sites in 2012 than O2, based on O2's reported figures (EE had over [✂] sites whereas Telefonica reported around 11,000 to 12,000 sites in 2012).[159] Accordingly, the difference in ALF payments for 1800 MHz spectrum as compared with those proposed for 900 MHz spectrum does not even cover the cost disadvantage caused by differential access to sub 1 GHz spectrum, let alone covering the higher

158 8 years provides for 1 generation of assets before some start needing to be replaced.

159 O2 site count taken from *Delivery of WiFi / 3G small cells network into London*, Telefonica presentation, 2012 (http://4g-portal.com/delivery-of-wi-fi-3g-small-cells-network-into-london). Both networks provided equivalent outdoor geographic and road coverage, according to Figure 39 of Ofcom's *Infrastructure Report 2014*, p75, published 8 December 2014: http://stakeholders.ofcom.org.uk/market-data-research/market-data/infrastructure/infrastructure-2014/. Note that O2 is expected to grow site numbers to deliver the indoor coverage obligation attached to the 800 MHz licence, but that is unrelated to the underlying differences for providing outdoor coverage.

business-as-usual CAPEX required to develop the network as technology advances (due to site volumes) or the additional sites and site upgrades that EE will require to meet the obligation.

7.5 Flaws in Ofcom's conclusion that the coverage obligation does not impact market value

EE welcome's Ofcom's acknowledgement at para 6.7 of the PD&C that "*the MNOs may incur incremental costs to meet the coverage obligation which could, therefore, reduce the overall value that they attach to their current spectrum holdings*". For the reasons set out above, it is in EE's case patently true that EE will incur such incremental costs[160]. [✂].

Logically, higher costs associated with particular bands of licensed spectrum [✂] would, all other things being equal, be expected to result in an accompanying lower market value.

In contrast, due to some fatal errors regarding key relevant facts surrounding the coverage obligation and a blinkered approach to setting market value based on its methodology developed before the coverage obligation became a relevant feature of the 1800 and 900 MHz spectrum to which the ALFs apply, Ofcom reaches the incongruous conclusion that this new obligation should be considered to make absolutely no difference to its market value.

In particular, Ofcom's erroneous conclusion is driven by three key errors:

- First, a mistaken approach that (inconsistently with the approach adopted by Ofcom when considering the impact of the geographic coverage obligation on the value of 800 MHz spectrum) assumes it is not possible for Ofcom to draw a "*meaningful distinction*" regarding the market value of the 1800 and 900 MHz spectrum before 31 December 2014 (when it was unencumbered by the new coverage obligation) and the market value after this date (after which point the spectrum and the obligation only came as "*a package*")[161];
- Second, a mistaken view that the geographic coverage obligation is *not* causally related only to the operators' holdings of ALF spectrum, when clearly this *is* legally the case[162]; and
- Third, a mistaken belief that an operator other than one of the MNOs would *not* have to meet the geographic coverage obligation were it to acquire 1800 MHz or 900 MHz spectrum from an MNO, which is again clearly legally incorrect[163].

160 The PD&C discloses no basis upon which Ofcom could form a view that meeting the coverage obligation now included in its 1800 MHz licence will *not* involve incremental costs to EE. Accordingly, in the absence of any evidence to the contrary, EE considers that Ofcom must give weight to the evidence on this point now provided by EE.

161 See Ofcom PD&C, footnote 183.

162 See Ofcom, PD&C, para 6.18(a).

163 See Ofcom, PD&C, footnote 184.

We examine below the impact of these assumptions and then explain why removing them leads to the conclusion that the coverage obligation *can* be expected to have affected the long-term market value of ALFs spectrum.

Changes in market conditions

Ofcom arrives at its conclusion that the coverage obligation does not impact market value of ALFs spectrum only by (i) assuming the new coverage obligation as a "pre-existing" condition attached each increment of spectrum within the 1800 and 900 MHz licences, even though Ofcom had committed to the Government and the MNOs to open-mindedly consider the impact of this very same obligation on ALFs; (ii) considering only the value of additional ALFs spectrum to the existing operators and (iii) assuming that the existing operators will not change their current spectrum holdings going forward. Given this flawed framework for assessment that the "market" is limited to four bidders each of whom is already subject to the coverage obligation, Ofcom has made it impossible for itself to arrive at any other conclusion than that the coverage obligation makes no difference to "market" value.

In contrast, EE believes that there is a real prospect of market developments that should lead Ofcom to consider that the coverage obligation *does* impact the market value of additional spectrum. [✂]. The European Commission has recently allowed a number of mergers in which national mobile markets have consolidated from four operators to three (e.g. in Austria, Germany and Ireland). In each case, the Commission sought remedies – including measures designed to facilitate the entry of a new mobile network operator.[164]

The Commission has stated its general preference for remedies that would facilitate new entry:

> "*In line with previous practice and applicable laws and guidance, the Commission continues to have a strong preference for structural remedies. In the mobile telecoms sector this translates into a preference for entry of new mobile network operators. Indeed, the entry of a new mobile network operator would compensate for the loss of competition in the most clearcut way*."[165]

[✂]. We note that potential entrants have also indicated their desire to enter the large German market. For example, Liquid is challenging BNetzA's proposed rules for the German 700 MHz auction for being too favourable to the incumbents at the expense of potential entrants such as itself.

The significant chance of a new entrant being the marginal operator for acquiring additional ALF spectrum is wrongly entirely discounted in Ofcom's analysis in the PD&C, due to Ofcom's flawed belief that such an operator would not be subject to the same licence obligations as are currently included in the 1800 and 900 MHz licences. Currently, the applicable Spectrum Trading Regulations[166] only permit a transfer of some or all of the rights and obligations held under these wireless telegraphy licenses if the applicable "*rights and obligations of the person making the transfer become rights and obligations of*

164 European Commission, Competition Merger Brief, Issue 1/2014, p.15.
165 Ibid, p.16.
166 *Wireless Telegraphy (Mobile Spectrum Trading) Regulations* 2011

the transferee"[167]. EE accordingly considers Ofcom's assumption to be wrong in law.

In the case where a new entrant is the marginal operator for 1800/900 MHz spectrum then, due to the costs it would incur to meet the coverage obligation, the value of the 1800/900 MHz spectrum would fall. This assumes that the entrant would not find it in its commercial interest to otherwise bind itself to reach that coverage level (just as EE has found) – which we consider reasonable for the reasons set out above. It also assumes that that fulfilment of the coverage obligation under the 1800/900 MHz licence would not be "costless" to the new entrant - i.e. that it would need to expend some additional costs to meet the obligation, and that it is not already subject to an equivalent coverage obligation that already obliges it to meet the targets contained in the 1800/900 MHz licence. This was certainly the case prior to 31 December 2014 in respect of EE and H3G, and EE submits that it should be regarded as the most likely and appropriate enduring assumption. In contrast, the assumption adopted by Ofcom at paragraph 6.19 of the PD&C that "*the marginal operator for the ALF spectrum has the geographic coverage obligation regardless of whether or not it acquires any additional ALF spectrum*" makes it impossible for Ofcom to take into account the incremental costs actually incurred by the MNOs in relation to their new coverage obligation, in plain contradiction of the Government's stated intention as per the exchange of correspondence with Ofcom on 17 December 2014.

7.6 Implications for market value of ALFs spectrum

The implication of correcting Ofcom's mistaken assumptions is that there is a significant prospect of the forward-looking market value of the ALFs spectrum being impacted by the coverage obligation. We have identified changes in market circumstances in which the market value of the spectrum would differ significantly because of the coverage obligation.

It should be noted that for the market value of 1800/900 MHz spectrum today to be lower because of the coverage obligation does not require that the change in market circumstances outlined above to be the most likely future scenario, only that there is a non-negligible risk of such a change. In particular, the value that an operator attaches to its spectrum asset today will take into account its value in a range of future circumstances (such as sale to an entrant) and the probability of those circumstances arising. [✂]. Ofcom's footnote 184 [✂] indicates that Ofcom considers that this is a possibility.

Ofcom's initial conclusion on the (non) impact of the coverage obligation on market value fails to properly consider how the market may develop in the future and its implications for the present market value of spectrum. There is a clear and obvious cost to the current licensees to meet the new coverage obligation, and it is likely that these costs would similarly lower the value attributed to this spectrum by any new entrant operator to whom the licence

[167] See regs 4 and 5.

may be transferred (thus in both cases lowering the present market value of the spectrum). As set out above, the initial capex costs that the 1800 MHz licensees may be expected to incur to meet the new coverage obligation over the next two years are [✂] – in EE's case alone estimated at around [✂].

It is accordingly clear that the deficiency in Ofcom's approach needs to be rectified in relation to the 1800 MHz spectrum for which Ofcom is setting ALFs. There are two main ways in which Ofcom can do this:

- Ofcom can choose a lower value for the 1800 MHz spectrum from within the potential ranges it can select this value when setting ALFs; and/or
- Ofcom can phase in the introduction of ALFs for 1800 MHz spectrum more gradually than Ofcom is currently proposing in the PD&C.

Whilst either of these options could be an appropriate way for Ofcom to ensure that it meets its statutory duties when setting ALFs and does not fall into legal error, the option of doing nothing clearly would not. We discuss each option in turn.

Selection of a lower 1800 MHz lump sum value for setting ALFs

While Ofcom is required to set ALFs to reflect market value, the reality is that market value cannot be identified precisely but only within a wide range, with the value ultimately selected by Ofcom required to be chosen in order to best fulfil Ofcom's duties (particularly its duties to ensure optimal and efficient use of radio frequencies, promote investment and to secure maximum benefits for consumers in terms of choice, price and quality). Proper consideration of the impact of the incremental costs of meeting the new coverage obligation viewed in light of these duties suggests that it would be entirely appropriate for Ofcom to choose a lower ALFs value from within this range than the value Ofcom would otherwise have arrived at.

As to estimating the precise required reduction in 1800 MHz ALFs, EE would recommend that Ofcom undertakes further work to identify how different scenarios would affect the value of spectrum and the probability of those scenarios arising.[168]

More gradual phase-in of ALFs for 1800 MHz spectrum

Alternatively, Ofcom may seek to achieve the same policy objectives through allowing a more gradual phase-in of ALFs.

EE has previously advocated that Ofcom should adopt a more gradual approach to the phasing in of ALFs than Ofcom is proposing in the PD&C[169]. EE stands by those submissions and does not seek to repeat them here. We also continue to stand by the principle that the timing of the implementation of the new ALFs needs to be determined balancing the costs and benefits of a

168 By way of illustration, assume that the lump sum market value of 1800 MHz spectrum is £13m per MHz assuming the coverage obligation does not impact market value. However, if there is 25% chance of scenarios under which that the coverage obligation would result in a lower market value of £9m per MHz then a symmetric approach to risk could support a market value of £12m per MHz. A conservative approach to risk might suggest a value of £11m per MHz.

169 EE submission (September 2014), see section 7.2.

more gradual phase-in of the new charges than the approach proposed by Ofcom[170].

Whilst these basic principles and arguments have not changed, what has changed is the new coverage obligation and the substantial incremental costs that EE and H3G will be required to expend to meet it (including very large costs over the next two years). As to some extent implicitly recognised by Ofcom in its openness to further evidence on this point in the PD&C, a more gradual phase-in of the new ALFs would clearly be a key means by which Ofcom could effectively moderate the negative effects of the cost of meeting the new coverage obligation – should it chose to exercise its regulatory discretion to do so.

In EE's opinion, the most important regulatory consideration to which Ofcom should have regard when making this decision is that a more gradual phase-in would avoid a significant and discriminatory financial impact on EE and H3G as a result of the large upfront costs they now bear to meet the new coverage obligation to which they have signed up in furtherance of the Government's public policy objectives.

Profit shocks can directly impose inefficient costs such as requiring operators to rely on costlier sources of finance or to delay planned investments. Ofcom has previously accepted in setting spectrum fees that asymmetric profit shocks should be avoided[171] Ofcom has also recently decided to apply a phased approach to the introduction of further reduced mobile call termination rates in order to moderate the financial impact of a loss in net termination revenues of £54m to the industry as a whole that would have resulted from a one-off change to the rates.[172] The proposed increases in ALFs set out in the PD&C would lead to an increased in ALF payments from the industry of £159m[173], i.e. around three times the financial impact of the MTR regulation.

EE considers that there would be significant benefits to a three year phase-in period compared with Ofcom's proposed two-step phase-in approach under which half of the increase would be imposed around late Summer 2015 and the full new rates a year later). A three year phase-in period would bring benefits in terms of the following three factors.

- Helping to moderate the profit shock for operators particularly from the cost of the new coverage obligation [174] but also from incomplete pass-through of ALFs and thereby reducing risks to investment in the sector. This is particularly important at the present time for EE and H3G given that they will be required to undertake substantial additional network

170 This is for example consistent with the general approach taken by the Competition Commission (CC) in having regard to impacts on operators' profitability, revenues and investment decisions as well as effects on consumer prices - see, CC Mobile termination determination, 2012, para. 5.59 and 5.104.

171 Ofcom, Application of spectrum liberalisation and trading to the mobile sector – further consultation, February 2009; Ofcom, Spectrum pricing for terrestrial broadcasting, July 2013, para. 3.72; Ofcom, Applying spectrum pricing to the maritime sector, August 2009, para. 4.60.

172 Ofcom, MCT Review Statement, March 2015, para 8.85.

173 Ofcom, PD&C, Table 5.3.

174 As the operators with 900 MHz spectrum would not suffer such a profit shock from the coverage obligation, this argument does not apply to the 900 MHz operators. As such, a shorter phase-in period would be appropriate for the 900 MHz operators.

investment to meet the obligation at a time when they are also engaged in funding general 4G network rollout. Given that Ofcom decided to apply a partial adjustment to moderate the financial impact of around £54m from cuts in mobile termination rates, it would be reasonable to apply a commensurately longer phase-in period to moderate a financial impact of £159m from the proposed increase in ALFs payments.

- Enabling time for operators to adjust consumer prices to reflect the higher cost of spectrum. ALFs form part of the variable costs in supplying services and they should efficiently be reflected in consumer prices. However, the majority of mobile customers are now under 24 month post-pay tariffs and under the General Conditions, operators have limited ability to increases prices above inflation during the period of the contract. In addition, a more gradual phase-in period would ensure that the increase in ALFs does not disproportionately harm pre-paid consumers.
- Enabling time for operators to make any adjustments in spectrum holdings in response to planned changes in ALFs. Mobile operators will need a period of several years to adjust their networks for changes in spectrum holdings. On the other hand, if Ofcom believes that there is no potential for operators to make changes in response to ALFs, then Ofcom's entire rationale for increasing ALFs to the extent Ofcom proposes (rather than a more conservative estimate of market value) falls away.
- Helping to offset the overall costs of the new coverage obligation on EE and H3G. In recognising the sound public policy principle that Governments should not require private companies to carry out public policy goals without compensation for net costs, this will act to reduce the perceived regulatory risks to future investment in the sector.

These benefits from a more gradual phase-in period can be expected to outweigh the costs, if any. EE believes that the costs of a more gradual phase-in (i.e. any risks of delaying changes that support more efficient spectrum use) will be immaterial. In particular, operators will determine spectrum holdings based on a long-term assessment for which expected long-term ALFs levels will be relevant. In addition, the current mobile operators are likely to be the highest-value users of the spectrum, because their mobile network design and planning rules are optimised on current spectrum holdings. Therefore, a more gradual phase-in of ALFs is highly unlikely to generate any material costs in delaying efficient spectrum use.

Ofcom's stated argument for introducing revised ALFs as soon as practically possible are that it is "*in the interests of good administration and recognising that we are revising ALFs having been directed to do so by Government*."[175] EE believes that good administration calls for balancing the costs and benefits of phasing in ALFs. The 2010 Direction does not impose a specific timeframe for the introduction of ALFs. As such, Ofcom should instead determine the appropriate adjustment period in accordance with its overall duties which, as

[175] PD&C, para. 7.18.

noted in section 7.8 of this response, support a longer phase-in period for EE and H3G.

EE proposes that the ALFs for 1800 MHz should be phased-in [✂] with the full final year ALFs being effective from the fourth year. If the final year ALFs are around the level Ofcom is proposing, this three year phase-in period would moderate the profit shock [✂] in the initial period to the end of 2017 from the coverage obligation and would also help to offset [✂] EE's and H3G's overall costs in meeting the new coverage obligation.

Table 7 - Proposed phase-in period if ALFs at level proposed by Ofcom

[✂] [Table redacted]

7.8 Summary of legal errors Ofcom will make if it continues to ignore coverage costs when setting ALFs

For the reasons set out above, EE considers that if Ofcom maintains the reasoning set out at section 6 of the PD&C as to the impact of the geographical coverage obligation on ALFs, it will be acting unlawfully in that:

Ofcom's analysis is based upon an erroneous and narrow interpretation of the 2010 Direction and thereby fails to consider all relevant factors and fettering its discretion as to the setting of ALFs:

- As set out above in section 3 of this response, the 2010 Direction provides that Ofcom should revise ALFs to "reflect" full market value of the spectrum rights. That does not require Ofcom necessarily to set ALFs so as to be equivalent, over a twenty year period, to the lump sum value which would be the market clearing price if the spectrum were auctioned now. Even on the plain wording of the 2010 Direction, it is open to Ofcom to set ALFs which reflect full market value but which also reflect other relevant factors, including the voluntary acceptance of a costly regulatory obligation. The fact that market value is not known with certainty but can only be estimated to lie within a wide range further calls for the consideration of other factors in choosing an ALFs level from within the range.
- Moreover, the 2010 Direction must be interpreted and applied consistently with Article 13 Authorisation Directive and Article 8 Framework Directive. That precludes any interpretation of the 2010 Direction that would require Ofcom to set ALFs to be equivalent to the market clearing price without consideration of other factors.[176]
- Article 13 specifically requires authorities of Member States charged with setting licence fees to "*ensure the optimal use*" of spectrum, and pursue the Article 8 objectives. In connection with an adjustment to ALFs to take account of the geographical coverage obligation, EE notes in particular that Ofcom must consider how to ensure benefits to

176 See details at section 3 of this response.

consumers in terms of choice price and quality, should promote efficient investment in infrastructure and should promote regulatory predictability. It would not be consistent with these objectives to limit Ofcom's consideration to the sole criterion of whether ALFs are equivalent to the market clearing price.

- However, it is clear from section 6 of the PD&C that that is what Ofcom proposes to do:
    - Ofcom explicitly defines "*full market value*" to be the market clearing price. It also proceeds on the implicit assumption that it is required to set ALFs to be *equivalent* to the market clearing price if it is to "*reflect*" that value.
    - Ofcom then concludes that, unless the geographical coverage obligation would impact on the market clearing price for the spectrum, it should not affect the level of ALFs.
    - As set out at paragraphs 6.5 to 6.7 of the PD&C:

        "6.5 The Government Direction requires us to revise ALF to reflect full market value. In Section 2 we define market value for the purpose of ALF as the market-clearing price in a well-functioning market, or the forward-looking marginal opportunity cost of the spectrum….

        …

        6.6 The market value of spectrum for the purpose of ALF therefore depends on the value to the marginal operator, the highest-value operator that does not hold that specific spectrum, since this determines the opportunity cost….

        …

        6.7 We recognise that the MNOs may incur incremental costs to meet the geographic coverage obligation which could, therefore, reduce the overall value that they attach to their current spectrum holdings. However, for the impact on the market value of 900 MHz and 1800 MHz, in our view this is not the relevant consideration. We consider that the impact on market value depends on the value to the marginal operator of acquiring additional ALF spectrum."
- EE considers that, by adopting this interpretation of the 2010 Direction, and limiting its analysis in this way, Ofcom is failing to take account of all relevant considerations and is unlawfully fettering its discretion.
- Ofcom is required to give proper consideration to the exercise of the discretion that it enjoys under s.12 WTA 06 and the 2010 Direction, interpreted in accordance with the relevant EU provisions. In that regard, Ofcom is required to have regard to the matters set out in Article 13 Authorisation Directive and Article 8 Framework Directive, in particular those set out at section 3 of this response above.
- Ofcom's proposed approach fails to take account of those considerations. As further set out below, the MNOs undertook a new geographic coverage obligation, which is expected to provide

significant benefits to consumers, but which also imposes very substantial capital and operational costs on the MNOs which (by definition) they would not have incurred for purely commercial reasons. That coverage obligation could not have been imposed on EE without its consent. The MNOs, and EE in particular, undertook the obligation in reliance, inter alia, on an undertaking that Ofcom would properly consider reducing ALFs to take account of the incremental costs involved.

- Ofcom thus resiles from a legitimate expectation on the part of the MNOs, and on the part of EE in particular, that Ofcom would properly consider adjusting ALFs to take account of the incremental costs of complying with the geographical coverage obligation, and would not limit itself to considering whether those costs would reduce the market clearing price for the relevant spectrum rights.
- For reasons set above, EE considers:
    - That it had a legitimate expectation that Ofcom would not only consider whether the incremental costs of the geographic coverage obligation would affect the market clearing price for 900 and 1800 MHz spectrum, but would properly consider whether to make an adjustment to ALFs (or the way in which they are implemented) to take account of the incremental costs of the geographic coverage obligation.
    - That Ofcom's proposed approach resiles from that legitimate expectation.

In any event, even if Ofcom's framework of analysis is adopted, Ofcom makes specific errors of reasoning as set out at above, and fails to take account of evidence from international auctions which indicates that coverage obligations do affect the market value of spectrum holdings:

- Ofcom's analysis of the impact of the geographical coverage obligation on the market clearing price is vitiated by flawed assumptions:
    - Ofcom wrongly assumes that operators will not significantly change their existing spectrum holdings. [✂].
    - Ofcom does not properly consider this possibility, and dismisses it simply by assuming that a new operator using 900 or 1800 MHz spectrum would not be required to meet the geographic coverage obligation. EE is not aware of any objective justification whatsoever for that assumption. EE does not understand how Ofcom can lawfully state that any new operator taking on spectrum covered by this licence obligation would not be expected to comply with it.
    - Ofcom also wrongly assumes that the coverage obligation applies regardless of what spectrum the operators hold. However, the coverage obligation is, in form and substance, a condition attached only to the 900 MHz and 1800 MHz licence. EE simply does not understand how Ofcom can contend that the geographic coverage obligation can have any existence independently of the licence of which it forms part. If an MNO

surrenders the licence of which it forms part, there is no other lawful basis on which the obligation can persist.

- Furthermore, Ofcom's conclusion is inconsistent with the evidence from international auctions. That evidence indicates that coverage obligations are highly material to the market value of spectrum. Plainly, that evidence should be taken into account in considering whether the coverage obligation affects market clearing price, and more broadly in considering whether ALFs should be reduced to take account of the coverage obligation. However, Ofcom has failed (so far) to consider this evidence. Moreover, the contrast between that empirical evidence and Ofcom's theoretical analysis is a strong indicator that something has gone wrong with Ofcom's analysis.

Ofcom is failing to ensure equality of treatment between operators holding 900 and 1800 MHz spectrum:

- By failing to adjust ALFs to take account of the additional costs of meeting the geographic coverage obligation, Ofcom is failing to ensure equality of treatment between operators holding 900 and 1800 MHz spectrum.
- As set out above, EE and H3G face costs in meeting the geographic coverage obligation [✂]. In failing to take account of those additional costs, Ofcom is failing to take account of an objective difference in the situations of the MNOs.

In order to avoid these serious errors, Ofcom should properly analyse whether it is appropriate to make an adjustment to ALFs to take account of the additional costs which the MNOs will incur in meeting the (voluntarily adopted) geographic coverage obligation.

As set out above, proper consideration of the relevant factors indicates that ALFs for the 1800 MHz bands should be discounted to take account of the costs of the geographical coverage obligation. Further (or in the alternative), Ofcom should carefully consider whether it would promote its statutory objectives to phase in ALFs for 1800 MHz spectrum over a longer period than it is currently proposing, to take account of the investment that is required to meet the new geographic coverage obligation.

8. Ofcom's approach fails to comply with its regulatory duties

For the reasons set out above in this response, EE considers that Ofcom's claims in the PD&C of having taken a conservative approach to interpreting the evidence regarding the market value of 1800 MHz spectrum for the purposes of setting ALFs do not stand up to scrutiny. In particular, we note that:

- In section 4 of this response we have shown that Ofcom's approach to the UK benchmark data fails to adjust for the inflationary impact of specific features of the 2013 auction; fails to properly consider the implications of much greater certainty of substantial new spectrum being made available for mobile services (except inconsistently to assume that the overall spectrum cap is no longer applicable); and fails to consider evidence of the much lower 1800 MHz market values that would be produced by cost modelling;
- In section 5, we have shown that Ofcom's proposed lump sum value for 1800 MHz of £13m per MHz is above the average of its international benchmarks of £11.6m per MHz and is based largely on a subset of only four countries, two of which Ofcom acknowledges have a significant risk of overstating values;
- In section 6 we have shown that Ofcom has chosen inappropriate parameters for the range of potential discount rates for annualisation – in particular its choice of the MCT WACC as the upper parameter, which has wrongly inflated the discount rate and thus ALFs; and
- In section 7 we have shown that Ofcom has failed to properly take into account the lowering impact on the value of 1800/900 MHz spectrum of the costs of meeting the new 1800/900 MHz licence coverage obligation when setting ALFs.

We further note that Ofcom's explanation in the PD&C as to why it believes it has been conservative is entirely unconvincing[177]:

- Ofcom's first argument is that it has assumed zero reserve prices in a particular context. However, this assumption leads to an opportunity cost estimate of £26.45m per MHz for 800 MHz spectrum.[178] Ofcom has not assumed the value of 800 MHz at this level but at the significantly higher level of £30m per MHz.
- Ofcom's second argument is that its value of £30m per MHz is 3% to 4% below its estimate of implied linear prices from the auction (which estimate itself assumes that the overall cap no longer applies). This relatively small discount is highly likely to be more than cancelled out by Ofcom's use of international benchmarks that have serious risks of overstating values. As such, it is wholly inadequate to account for the likely impact of developments in relation to other spectrum bands.

177 See Ofcom, PD&C para 2.186
178 Ofcom, PD&C, para 2.67.

- Ofcom's third and fourth arguments relate to the value of 900 MHz spectrum, not 1800 MHz.[179]
- Ofcom's final argument is that budget constraints at the time of the auction may understate the full market value of the spectrum. However, market value depends on what market participants are able to pay for spectrum. In the absence of any evidence as to whether budget constraints are less relevant now than at the time of the auction, Ofcom has no basis for assuming that market value would be less affected by budget constraints than previously. Indeed, market value may be more affected by budget constraints today than it was at the time of the auction.

In short, the purportedly conservative elements in Ofcom's analysis are of at best marginal impact for the estimated value of 1800 MHz and are likely to be more than offset by the other errors it has made that EE has identified.

The compound effect of all of these errors is that Ofcom has failed to ensure that the level of ALFs it is proposing promote the objectives in Article 8 of the Framework Directive and also failed to ensure that the level of the ALFs proposed in the PD&C is proportionate, in direct contravention of Ofcom's applicable legal obligations. We expand on these points below.

8.1 Ofcom has failed to examine or articulate how the revised level of ALFs would promote the Article 8 objectives

The PD&C suffers from the same legal flaws as Ofcom's previous consultation proposals on ALFs in that Ofcom fails to examine or articulate how the revised level of ALFs would promote the objectives in Article 8 of the Framework Directive. Ofcom has instead limited itself to the question of establishing full market value. EE refers in this regard to its previous consultation responses on this important point – which have lost none of their force for Ofcom's continued failure to take account of them.

As set out at section 3 of this response above, Ofcom is required by Article 13 of the Authorisation Directive to ensure that ALFs reflect the need to ensure the optimal use of the spectrum in question. Further, it is required to ensure that such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and shall take into account the objectives in Article 8 of the Framework Directive. It follows that Ofcom is required *specifically to consider whether the ALFs it is proposing comply with these requirements*.

It is accordingly for good reason that Ofcom's general statement of its approach to spectrum pricing (the SRSP) states as a key principle that Ofcom will undertake impact assessments of spectrum fee proposals. EE notes that Ofcom has concluded that it is not required to publish an impact assessment under s.7 CA 03. We note that the obligation to consider how the statutory

[179] See the PD&C, paras 2.145 and 2.152.

objectives are promoted is distinct from (and broader than) the obligation under s.7 CA 03 to publish impact assessments in certain circumstances, and irrespective of whether s.7 is engaged on the facts of the present case, it is clear that Ofcom is required to consider how the EU and statutory objectives are promoted (or undermined) by its proposals. However, conducting a robust impact assessment is one proven way in which Ofcom can ensure that it has met these requirements.

In its October 2013 Consultation, Ofcom acknowledged that its duties under Article 8 of the Framework Directive, Article 13 of the Authorisation Directive, s.3 and 4 CA 03 and s.3 WTA 06 were relevant to the setting of ALFs, in addition to the requirements of the 2010 Direction. Unfortunately, Ofcom did not address in detail how those duties were satisfied by its approach and the proposed ALFs, rather it stated only in brief terms that:

> *"we have considered our principal duty to further the interests of citizens, and the interests of consumers where appropriate by promoting competition, and we have considered our duties relating to the optimal use for wireless telegraphy of the electro-magnetic spectrum, the desirability of encouraging investment and innovation, the desirability of encouraging competition, having regard to the interests of consumers in respect of choice, price, quality of service and value for money. We consider that our proposals for implementing the requirement in the Direction are consistent with our statutory duties."*

Even if that brief statement were sufficient at the time it was made (which it clearly was not), Ofcom cannot now rely on that statement to discharge its obligation to consider whether the present, different, proposals satisfy the EU and statutory objectives in the light of all the facts as they are now known to Ofcom. However, in the present PD&C, which purports to set out Ofcom's provisional decision on the level of ALFs, Ofcom does not make even an equivalent brief statement, let alone conduct any substantive analysis of how its provisional decision would serve the objectives which it is statutorily required to pursue. That is a serious flaw: Ofcom is failing to address the relevant factors which, as a matter of law, it is required to take into account in reaching its decision.

For the avoidance of doubt, the fact that the 2010 Direction requires it to revise ALFs so as to reflect the full market value of the relevant spectrum does not remove from Ofcom the requirement to consider whether and how the ALFs set promote its statutory objectives:

- First, as set out at in section 3 above, Ofcom cannot rely on the terms of the 2010 Direction to justify any action which would not be lawful under Article 13 of the Authorisation Directive and Article 8 of the Framework Directive.
- Secondly, and in any event, the 2010 Direction does not identify a specific level at which ALFs must be set: the requirement is only that the ALFs set should "reflect" full market value and it is clear that there may be a range of prices which could properly be described as full market value.
- Thirdly, it is also clear that there is considerable uncertainty and room for error in seeking to ascertain full market value and Ofcom should

consider its statutory duties in considering where the balance of risks lies in that regard.

8.2 The overall level of ALFs proposed is disproportionate and does not promote the statutory objectives

By reason of the various specific errors of reasoning identified in this response,[180] it is clear that Ofcom's conclusions are biased towards higher ALFs at each stage of the analysis. As a result, the ALFs proposed by Ofcom are disproportionate to the aims set out in Article 8 of the Framework Directive and are unlawful.

- First, the proposed increase in ALFs will not secure the optimal or efficient use of spectrum, contrary to Article 13 of the Authorisation Directive, Article 8(2) Framework Directive, s.3(2) CA 03 and s.3(2) WTA 06:
    - Lower service prices will support greater usage of the relevant spectrum and thereby support efficiency in its use. Further, conservatively set ALFs will also reduce the risk of spectrum being left fallow.
    - There is no countervailing risk that the spectrum might be "over-consumed" by mobile services as a result of being under-priced as there is no material prospect of the ALF spectrum being more efficiently used for the supply of services other than mobile services; and given the possibility of spectrum trading, operators can in any event be expected to take into account the market value of their spectrum resources even if ALFs are set below market value.
    - One of Ofcom's efficiency arguments is that direct costs, such as ALFs are more visible to shareholders than is the opportunity cost of holding licences. However, there is no evidence to support this argument. Nor is there any clear reason to believe shareholders and management acting on behalf of shareholders will not efficiently manage an operator's spectrum holdings, which are among the largest assets owned by the operators. Neither shareholders nor management can be expected to simply hold an asset that could be sold for tens of millions of pounds if that asset is not generating significant value to the operator.
    - Ofcom also cites in support of its efficiency claims the fact that operators have noted the pressure that they would be under from Ofcom's proposed increase in ALFs. Ofcom claims that this implies that operators were not already taking into account

180 For the avoidance of doubt, this includes both those errors which are in themselves unlawful as set out above, and other errors of reasoning identified elsewhere in this response.

the opportunity cost of the spectrum. There are two flaws in Ofcom's argument. First, as shown in sections 4 to 7 of this submission, Ofcom's proposed increase in ALFs for 1800 MHz is higher than the likely market value of the spectrum. Second, ALFs require operators to have the funds to make the payments (such as by raising additional debt or equity). This is not equivalent to forgoing for a period the value that would be received upon the sale of spectrum.

- Secondly, the proposed increase in ALFs is likely to bring harm to consumers in terms of higher prices, contrary to Article 8(2) of the Framework Directive and s.3(1) and (5) CA 03:
    - Economic theory suggests that there should be a high (but not necessarily complete) level of pass-through of variable costs to end-user prices in a market as competitive as the UK mobile market[181]. Further, the available evidence does not enable the full market value of ALFs spectrum to be identified precisely, but only within a wide range. This effect suggests that end-users will be better off with lower ALFs.
    - Ofcom recognised in the August 2014 Consultation that setting ALFs above the true market value risks artificially depressing mobile traffic.
    - Against this clear harm, there is no coherent argument to suggest that setting lower ALFs below true market value could harm consumers.
    - There is accordingly a clear asymmetry in the impact on consumers: should ALFs be set too low, consumers will gain from lower service prices while if ALFs are set too high, consumers will lose from higher service prices.
- Thirdly, the higher the level of ALFs the more likely that investment will be harmed, contrary to Article 8(5) of the Framework Directive and s.3(4) CA 03. In particular, less than complete pass-through of ALF increases would lead to lower returns for the industry and reduce investment. The international diversified mobile operators and capital markets are instead likely to allocate capital to other counties to the detriment of UK citizens and consumers. Ofcom's proposal to not compensate the mobile operators for the cost of the new coverage obligation also increases regulatory risk to the sector. Ofcom has previously noted the importance of avoiding asymmetric profit shocks. Moreover, a failure to provide some compensation for the coverage obligation is also discriminatory as it is likely to have a disproportionate impact on EE and H3G compared with Telefónica and Vodafone. There are means available for Ofcom to compensate the operators for the cost of coverage and it behoves Ofcom to utilise them.

181 See, for instance, Oxera, "Quantifying antitrust damages – Study prepared for the European Commission", 2009, p.x.

9. Annex 1: Response to consultation questions

Question 1: Do you agree with the approach we put forward to assess the impact of the geographic coverage obligation on revising ALF to reflect full market value?

No, for the reasons set out in the body of this response and in particular in section 7.

Question 2: Do you agree with our assessment under the approach that we have put forward of the impact of the geographic coverage obligation on the market value of 900 MHz and/or 1800 MHz spectrum for the purpose of revising ALF to reflect full market value (where possible, supported by evidence)?

No, for the reasons set out in the body of this response and in particular in section 7.

Question 3: If you think that we should use a different approach to assess the impact of the geographic coverage obligation, what is your alternative approach and why do you consider it more appropriate than the approach we put forward?

Please see the details provided in the body of this response and in particular in section 7.

Question 4: If you have set out an alternative approach to assess the impact of the geographic coverage obligation, what is your assessment under that approach of the impact of the geographic coverage obligation on the market value of 900 MHz and/or 1800 MHz spectrum for the purpose of revising ALF (where possible, supported by evidence)?

Please see the details provided in the body of this response and in particular in section 7.

Question 5: Do you have any other comments on whether, and if so how, the geographic coverage obligation, taking account of the associated incremental costs incurred by the MNOs, should impact ALF?

Please see the details provided in the body of this response and in particular in section 7.

10. Annex 2: CEG's memorandum on cost modelling

Please see memorandum submitted alongside this response: "CEG memo on modelling ALF value_17 April 2015", prepared by CEG for EE, which details the approach applied to estimate the market value of 1800 MHz spectrum based on the costs that would be saved from the UK operators gaining an increment of 1800 MHz spectrum and the additional costs that would be incurred by the UK operators losing an increment of 1800 MHz spectrum.