# Annual licence fees for 900 and 1800 MHz

## EE response to Ofcom's consultation

January 2014

Non-Confidential version

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# 1. Executive Summary

Ofcom has proposed to increase the annual licence fees ('ALFs') for 900MHz and 1800MHz spectrum from the current level of £65m to £309m, a nearly five-fold increase.

We consider Ofcom's proposed increase to be unjustifiably high, particularly so with respect to 1800MHz spectrum which EE holds.

**Ofcom presents no evidence that spectrum is inefficiently used by mobile operators and that significant increases in annual fees will make spectrum use more efficient.**

Ofcom concluded the combined 800 MHz and 2.6 GHz auction in Q1 2013, releasing 78% more spectrum for mobile and has dedicated a considerable amount of its resources to creating a pipeline of additional spectrum bands for mobile use in the future. These actions suggest Ofcom believes mobile operators neither have too much spectrum nor use it inefficiently.

The combined auction of 800 MHz and 2.6 GHz also represented an opportunity to redistribute the shares of different mobile spectrum bands amongst UK operators but resulted in relatively small changes given the differences in relative holdings.

Consistent with this, we see no evidence the mobile sector has too much spectrum nor that mobile spectrum is inefficiently distributed amongst mobile network operators ('MNOs'), nor that Ofcom thinks otherwise. Significant increases in annual licence fees ('ALFs') are therefore not needed to correct any distortion in mobile spectrum use.

We commissioned Plum Consulting to consider the economics of ALFs and their impact further. Plum Consulting notes the inherent contradiction in Ofcom's suggestion that ALFs will have an impact on incentives to use spectrum more efficiently, suggesting real effects emanating from ALFs (and not just a transfer of surplus from the operators to the Government), while at the same time not undertaking an impact analysis of the real impacts of the mechanisms through which those real effects would occur.

**The proposals for 1800MHz in particular are in conflict with Ofcom's previously expressed views, the results of the auction and European benchmark data.**

We recognise that Ofcom has been directed by Government to revise annual fees for 900 and 1800 MHz spectrum to reflect "full market value", and hence this consultation is not about the principle of full market value but the methodology to be used to assess such value and the eventual valuations. Given the Government Direction and its reference to the results of the UK auction, we also understand at a high level why Ofcom has proposed a methodology that starts by establishing lump-sum values for the spectrum, based on auction benchmarks, and then converts those to annual payments. However, we do not think that is the only relevant methodology – as in other Administrative Incentive Pricing ('AIP') determinations, it is also relevant and consistent with Ofcom's statutory duties to consider avoided network costs, for example, as a check on the proposals.

Further, the level of the increase in fees proposed by Ofcom, on the basis of its methodology, is not reasonable or proportionate (and is not justified through any appropriate impact assessment). In particular, the 1800 MHz fees are excessive to a much greater extent than the 900 MHz fees. This can be clearly seen by comparing Ofcom's current proposal with its views of the value of 1800 MHz expressed before the auction, as well as the auction prices that came out at the lower end of the range of European benchmarks. It is therefore disproportionate and unreasonable that the lump-sum values Ofcom proposes for setting ALFs are at the top of the range of European benchmarks.

**Ofcom makes a series of process errors in calculating its proposed Annual Licence Fees.**

The first of these is in Ofcom's benchmarking analysis. It seeks to establish the lump-sum value of 900 and 1800 MHz with reference to European 4G spectrum auctions using a methodology that can be described as highly selective. Ofcom does not have clear, objective and consistent criteria for choosing which auctions should form part of the benchmark data set, the evidence that it does include is not analysed consistently and the derivation of two sets of relative prices for 1800 MHz from each auction introduces unjustified variance into the inferences drawn from benchmark data.

EE and Three jointly commissioned Aetha and Analysys/Mason to review Ofcom's benchmark analysis and propose what the benchmark value of 1800 MHz should be using the information from the UK auction and European benchmarks in a robust analysis. Given the available evidence, Aetha and Analysys/Mason conclude that a lump-sum value of approx. £9m per MHz more accurately reflects the value of 1800MHz in the UK. This is about 40% lower than Ofcom's proposed figure of £15m per MHz. We note that, given Ofcom's proposed 900 MHz lump sum value of £25m per MHz, our proposed 1800 MHz lump-sum value is also consistent with the auction benchmark evidence on relative values of 900 MHz and 1800 MHz (which suggest that 1800 MHz values are on average 30-40% of 900 MHz).

Ofcom follows this serious and material error in its lump-sum valuation by omitting to adjust for the inherent differences between the values obtained in an auction of 'new', clean spectrum and the value of renewal licences for spectrum, in which operators already have significant associated investment. This means Ofcom converts the lump-sum value to an annual payment stream using the wrong formula, a formula that does not adjust for the terminal value element of bids for 'new' spectrum.

Finally, the discount rate applied in the conversion formula is not the relevant discount rate. Ofcom argues that the weighted average cost of capital ('WACC') is the appropriate discount rate, implying that this relates to an investment subject to the same risks as the wider business. In fact the question facing Ofcom is to establish the discount rate at which the MNOs would be indifferent between paying the lump-sum value upfront or a long-term contract of annual instalments. The only relevant element of risk therefore relates to Ofcom itself: it is the risk that Ofcom may act irrationally or unexpectedly in revising the ALFs in the future. We assume that Ofcom would agree that this risk should be relatively low in a stable regulatory regime, such as that in the UK. Hence a more appropriate discount rate is the cost of debt (post-tax). The

cost of debt is 2.4% compared to the post-tax WACC of 4.2% per annum. Applying the appropriate discount rate would alone result in annual fees being 15% less than Ofcom's conversion.

If all these errors were adjusted for, Ofcom's proposals for Annual Licence Fees for EE's 1800MHz spectrum would be reduced from approx. £120m to £43m. This is still a substantial increase from current rates.

If Ofcom persisted with its current proposals, its approach would have a profound impact on mobile operators and our customers. Customers would experience a delay in 4G rollout in those predominantly rural areas where mobile broadband could have a large socio-economic impact. In due course, price increases would follow. As suggested above, we believe the potential for such effects requires a thorough impact assessment. Given that the Government never undertook an Impact Assessment of the requirement on Ofcom to charge 900 and 1800 MHz fees at "full market value", the Impact Assessment presented by Ofcom in the current Consultation is weak and incomplete. It does not assess the proposal against the correct counterfactual and Ofcom has no dynamic analysis of how the proposed new fee levels may impact consumer prices and by how much, or how investment may be affected given the low levels of profitability that UK MNOs exhibit.

We also note that the proposed 'claw back' implementation, by which Ofcom would invoice annual fees both with respect to the previous and the coming year at the first invoice after the implementation of the new fee levels, is unlawful. We propose alternative ways of implementing the new fee level to achieve a common effective date for the new fee levels for all operators. In a proper impact assessment, Ofcom would also consider phasing in the new fees as has been the case for other sectors.

In order to promote its statutory duties and the purpose of the Direction, Ofcom must substantially revise its proposals. Specifically, we suggest Ofcom should firstly, cut its proposed 1800 MHz fees drastically. Correcting the benchmarking error alone would result in 1800 MHz lump-sum values at less than two thirds of that proposed, restoring a more appropriate balance between 900 MHz and 1800 MHz values. Ofcom must also correct for errors in the conversion to an annual fee to get to an appropriate 1800 MHz ALF of about a third of that proposed. Secondly, Ofcom should carry out a rigorous impact assessment of its new proposals. Finally, Ofcom should implement the new fees without imposing the currently proposed claw back proposals.

# 2. Introduction

We are not aware of any evidence that mobile spectrum is not used efficiently in the UK - its use certainly generates a lot of economic value. An estimate on behalf of Government suggests that the use of mobile spectrum generates £30bn of economic value every year, which represents 58% of the value derived from spectrum by the private sector.[1] ALFs (or its predecessor, AIP) is not needed to incentivise efficient use and indeed our view is that such fees pose a risk of negative consequences in a market based spectrum management framework.

We recognise however that this consultation is not about the principle but the methodology by which Ofcom responds to the Government Direction to revise annual fees to reflect "full market value". Nonetheless, a consideration of the consequences of setting fees at the proposed level is relevant. Determining 'full market value' is not a science that will yield an objective result; there is a range within which the market value could lie. Valuation is about correctly establishing this range and then picking from within it based on good judgement whilst being mindful about the impact such fees would have. It is because Ofcom's judgements lack balance and because their impact has not been properly considered that we remain shocked by Ofcom's proposals.

This document contains EE's response to Ofcom's consultation document, "Annual licence fees for 900 MHz and 1800 MHz spectrum", published on 10 October 2013 ('the Consultation'). It covers a range of concerns and issues, as described below. We comment on how Ofcom has implemented the Government Direction, an implementation based on a narrow interpretation of the wording of the Direction and one that contains several errors both in judgement and in law. We are concerned that Ofcom has not had sufficient regard to all of its statutory duties or indeed to the stated purpose of the Direction.

In section 3, we discuss the lack of a clearly defined rationale for ALFs. We also describe how the Consultation lacks an economic framework within which to articulate a problem that ALFs might be seeking to address and fails to discuss the mechanisms by which the proposed fees would redress such a problem. It is our view that an economic framework for analysis of the ALFs would enable Ofcom to assess the impacts of its proposals properly.

In section 4, we quantify some of the effects the proposed levels of ALFs could have for EE in terms of price increases and investment delay. Section 5 then looks at Ofcom's benchmarking analysis to arrive at a lump-sum valuation for spectrum, while section 6 considers the conversion from a lump-sum value to annual fees. Section 7 considers the implementation of revised fees. Finally, section 8 concludes on the total impact of the adjustments necessary to make Ofcom's proposals accepted and section 9 provides a short summary of our response to each consultation question.

[1] Analysys Mason, "Impact of radio spectrum on the UK economy and factors influencing future spectrum demand", Final Report for Department for Business, Innovation and Skills and Department for Culture, Media and Sport, 5 November 2012

# 3. Economic framework for assessing impact of ALFs

We have a number of fundamental concerns with the economic analysis contained in the Consultation and this section elaborates the reasons for our concerns. Underlying these concerns we consider that Ofcom has failed to lay out a suitably clear economic framework for ALFs. That is, the Consultation does not set out a clear rationale for ALFs in terms of providing an economic framework which enunciates the problem which they are designed to address and the mechanisms by which they do so. EE has commissioned Plum Consulting to consider these issues and the underlying economics which apply to ALFs. This section of the response especially draws on Plum's report and analysis to consider the issue of the extent to which ALFs promote different types of economic efficiency and how. We have submitted Plum's report titled "Annual licence fees – you cannot have your cake and eat it" as part of our response.

We have structured this section as follows: the first sub-section addresses the implicit suggestion in the Consultation that mobile spectrum is being inefficiently used, which is in contrast to our view that licensees have strong incentives to use spectrum efficiently regardless of ALFs, meaning that ALFs are an unnecessary regulatory burden; the second sub-section explains why a proper impact assessment, based on a coherent economic framework, is required, notwithstanding the requirement from the Direction to set ALFs at "full market value".

## 3.1 ALFs and efficient spectrum use

Ofcom's stated policy is to intervene only where regulation is required and act with a bias against regulation.[2] This injunction in favour of regulatory restraint is also inherent in the Communications Act, which requires Ofcom to carry out its functions with a view to securing that regulation does not involve "the imposition of burdens which are unnecessary; or the maintenance of burdens which have become unnecessary".[3] In the Consultation, Ofcom implies that ALFs will promote efficient spectrum use; this view is inherent both in the arguments made in Annex 9 of the Consultation and in the statement Ofcom has made that it considers the level of full market value assessed in the document is consistent with its wider statutory duties[4] - these duties include the obligation to promote efficient use of spectrum. This further implies that Ofcom believes the current use of 900 and 1800 MHz is inefficient: otherwise ALFs (and AIP) would be an unnecessary regulatory burden on licensees.

EE strongly disputes any such view. A view that the 900MHz and 1800MHz licensees do not already have incentives to use these bands efficiently is at odds with the available evidence. All the existing (and prospective) holders of

2 See http://www.ofcom.org.uk/about/what-is-ofcom/statutory-duties-and-regulatory-principles/ or Ofcom, "Draft Annual Plan 2014/2015". Consultation published 20 December 2013, para. 1.7

3 Communications Act 2003, Section 6(1)

4 Consultation, para. 3.35

such spectrum bid for (and won) licences in the 800 MHz and/or 2.6 GHz bands in the combined auction held in Q1 2013. This would not have been rational behaviour if operators considered they were able to use existing bands more efficiently.

Looking ahead, MNOs face increasing demand for mobile data capacity. Any conceivable future demand scenario sees additional demand for capacity over the next decade.[5] The question is how to meet this, i.e. what is the efficient blend of additional spectrum and additional site infrastructure to produce more capacity? As we did in the combined auction in Q1 2013, over the next decade operators will face this choice continuously, both when making decisions about investments in network densification and in upcoming spectrum auctions. For example, one would expect an operator, who at a given point in time has unused spectrum, to deploy more carriers before investing in network densification. Operators have a clear incentive to use their spectrum holdings efficiently in the absence of ALFs because spectrum is a scarce resource and the alternatives to using that spectrum in the most efficient way are costly: acquisition of more spectrum or investment in more sites and equipment.

If Ofcom is suggesting that spectrum usage is inefficient because licensees have got the balance between spectrum and additional infrastructure wrong,[6] EE suggests that when setting ALFs it would be highly relevant for Ofcom to look at the associated costs of building more sites as it did under its AIP methodology. Yet, Ofcom specifically rejects network cost modelling in Annex 6 of the Consultation because the uncertainty around future mobile data demand generates too much uncertainty in the associated cost modelling results.

In conclusion, we are highly sceptical that there is a rationale for ALFs in terms of efficiency; operators face strong incentives to use existing spectrum efficiently without paying ALFs and Ofcom's principle of seeking the least intrusive regulatory intervention would suggest ALFs are an unnecessary regulatory burden. It is in the context that Ofcom needs to analyse the impacts of its proposal properly and to consider and assess the mechanism by which ALFs promote spectrum efficiency.

## 3.2 The Direction and Impact Assessment

The Direction required Ofcom to set the fees paid for non-auctioned mobile spectrum (900 MHz, 1800 MHz and 2.1 GHz) at "full market value".

EE notes that no explicit impact assessment was undertaken in relation to this specific aspect of the Direction. The impact assessment undertaken to assess the Direction included no analysis of the proposal to set ALFs at full market value or any assessment of the actual level of full market value. The options considered in the impact assessment of the Direction all included the proposal

5 See for example section 1.5 of Real Wireless, "Techniques for increasing the capacity of wireless broadband networks: UK, 2012-2030", April 2012. A report commissioned by Ofcom and which Ofcom relied on in its UHF Strategy Statement.

6 In the context of Mobile Call Termination market reviews, Ofcom has always considered the mobile operators (productively) efficient, and a suggestion that we are unable to determine the efficient balance between spectrum and infrastructure would somewhat contradict that view.

to set ALFs at full market value.[7] In our view, the proposal to use an approach using 'full market value' to set spectrum fees represented no significant departure from Ofcom's pre-existing AIP policy. In setting the Direction, the Government may have relied on its perception that Ofcom would set fees at these levels anyway.

We therefore do not consider that Ofcom can rely on any analysis undertaken in support of setting the Direction to satisfy the requirement to provide an Impact Assessment for its current proposal: it needs to consider afresh the overall impact on the sector and consumers of how it interprets the "full market value" requirement and surrounding risks. The meaning of this term is clear with reference to liquid markets where goods or services are traded frequently; it is the price at which demand and supply balance (although there is no distinction between 'full market value' and 'market value'). In the case of mobile access spectrum however, there are very few reference trades. Consequently, there is a considerable spread of reasonable estimates of what 'market value' is for mobile spectrum. Therefore how a particular level of ALFs impacts on incentives and economic efficiency needs to be properly and appropriately assessed. A deficiency of Ofcom's approach is that the resulting benefits (if any) of setting ALFs at the proposed levels have not been compared to the costs or to reasonable alternative interpretations of full market value.

Undertaking such an assessment of how the proposed increase in ALFs encourages efficient use, would at the very least have to consider whether end user prices need to increase correspondingly in order for our customers to take this resource cost into consideration in their consumption of voice and data which determines the total capacity demand. The Consultation contained no assessment of the potential for increased retail prices and lower consumption of mobile services. Higher retail prices will also have an impact on overall welfare. Increasing prices could lead to lower ownership levels of mobile handsets or reduced usage. The patterns of such impacts across different customer types (including vulnerable customers whom Ofcom has a statutory duty to protect) also needs to be taken into account and assessed against Ofcom's statutory duties. The Consultation includes no assessment of these welfare effects and makes no attempt to assess the overall size of the net benefits which would be achieved.

As a basic proposition, it is logical to expect that higher usage charges would lead to lower usage. The Consultation, however, is neither clear nor explicit on whether Ofcom considers that this is necessary or will occur. Some of the analysis in the Consultation would seem to suggest that Ofcom takes this view, at least implicitly. For example:

[7] That impact assessment also referenced four other IAs: The first (Digital Britain Final Report IA, June 2009) does not appear to contain any assessment of the impact of a full market value proposal. The second (October 2009 Consultation on a Direction to Ofcom) did refer to the proposal of full market value / full economic value as being one of the Independent Spectrum Broker's proposals, but did not appear to carry out any in-depth impact assessment of this. The third (first Digital Economy Bill Impact Assessment, November 2009) did not appear to refer to the full market value proposal for ALFs at all. The fourth IA mentioned (the second IA of the Digital Economy Bill from March 2010) provides an impact assessment for the proposal to change the Wireless Telegraphy Act 2006 to permit Ofcom to charge ALFs for licences allocated by auction – which is not relevant to 900 and 1800 MHz spectrum.

- Ofcom accepts that the levels of ALFs may feed through to retail prices in paragraph A9.5 and footnote 183 in Annex 9 but relies on the level of fees being at market value as being sufficient justification for such fees to avoid introducing a "market distortion". In making this argument, Ofcom is essentially assuming that spectrum usage is inefficient ("distorted") without the increase in fees, without providing any evidence for that proposition. Further, this approach fails to take account of the risks and uncertainties around the level of "full market value". That is, Ofcom stresses the uncertainties around market value in coming to its view on the appropriate lump sum value but, once it has chosen a value, it disregards those uncertainties and assumes that that value is the least distorting one.
- Paragraph 6.9, in discussing the implementation of the increase in fees, states that different implementation dates could have "significant differential impacts" on the licensees, which implies that Ofcom accepts that ALFs can have an impact on prices and the ability to compete in the downstream retail markets. Similarly, in paragraph 6.10 the Consultation notes that "[t]here is the potential for such a payment separation to have an effect on competition", which again implies that higher ALFs will need to feed through to impact competition in downstream markets.

EE considers that any price increase leading to a reduction in demand is highly unlikely to be welfare enhancing (as is strongly suggested by Ofcom at paragraph A9.5). For this to be the case, spectrum usage would need to be inefficient, despite the strong market incentives all operators have to use spectrum efficiently (as discussed further in the attached Plum report). If Ofcom considers spectrum use to be inefficiently high in the absence of ALFs, this must mean that consumers would need to lower their demand in response to higher prices for the market distortion to be corrected by ALFs. Given this, it is incumbent on Ofcom to set out the mechanism by which this cost pass through works and how in fact demand would respond to such price increases through lower ownership and/or usage. A proper impact assessment of the specific proposed ALFs should consider these issues in much greater detail than Ofcom has done, in order to set any costs or associated risks against the benefits of more efficient spectrum usage (if any). Ofcom should also set out evidence for spectrum usage being inefficient and what efficiency costs this implies. Ofcom's approach essentially assumes that ALFs result in net benefits and such unsubstantiated assumption is clearly not sufficient.

In the absence of any evidence or information on the likely cost pass through strategies from MNOs, it is unclear how Ofcom could come to the view stated in the Consultation regarding likely demand responses. For example, Ofcom have previously argued in the context of the Mobile Call Termination Market Review that cost pass through to monthly line rental is likely to have a limited impact on ownership or subscription levels.[8] If Ofcom still consider this to be the case, and no consumer behavioural changes were expected, it is not clear how ALFs passed through to higher consumer prices would increase spectrum efficiency.

[8] Ofcom, 2011 Mobile Call Termination Statement, para 7.149, 15 March 2011

The stated purpose of the Direction itself also needs to be taken into account. The Direction sets out the underlying objective in setting ALFs at full market value:

> "The Secretary of State gives these directions for the purposes of: ensuring the release of additional electromagnetic spectrum for use by providers of next generation wireless mobile broadband; allowing early deployment and maximising the coverage of those services; creating greater investment certainty for operators; and implementing Directive 2009/114/EC(**b**) and the Decision(**c**) on the liberalisation of frequencies in the 900MHz and 1800MHz bands."[9]

In meeting the requirements of the Direction, Ofcom should also establish how (and whether) its proposed approach promotes the purposes of the Direction.

We would conclude that it remains important to assess the impact of increasing spectrum fees and the extent to which such increases promote efficiency and meet the various objectives set for them (either through meeting the objectives of the Direction itself or through promoting Ofcom's wider statutory duties). Given that the Impact Assessment associated with the Direction itself did not consider such impacts, the mere fact that the Direction requires fees to be set at "full market value" does not exempt Ofcom from having to consider the wider impacts of setting fees at specified levels and taking these impacts into account when exercising judgment around the appropriate level of ALFs. (This incidentally is what Ofcom would need and be required to do if it was updating the existing AIPs.[10])

## 3.3 Conclusion

Whilst the Direction clearly stated the wider purposes it sought to achieve, there was no specific assessment of the impact that setting ALFs at full market value would have. For the reasons set out above, EE considers that Ofcom has not carried out a proper IA in the Consultation - it has failed to assess properly the impacts of its proposed approach on the downstream retail markets and hence failed to undertake a full assessment of how higher ALFs will in fact promote efficiency and welfare. Ofcom's approach seems to imply a belief that MNOs and their customers consume spectrum inefficiently - and increasing the fees paid for spectrum will remove, or at least reduce, such a distortion. If ALFs are not removing such inefficiency, then it would not be appropriate to introduce them, as this would be contrary to Ofcom's regulatory principles and statutory duties. The Direction cannot override Ofcom's requirement to comply with its statutory duties.

However, EE strongly refutes that ALFs are necessary to encourage efficient spectrum usage. We urge Ofcom to describe clearly the mechanism by which ALFs will help achieve the purpose of the Direction and its statutory objectives. This is not clear from the current Consultation and this creates a deficiency in the assessment of the impact of the proposed ALFs.

9 The Wireless Telegraphy Act 2006 (Directions to OFCOM) Order 2010, Section 2

10 Ofcom's AIP framework notes explicitly that the potential for AIP to increase end user prices should be considered under the impact assessment of the AIP (SRSP, para 5.152)

# 4. Our impact assessment

In the previous section we discussed the economic framework in which a proper, dynamic assessment of the impact of ALFs should be undertaken. This section outlines the practical, commercial reality that EE (and other UK MNOs) would face if Ofcom's proposed ALF increase became a reality. These considerations should be included in a proper Impact Assessment by Ofcom with both quantitative and qualitative elements.

We first explain why, in the broader context both of the competitive market that we operate in and of the various other regulatory decisions affecting MNOs in the UK, ALFs will not simply be taken out of operator profits in a straightforward 'rent transfer' from the private sector (the MNOs) to government. We then illustrate:

- the impact increased ALFs could have on prices if we were to recover the cost increase through increased revenue: and
- how increased ALFs might translate into delayed 4G rollout in less populated areas through constraints on CAPEX budgets to protect minimum dividends in the short term.

## 4.1 Overall investment climate

In assessing the impact of individual regulatory interventions, it is our view that Ofcom should also consider the wider context, taking account of the cumulative impact on the sector of different regulatory measures. Ofcom has not done this and assesses the impact of the increased ALFs on MNOs in isolation rather than in light of how it interacts with other regulatory measures being imposed.

While it is possible that many of the individual regulatory constraints on their own do not affect the commercial sustainability of MNOs, the combined effect is very substantial. The cumulative regulatory burden is starting to constrain the commercial ability of communications providers to compete effectively and sustainably, to the ultimate harm of consumers and citizens. The significant increase in cost which the proposed ALFs represent is an additional burden which MNOs will not be able to absorb. The cumulative effects of regulatory interventions by Ofcom and the European Commission, combined with a very tough competitive environment, have already compromised the ability of the UK MNOs to make an acceptable return; new burdens (emanating again from both Ofcom and the Commission, and including the proposed ALF payments) threaten to make this worse.

This point is clear from a consideration of the EBITDA margins of MNOs, including EE. By definition, EBITDA margins do not include the costs of capital and mobile telephony is a capital intensive business, meaning we need to earn relatively high EBITDA margins. A recent BCG report for ETNO states that MNOs need to earn EBITDA margins of around 25% to recover their cost of capital.[11] Reductions of EBITDA margins of the scale of 1 or 2 percentage

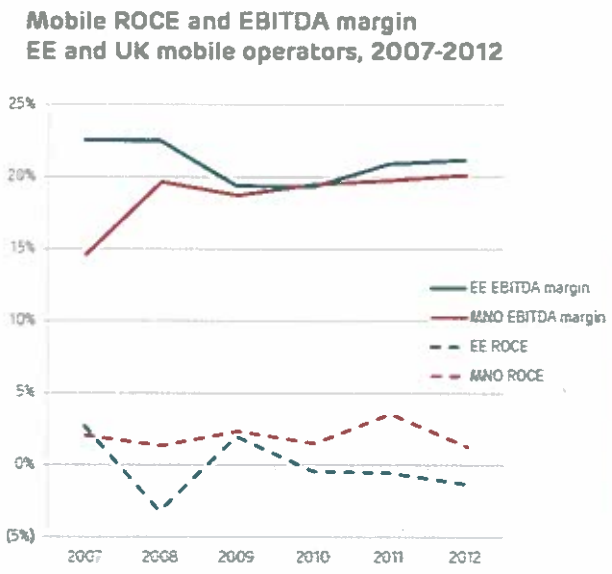
[11] BCG Report for ETNO, Reforming Europe's Telecoms Regulation to Enable the Digital Single Market, Exhibit 7, page 24, July 2013

points from a superficially acceptable level can therefore be highly damaging for UK MNOs.

EE estimates that recent and proposed regulatory interventions (notably mobile termination rate ('MTR') cuts, roaming regulation and the Single Market proposals) will reduce MNO EBITDA margins by between 1 and 3 percentage points. ALFs, if implemented at the proposed level, would reduce EBITDA margins by a further 1%. EE has made significant efforts to increase its EBITDA margin over recent years towards a stated target of 25% by the end of 2014. We estimate that average EBITDA margins across all UK MNOs are around 20%, as compared to EBITDA margins of around 35% in continental Europe and more than 40% in the USA.[12]

Figure 1 illustrates historic returns achieved in the UK.[13] The chart indicates that EE and the UK MNOs do not achieve an acceptable return currently and therefore the cost increases represented by Ofcom's proposals would further worsen this picture if their commercial consequences could not be counteracted by price rises.

**Figure 1: Profitability of UK mobile network operators**




| Converting EE EBITDA to ROCE | 2012 UK estimate |
|---|---|
| (A) EBITDA margin | 21.2% |
| (B) ITDA margin | 23.8% |
| (C) operating margin* | (2.6%) |
| (D) Sales : Capital employed | 1 : 2 |
| (E) ROCE** | (1.3%) |

*operating margin = (A) – (B)
**ROCE = (C) / 2

Source: EE, various operator financial reports

The effect of raising ALFs to the level proposed in the Consultation (assuming no other changes) would be to push EE's returns into even more negative territory, despite the efficiencies which EE is achieving and the synergies

12 See for example, http://www.reuters.com/article/2014/01/11/us-ces-mobile-pricewar-idUSBREA0A08U20140111, reporting AT&T EBITDA margin as 42% and Verizon's as 51% with fourth operator, T-Mobile stating a long term goal of 34-36%

13 There are three key assumptions in the above conversion methodology. First, we derive the post tax, depreciation and interest operating margin (represents the EBITDAmargin less the 'ITDA' charges). Second we identify the sales to capital employed ratio, where capital employed is defined as current assets less current liabilities. Finally, we derive the (negative) ROCE by applying the sales to capital employed ratio to the operating margin ( i.e. by dividing the operating margin by 2).

resulting from the creation of a combined network. Clearly such a position is not sustainable and cannot be the intention of sector regulation.

## 4.2 Illustrative price increases due to ALFs

The proposed increase in ALFs will continue a recent and broader trend of regulation having significant impact on MNO revenues and costs, requiring changes to end user prices in order to achieve the minimum required profitability. MTR cuts of 45% in each of the three financial years to 2013/14[14] have been partially – but not fully – offset in the retail market via higher consumer prices. On-going regulatory cuts to roaming revenues have reinforced the need for similar action to increase other revenue streams.

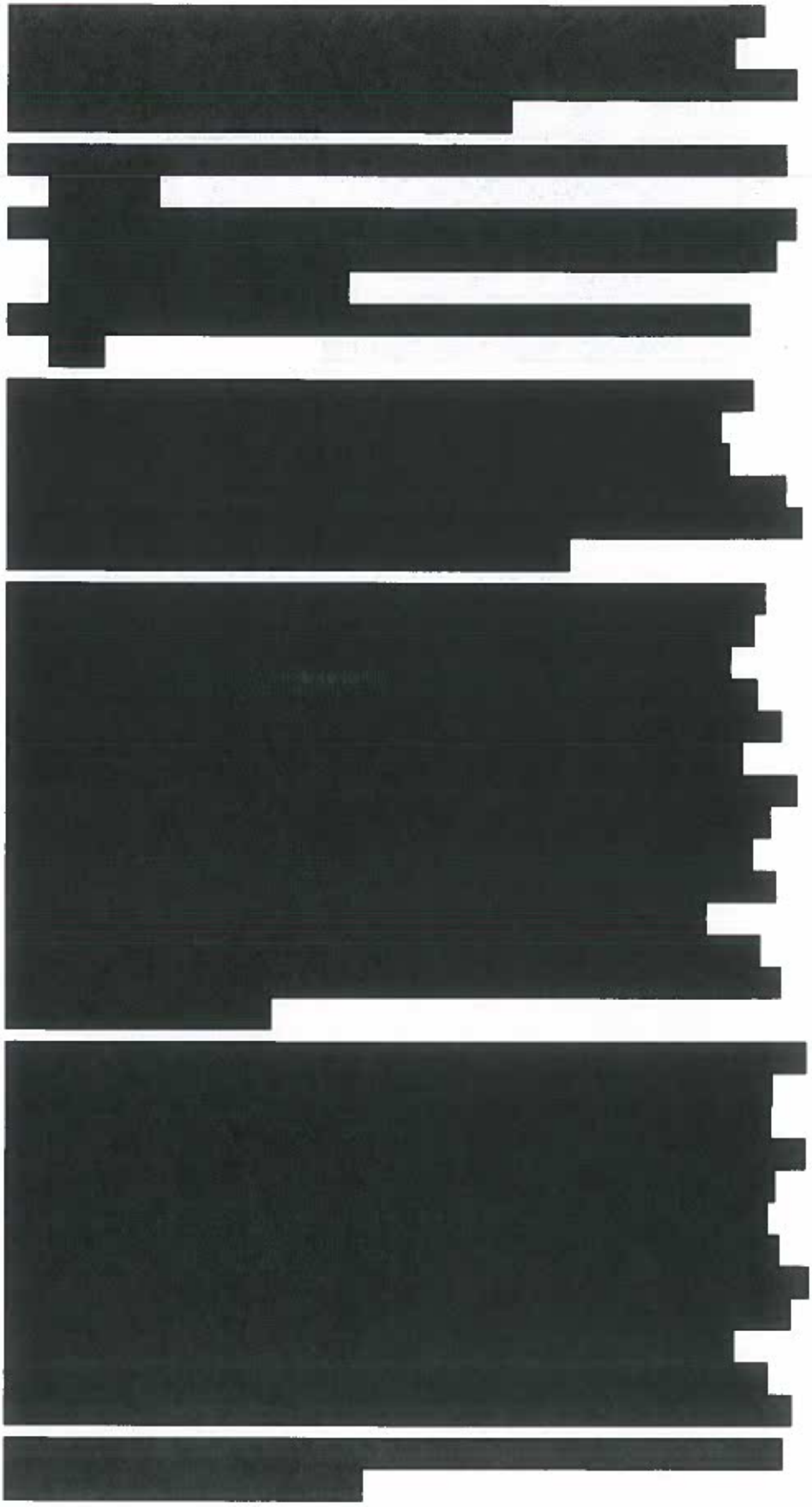
The cumulative financial impact of these regulatory measures continues to represent a drag on EE's profitability, as the financial impacts have not been fully recovered from elsewhere in the business. There are lags between the timing of the impact of regulation and when this impact can be offset through other types of revenue. To highlight this problem, EE publishes both underlying service revenue and profitability, excluding and including the impact of regulation. For instance, EE reported year-on-year service revenue growth of 0% excluding regulation and -4.4% including regulation for the same period and a £29m reduction in EBITDA for the first half of 2013 due to regulation. These numbers quantify the significance of these regulatory impacts on EE's revenue – and, of course, on profits.[15]

Ofcom's proposed increase in 1800 MHz licence fees means that EE would have to pay £115-120 million per annum instead of the current £32 million, with liabilities accruing on the EE profit and loss account from 2014. The proposed fee increase would have a significant negative impact on our profitability

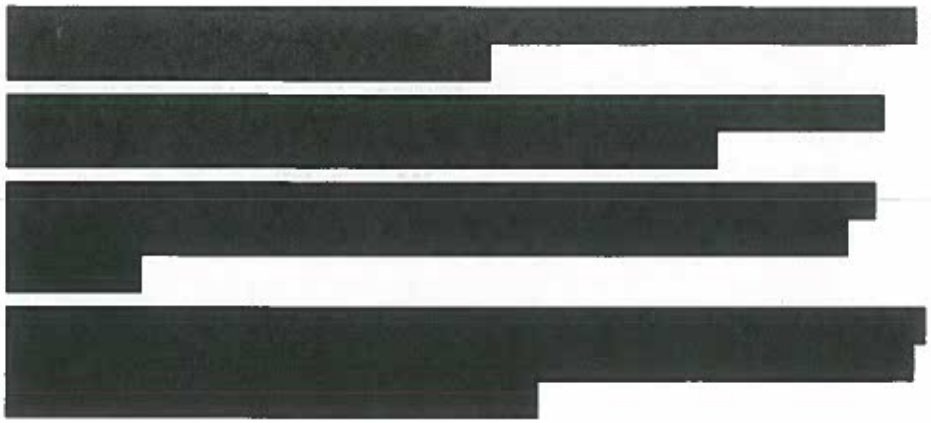
[redacted]

14 In its 2011 Mobile Call Termination ('MCT') Statement, Ofcom revised the MCT cost standard from LRIC+ to pure LRIC, with the effect that fixed and common network costs (ie. the "+") could no longer be recovered from the regulated MTR. Moreover, Ofcom's intended aim was for these costs to be recovered by cost pass through to consumers via "tariff rebalancing" (ie. increases in other price elements).

15 https://explore.ee.co.uk/our-company/newsroom/ee-interim-results-for-6-months-ended-30-june-2013



[16] Ofcom, 2011 Mobile Call Termination Statement, para 7.149, 15 March 2011.



## 4.3 Illustrative delay to rollout of 4G due to ALFs

Classic economic theory suggests that if an investment project has an NPV greater than zero, it is rational to invest. Firms can borrow from the capital markets to fund the investment. Accordingly, financial impacts do not alter real impacts (i.e. choices to invest).

For this reason, the standard view of the investment choice may consider ALFs to be irrelevant to capital expenditure ('CAPEX') decisions such as 4G rollout. However, the commercial drivers of investment decisions are more complex in practice and other factors suggest this prediction is not necessarily an accurate one, even from a theoretical perspective. For example, in their report "Annual licence fees – you cannot have your cake and eat it", Plum notes that:[19]

- Investor views are informed by equity analysts who assess the capacity of firms to pay dividends and invest in terms of financial ratios, for example, net debt/EBITDA, which are not directly related to the net present value of investment opportunities.
- Companies within groups must also justify capital budgets to the group and reduced capacity to pay returns may lead to a more constrained capital budget position.
- There is evidence pointing directly to agency issues in explaining observed investment behaviour.
- Economic literature on the impact of cash flows on investment draws on both econometric analysis of outcomes and surveys of chief financial officers and finds that reduced cash flow tends to reduce investment.
- An increase in costs to mobile operators due to ALF may therefore result in reduced investment via this capital market/ownership channel (with asymmetric information and agency problems).

Of particular relevance is the CAPEX envelope agreed with our shareholders that constrains EE's annual investment. The CAPEX envelope serves as a

17 Ofcom, "Price rises in fixed term contracts, Options to address consumer harm" consultation published 3 Jan 2013, para. 4.30

18 ibid.

19 Plum, "4G spectrum fees - you cannot have your cake and eat it", A report for EE, Brian Williamson, Phillipa Marks & Yi Shen Chan, January 2014

total ceiling on the amount of investment EE can undertake in a given budget year and cannot be raised unilaterally by EE.

Some economists argue that this type of internal budget constraints can be viewed as a rule of thumb applied in response to real or perceived agency problems. In this case, the agency problem could arise where decisions relating to investment are made by the agent (i.e. EE). A perception that the agent might 'over-invest' could imply lower dividend payments. Hence, the principal (i.e. our shareholders) may restrict annual CAPEX, as a simple rule of thumb to ensure CAPEX costs are kept to a desirable levels and to ensure that Free Cash Flows are not eroded, resulting in lower dividend payments.

In addition to a CAPEX envelope, we are also given challenging shareholder dividend targets, which will not be moderated in the face of the low return on capital employed made by UK operators (as described above). Accordingly, in the face of higher ALFs, it is not possible for EE to propose a lower dividend payment to our shareholders.

[redacted]

The proposed £80-90 million increase in annual licence fees may have a significant impact on the pace of 4G mobile coverage, particularly 4G mobile services in the 'final' 10% of the population where the direct return per upgraded mast is lowest. Due to the uncertainty caused by the very large increase in annual licence fees proposed by Ofcom, EE has noted we will defer rollout targets of 4G to 98% of the population from the end of 2014 to the second half of 2015.

[redacted]

However in the longer term, it is not sustainable to reduce investment below a certain minimum – investment analysts know that mobile network operators are capital intensive businesses and cuts in replacement capital will put long term returns at risk

[redacted]

The danger inherent with the proposed level of ALFs is that because CAPEX is the easiest cost to adjust in response to higher operational expenditure (such as ALF) in the short term, Ofcom's proposals may have inefficient short run implications for 4G rollout.

## 4.4 Conclusion

None of these effects have been fully assessed in Ofcom's impact analysis and Ofcom must now carry out a proper Impact Assessment according to its own guidelines, including both quantitative and qualitative analysis of the increase from current fee levels to the proposed new ALF levels.

Ofcom's statutory duties include "to further the interests of consumers in relevant markets" and securing "that a wide range of electronic communications services is available throughout the UK." The possible impact on prices and investment that we have illustrated in this section are not in the interest of consumers, nor do they promote the availability of 4G services throughout the UK. Consequently the high level of ALFs proposed is contrary to both Ofcom's statutory duties and also to the stated purpose of the Direction.

# 5. Proposed 1800 MHz lump sum valuation

Ofcom's methodology for deriving annual licence fees starts by estimating a lump sum value, i.e. the value of the licensed spectrum per MHz if it was to be awarded and payment required up front. Ofcom estimates the lump sum value by benchmarking against prices paid for 800 MHz and 2.6 GHz in the UK auction (as required by the Direction) and in European auctions since 2010.

In this section, we first show how it is evident that Ofcom has made an error in its estimation of the lump sum value before providing detailed instances of the errors Ofcom has made in its interpretation of the UK auction prices and European auction benchmarks.

EE and Three jointly commissioned Aetha and Analysys Mason to review Ofcom's benchmark analysis. EE agrees with Aetha and Analysys Mason's critique of Ofcom's benchmarking methodology as well as their alternative proposal and result. We provide Aetha and Analysys Mason's report titled "Review of Ofcom's benchmarking of the value of the1800MHz spectrum band to determine annual licence fees" with our response and Ofcom should treat it as an integral part of our response in relation to benchmarking and estimating a lump sum value.

## 5.1 A sense check

### 1. The UK auction

Prior to the auction, Ofcom also conducted an international benchmarking analysis which established a valuation range for 800 MHz, 1800 MHz and 2.6 GHz. Throughout the preparation of the auction, Ofcom had stated that, if EE failed to sell the 2x15 MHz of 1800 MHz we were required to divest following the merger of Orange and T-Mobile in the UK, Ofcom would include that 1800 MHz spectrum in the combined award of 800 MHz and 2.6 GHz. Hence Ofcom's valuation exercise prior to the auction considered both 800 MHz, 1800 MHz and 2.6 GHz spectrum.[20] Ofcom used its benchmark valuation to inform the setting of reserve prices for the auction and published the benchmark valuation with its Statement on the auction in July 2012.[21] In effect, this benchmark valuation showed Ofcom's expectations of market values in the UK prior to the auction.

Following the auction, it is now clear that the price of both 800 MHz and 2.6 GHz spectrum in the UK was at the bottom end of Ofcom's prior expectations (and indeed £1.2bn less than the proceeds expected by the Treasury and the Office of Budget Responsibility[22]).

20 EE announced on 29 August 2012 that we had sold our 1800 MHz divestment spectrum to Three in a private sale so there is no UK auction price for 1800 MHz.

21 Ofcom, "Assessment of future mobile competition and award of 800 MHz and 2.6 GHz", Statement, 24 July 2012

22 See for example http://www.bbc.co.uk/news/business-21516243

The table below sets out Ofcom's expectations of spectrum value prior to the auction, the actual auction prices achieved and Ofcom's proposed 'market value' lump sum estimate for 900 and 1800 MHz:

**Table 1: Ofcom's inconsistent valuation of 1800 MHz**

| | | 2x5 MHz of 800 MHz | 2x5 MHz of 900 MHz | 2x15 MHz of 1800 MHz | 2x5 MHz of 2.6 GHz (paired) |
|---|---|---|---|---|---|
| Ofcom benchmark valuations of relevant spectrum prior to auction[23] | Small bidder (fourth player) | £159-£273m | | £276-£414m | £50.4-£76.2m |
| | Large bidders (top three incumbents) | £290-£450m | | £276-£414m | £54.8-£76.2m |
| Linear reference price from auction[24] | | £298.5m[25] | | | £49.5m |
| Proposed lump sum value for ALF[26] | | | £250m | £450m | |

Source: Ofcom

As is evident from Table 1, the auction produced values at the bottom end of the range for both 800 MHz and 2.6 GHz compared to those expected by Ofcom prior to the auction:

- lots in the 800 MHz band sold for £298.5m whereas Ofcom had expected large bidders to pay £290m-£450m; and
- lots in the 2.6 GHz paired band sold for £49.5m against Ofcom's expectations of £54.8m-£76.2m for large bidders.

With auction values that confirmed UK spectrum values to be at the lower end of Ofcom's international benchmark valuations and a Direction that requires Ofcom to have particular regard to those prices established by the auction, it is completely incomprehensible to us how Ofcom can now propose a lump sum value for 1800 MHz equivalent to £450m for 2x15 MHz. This is substantially above the value range of £276-£414m derived by Ofcom's international benchmarking analysis, conducted prior to the auction. As the auction values were lower than those expected of Ofcom and the OBR and as Ofcom was directed to pay attention to the UK auction results, the ALF proposed by Ofcom for 1800MHz should have been at the bottom of the range and not significantly above it. The proposed 900 MHz valuation on the other hand looks more reasonable specifically in the context of being compared with the 800 MHz auction results.

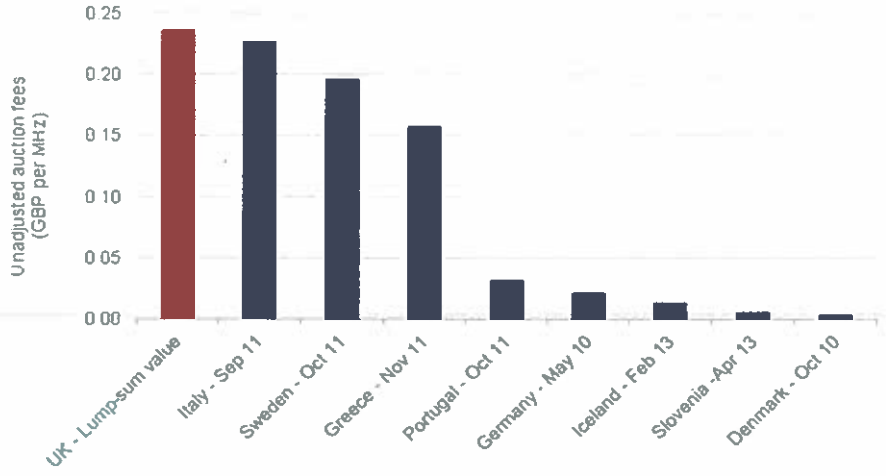
23 Assessment of future mobile competition and award of 800 MHz and 2.6 GHz, Ofcom Statement, July 2012
24 Consultation, para. 4.20 and 4.25
25 Including the £30m contribution to DTT/LTE800 coexistence
26 Consultation, para. 4.57-4.58

### 2. International benchmarks

In terms of international benchmarks, Ofcom has found it appropriate to look at European 4G auctions since 2010 and we broadly agree with this choice of benchmarks:[27] European countries have similar regulatory regimes which influence the revenue that can be earned from deployment of spectrum and European countries are part of the ITU region 1 and hence have very similar supply conditions for mobile spectrum.

The chart below illustrates Ofcom's proposed lump sum value for 1800 MHz compared to the 1800 MHz values per MHz per capita achieved in other auctions in the sample for which directly comparable benchmarks exist:[28]

**Figure 2: 1800 MHz prices – Ofcom ALF proposal vs. European auction benchmarks**




Source: Analysys Mason/Aetha

As is clear from the figure above, no 1800 MHz spectrum in Europe has been sold at the lump sum value proposed by Ofcom.

## 5.2 Ofcom's analysis of evidence

Ofcom has been selective in its choice of 'evidential points'. Combined with a shaky methodology that blurs the information read from the more important evidence points, Ofcom's analysis of the benchmarks produces significant bias. The bias results in Ofcom setting the 1800 MHz values higher than can be justified by the evidence and getting the relativity between 900 and 1800 MHz wrong. In this section we instance the ad hoc approach taken by Ofcom in establishing the evidence base and explain how the lack of a systematic approach to sample selection produces bias.

27 Although we disagree with Ofcom's pick and mix methodology for determining which of these auctions provide more/less important evidence or should be ignored entirely.

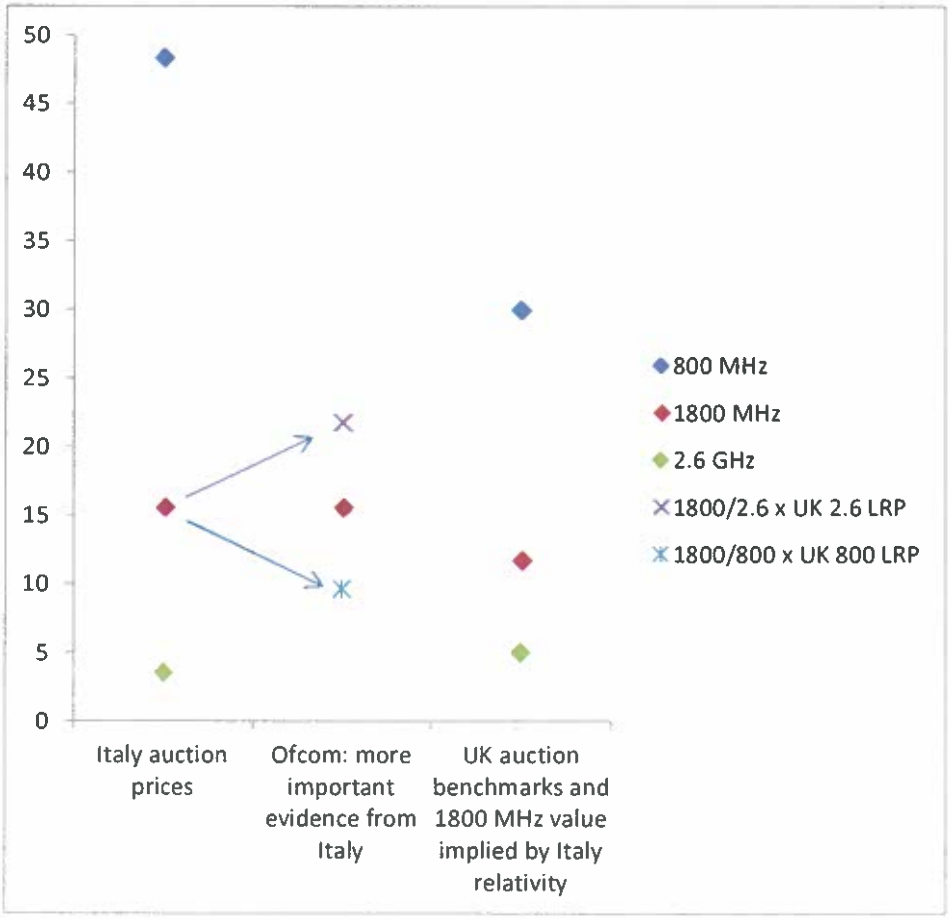
28 i.e. single band auctions or simultaneous multiple round ascending auctions for which price benchmarks are available band by band, converted into Sterling at the relevant exchange rate at the given time. We do not make any assessment of whether it is relevant to adjust for Purchasing Power Parity.

1. Flawed methodology for analysis of the benchmarks that are in the data set

Ofcom does not have a clear methodology for how it uses benchmark data from auctions in other countries. Ofcom acknowledges that both absolute and relative benchmark data could present 'evidential points'. However its indiscriminate use of both absolute and relative benchmark prices actually serves to blur the information contained in those benchmarks. Ofcom notes that both absolute values of 900 and 1800 MHz, as well as relative valuations between 800/900 MHz, 800/1800 MHz and 1800 MHz/2.6 GHz, could be more or less important evidence. However, the lack of a systematic approach for considering those relativities actually serves to introduce uncertainty into the data from the more important 'evidential points', thereby undermining the information that those evidence points provides. Consider the example of Italy to illustrate this:

- the UK equivalent of the absolute price of 1800 MHz in Italy is £15.5m/MHz;
- the relative price of 1800 to 800 MHz was 32% which Ofcom then applies to the UK LRP for 800 MHz to imply a UK equivalent price of 1800 MHz of £9.6m/MHz; and
- the relative price of 1800 MHz to 2.6 GHz was 443%, which Ofcom applies to the UK LRP for 2.6 GHz to imply a UK equivalent price of 1800 MHz of £21.7m/MHz.

**Figure 3: Ofcom's use of Italian benchmark data (UK equivalent £m/MHz)**



As illustrated in Figure 3 above, Ofcom's calculation of two different relative values for 1800 MHz on the basis of the same benchmark data serves only to exaggerate the range of values that could be 'supported' with reference to this 'evidential point'.

This is a particular weakness of Ofcom's relative value benchmarks for 1800 MHz because 1800 MHz is being compared to two other bands. The analysis of 900 MHz does not suffer this weakness because it is only being compared to 800 MHz.

In their report, Aetha/Analysys Mason propose an alternative method for comparing 1800 MHz to both 800 MHz and 2.6 GHz, named the 'distance method'. Using the benchmarks from multi-band auctions, the distance method simply calculates the proportion of the distance from the 2.6 GHz to the 800 MHz prices to where the 1800 MHz price is found. This method does not suffer the weakness of introducing the unjustified variance in the benchmark data that is produced by Ofcom's methodology.

Finally, Ofcom has focused on using benchmark information to establish relative values of 900 MHz vs. 800 MHz as well as 1800 MHz vs. 800 MHz and 2.6 GHz.[29] However, the evidence on the ratio of 900 MHz values relative to 1800 MHz is important too. Whilst it cannot on its own produce estimates of lump sum value for those bands in the UK (because a relative price allow you to infer the value of one band only if you have a value for the other), there is nonetheless important information in the evidence on relative prices of 900 MHz vs. 1800 MHz **in other countries**, which Ofcom's proposals should take into account. Ofcom's proposed prices for 900 and 1800 MHz imply a 167% relative price of the two bands. Ofcom's check of this relativity against benchmark evidence is cursory and inconsistent. The various tables and figures in the Consultation do not report the evidence of 900 MHz vs. 1800 MHz values along with relative valuations of other bands but Ofcom does note the following in paragraph 4.52, third bullet:

"As regards the relative value of 900 MHz and 1800 MHz spectrum, [...] we would expect 900 MHz spectrum to have a higher value than 1800 MHz spectrum. This is supported by the benchmarking data [....], in that prices for 900 MHz were consistently higher than for 1800 MHz where both were included in the same award and, with the exception of Ireland, 900 MHz prices were more than **twice as high** as for 1800 MHz." [Our emphasis]

However in paragraph 4.58 (e), Ofcom seems to suggest that their proposed relative value of 900 MHz vs. 1800 MHz below 200% is well within range (confusingly, Ofcom reverses the relativity and refer to 1800 MHz vs. 900 MHz relative values):

"The implied relativity of this lump-sum [1800 MHz] value to our best estimate of the value of 900 MHz spectrum appears consistent with our view – supported by technical considerations and the international benchmarks generally – that 900 MHz spectrum has a higher value than 1800 MHz spectrum (see paragraph 4.52 (c)). The specific relativity of 60% sits within, although towards

[29] See for example Figures 4.3 and A7.1 in the Consultation

the top of, the range of relativities in Ireland (65%) Greece (45%) and Romania (25%)"

In order to cut through this confusion and illustrate the breadth of evidence that Ofcom should have regard to we have listed the available evidence on relative 900 MHz and 1800 MHz prices in Table 2 below:

**Table 2: Benchmark evidence on relative prices of 900 MHz and 1800 MHz**

| | Price per MHz, £m UK equivalent | | Relative prices | | Ofcom classification of evidence point |
|---|---|---|---|---|---|
| | 900 MHz | 1800 MHz | 900/1800 MHz | 1800/900 MHz | |
| Denmark | 2.4 | 1 | 240% | 42% | Less important |
| **Greece** | **31.4** | **13.9** | **226%** | **44%** | More important |
| **Ireland** | **35.7** | **23.1** | **155%** | **65%** | More important |
| Portugal | 24.1 | 3.1 | 777% | 13% | Less important |
| **Romania** | **24.9** | **6.2** | **402%** | **25%** | More important |
| Spain | [30]17.2 | 2.9 | 593% | 17% | Less important |
| | | | | | |
| Ofcom proposal | 25 | 15 | 167% | 60% | |
| Average[31] | | | 340% | 29% | |
| Average of 'more important evidence' | | | **241%** | **41%** | |

Source: Consultation

Table 2 demonstrates very clearly that the relativity between the 900 MHz and 1800 MHz lump-sum valuations proposed by Ofcom is not consistent with the benchmark evidence. Ofcom's proposed 900 MHz lump-sum value for 900 MHz is 167% higher than 1800 MHz (conversely, 1800 MHz is 60% of 900 MHz). However, the benchmark evidence suggests that on average 900 MHz prices are 340% higher than 1800 MHz (or 1800 MHz prices are 29% of 900 MHz). Focusing purely on the benchmarks Ofcom classified as 'more important evidence' (in our view, without the evidence to support the classification), 900 MHz values are still on average 241% of 1800 MHz (or 1800 MHz is 41% of 900 MHz). This means that Ofcom's proposed lump-sum valuation of 1800 MHz is too high compared to 900 MHz. If Ofcom proposes a 900 MHz lump sum value of £25m/MHz, applying these two ratios (340/29% and 240/41%) would produce 1800 MHz lump sum values between £7.3m and £10.4m/MHz.[32]

30 This is the May 2011 price rather than the higher price of £24.9m from Nov. 2011, where the Nov. auction did not bar particular bidders. Ofcom deem the higher price more important evidence on the absolute value of 900 MHz. Using the higher 900 MHz price would bring the 900/1800 MHz ratio up to 859%

31 We use the geometric average to calculate the average of ratios as the arithmetic average would produce different results depending on whether the 900/1800 MHz or 1800/900 MHz ratios were considered.

32 Calculated as 29% and 41% of £25m/MHz respectively.

2. Ofcom has no clear definition for choosing which benchmarks are part of the data set and their relative importance within the set

Ofcom summarises European 4G spectrum auctions since 2010 in Annex 7 of the Consultation. We agree that not all auctions provide equally useful benchmarks. However Ofcom's assessment of these auctions becomes very subjective because it does not set out at the start of its analysis a set of robust criteria for deciding which auctions are sufficiently relevant to be included in the sample, nor is there a clear distinction between which benchmarks should be excluded from the sample and which should be included but form 'less important evidence'. The attempt to set up such criteria in the second half of paragraph A7.2 lists more country specific exceptions than criteria. 'More important' evidence also is arbitrarily further sub-divided into 'important' evidence and 'important evidence that potentially' 'understates' 'the value', but it is not clear why the latter would not simply be categorised as 'less important' evidence. Aside from the lack of clear definitions for these categorisations, there are simply not enough data points to sustain this many categories, meaning that Ofcom's framework deteriorates into an unfortunate country by country assessment that is highly subjective.[33]

This subjectivity is illustrated clearly in Ofcom's approach to the outcome of combinatorial clock auctions (CCAs). The CCA format championed by Ofcom in the UK has also been used in a number of other European countries. In CCAs, the price paid by each bidder refers to a package of spectrum, which may contain spectrum in several bands and the price paid for spectrum in the same band may also differ across winners. Unlike Simultaneous Multiple Round Ascending (SMRA) auctions, it is not possible to estimate average prices per band without access to the underlying bid data. Ofcom is the only regulator to publish bid data following a CCA and hence the UK is the only country for which we can estimate 'a linear reference price' ('LRP') for each band.[34]

Ofcom has included the Irish multi-band CCA from November 2012 where 800, 900 and 1800 MHz spectrum was awarded for two discrete licence periods in its benchmarking and classified this data point as "more important evidence". However only the final package price of each winner is available and the band by band price benchmarks that Ofcom derive from the auction results are based on estimations by Ofcom that include several critical assumptions. Ofcom uses the relative values of the different spectrum bands based on the ratios of clock prices in the final primary round as a key assumption to establish value by band.[35] As we know from the UK auction, the clock prices can be poor indications of the price paid for each band. In the UK auction the price ratio of 800 MHz to 2.6 GHz prices in the final primary round was 4.6 but in the final prices (LRPs calculated by Ofcom) the price ratio is 6.0.[36] EE has no way of

33 See for example footnote **Error! Bookmark not defined.** suggesting that the 900 MHz lump sum estimate is based on three data points only

34 Or indeed discuss whether the linear reference price is a good fit.

35 We assume that by "clock prices in the rounds in which supply matched demand for each band" (Consultation, p.98), Ofcom means final primary round prices.

36 In the final primary round (round 52), the price of an A1 one lot (2x5 MHz of 800 MHz without coverage obligation) was £423m and the price of a C lot (2x5 MHz of 2.6 GHz) was £92m.

verifying the assertions being made by Ofcom based on a confidential note submitted to Ofcom by Vodafone and this uncertainty means Ofcom should attach less weight to this benchmark. In establishing a 900 MHz price that is 84% of the UK LRP for 800 MHz, it seems that the Irish evidence effectively forms a third of the benchmark evidence relied on by Ofcom.[37] That seems too much emphasis to attach to a benchmark value that is associated with a degree of uncertainty.

Despite designating the Irish multi-band CCA as 'more important evidence', Ofcom has not included the Swiss multi-band CCA that took place in February 2012, despite noting that "the prices obtained in this auction could potentially have offered relevant evidence for deriving ALFs."[38] We cannot understand this omission. As Aetha/Analysys Mason demonstrate in their report, it is in fact possible to infer from the published Swiss auction results that 900 MHz spectrum was more expensive than 800 MHz, contrary to the Irish result.[39] For consistency, Ofcom should have included Switzerland in the benchmark data set with the same weight as the Irish auction.[40] At a minimum, Ofcom should address the fact that the results of the Swiss auction contradict the Irish auction with respect to the relative values of 900 MHz to 800 MHz.

In an unrelated point, Ofcom notes that where all spectrum in a band was sold at or close to the reserve price because of low competition in the auction, there is a risk that the outcome understates the market value of spectrum in that band. Ofcom's rationale is that bidders might have been willing to pay more, if there had been stronger competition for the spectrum. However, bidders' willingness to pay are not the market values. The market value is the clearing price at which demand equals supply. Where spectrum was sold at the reserve price, the underlying demand and supply conditions in that auction were such that in the absence of a reserve price, the spectrum would have sold for less. Had reserve prices been less, more bidders (with lower private values) may have entered the auction to create what Ofcom labels "stronger competition for the spectrum" but the result would likely have been auction prices that were lower than the actual reserve prices.[41, 42] Hence we believe the contrary to Ofcom's judgement is valid: where all spectrum in a band was sold at reserve price, the reserve price is very likely to overstate the market value.

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The LRPs estimated by Ofcom are £298.5m for 800 MHz (including the required funding of MitCo) and £49.5 for 2.6 GHz.

37 As Ofcom's methodology is non-mechanistic, it is difficult to establish a clear link between individual evidence points and Ofcom's result. However, we note that the relative value of 900/800 MHz in Romania is 114%, Spain is 79% and Ireland is 61% the arithmetic average of which is 84%; and the proposed lump sum value of 900 MHz is £25m, which is 84% of the 800 MHz LRP of £29.9m. Hence it would seem that the Irish auction results potentially form a third of the basis for Ofcom's 900 MHz proposal.

38 Consultation p. 117

39 Aetha and Analysys Mason, "Review of Ofcom's benchmarking of the value of the1800MHz spectrum band", January 2014, section 5.3.1

40 For the avoidance of doubt, whilst CCA results should be included in the data set they should be labelled as 'less important evidence' because band specific prices cannot be derived directly. See also Aetha and Analysys Mason, "Review of Ofcom's benchmarking of the value of the1800MHz spectrum band", January 2014, section 5.2.

41 Consultation, para. A7.2

42 For example in the UK auction, there were several bidders other than the MNOs for 2.6 GHz TDD spectrum which had a relatively low reserve price.

Finally, Aetha/Analysys Mason show that the painstaking classification of each potential benchmark into 'less important', 'more important' or 'more important (risk of understating)' evidence points that Ofcom undertakes is in fact not reflected in its conclusion for the lump-sum value of 1800 MHz. Whilst the £25m/MHz lump-sum value proposed for 900 MHz is in line with the average of the less important evidence (£24.88m/MHz) and below the average of the more important evidence (£27.56m/MHz), the proposed £15m/MHz for 1800 MHz is above the average of the less important evidence (£7.62m/MHz) and the average of the more important evidence (£14m/MHz). Ofcom has not implemented its methodology consistently, reinforcing the picture that Ofcom's analysis is arbitrary and subjective.

### 3. Relative value of 1800 MHz to 800 MHz and 2.6 GHz

In the category of 'evidential points' which Ofcom labels "Implied values of 1800 MHz spectrum based on combinations", Ofcom compounds selective and biased use of the evidence with use of judgements which lack any objective justification or reasoning. Ofcom considers the following combinations of the 800 MHz and 2.6 GHz LRPs from the UK auction and assesses them as either 'more' or 'less important evidence' for the value of 1800 MHz:

- the simple average of 800 MHz and 2.6 GHz – 'more important evidence';
- 1800 MHz on the linear interpolation between 800 MHz and 2.6 GHz – 'less important evidence'; and
- 1800 MHz on the inverse exponential relationship between 800 MHz and 2.6 GHz – 'less important evidence'.

Ofcom has not produced any evidence or reasoning to justify its claim that the simple average is relevant, let alone 'more important evidence' for the valuation of 1800 MHz. We are not aware of any auctions where the 1800 MHz price emerged as the average of 800 MHz and 2.6 GHz. It is simply an arbitrary assumption put forward by Ofcom.

Ofcom notes in the Consultation[43] that Vodafone and Telefonica, who only hold 2x5.8 MHz of 1800 MHz, bid 'strongly' for 800 MHz in the auction compared to EE and H3G who will hold at least 2x15 MHz of 1800 MHz. Ofcom suggests that this is evidence 800 MHz and 1800 MHz are substitutes to a greater extent than 1800 MHz and 2.6 GHz. As Ofcom is aware EE conducted a private sale of our 1800 MHz divestment prior to the auction in which all MNOs were invited to bid. By Ofcom's logic, if 800 MHz and 1800 MHz are close substitutes and Vodafone and Telefonica had relatively high valuations for 800 MHz because they did not have much 1800 MHz, we should also have expected Vodafone and Telefonica to have high valuations for our 1800 MHz divestment spectrum. This was not the case; our 1800 MHz divestment was sold to H3G. We suggest the auction evidence simply shows that 800 MHz and 900 MHz are complements: the observed bidding behaviour confirms that bidders who held 900 MHz, i.e. Vodafone and Telefonica, had an inherent advantage when bidding for 800 MHz as their networks are configured for sub-1 GHz spectrum.

[43] Consultation para. 4.44

We note that when this suggestion was first proposed in the first auction consultation along with the other options of using the 2.6 GHz price information (with or without an adjustment factor) or 800 MHz price information (with or without an adjustment factor),[44] the average of 800 MHz and 2.6 GHz was justified as the preferred choice with the following entirely unsatisfactory rationale:

"[An average of 800 MHz and 2.6 GHz price information derived from the auction] seems to us to be the best approach in the circumstances. This reflects our understanding of the technical characteristics of the bands which suggests that 1800 MHz lies between 800 MHz and 2.6 GHz and it avoids the risks of regulatory failure associated with deriving adjustment values which could be considerable."

Not only is there absolutely no evidence to back up Ofcom's suggestion that the simple average of 800 MHz and 2.6 GHz prices is a relevant evidential point for 1800 MHz prices. there is evidence to suggest that other methods for implying 1800 MHz prices from 800 MHz and 2.6 GHz are more relevant such as:

- EE's response to Ofcom's first auction consultation[45] showing relative propagation characteristics for LTE in 800 MHz, 1800 MHz and 2.6 GHz, which if applied to the UK auction prices for 800 MHz and 2.6 GHz according to the 'distance method' indicates an 1800 MHz price of £7m to £7.3m per MHz;
- the international valuation benchmark study by DotEcon and Aetha for Ofcom in 2012 in which a panel of financial experts suggested that "[financial] analysts would typically consider higher frequency spectrum (including 1800 MHz) to be worth a tenth of the price of 800 MHz spectrum"[46]; and
- a recent paper suggesting that the value relationship between spectrum bands can be explained by an inverse exponential curve.[47]

Ofcom's reliance on a simple average may be explained by the fact that it falls within the range of other benchmarks that Ofcom has used. However, if so, that is simply circular: whether or not a simple average is likely to reflect the proper valuation is an empirical point and, to the extent that Ofcom's other benchmarks are flawed, so is its reliance on a simple average.

We would argue that a regulatory risk arises from applying the average of 800 MHz and 2.6 GHz when technical evidence and European auction benchmark evidence point to 1800 MHz being closer to 2.6 GHz than 800 MHz.

It is also noticeable that Ofcom has failed to consider spectrum supply or expectations of changing supply in its assessment of relative values of different bands. There is more spectrum available for mobile above 1 GHz – only 21% of

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

45 Everything Everywhere's Response to the Ofcom Consultation "Assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues", 3 June 2011, Annex E: Propagation differences between frequencies

46 "Spectrum value of 800MHz, 1800MHz and 2.6GHz", DotEcon and Aetha Report for Ofcom July 2012, para. 240, p.52

47 Conder et al; "Pricing of Spectrum Based on Physical Criteria"; Proceedings of IEEE DySPAN (2011): p.223-230.

current mobile spectrum is sub-1 GHz - and reasonable expectations to spectrum release would suggest that sub-1 GHz spectrum for mobile will become relatively more scarce: by 2020, only 16% of mobile spectrum will be sub-1 GHz.[48] Considering the supply side provides further powerful logic for the value relationship between 800 MHz and 1800 MHz and 2.6 GHz being non-linear.

## 5.3 Conclusion

Our view is that, while Ofcom's lump sum valuation of 900 MHz is perhaps justifiable, the value suggested for 1800 MHz is quite wrong and is completely unsupported by an impartial review of the evidence. Ofcom uses an ad hoc selection of benchmark data, which is not supported by any appropriate reasoning. Its manipulation of the selected data then magnifies the variance in 'evidential points' by calculating relativities between 1800 MHz/800 MHz and 1800 MHz/2.6 GHz separately, seemingly leading Ofcom to believe its proposed valuation is comfortably in the middle of a range – although the range itself is an arbitrary and subjective construct. This is further justified by the proposed 1800 MHz lump sum valuation being less than the average of the 800 MHz and 2.6 GHz spectrum in the UK auction, despite there being absolutely no evidence to suggest that the average of 800 MHz and 2.6 GHz is a reasonable benchmark for 1800 MHz. Ofcom's methodology does not suffer the same shortcomings in terms of 900 MHz because 900 MHz is only assessed in relation to one other band, namely 800 MHz.

Against this background, Three and EE jointly commissioned Aetha and Analysys Mason to review Ofcom's auction benchmark analysis. Their conclusion is that Ofcom's methodology is not sound and that Ofcom has not applied its methodology consistently. They propose an alternative and more robust methodology for the benchmarking of 1800 MHz in relation to two other bands (800 and 2.6 GHz), 'the distance method'. This is fully consistent with the methodology Ofcom has used for 900 MHz.

On the basis of this more robust methodology we estimate that the lump sum value of 1800 MHz spectrum is about £9m per MHz compared with Ofcom's estimate of £15m per MHz. However, Aetha and Analysys Mason also show that had Ofcom applied its methodology for 1800 MHz in the same way as for 900 MHz, it would have arrived at a lump sum value around £8m per MHz.

[48] See Plum. "4G spectrum fees - you cannot have your cake and eat it", January 2014, Appendix A

# 6. Converting lump sum values to annual fees

Following the estimation of a lump-sum value per MHz, Ofcom's methodology then converts that lump-sum value into annual payments using a formula which Ofcom suggests produces an annuity whose present value is equivalent to the lump-sum value.

Ofcom commits two further mistakes in the application of its overall methodology in this conversion, where both are related to the fundamental misconception that renewal or 'in-use' licences are similar to new licences awarded by auction except that they are subject to a different payment profile. The nature of the errors can be characterised as follows:

- Firstly, Ofcom is wrong to convert lump-sum values based on the auction prices to a 20 year annuity because the auction bids may include terminal value attributable to the period after the initial 20 years. A renewal licence is effectively a complement to the initial licence and we refer to the literature on sequential auctions for complements to demonstrate this.
- Ofcom's second mistake is to use the WACC as the discount rate in the annuity formula. The second sub-section explains why it is more appropriate to use the cost of debt as discount rate in this calculation.

## 6.1 Terminal value

An ALF licence or renewal licence is a fundamentally different proposition to investing in a new licence for spectrum bands that have not previously been used for mobile or by that operator. A new licence carries risk: network equipment will first need to deployed and there will be some uncertainty around cost, availability and performance of that equipment; no revenue will be earned from the new bands until a sufficiently large proportion of the customer base has compatible handsets and there will be a great deal of uncertainty around the timing of that as it depends not only on third party handset manufacturers but also the demand presented to those manufacturers by other operators. Hence the level of risk, the investment profile and the net income that can be attributed to a new licence is very different to a renewal licence for in-use spectrum.

A new licence has 'terminal value' associated with it, i.e. a value that relates to the period following the initial 20 year period for which the auction determines the upfront payment. This is because at the end of the initial licence period, the licensee will have a set of assets associated with the licence such as a network based on those frequencies (and possibly other bands), a customer base and brand value. A licensee who sells the licence at the end of the initial 20 year licence period cannot expect to recover its terminal value associated with network equipment, brand and customers without selling those too. The Direction tasks Ofcom with finding the market value of the renewal licence, not the private value of the incumbent licensees.

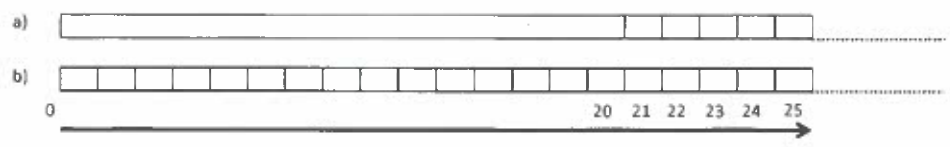
Considering a hypothetical situation in which two spectrum licences covering two different time periods are let sequentially at auction helps illustrate the point. In particular, consider a scenario in which two separate licences for the

same bandwidth are awarded by auction, one after the other. The first licence covers year 0 to 20 of operation and the second licence would cover year 20 and beyond. Clearly, these two licences would be seen as complements by bidders participating in the hypothetical auction. Specifically, a bidder is unlikely to want a licence to provide mobile service 20 years into the future without the licence to provide mobile service during the first 20 years. Equally, given a licensee will have assets representing sunk costs at the end of the initial licence period, a bidder interested in providing mobile services in the near term would also be interested in acquiring the future right to provide service on the same frequencies were such a licence offered at auction. This hypothetical situation has been studied within the academic literature on sequential auctions, which provide some helpful insights on how rational bidders would respond when bidding for the initial licence. We present examples from this literature in Annex A.

As the examples outlined in Annex A illustrate, when faced with these complementarities, *any* bidder that is a legitimate wireless service provider would, in equilibrium, apportion some of the value of the complementarity (such as the terminal value) into its bid for the initial licence. The marginal (losing) bidder for the second licence, however, would be unable to experience this synergy. Therefore, the *market value* of the second licence is diminished, as it does not, and cannot, include the value of the synergy, which was already apportioned to the first item at auction. Consequently, Ofcom's assertion that the terminal value should be included as part of the fair market value of the ALF is misguided, because that value was already lost to the marginal bidder that did not win the initial licence in the earlier auction. Put differently, after the initial auction takes place, that terminal value is lost to all losing bidders that might compete and therefore be price setters in the subsequent auction. Ofcom cannot simply establish lump-sum values on the basis of the auction and convert them to annual payments with a 20 year annuity formula. The terminal value element must first be netted off.

An operator submitted confidential evidence to Ofcom regarding the proportion of its overall valuation for 800 MHz and 2.6 GHz that was terminal value and as an evidence based regulator, Ofcom has referred to that submission in the Consultation. In the Consultation, Ofcom argues that its 20 year annuity formula that ignores terminal value is correct on the basis of a comparison between the 800 MHz licences as awarded in the auction (which have no further fees in the initial 20 year licence period and ALF payable thereafter) and a hypothetical 800 MHz licence on which ALF is payable from year 1. This comparison is illustrated schematically in Figure 4:

**Figure 4: Ofcom's comparison of hypothetical ALF licence vs. auctioned licence**

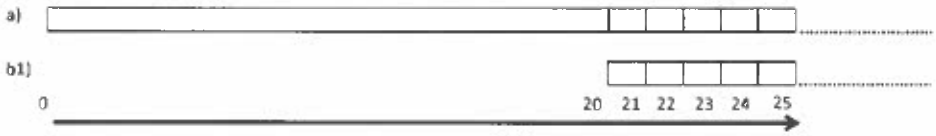



The only difference between the auctioned licence a) and the ALF licence b) in Figure 4 is the payment profile of the initial 20 year period and on that basis,

Ofcom concludes that the auction payment represents the first 20 years only and hence can be annuitised over 20 years to derive an appropriate ALF for licence b).

However, this logic is wrong because the conclusion is derived from a comparison of the auctioned licence with the wrong counterfactual. It compares a new licence that is paid for upfront with a new licence that is paid for in annual instalments. The appropriate comparison is between a new licence and a licence that is renewed at the end of a long initial licence period as illustrated in Figure 5:

**Figure 5: Correct comparison of ALF licence vs. auctioned licence**




Our existing licences are more akin to licence b1) in Figure 5 than licence b) in Figure 4, in that they should be considered as the extension part of an initial licence such as licence a). If using a 20 year annuity formula, the relevant task is therefore to work out which proportion of the auction bid for licence a) is relevant to the initial period and then convert that value to a 20 year annuity. The amount relevant to the initial period is the amount bid in the auction minus the value associated with second period. Converting that difference as a 20 year annuity would give the correct annual payment for licence b1) from year 21 onwards. Establishing this difference is clearly difficult as Ofcom does not necessarily have information about the share of terminal value in the bids of the marginal bidders that priced spectrum in the relevant category in the auction. We would suggest Ofcom could use the evidence given to them about terminal value and reduce auction lump-sum values by a third before converting to an annuity.

## 6.2 Discount rate

A key variable in converting the appropriate lump sum value to an annual amount is the relevant discount rate used in the calculation. The Consultation proposes using the MNOs' cost of finance in the form of the weighted average cost of capital ("WACC") calculated for the last mobile call termination ("MCT") rate market review, published in March 2011. EE believes that this is an inappropriate discount rate to use.

EE considers that Ofcom is approaching the issue from the wrong direction. Whilst EE's internal valuation of the 800 MHz and 2.6 GHz spectrum would have used a WACC, because bids in the auction represented wider investment decisions, the issue now facing Ofcom is how to set the full market value for spectrum licences where the investment decision has already been made and the risk incurred. In converting a lump sum value into a stream of annual payments, the relevant discount rate is therefore one which would make an

efficient operator indifferent between paying a lump sum for the spectrum licence up front and paying in annual instalments and that is not the WACC.[49] Applying the wider systematic risk associated with the full operations of a mobile operator (or those associated with the provision of 4G services including the up-front lump sum payment of the associated spectrum licence payments) is not appropriate. The relevant stream of payments which needs to be considered are the ALF payments themselves and it is the risk associated with these payments which is relevant to a consideration of the appropriate discount rate. These payments are to be set by a regulator on presumably rational, reasonable and proportionate grounds. We assume that Ofcom would agree that this risk should be relatively low in a stable regulatory regime such as the UK. Moreover, one would not necessarily expect the regulatory risk to be correlated with overall market movements – so beta and equity return in the WACC calculation are not relevant.

This suggests a more appropriate approach would consider the relevant interest rate which an operator would face if financing such a steady stream of payments. Again, such an approach suggests a significantly different rate than the weighted average cost of capital used by Ofcom which assumes an ex ante cost of finance where facing ex ante risks. Assuming Ofcom sets these payments on a consistent and reasonable basis and given that the investment has already been to a significant extent made, EE expects that it would be hypothetically possible to construct a financial instrument effectively selling on the liability or borrowing the money to pay for such payments. In such a circumstance, the appropriate discount rate would be the cost of debt. Such a hypothetical operator would be able to finance the licence fee obligations with suitable debt instruments for this bond-type asset. The risk and consequently the interest rate would reflect the wider cost of debt and not the wider cost of capital.

The elements used to derive the WACC in the last MCT Market Review can be used to derive a suitable cost of debt estimate to illustrate what this would mean in practice even if the detail of these figures may need to be updated. We note that Ofcom is at the start of the process of updating these cost of capital estimates for the purposes of the next mobile termination market review (for the SMP Conditions which should apply from 1 April 2015 in relation to MCT services). We understand that Ofcom will be publishing its views on this process in a Consultation next May, which will need to include updated estimates for the appropriate WACC for MNOs. Annex 8 of the 2011 MCT Statement set out the WACC calculation. In particular, the components of the 6.2% pre-tax real WACC were set out in Table A8.9. Adding the real risk free rate and the real debt premium in that table gives a real (pre-tax) cost of debt of 3%. Adjusting this to a post-tax real cost of debt (consistent with the approach used in the Consultation) is achieved by multiplying by one minus the tax rate.

[49] EE has previously argued that the relevant conversion is about ensuring that the time value of money is taken into account when converting a lump-sum in 2013 prices into a stream of annual payments stretching into the future and hence that the Government Social Time Preference Rate published by the Treasury is relevant. On reflection, we now believe that use of the cost of debt, for the reasons explained in this section, is a more appropriate approach.

Using the same tax rates as assumed in the Consultation (broadly a long run rate of 20%), leads to a resulting cost of debt of 2.4%.

## 6.3 Conclusion

The amounts bid in the combined auction are likely to include an element of terminal value. The market value of existing licences, which Ofcom is tasked to derive, would not include terminal value. This difference can be understood by thinking about hypothetical sequential auctions for a licence for year 0-20 followed by an auction for a licence from year 21 onwards and considering the strong complementarity between these goods. The terminal value bid in the first auction represents this complementarity and the market value of the second licence is diminished, as it does not include the value of the synergy already apportioned to the licence in the first auction.

The terminal value included in bids for new licences means that Ofcom needs to adjust the lump sum values determined with reference to the combined auction, before inputting to the 20 year annuity formula. On the basis of the evidence available to Ofcom, we would suggest that Ofcom could reduce the lump-sum values by about a third.

In addition to the terminal value adjustment, Ofcom should use the cost of debt as the appropriate discount rate in the conversion formula rather than WACC. The relevant discount rate in this context is the rate at which a licensee would be indifferent between paying the lump-sum value up front and the ALF. We would suggest a long term spectrum licence under which any uncertainty over the level of future payment is limited by the predictability of the regulator's behaviour is akin to a bond or mortgage and hence the appropriate discount rate should be the cost of debt (post-tax) of 2.4%.

# 7. Implementing revised fees

Ofcom proposes that the revised annual licence fees will apply to all licensees from the same date. This recognises the fact that the relevant licences have different fee payment dates and changing those would be licence variations which require the consent of the licensee. We support the principle of introducing the revised licence fees on the same date for all licensees but the way Ofcom has proposed to implement a common effective date is disproportionate and, in our view, unlawful. We propose an alternative, which achieves the objective of implementing the revised fees on the same date and is consistent with the legal framework under which Ofcom charges annual licence fees. Moreover, there is a strong precedent for phasing the revised fees in over a number of years. We explain both these points in the following sub-sections.

## 7.1 The proposed claw back

Ofcom has proposed a 'claw back' mechanism whereby, at the first fee payment date after the new fees regulation come into force, a licensee would be charged:

- a full annual fee; **as well as**
- a charge set as the differential between the current fee and the revised fee pro-rated according to the period of time that has lapsed between the new fees regulation coming into force and the licensee's fee payment date.

Hence, at that first fee payment date, the licensee would be charged a fee that would be in excess of an annual fee (whether determined with reference to the current or the revised level), which would be unlawful under the Framework Directive, the Authorisation Directive and the Communications Act as it would be disproportionate and in excess of the market value. It would also be inconsistent with the Direction by setting fees for the first year substantially above full market value.[50]

The Wireless Telegraphy (Licence Charges) Regulations 2011(the 'Fees Regulation') stipulate that fees are payable with respect to a 12 month period[51] but we note there may be some confusion as to which 12 month period that is. The wording of the fees regulation suggest that the annual fees are charged in arrears, i.e. the fees charged on a given fee payment date relate to the year prior to that date. We note this does not seem consistent with what Ofcom believes their practice is: the proposed claw back mechanism seems to assume that at the annual fee payment date prior to the new fees regulation coming into force, the licensee has paid the annual fee at the current rate for the year ahead. Ofcom has made no explicit proposal for changing the charging basis from arrears to forward looking or vice versa, nor has it presented a rationale

50 Ofcom's proposal would lead to EE paying an ALF well in excess of the proposed revised ALF for the year payable on 28 Feb. 2015. An ALF of that amount is unlawful under Article 8 Framework Directive, Article 13 Authorisation Directive, s.3(3) Communications Act 2003 and Article 6(1) of the 2010 Direction as being both (i) disproportionate and (ii) in excess of Ofcom's own assessment of the market value of the spectrum.

51 Fees regulation, section 4(1) and Schedule 2.

for why such a change would be necessary.[52] The only clear rationale given for the proposed claw back mechanism seem to be the desire to introduce the new level of fees on the same date for all licensees.

The claw back mechanism would lead to fees being charged both in arrears and on a forward looking basis at the first annual payment date after the new fees regulation come into force. As there is no legal basis for one fee payment relating to two periods, Ofcom's claw back proposal amounts to a suggestion that operators should be charged an amount that is greater than the estimated market value of their licence, which, as explained above, would be unlawful. In respect of legality, it also highly relevant that the claw back mechanism is not necessary in order to achieve a 'common effective date'. We propose a straight forward alternative approach for the implementation of a common effective date that does not require a change to the fee payment dates stipulated in the licences. Given the confusion about whether annual licence fees are paid in arrears or in advance, we suggest an alternative for either situation:

a) If fees are charged in arrears: the new fees regulation stipulate the same fee levels as the current fees regulation until a common effective date after which the new fee levels apply. As long as the common effective date is chosen to fall before the first fee payment date of any licence after the new fees regulation come into force, this proposal will ensure that effectively all licensees become liable for the new fee levels at the same date. When calculating the annual fee payable by each licensee on their next fee payment date following the new fee levels coming into force, Ofcom will simply pro-rate the calculation such that the annual fee paid is the sum of:

   - the 'old' fee level for the proportion of the year that falls from the licensee's previous fee payment date until the common effective date; and
   - the 'new' fee level for the proportion of the year that falls after the common effective until the fee payment date at which fees are now being calculated.

   The licensees whose fee payment date would come sooner following the common effective date would get a relatively small uplift to the first annual fee payment following the common effective date, compared to the licensees whose fee payment date fall later.

b) If fees are charged on a forward looking basis: the new fees regulation should stipulate split fees and a proportionate calculation for the first year as under a) above but the common effective date must be chosen as the latest fee payment date of the licences, counting from the common effective date.

The fact that an alternative approach to Ofcom's claw back mechanism exists for either situation (i.e. the claw back mechanism is not necessary in order to

[52] We note that any incentive effect in terms of spectrum use (we dispute that there is one) is probably not affected by the timing of payment, i.e. whether fees are paid in arrears or on a forward looking basis as long as it is clear that the ongoing use of that spectrum will trigger a payment.

achieve a common effective date) illustrates clearly that Ofcom's proposed claw back is disproportionate.

We also note that Ofcom considers its proposed approach whereby the revised level of fees come into force soon after new regulations have been made to be "in line with the Direction requiring Ofcom to set ALF for 900 MHz and 1800 MHz at full market value after completion of the 4G auction".[53] We interpret this consideration as Ofcom suggesting they feel bound by the Direction to introduce the fees as soon as possible. We strongly refute this; the Direction does not include any wording that directs Ofcom to impose the fees sooner rather than later. The Direction simply requires Ofcom to revise the fees after the auction:[54]

"(1) After completion of the Auction OFCOM must revise the sums prescribed by regulations under section 12 of the WTA for 900MHz and 1800MHz licences so that they reflect the full market value of the frequencies in those bands.

(2) In revising the sums prescribed OFCOM must have particular regard to the sums bid for licences in the Auction."

In other words, Ofcom can revise the fees at any time after the auction. The fact that the Direction does not require Ofcom to implement the revised fees as soon as possible is also relevant in relation to the question of phasing in the revised fees as discussed in the following section.

## 7.2 Phasing in

Ofcom has proposed to implement the revised fees with the full increase payable immediately after the new fees regulation come into force. Ofcom has specifically rejected the phasing–in of the increased fee. As explained in this response, Ofcom's estimate of the full market value contains several errors meaning it is much too high and we expect Ofcom to revise the proposed fee. We also believe the increase should be phased in over three to five years.

As noted above, the Direction allows Ofcom discretion to implement the revised fees any time after the completion of the auction and there is no requirement to do so urgently or not to phase in the increases. It is also clear that, irrespective of the Direction, Ofcom has to have regard to its statutory duties. In its AIP framework, which we assume Ofcom believes to be consistent with its statutory duties, Ofcom found that it was relevant to consider the phasing in of revised fees in relation to assessing the impact of increased fees. Ofcom's AIP methodology has four components, the last of which is about assessing the impact to spectrum users:[55]

"AIP methodology 4: impact assessments

We will undertake Impact Assessments on our fee proposals to identify any potential detrimental impacts to spectrum users, consumers and citizens. We

53 Para. 6.16

54 The Wireless Telegraphy Act 2006 (Directions to OFCOM) Order 2010, section 6

55 The first three steps are: 1) determine that AIP is applicable, 2) estimate what the cost of the relevant spectrum is and 3) calculate how much individual licensees would be liable for

will need to consider carefully the balance of benefits and risks of the implementation of all changes in fees."[56]

As one of two examples of what Ofcom might consider under such impact assessments, the Statement lists the phasing in of increase fees:

"Cases where the impact on licensees of increasing fees would be so great that we would consider phasing in of fees"[57]

We are therefore at a loss to understand how Ofcom could propose an increase to EE's fees of £80-90m per annum[58] without assessing the impact of such a substantial increase on EE, our customers and citizens who live in areas that may experience a delay in getting 4G coverage. As explained in section 4, an increase of the magnitude proposed cannot but have an impact.

[redacted]

Although Ofcom states in its AIP methodology that phasing in of AIP is a case by case assessment, we believe there is a precedent of phasing in increases in AIP:

- When AIP was first applied to mobile spectrum in 900 and 1800 MHz by the Radiocommunications Agency it was phased in over four years from 1999 with the full fee applicable from 2002.
- Ofcom has recently deferred the introduction of AIP for DT mux licensees till around 2020 and provided "indicative levels for AIP" as well as stated the "working hypothesis" that when introduced, annual fees will be phased in over five years (i.e. fees will be phased in despite licensees having a seven year notice period).[61]

56 SRSP: The revised framework for spectrum pricing, Ofcom Statement, 17 December 2010, para. 5.170

57 SRSP: The revised framework for spectrum pricing, Ofcom Statement, 17 December 2010, para. 5.142

58 Consultation, para. 5.83

59 Consultation, footnote 183 and SRSP: The revised framework for spectrum pricing, Ofcom Statement, 17 December 2010 – 5.152

60 Price rises in fixed term contracts, Ofcom Statement 23 October 2013

61 Ofcom, Spectrum pricing for terrestrial broadcasting: Consultation on Implementation, 13 March 2013

- In 2010, Ofcom decided to apply AIP to certain spectrum users in the maritime sector. The highest increases were phased in over two to three years.[62]
- In June 2011, Ofcom stated that it would phase in fees for aeronautical spectrum licences over 5 years, giving also one year notice of the new fees ahead of their implementation.[63]
- As part of a raft of licence fee changes, Ofcom imposed AIP on satellite services. The increase for satellite (permanent earth station) licences were calculated to be "up to" 90%-228%, which Ofcom considered to "be relatively high in percentage terms".[64] In response to complaints from licensees, Ofcom agreed effectively to phase in the relatively high increases over a two year period. For comparison the proposed increases on 900 and 1800 MHz mobile licensees are between 330% and 430%.

Based on these precedents and its stated AIP methodology, we fail to understand why Ofcom has not carried out an assessment of the impact of the proposed increase on mobile operators and our ability to respond to it. If Ofcom applied proper consideration to the impact of such a substantial increase, it would be evident that it needs to be phased in over three to five years as indeed has been the case when significant increases have been applied to other licence classes.

At best, Ofcom's consideration of whether the increases should be phased in appears cursory by stating in one paragraph[65] the following two reasons for rejecting phasing in:

- Licensees have been aware of the impending increase since the Direction was given in December 2010. Based on the auction results, we should have been able to make estimates of the increase and plan accordingly. The proposed increase should not come as a shock.
- The fact that licensees' bids in the auction exceeded the prices paid by an amount greater than the proposed annual increase for 900 and 1800 MHz means we have a room in our budgets to absorb the first year of ALF increases.

Addressing these points in turn:

- We have indeed budgeted for an increase in licence fees as this was expected. However, as explained in section 5.1 we could not reasonably have expected the increase that Ofcom has now proposed.
- We find the suggestion that our financial exposure during the auction is in any way relevant to our ability to absorb the first year ALF increase commercially naïve. Ofcom's suggestion seem based on a view that the auction prices were paid out of retained earnings in the current year, which is plainly not the case. A licence with an initial 20 year period is the largest

62 Applying spectrum pricing to the maritime sector, and new arrangements for the management of spectrum used with radar and aeronautical navigation aids, Ofcom Statement, 15 June 2010

63 Bespoke licence fees for aeronautical VHF communications frequencies, Ofcom Statement, 7 June 2011.

64 Modifications to spectrum pricing, Ofcom Statement, 10 January 2007, paragraph 4.18 and table 11)

65 Consultation, para. 6.19

single capital investment a mobile operator will make, which is financed in the capital markets and amortised over many years. The annual licence fee on the other hand is a recurring operational expense.
We also note that the combinatorial clock auction is designed specifically to incentivise bidders to bid their full valuations, as a bidder's own bid is not meant to influence the price that bidder pays; the 'second price' rule brings prices down to the minimum level required to beat the marginal bidder(s). For this reason prices in a CCA may be significantly less than winning bids. Had Ofcom chosen another auction format such as an SMRA auction, bidders would have had the same valuations but bidding would have stopped at the level required to beat the marginal bidder. The final prices might have been the same as the result of an SMRA but the highest bids observed would most certainly have been lower than in a CCA and Ofcom would not have been able to make such an irrelevant comment. On an even more serious note, the suggestion that Ofcom would use information about the gap between bids made and price paid in a second price auction for subsequent regulatory decisions could have an impact on bidders' willingness to reveal their valuations in future auctions and hence compromise the efficiency of any future CCAs that Ofcom may wish to conduct.

## 7.3 Conclusion

Ofcom's proposed claw back mechanism whereby licensees would pay more than an annual fee at the first fee payment after the new fees regulation come into force is disproportionate, in excess of Ofcom's own assessment of the market value and as such unlawful. We propose an alternative method whereby Ofcom can implement the revised fees without changing the fee payment dates stipulated in the licences but still achieve a common effective for the revised fee levels.

Ofcom has not given proper consideration to the financial impact that the revised fees will have on operators, our customers and other citizens. We cannot respond to a substantial increase in fees instantaneously. We expect that when Ofcom has considered phasing in of the revised fees sufficiently, it will find that the revised ALFs should be phased in as has been the case elsewhere for other licence classes.

# 8. Conclusion

This concluding section summarises the adjustments to Ofcom's proposed methodology and fee calculation that Ofcom must implement.

Starting from the UK auction values and applying information about relative prices of 1800 MHz compared to 800 MHz and 2.6 GHz from relevant European auctions, we would expect to see a lump-sum value around £9m per MHz. This assumes that the lump-sum valuation of 900 MHz is approximately £25m per MHz, and is thereby consistent with the evidence suggesting the 1800 MHz value should be 30-40% of the 900 MHz value.

The lump-sum value should then be adjusted for the terminal value element of auction bids which do not apply to the market value for renewal licences. On the basis of the evidence presented to Ofcom, we suggest that Ofcom reduces the lump sum value by a third to reflect this.

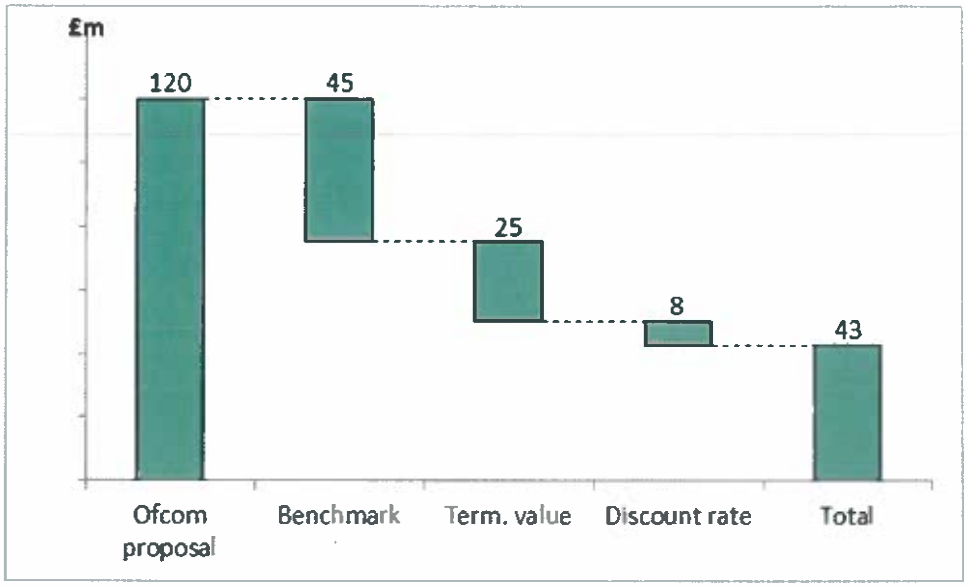
This net lump-sum value may then be converted to an annuity using a 20 year annuity formula and the appropriate discount rate for this calculation is the cost of debt, which in Ofcom's 2011 MCT statement (somewhat out of date now) was estimated at 2.4% (post-tax).

In summary, the corrections required to Ofcom's methodology have the following impact:

- the lump-sum values should be reduced by approx. 40% on the basis of robust analysis of the benchmarks;
- a further 33% should then be netted off to adjust for the terminal value ascribed to the auction bids before converting to annual amounts; and
- using the cost of debt as the appropriate discount rate brings down the annual payments a further 15% compared to Ofcom's calculation based on the WACC.

The combined effect of these corrections is to reduce the annual amount payable by EE from approx. £120m to £43m, i.e. by almost two thirds. This is illustrated in Figure 6 below.

Figure 6: Ofcom proposed ALF payable by EE and required corrections




Source: EE calculations based on Ofcom Consultation[66]

Finally, it is essential that Ofcom implements the new fee levels in a legal and proportionate manner: the proposed claw back mechanism must be dropped and it would be consistent with precedent (and the Direction) if the higher fees were phased in over a period.

66 Assuming an RPI rate of 3% pa, we calculate the average annual payment by EE given our 1800 MHz spectrum holding for the years 2015, 2016 and 2017 as £120m pa. Note the corrections we have identified are multiplicative meaning the order in which they are illustrated matter for the absolute amount of the correction required.

# 9. Consultation questions and answers

This section lists the Consultation questions and provides our short answers and references back to main document.

**Question 1. Do you agree with the approach that we propose to deriving a lump sum estimate of full market value for licences for 900 MHz spectrum and for 1800 MHz spectrum?**

At a high level, we agree that the LRPs from the auction should be the starting point. These best reflect the dynamics of the UK market. We agree that this should be qualified by looking at benchmarks from other countries, where in particular the relative values between different bands can provide useful information, provided that a robust method to analysing these relativities is deployed.

Ofcom's approach to the international benchmarks is ad hoc and biased. Ofcom's manipulation of the benchmark data magnifies the variance in 'evidential points' by calculating relativities between 1800 MHz/800 MHz and 1800 MHz/2.6 GHz separately, seemingly leading Ofcom to believe its proposed valuation is comfortably in the middle of a range. Ofcom's selection of data points to include in this analysis also lacks objective criteria.

We do not think that absolute benchmarks from other countries provide good evidence as they are subject to country specific factors and the conversion into UK equivalents produces uncertainty for example through currency fluctuations.

We disagree strongly with the suggestion that the average of the LRPs for 800 MHz and 2.6 GHz in the UK auction is in any way a useful benchmark as there is no evidence to back that up.

We propose an alternative methodology for using information about the relative prices in other countries. We call this the 'distance method' as it simply calculates where in the distance between the 800 MHz and the 2.6 GHz prices, the 1800 MHz prices is located and applies this relative distance to the UK auction prices for 800 MHz and 2.6 GHz.

Please refer to section 5 for our detailed views on the approach to deriving lump sum value as well as to the Aetha/Analysys Mason report which forms an integrated part of our response.

**Question 2. Do you have any comments on our assessment of the lump sum value of (a) a licence for 900 MHz spectrum; or (b) a licence for 1800 MHz spectrum?**

We find Ofcom's assessment of the benchmarks poor and the results shocking. Our view is that, while Ofcom's lump sum valuation of 900 MHz is perhaps justifiable, the value suggested for 1800 MHz is quite wrong and is completely unsupported by an impartial review of the evidence. This is all the more surprising, when it should be obvious to anybody who has looked at European auction data that the proposed lump sum value for 1800 MHz is much too high.

On the basis of a more robust methodology, and assuming the 900 MHz lump-sum value is at £25m/MHz we estimate the lump sum value of 1800 MHz spectrum would be around £9.4m per MHz, 37% lower than Ofcom's estimate of £15m per MHz. These values would also ensure that the proposed lump-sum valuations of 900 and 1800 MHz adhered to the evidence from other auctions on the relative value of 900 MHz and 1800 MHz.

Please refer to section 5 for our detailed views.

**Question 3. Do you agree with our approach to annualising the proposed lump sum value, including the cost of capital which we propose to use?**

No. Ofcom converts the lump-sum value to an annuity using a 20 year annuity. This is not an appropriate formula to use without acknowledging that the amounts bid in the combined auction are likely to include an element of terminal value. The market value of existing licences, which Ofcom is tasked to derive, would not include terminal value. This difference can be understood by thinking about hypothetical sequential auctions for a licence for year 0-20 followed by an auction for a licence from year 21 onwards and considering the strong complementarity between these goods. The terminal value bid in the first auction represents this complementarity and the market value of the second licence is diminished, as it does not include the value of the synergy already apportioned to the licence in the first auction.

On the basis of the evidence available to Ofcom, we would suggest that Ofcom could reduce the lump-sum values by about a third before converting to annual payments with the 20 year annuity formula.

We also disagree that the WACC is the relevant discount rate to use in this conversion. The question of licence fees is not an investment decision where investment risk is relevant – we are already invested in 1800 MHz. The risk and uncertainty here relates purely to Ofcom who may revise the annual licence fees in the future and we would like to assume that Ofcom's aspirations are to provide regulatory certainty. Any risk is certainly not related to the general market risk as for example reflected in an equity premium. The relevant discount rate for the purpose of annualising the lump-sum value is the rate at which licensees would be indifferent between paying the lump-sum value up front and paying in annual instalments. We argue that this is the cost of debt because the payment stream being considered is much closer to a bond or a mortgage than an investment decision such as for example our valuation for the new spectrum bands that were offered in the auction.

Please refer to section 6 for our detailed response.

**Question 4. Do you agree that fees should be specified in constant real terms and should be adjusted annually in the light of changes to the Retail Prices Index (RPI)?**

We can see how the annual RPI adjustment arises as a technicality from the methodology that starts from a lump-sum value, which is then converted to an annual payment stream. However, it is difficult to explain the logic to the wider group of stakeholders in the business in light of Ofcom's recent guidance on

General Condition 9 suggesting we are not allowed to increase our prices by RPI for customers who are in contract. They find it difficult to understand how Ofcom wants to include an automatic RPI uplift in our costs whilst at the same limiting our ability to pass cost increases through to our customers through RPI adjustments to existing customers' price plans.

Aside from that, we urge Ofcom to consider whether the CPI is a better measure for adjustments to keep ALF's constant in real terms. This is relevant also in light of the recent consideration by the ONS that the RPI does not fulfil the criteria for a national statistic (but the CPI does). The ONS has now introduced a new inflation measure alongside RPI, the RPIJ.[67] If Ofcom intends to write a reference to an inflation measure into the revised fees regulation, it is important that this is a robust measure which the ONS will continue to publish.

**Question 5. Do you agree that revised fees should be implemented in a manner which has an effect such that all licensees are charged higher fees simultaneously, even though payment dates of individual licensees may vary?**

Yes. However, we disagree with Ofcom's proposed 'claw-back' mechanism. Based on legal advice, we believe that it would be disproportionate and unlawful for Ofcom to charge a licensee a fee that represented more than a year's worth of fees at the point of an annual invoice (whether at the current or the revised rate). We are surprised that Ofcom has put this proposal forward as there is an alternative, lawful way of implementing the revised fees such that all licensees become liable for the revised fees at the same date.

Please refer to section 7 for our detailed views.

**Question 6. Do you agree it is appropriate that revised fees should be payable in full as soon as practicable after revised fee regulations are made.**

No. There is strong case for phasing in the new fee levels over three to five years. The Direction does not require Ofcom to collect the new fees as soon as possible and we are not able to respond to the increased fee levels instantaneously. If the purpose of the increased fees is to address an inefficient use of spectrum then it will need to lead to some real changes to have that effect such as increased end-user prices. [redacted]

It is also relevant that there is a strong precedence for phasing in licence fee increases for other licence classes – even where those licensees have been on longer notice than we have had.

[67] Office for National Statistics, "Introducing the New RPIJ Measure of Consumer Price Inflation", March 2013.

Please refer to section 7 for our detailed views.

**Question 7. Do you have any views about the minimum period that should elapse before we should consider revising fees again?**

Ofcom needs to get the revised fee level right for the sake of investment and to the benefit of consumers and citizens. Provided that Ofcom sets the fee at an appropriate level of about a third of that proposed for 1800 MHz in order to promote its statutory duties, we believe a long period of five to 10 years should ensue before the fees are revised in order to create stability and certainty for investment.

# Annex A: Academic literature on sequential auctions for complements

This annex outlines examples from the academic literature where the issue of sequential auctions for complements have been analysed. This is relevant to the question of whether auction bids include terminal value that relates to the period beyond the initial licence period.

Recent research by Javier Dona and Jose-Antonio Espin-Sanchez studies bidder strategies in sequential auctions when goods are complements versus when they are substitutes.[68] The authors explore auctions in which sequential units of identical goods could serve as either complements or substitutes to a good sold earlier at auction. The auction model involves significant fixed (sunk) costs. Substitutes are characterised by declining marginal values as more items are procured, whereas complements exhibit higher marginal value in obtaining a subsequent unit.

These water auctions function as follows. Water distribution (in Spain) is let during time periods over the course of a day. The water is distributed through canals. There is significant water loss when a canal is dry and trivial water loss when the canal is wet. Consequently, there is a sunk-cost aspect to the auction in that a farm that has won two consecutive time slots will incur less water loss during the second time period because its canal is already wet. However, a farm needs only a certain amount of water during a given time frame. So after procuring enough water, there may be diminishing value in additional distribution licenses (that is, there is also possible substitution effects).

The authors find that in periods when the expectation of future rain is low, the auction data exhibits strong complements, as would be expected. In particular, there is a premium in the first irrigation periods at auction, and significantly declining transaction price on subsequent periods. Moreover, consecutive irrigation periods are won by the same bidder. Therefore, bidder strategies are expressing value from the latter water rights that *have yet to be procured* into the first license on which they are bidding. The winning bidder then has a toe-hold in procuring the subsequent (complementary) licenses, and so it is able to procure them for declining amounts in the subsequent sales.[69]

Fernando Branco provides a basic ascending price model for the sequential sale of two items.[70] Branco's model shows that bidders that value the goods as complements will bid an additional option value for the first unit of the good beyond the intrinsic (stand-alone) value of that good. Consequently, goods with synergies sold in sequence will tend to exhibit decreasing price effects.[71]

68 Javier Dona and Jose-Antonio Espin-Sanchez, "Complements and Substitutes in Sequential Auctions: the Case of Water Auctions," *2013 Working Paper*. available at: http://www.jdonna.org/waterauctions-Web.

69 *Id* at 35-36, 5-7.

70 Fernando Branco, "Sequential Auctions with Synergies: An Example," 54 *Economics Letters* 159 (1997).

71 *Id*.

Research by Flavio Menezes and Paulo Montiero confirms the findings in Branco through the development of a more generalized model.[72] In particular, the authors find that when strong complementarities exist, bids placed on the initial items sold at auction will include an option value based on the opportunity to experience the synergy conditional on winning subsequent items at auction.

It is also worth noting that Menezes-Montiero do find instances where it is theoretically possible for good with synergies to experience increasing price for the latter items sold in a sequential auction. Importantly, however, these occurrences rely on only a single bidder in the auction viewing the items as complements while all other participants view the items as substitutes. Therefore, this scenario is not applicable to determination of ALFs from auction transactions, as all bidders in the auctions would view licenses for two separate and non-overlapping time periods as complements rather than substitutes.

In conclusion, the academic literature on the sequential auctioning of complements indicates that, in equilibrium, bidders that place synergistic value on two licenses will bid more aggressively for the first license. That is, they will transfer a portion of the value of the combination of licenses into the bid that is placed on the first license. In this manner, sequential auctions for complementary licenses exhibit declining price trends. Also, a single bidder tends to win all licenses in the basket of complements when the synergies are particularly strong.

72 Flavio Menezes and Paulo Montiero, "Synergies and Price Trends in Sequential Auctions," 8 Review of Economic Design 85 (2003).