



Update on ALFs for 900 MHz and 1800 MHz spectrum: German 2015 auction

EE Limited's response to the consultation of
9 July 2015

August 2015

Non-confidential version

Contents

1. Introduction and executive summary.....	3
2. Background.....	6
3. Ofcom’s proposals to adjust ALFs demonstrates flaws in its benchmarking approach.....	8
4. The 2015 German benchmark should be included as no more than a Tier 2 benchmark.....	11
4.1 The relative prices from the 2015 and 2010 German auctions largely reflect factors not related to the intrinsic value of spectrum.....	12
4.2 The relative prices from the German auction are not fully representative of UK market value of spectrum.....	17
4.3 The continued importance of multiple benchmarks.....	18
5. 2015 German auction results should not change the LSV estimates for 1800 MHz or 900 MHz spectrum.....	19
5.1 Including the 2015 German benchmark in Tier 2 should result in no adjustment to LSVs for 900 MHz and 1800 MHz spectrum.....	19
5.2 Weak case for adjusting LSV for 1800 MHz even if the 2015 German benchmark is included as Tier 1 in Ofcom’s analysis.....	23
6. Conclusion.....	25

1. Introduction and executive summary

On 9 July 2015, Ofcom published for stakeholder comment an “Update on annual licence fees for 900 MHz and 1800 MHz spectrum: German 2015 auction” (the “Update”). This is EE Limited’s (“EE’s”) response to the Update.

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

- Ofcom’s provisional decision and further consultation on annual licence fees (“ALFs”) for 900 MHz and 1800 MHz spectrum, published on 19 February 2015 (the “PD&C”)
- Ofcom’s consultation on ALFs for 900 MHz and 1800 MHz spectrum, published on 1 August 2014 (the “August 2014 Consultation”);
- Ofcom’s invitation for comments on European auctions that had taken place since the time of the October 2013 consultation; and
- Ofcom’s consultation on ALFs for 900 MHz and 1800 MHz spectrum published in October 2013 (the “October 2013 Consultation”).

In addition we are submitting as part of our response to the Update a report by Analysys Mason and Aetha Consulting (“AM/Aetha”) titled “The impact of the German auction result on 1800MHz and 900MHz annual licence fees” (the “AM/Aetha Report”).

In summary, this response makes the following key points:

- We do agree with Ofcom that the 2015 German auction results provide relevant evidence that it is appropriate for Ofcom to include in its analysis alongside all other relevant evidence.
- However, it is a matter of pure happenstance that the German auction (and not, say the 800 MHz and 2.6 GHz spectrum auction ongoing in Poland, the 1800 MHz and 900 MHz spectrum auctions expected in Norway in November 2015 and mid-2016 respectively, and the 1800 MHz auction in Denmark expected in 2016) has concluded prior to Ofcom reaching its final decision on ALFs following the issuance of its PD&C,
- In that context, it is both striking and concerning that Ofcom should be contemplating in its Update, the making of potential material adjustments to its lump-sum values (“LSV’s”) estimates of 900 and 1800 MHz spectrum on the basis of the results from this single international auction. The fact that Ofcom could even be contemplating such changes demonstrates the concerns we set out in response to the PD&C that Ofcom’s approach to setting ALFs based on benchmarking is too highly sensitive to changes in the tiering of individual benchmarks; and thus liable to produce estimates that do not correlate to UK market value. We accordingly stress again all of the points we made in response to the PD&C regarding the importance of cost modelling as a source of deriving LSV estimates.
- EE commissioned AM/Aetha to consider if and how the 2015 German auction results provide relevant evidence for the purposes of determining LSVs for 900MHz and 1800MHz spectrum in the UK. AM/Aetha’s attached report finds that both the 2010 German

benchmark and 2015 German benchmark that Ofcom has produced should be included in Ofcom's benchmarking analysis, but that neither benchmark meets Ofcom's criteria to be included as a Tier 1 benchmark. They accordingly recommend that both German benchmarks are included as Tier 2 benchmarks. EE agrees with this recommendation and with AM/Aetha's reasons for this, which are in summary as follows.

- There is strong evidence that the 2015 German auction prices did not reflect bidders' intrinsic valuation of the spectrum:
 - It is clear that various strategic bids were placed during the auction, which affected the final prices for 900 MHz and 1800 MHz spectrum - most notably, Vodafone's and Telefonica's bids in Rounds 172 and 173 appear to have led to the auction rapidly concluding. These bids were very similar in nature to bids placed in the 2010 German auction that have been identified by Ofcom as strategic; and were a major factor in Ofcom categorising benchmarks from the 2010 German auction in the Second Tier.
 - The 900 MHz spectrum cap of 2x15 MHz prevented bidders expressing their full range of valuations for the spectrum and restricted competition in the band, both of which are likely to have resulted in a departure from intrinsic value, a view acknowledged by Ofcom in the Update.
 - The final 900MHz prices were lower than 1800MHz prices, a phenomenon that is unique amongst European benchmarks, and an indication that bidding in one or both of the bands departed considerably from bidding based on intrinsic value.
- In any case, Ofcom's proposed 2015 German 1800MHz distance method benchmark and 2015 German 900MHz relative benchmark continue to rely heavily on data points from the 2010 German auction, the results of which Ofcom expressly concludes, vary from intrinsic valuation.
- Moreover, the proposed 2015 German benchmarks for 1800 MHz and 900 MHz rely heavily on the 800MHz and 2.6GHz results from the 2010 auction, with the relative value of this spectrum being likely to have changed significantly since 2010.
- AM/Aetha were further asked to consider whether there should be any adjustment to LSVs for 1800MHz and 900MHz spectrum, in the event that Ofcom were to include the results of the 2015 German auction as Tier 2 evidence. EE again agrees with AM/Aetha's reasoning and conclusions, being in summary that:

- Ofcom's benchmarking approach for estimating LSVs for 1800 MHz and 900 MHz spectrum as set out in the PD&C relies almost entirely on Tier 1 benchmarks. The inclusion of the 2015 German benchmark in Tier 2 has no impact on Tier 1 benchmarks and therefore Ofcom's LSV estimate should be unaffected.
- For 1800MHz spectrum, although the average of the Tier 2 benchmarks does increase with the addition of the 2015 German benchmark, Ofcom currently places little or no weight on Tier 2 benchmarks, and in any case its value remains well below Ofcom's proposed LSV. Furthermore, a cross-check calculating the average LSV based on a weighting of each individual benchmark is unchanged by the inclusion of the 2015 German benchmark. Therefore, there should be no impact on Ofcom's proposed 1800MHz LSV of **£13 million per MHz**.
- For 900 MHz spectrum, the addition of the 2015 German benchmark only slightly decreases the average of the Tier 2 benchmarks and the results of the cross-check calculating the average LSV based on a weighting of each individual benchmark. Departing from the PD&C on the basis of this single additional benchmark would risk creating highly undesirable regulatory volatility and uncertainty for 900MHz and 1800MHz licensees. Therefore, AM/Aetha consider that Ofcom's proposed 900 MHz LSV of **£23 million per MHz** remains appropriate.

We appreciate that Ofcom has not yet reached any final views and is at this stage only seeking stakeholders' comments on whether and how it might take account of the German 2015 auction in its international benchmark analysis. We trust that Ofcom will take EE's comments into account in reaching its final decision on the level of ALFs, which will of course also include consideration of EE's response to the PD&C.

2. Background

EE remains of the view that Ofcom's benchmarking analysis as presented in the February 2015 PD&C is flawed and unreliable, in particular with respect to estimating LSVs for 1800 MHz spectrum. We set out these concerns in detail in our response of 17 April 2015 to Ofcom's PD&C. In summary, we explained that:

- Ofcom's approach to selecting benchmarks is highly subjective and heavily assumption driven. This includes assumptions about whether the bidding in an auction reflects intrinsic value as well as the relevance of the auction in a particular country to informing UK market values (noting the multiple sources of differences between markets which impact on spectrum values). The result is that Ofcom's benchmarking analysis, used to estimate LSVs for 900 MHz and 1800 MHz spectrum, is prone to error.
- Ofcom's estimates of UK market value, using International benchmarking analysis, rely on too few data points, resulting in the LSV estimates being highly sensitive to changes in estimates, tiering, and weighting of individual benchmarks.
- Ofcom's benchmarking analysis also produces a wide range of estimates. For example, combining Ofcom's estimated range of UK market value of 800 MHz spectrum in the UK 4G auction and Ofcom's estimated range for the Y/X ratio for 1800 MHz, leads to an estimated range for the LSV of 1800 MHz of £5.5m to £28.5m per MHz.¹ The top of Ofcom's range of evidence is over five times higher than the bottom of the range.
- Two of the Tier 1 benchmarks that Ofcom appears to place most weight on, namely Austria and Ireland, are likely to significantly overstate the UK market value of 1800 MHz spectrum. EE has proposed that Ofcom can reduce the significant risk of overstating UK market value of 1800 MHz by correcting the value for Austria and placing more weight on non-Tier 1 benchmarks.
- International benchmarking analysis is unable to take account of UK market developments since the UK 4G auction that are likely to have affected the value of 1800 MHz and 900 MHz spectrum in the UK (e.g. greater certainty around the future use of spectrum, changes in traffic and traffic off-load forecasts, technology developments, and changes in equipment costs and the cost of capital).
- Ofcom has failed properly to consider estimating the UK market value of spectrum from cost modelling to inform the level of ALFs for 1800 MHz spectrum. This is despite Ofcom recently publishing a cost model which it has used to set mobile call termination rates, and which is fully capable of estimating the market value of spectrum. The use of cost

¹ The Y/X ratio for 1800 MHz is the difference in value between 1800 MHz and 2.6 GHz ("Y"), divided by the difference in value between 800 MHz and 2.6 GHz ("X"), expressed as a percentage

modelling has significant benefits compared to a benchmarking approach, including that it:

- is specific to valuing the actual ALF spectrum bands in the UK;
 - produces a narrow range of LSV estimates for 1800 MHz spectrum compared to Ofcom's benchmarking approach; and
 - takes into account information on key drivers of UK spectrum market value that was not available at the time of the UK 4G auction.
- EE believes that on this basis, the estimates of LSVs for 1800 MHz spectrum derived from cost modelling should be given at least as much weight as the results derived from Ofcom's benchmarking analysis.

Ofcom's latest proposals do not contain any information as to whether or how Ofcom intends to rectify any of the flaws associated with its benchmark analysis which EE and other stakeholders have identified in their responses to the PD&C. For the avoidance of doubt, EE maintains its overall critique of Ofcom's benchmark approach and its comments on how the results from the 2015 German multiband auction should be taken into account are submitted without prejudice to that position. Indeed, EE considers that Ofcom's proposals in the Update serve only to vindicate the concerns raised by EE regarding the flaws that have already been identified with Ofcom's international benchmarking approach, and to strengthen the case for greater reliance by Ofcom on cost modelling to derive LSVs.

3. Ofcom's proposals to adjust ALFs demonstrates flaws in its benchmarking approach

In the Update, Ofcom has suggested that the proposed inclusion of the 2015 German benchmark in Tier 1 of its benchmark analysis may potentially justify Ofcom making a "material downward adjustment" to its latest LSV estimate for 900 MHz spectrum and a "moderate upward adjustment" to its latest LSV estimate for 1800 MHz spectrum.²

The fact that Ofcom could even be contemplating such changes to the UK LSVs, which determines the ALFs to be charged to 1800 MHz and 900 MHz licensees for at least the next five years, on the basis of a single new European auction result when nothing has otherwise changed in relation to the actual value of that spectrum to the UK licensees, starkly demonstrates the logical and legal flaws in Ofcom's methodology for calculating ALFs that we set out in response to the PD&C.

It is both striking and concerning that Ofcom might make adjustments, and in particular a "material" adjustment, to its LSV estimates and therefore to its proposed ALFs for 900 MHz and 1800 MHz spectrum, on the basis of the results from a single auction. Such an outcome is only possible because of flaws in Ofcom's analysis, namely (i) that Ofcom's methodology places insufficient weight on non-auction benchmark data sources, and in particular cost-modelling and (ii) that Ofcom's benchmarking analysis relies on only a few benchmarks and is therefore likely to be highly sensitive to changes in estimates, tiering, and weighting of individual benchmarks. This is particularly concerning when it is evident that there is a wide variation in both the absolute and relative LSVs implied by individual auctions.³ Taken together, these facts mean that Ofcom's analysis is prone to a high degree of error.

Further, it may be purely a matter of chance whether a particular data point has or has not become available before Ofcom makes its final decision in respect of ALFs. EE is aware of a number of European auctions that are expected to be completed over the next 12 to 18 months, the results of which may provide relevant evidence for the purposes of estimating the market value of ALF spectrum. This includes:

- an ongoing auction of 800MHz and 2.6GHz spectrum in Poland;
- the auction of 1800MHz and 900MHz spectrum in Norway, which is scheduled for November 2015 and mid-2016 respectively; and
- the auction of 1800MHz spectrum in Denmark which is expected to take place in 2016.

The outcome of these auctions is clearly unknown, as is their relevance for the purposes of estimating the market value of ALF spectrum in the UK. However, given the wide range of spectrum values observed in other European auctions,

² Ofcom, The Update, Para 70

³ See table 2 of this response

it would be unsurprising if the results from each of these auctions varied widely when compared to the results from Ofcom's current benchmarks.

EE submits that it would not be rational for Ofcom to adopt an analytical approach under which a single new benchmark could lead it to make material adjustments to an ALF level which it had otherwise determined appropriately reflected UK market value for 1800MHz and 900 MHz spectrum. This is particularly the case when it is clearly purely a matter of happenstance as to which benchmarks become available when. Under such an approach the level of ALFs could vary significantly depending on the precise time at which the final decision is taken, but there is no reason to believe that the underlying market value of 900 and 1800 MHz spectrum in the UK is similarly volatile.

Further, Ofcom has clearly (and correctly) stated that ALFs are intended to be set to reflect medium to long term values of spectrum. To illustrate this point, it can be noted that Ofcom stated in the PD&C that by the end of 2014 it had reached a provisional decision on future ALFs, subject to final internal confirmation and approvals. Had Ofcom proceeded to make a final decision at that time, it would have set ALFs in ignorance of the result of the German auction.

It is symptomatic of the flaws in Ofcom's approach that the availability of the 2015 Germany benchmark could lead Ofcom to contemplate potential material revisions to its proposed ALFs, when there is no reason to believe that the value of 900 MHz spectrum in the UK has materially declined since late 2014 nor that the value of 1800 MHz spectrum in the UK has materially risen in that time. To state the obvious: the result of the German auction plainly does not determine the real market value of spectrum in the UK.

It is, in part, for these reasons that EE submits, first, that Ofcom should take into account as wide a range as possible of available benchmarks and, secondly, that Ofcom should carry out a rigorous cross-check on the LSVs implied by any benchmarking analysis, in particular through cost modelling. Under such an approach, the LSVs are far less likely to be unduly sensitive to the value of any one particular benchmark. By failing to do so, Ofcom is failing to have regard to relevant information, namely cost modelling and the information to be derived from other benchmarks.

Further, an approach that is highly sensitive to changes in benchmarks is likely to be contrary to Ofcom's duty to promote efficient use of spectrum. One of Ofcom's stated rationales for ALFs is to encourage efficiency, which Ofcom claims ALFs have the potential to do by improving spectrum trades over and above the commercial incentive that already exists for such trades. As Ofcom noted in its August 2014 Consultation:

"In principle, operators have an incentive to trade spectrum if there is a higher-value user. This will tend to reduce the risk that they will hold spectrum inefficiently (i.e. when they are not the highest-value user). However, we consider that operators may be less responsive to foregone receipts from trading spectrum than they would be if faced with a direct cost of ALF".⁴

⁴ Ofcom , August 2014 Consultation, Para. A5.15

EE has previously explained that there is no evidence that 1800 MHz spectrum is presently inefficiently distributed, or that ALFs are required to ensure efficient use of spectrum. However, assuming that Ofcom's rationale is correct, that setting ALFs at market value is required to ensure efficient spectrum allocation, then it would be critical that ALFs are actually set at the forward-looking long term market value. The fact that Ofcom's approach may produce ALFs which vary materially over a period of only a few months indicates that there is a substantial risk that that approach will produce a level of ALFs which does not match market value over the medium to long term.

Indeed, if Ofcom were to consider that a single auction result could lead it to make material adjustments to its proposed ALFs, then logic and consistency would suggest that it should similarly revise ALFs following the results of future spectrum auctions. Plainly, if such an approach were adopted there would be a significant risk that ALFs could become unstable in the short to medium term. For the avoidance of doubt, EE is not advocating that Ofcom should make repeated adjustments to ALFs following any future auctions. Rather this illustrates the weaknesses of Ofcom's proposed approach to estimating LSVs.

4. The 2015 German benchmark should be included as no more than a Tier 2 benchmark

In the Update, Ofcom has stated that it considers that the results for the 2015 German multi-band spectrum auction provide relevant evidence for estimating the market value of 1800 MHz and 900 MHz spectrum in the UK for the purposes of setting ALFs.⁵ On this basis, Ofcom has used the results of the 2015 German auction in conjunction with those from the 2010 German auction to derive a distance method benchmark of £15.2m per MHz for 1800 MHz spectrum and relative benchmark of £9.6m per MHz for 900 MHz spectrum (the “2015 German benchmark”).⁶

Ofcom is consulting on proposals to include the 2015 German benchmark in Tier 1 of its benchmarking analysis. EE commissioned AM/Aetha to review Ofcom’s interpretation of the German auction results. We provide the AM/Aetha Report together with this response and Ofcom should treat that report as an integral part of our response in relation to the issues contained therein.

The AM/Aetha Report assesses the 2015 German benchmark against Ofcom’s tiering criteria for including benchmarks in Tier 1 of its analysis (the “Tier 1 criteria”), as set out in the PD&C.⁷ The Tier 1 criteria are as follows:

1. the auction prices for 900MHz, 1800 MHz, 800 MHz, and 2.6 GHz spectrum (“the relevant bands”) must have been primarily determined by a market-driven process of bidding in the auctions, in the sense that they were not set by reserve prices;
2. based on the evidence available, the relative prices between the relevant bands must be at least as likely to be based on bidders’ intrinsic valuations of spectrum as on strategic bidding; and
3. the outcome of the auction appears likely to be informative of forward-looking relative spectrum values in the UK, having regard to country-specific circumstances and auction dates.

AM/Aetha’s assessment sets out evidence which clearly demonstrates that the 2015 German benchmark does not meet the second and third criteria set out above. This leads AM/Aetha to conclude that the 2015 German benchmark should, at best, be included in Tier 2 of Ofcom’s benchmarking analysis, along with the 2010 German auction.⁸

⁵ Ofcom, The Update, Page 1

⁶ Ofcom, The Update, Para 23

⁷ Ofcom, PD&C, Para 3.48

⁸ AM/Aetha Report, Page 9

4.1 The relative prices from the 2015 and 2010 German auctions largely reflect factors not related to the intrinsic value of spectrum

In relation to Ofcom's second criterion, AM/Aetha provide compelling evidence that the relative prices between the relevant bands are likely to be based heavily on factors that are unrelated to the intrinsic valuations of the spectrum. The AM/Aetha Report therefore recommends that the results of the 2015 German auction should be treated with caution and should be included, at best, as a Tier 2 benchmark for the purposes of estimating UK LSVs for 900 MHz and 1800 MHz spectrum.

Relative prices from 2015 German auction were significantly affected by strategic bidding

EE considers that there is clear evidence that strategic bidding took place in the 2015 German auction, in the form of signalling, and that this is likely to have significantly impacted on the relative auction prices of 900 MHz and 1800 MHz spectrum in that auction, in a similar way to how Ofcom concluded strategic bidding in the 2010 German auction is likely to have affected relative prices in that auction. In the Update, Ofcom identify a number of rounds in the 2015 German auction, in which it believes that bidding may have reflected some element of signalling; however conclude that they were unable to identify clear evidence that it influenced the final outcome of the auction.⁹

In contrast, AM/Aetha provide a number of separate and clear evidentiary examples of bidding in the 2015 German auction that did not reflect intrinsic valuations but was instead intended to signal to, and potentially to intimidate, other bidders. Crucially, that signalling was effective in influencing the final outcome of the auction. For instance, AM/Aetha show that Vodafone's bids in Round 172, in which it substantially increased the standing high bid on all lots in the 700MHz band, including the lots where it was already the standing high bidder, was more likely to reflect strategic bidding than the intrinsic value of the spectrum. AM/Aetha state that "*this was clearly not a value-based bid but rather a signal to encourage competitors to drop demand in the 900MHz and/or 1800MHz bands – where there was excess demand.*"¹⁰ Crucially Vodafone's strategy appears to have been successful, as in round 174, the final bids were placed in the 700MHz, 900MHz and 1800MHz bands, effectively bringing the auction to an abrupt end.

AM/Aetha also point to bids by the other two bidders, Telekom and Telefonica, in rounds 134 and 138 respectively, that appear to have had no value-based rationale, but instead were more likely intended to signal other bidders to reduce their demand in the 900 MHz and/or 1800 MHz band(s). For example AM/Aetha note that in round 134, Telekom bid on eight lots in the 1800 MHz, despite consistently bidding for no more than four lots in the band up until that

⁹ Ofcom, The Update, Para 42

¹⁰ AM/Aetha Report, Page 7

point, and this resulted in an increase in the average price by around 10% compared to the average round-to-round price increase of around 1%. Furthermore, it placed bids on all of the 1800 MHz lots that Vodafone held standing high bids on, despite the fact that these were not the cheapest lots. It also increased the price of its own standing high bids. The AM/Aetha Report concludes that *“there is no rationale, other than signalling, to bid on more expensive lots, to bid substantially more than the minimum bid, or to increase one’s own standing high bid. Therefore, one can surmise that Telekom’s bids in this round were to signal to Vodafone to reduce its demand in the 1800MHz band (and potentially the 900MHz band).”*¹¹

Importantly, AM/Aetha show that all of these cases of signalling were almost immediately followed by other bidders significantly reducing their demand in the 900 MHz and/or 1800 MHz band, and in the case of Vodafone’s bids in round 172, the auction effectively coming to an abrupt close for the 700 MHz, 900 MHz and 1800 MHz bands in round 174. This demonstrates that strategic bidding, in the form of signalling, significantly influenced the final outcome of the auction.

EE notes that Ofcom identified similar bidding behaviour for the 1800 MHz spectrum in the 2010 German auction, and that this evidence formed Ofcom’s basis for concluding that the 2010 German benchmark should not be included in Tier 1.¹² In the August 2014 Consultation, Ofcom noted that it believed there was evidence of *“strategic bidding in the band [1800 MHz] in the form of signalling”* and referred to a number of Telefonica’s bids for 1800MHz in the 2010 German auction, which it believed had no value-based rationale and *“could be interpreted as an attempt at ‘punishing’ E-Plus for bidding aggressively in the 800 MHz band”*.¹³ Ofcom subsequently concluded that the relative prices from the 2010 auction *“are more likely to reflect strategic bidding than to reflect intrinsic valuations of spectrum in Germany”*. This formed the basis of Ofcom’s decision to exclude the 2010 German benchmark from Tier 1.¹⁴

As a matter of consistency, where strategic bidding of the nature observed in the 2010 German auction took place in the 2015 German auction, which is clear from the numerous examples provided in the AM/Aetha Report, then Ofcom should also conclude that 2015 German benchmark cannot qualify as a Tier 1 benchmark.

Relative prices from 2010 German auction were significantly affected by strategic bidding

Further, Ofcom’s proposed 2015 German benchmark still relies heavily on the relative prices from the German 2010 auction, which as noted above, Ofcom has concluded are likely to have been significantly influenced by strategic bidding. As AM/Aetha note, in the case of Ofcom’s 2015 German benchmark, two of the three data points used to derive an 1800 MHz distance method benchmark come from the 2010 German auction. Ofcom’s 2015 German

¹¹ AM/Aetha report, Page 6

¹² Ofcom, PD&C, Para A8.256 and A8.265

¹³ Ofcom, PD&C, Para A8.221

¹⁴ Ofcom, PD&C, Para A8.265

benchmark for 900 MHz spectrum is also heavily influenced by the relative prices from the 2010 German auction. EE considers it clear that, given that the 2010 German auction, upon which the 2015 German benchmark relies so heavily on, was affected by strategic bidding, there is sufficient uncertainty that the benchmarks reflect intrinsic relative market values to justify a consistent approach of Ofcom continuing to exclude both benchmarks from Tier 1.

It would not be rational for Ofcom, having categorised the 2010 German benchmark as Tier 2, to categorise the 2015 benchmark as Tier 1. To the extent that the 2015 benchmark is based upon 2010 data points, it cannot be more reliable than those data points.

The spectrum cap significantly depressed prices for 900 MHz spectrum

In the Update, Ofcom note that the three bidders in the 2015 German auction were subject to a tight spectrum cap which meant that they were prevented from acquiring more than 2x15 MHz of the 2x35 MHz of available 900 MHz spectrum in the auction. The cap level was set to ensure that all three bidders could gain sufficient spectrum in order to maintain their existing GSM infrastructure. However, the spectrum cap, coupled with bidders' need to gain sufficient spectrum to support GSM, is also likely to have led to the bids in the auction not reflecting the full market value of the 900 MHz spectrum.

Firstly, the spectrum cap meant that bidders were prevented from expressing their full range of valuations for the available 900 MHz spectrum (i.e. on up to 2x15 MHz of 900 MHz spectrum), which introduces a significant risk that auction prices understated the forward-looking value of 900 MHz spectrum. The risk that bidders were unable to express their full range of valuations was particularly acute as at least two of the bidders were understood to require 900 MHz spectrum to support GSM, which meant that they would potentially be prevented from acquiring the necessary amount of spectrum to support other services such as LTE. Clearly this would have in turn prevented bidders from expressing their valuations for services such as LTE and thereby led to the final prices not reflecting the intrinsic value of the spectrum. Ofcom acknowledge this in the Update:

“it is possible that individual bidders in the German auction, particularly those with a need for 900 MHz spectrum for GSM in the medium term, were prevented by the spectrum cap from expressing their full range of valuations of 900 MHz spectrum for other uses such as LTE. For example, if Vodafone needed more than 2x5 MHz of 900 MHz spectrum for GSM in the medium term, it could not have acquired 2x10 MHz for LTE. This is also true of Telekom Deutschland. Moreover, in the case that either Telekom Deutschland or Vodafone needed more than 2x10 MHz for GSM in the medium term they could not have expressed any valuation of 900 MHz spectrum for LTE at all.”¹⁵

Ofcom then go on to conclude that the “spectrum cap introduces a risk that auction prices understate the forward-looking value of 900 MHz spectrum for a 2x10 MHz increment.”¹⁶

¹⁵ Ofcom, The Update, Para 33

¹⁶ Ofcom, The Update, Para 34

Secondly, it is clear that the cap weakened competition for the available spectrum in the auction, which is likely to have depressed final prices that resulted from the auction. In particular, the spectrum cap level (2x15 MHz) meant that all three bidders were all but guaranteed to win at least 2x5 MHz of the available spectrum.¹⁷ AM/Aetha considered that the result of this is that there was a “very material” risk that the auction results for 900 MHz understate market value and that this was borne out by the fact that the 900MHz prices in Germany were low, on an absolute level, when compared to other benchmark countries (see table 2).¹⁸

Relative prices of 900/1800 MHz spectrum in the 2015 German auction indicate departure from market value

The relative prices for 900 MHz and 1800 MHz spectrum in the 2015 German auction are completely inconsistent with both prior expectations regarding the intrinsic value of the spectrum and the results from auctions in other benchmark countries that Ofcom includes in its benchmarking analysis. In the 2015 German auction, 900 MHz sold at a significantly lower price than 1800 MHz, and this is reflected in Ofcom’s estimates of the LSVs for the 2015 German benchmark. This is contrary to prior expectations, in so far as, in the UK it is recognised that 900 MHz spectrum provides superior propagation characteristics in relation to indoor coverage, compared to 1800 MHz spectrum, and therefore we would expect 900 MHz spectrum to have a significantly higher market value than 1800 MHz spectrum. Indeed the relative prices observed for all the other benchmarks in Ofcom’s benchmark analysis are consistent with this expectation, as shown in Table1.

Table 1: Summary of the difference in 900MHz and 1800MHz UK equivalent prices in benchmark countries for which both are available

	900MHz benchmark UK-equivalent price (£m per MHz)	1800MHz benchmark UK-equivalent price (£m per MHz)	Difference in UK equivalent prices (£m per MHz)	Proportional difference in UK equivalent prices (%)
Austria	78.2	44.2	34.0	44%
Denmark	2.9	1.3	1.7	57%
Germany (2015)	15.5	20.0	-4.4	-29%
Greece	32.9	14.5	18.4	56%
Ireland	36.1	23.4	12.7	35%
Portugal	29.3	8.0	21.3	73%
Romania	44.3	47.7	28.5	60%

Source: AM/Aetha

AM/Aetha state that this is likely to indicate that bidding in one or both of the bands departed considerably from market value. Ofcom accept that this is an entirely plausible interpretation:

¹⁷ The 900 MHz spectrum cap (2x15 MHz) and available 900 MHz spectrum (2x35 MHz) meant that even if two of the bidders reached the cap (i.e. both acquired 2x15 MHz each, 2x30 MHz in total) this would still leave 2x5 MHz of spectrum available to the third bidder. See Ofcom’s Update, para 36.

¹⁸ AM/Aetha report, Page 8

*“We note that 900 MHz sold at a significantly lower price than 1800 MHz in the German 2015 auction and we do not observe this outcome in any other auction in our dataset. One interpretation of this outcome could be to treat the benchmark as having a larger risk of understatement (and/or that the scale of understatement is larger).”*¹⁹

Ofcom’s only stated justification for not treating the 2015 German benchmark for 900 MHz as carrying a material risk of understatement is that there are a *“limited number of evidence points in our [Ofcom’s] dataset”*.²⁰ However, this purported justification is simply illogical, and based on an irrelevant consideration. Whilst EE agrees that Ofcom’s current benchmarking approach relies on too few data points, that fact does not make other data points any more reliable. Nor does it give Ofcom the freedom to pick and choose Tier 1 benchmarks as it likes. There is a clear evidentiary indication (certainly at least as clear as those applicable to its other benchmarks in that limited set) that the 2015 German benchmarks, in particular for 900 MHz, have departed considerably from market value. Further, to treat it as a Tier 1 benchmark would involve Ofcom being inconsistent with its own treatment of other benchmarks. This would be both irrational and contrary to Ofcom’s duty under Article 8(5)(a) of the Framework Directive and s.3(3)(a) Communications Act 2003 to adopt a consistent regulatory approach.

In further support of this point, AM/Aetha note that, despite the lack of data points in its Tier 1 category, Ofcom has previously proposed to place less weight on the results from the auction in Denmark on the basis that the relative prices of the relevant spectrum were unexpected. In the October 2013 Consultation Ofcom stated that that *“1800 MHz spectrum sold at a price which would, in UK terms, be well below the price of 2.6 GHz spectrum. 900 MHz spectrum also sold at a very low price... We provisionally conclude that the Denmark auctions provide less important evidence when deriving ALFs for 900 MHz and 1800 MHz licences in the UK”*.²¹ Although Ofcom has subsequently proposed to completely exclude the 1800 MHz Danish benchmark from its analysis and only include the 900 MHz Danish benchmark in Tier 3 of its benchmark analysis, for separate reasons, Ofcom has clearly acknowledged that it should not place significant weight on benchmarks that provide such unexpected relative prices. There is simply no credible justification for Ofcom departing from this approach in relation to the 2015 German benchmark.

Finally, AM/Aetha note that the findings above regarding the 2015 German benchmark being the only benchmark to date in which 1800 MHz spectrum has sold for more than 900 MHz spectrum also reinforce the conclusion that the 2015 German auction results for one or both bands is likely to have departed from market value.

¹⁹ Ofcom, The Update, Para 50

²⁰ Ofcom, The Update, Para 50

²¹ Ofcom, October 2013 Consultation, Page 90

4.2 The relative prices from the German auction are not fully representative of UK market value of spectrum

In relation to Ofcom's third criterion, on the basis of strong evidence provided in the AM/Aetha Report, EE considers that the 2015 German benchmark is unlikely to be informative of the forward looking relative market value of spectrum in the UK for the same reasons that the 2010 German benchmark was not informative of UK market value.

Relative value of 800 MHz and 2.6 GHz spectrum likely to have changed since 2010

In the PD&C, Ofcom proposed to include the 2010 German benchmark in Tier 2 (instead of Tier 1) of its analysis, largely on the basis that the auction occurred five years ago and the LTE ecosystem has evolved significantly since then. In relation to the 2010 German benchmark Ofcom noted that:

"The multiband auction in Germany, which included the 1800 MHz, 800 MHz and 2.6 GHz bands, took place in May 2010, well before important developments in the ecosystem for LTE1800. We said that this was likely to have had a substantial effect on the relative value of these bands in the German auction".²²

This change in the relative value of the bands is likely to have not only affected the value of the 1800MHz band, but also both the 800 MHz and 2.6 GHz band values, which as noted in section 4.1 of this response, Ofcom's estimate of the 2015 German benchmark relies heavily on. Ofcom acknowledges this in the Update:

"our measure of 800 MHz and 2.6 GHz spectrum in Germany is based on an auction from 2010. There is a risk that the value of 800 MHz spectrum may have increased or decreased in value since that date...We consider that there is a risk that the benchmark is an understatement or overstatement of the market value of 1800 MHz spectrum in the UK, but we cannot be sure of the likelihood or scale of this risk."²³

EE submits that Ofcom's approach to the categorisation of benchmarks must be rational and comply with its statutory obligation of regulatory consistency. In that context it is clear an 1800MHz distance method benchmark and a 900MHz relative value method benchmark that rely so heavily on 800MHz and 2.6GHz benchmarks from five years ago, and therefore are unlikely to reflect the forward-looking relative UK market value of ALF spectrum, should be, at best, included in Tier 2 of Ofcom's benchmark analysis.

²² Ofcom, PD&C, Para A8.234

²³ Ofcom, The Update, Para 61

4.3 The continued importance of multiple benchmarks

In the Update, Ofcom includes both the 2010 and 2015 German benchmarks in its analysis. The AM/Aetha Report concludes that Ofcom is correct to include both benchmarks; however the benchmarks should only be included in Tier 2 of Ofcom's analysis.

In EE's responses to all of Ofcom's consultations, we have strongly advocated that Ofcom should include more rather than fewer evidence points, as this increases the overall robustness of the analysis and resulting ALFs. We maintain this view. On this basis, whilst we strongly believe that they should be categorised as no more than Tier 2 benchmarks, we support the inclusion of both the 2010 and 2015 German benchmarks in Ofcom's analysis.

5. 2015 German auction results should not change the LSV estimates for 1800 MHz or 900 MHz spectrum

In the Update, Ofcom has suggested that, on the assumption that the 2015 German benchmark is included as a Tier 1 benchmark, there may be a case for a material downward adjustment to its estimated LSV for 900 MHz and a moderate upward adjustment to its LSV estimate for 1800 MHz spectrum. However, Ofcom also notes if the 2015 German benchmark were considered as Tier 2 evidence then it is less clear that its inclusion would require an adjustment to the 900 MHz LSV estimate. Likewise Ofcom state that it may take the view that it is not necessary to make an adjustment to the LSV estimate for 1800 MHz spectrum.²⁴ We explain below the key reasons that including the 2015 German benchmark in Tier 2 of Ofcom's benchmark analysis should result in no adjustment to Ofcom's LSV estimates for 900 MHz and 1800 MHz spectrum, and that even if Ofcom was to incorrectly include the 2015 German benchmark in Tier 1, there is still no basis for making an adjustment to the LSV for 1800 MHz spectrum.

5.1 Including the 2015 German benchmark in Tier 2 should result in no adjustment to LSVs for 900 MHz and 1800 MHz spectrum

In section 4 of this response we have set out clear evidence-based reasoning to support the inclusion of the 2015 German benchmark in Tier 2 of Ofcom's proposed benchmarking analysis. We note that Ofcom's Update indicates that the inclusion of the 2015 German benchmark in Tier 2 of its analysis would significantly weaken any case for an adjustment to its LSV estimates. To test this suggestion, we asked AM/Aetha to also consider the implications of including Ofcom's proposed 2015 German benchmark in Ofcom's benchmark analysis on the 900 MHz and 1800 MHz LSV estimates as proposed in the PD&C.

In their Report, AM/Aetha assume for simplicity that Ofcom's proposed benchmarking analysis and estimates of UK market values for 800 MHz and 2.6 GHz spectrum are retained as they are set out in the PD&C. AM/Aetha, again for simplicity, also adopt Ofcom's approach of first selecting the LSVs, "in the round", before then conducting a cross-check of the benchmarks. The only difference compared to Ofcom's proposed benchmarking approach, is that AM/Aetha includes the 2015 German benchmark in Tier 2 of the analysis, as recommended in their Report.

No impact on Ofcom's LSV estimate of 1800 MHz spectrum

In the PD&C Ofcom has estimated a LSV of £13m per MHz for 1800 MHz spectrum.²⁵ As noted in EE's response to the PD&C it is unclear exactly how

²⁴ Ofcom, The Update, Paras 69-71

²⁵ Ofcom, PD&C, Para 1.9

Ofcom has arrived at its proposed LSV estimates for 1800 MHz spectrum. However, it is apparent that Ofcom places a significant amount of weight on its Tier 1 benchmarks, and very limited or no weight on Tier 2 and Tier 3 benchmarks. The AM/Aetha Report concurs with this interpretation. AM/Aetha explain that:

“[Ofcom] firstly considered that the mid-point of the lowest benchmark value in Tier 1 (GBP12.8 million) and the average of the Tier 1 benchmarks (GBP16.3 million) was GBP14.6 million. However, Ofcom thought that a lower LSV estimate was appropriate because the Irish benchmark risked overstatement of the UK market value. Ofcom then considered that the Tier 2 benchmarks, at the time only consisting of the 2010 German benchmark of GBP5.6 million, did not provide it with “a strong basis to modify the view [derived] from the first-tier benchmarks.”²⁶

As shown in Figure 1 below, if Ofcom were to include the 2015 German benchmark in its proposed 1800 MHz benchmark analysis as a Tier 2 benchmark, this would result in:

- the average estimated LSVs of Ofcom’s Tier 1 and Tier 3 benchmarks remaining unchanged; and
- an increase in the estimated LSVs of Ofcom’s Tier 2 benchmarks to £10.4m (below Ofcom’s current 1800 MHz LSV estimate of £13m).

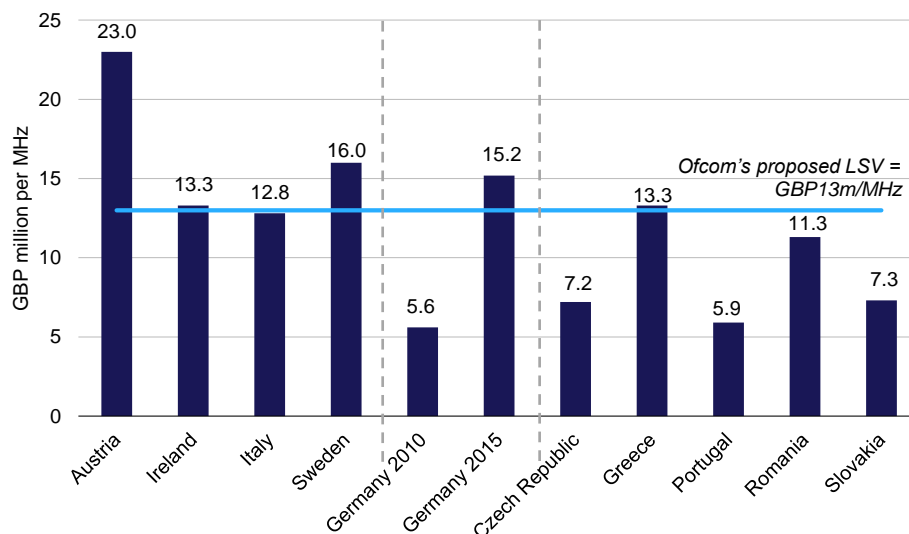
This suggests that Ofcom’s current LSV estimate for 1800 MHz spectrum should be unaffected by the inclusion of the 2015 German benchmark in Tier 2 of Ofcom’s analysis. The reasons for this are as follows:

- Firstly, Ofcom appears to have based its current 1800 MHz LSV entirely on Tier 1 benchmarks, and the inclusion of the German 2015 Benchmark as a Tier 2 benchmark has no impact on the average LSV of Tier 1. Thus, within Ofcom’s analytical approach there is no basis for altering the 1800 MHz LSV.
- Secondly, whilst AM/Aetha note that there may be a case for placing slightly more weight on the Tier 2 benchmarks, and indeed EE is of the view that Ofcom should be placing more weight on non-tier 1 benchmarks²⁷, the overall effect of adopting such an approach would be to produce a lower, rather than a higher, estimate of the 1800 MHz LSV. Even with the German 2015 benchmark included in Tier 2, the average estimated LSV of Tier 2 benchmarks (£10.4m) is still well below Ofcom’s current estimate of £13m. EE also notes that this estimate remains significantly above the average estimated LSVs for Tier 3 benchmarks (£9.1m).

²⁶ AM/Aetha report, Page 12.

²⁷ EE sets out the key reasons Ofcom should be placing more weight on non-tier 1 benchmarks in section 5 of its response to Ofcom’s PD&C.

Figure 1 - 1800MHz distance method benchmarks assuming Ofcom's UK values for 800MHz and 2.6GHz



Source: AM/Aetha

This appears to be consistent with Ofcom's latest view expressed in the Update, that inclusion of the 2015 German benchmark may only present a case for a moderate upward adjustment to its proposed 1800 MHz LSV estimate or that such an adjustment may not be necessary. Clearly then inclusion of the 2015 German benchmark in Tier 2 removes any case for an upward adjustment.²⁸

No impact on Ofcom's LSV estimate of 900 MHz spectrum

Ofcom propose an LSV estimate of £23m per MHz for 900 MHz spectrum in the PD&C.²⁹ Ofcom's approach to deriving the LSV for 900 MHz spectrum is clearer than its approach to estimating the LSV for 1800 MHz spectrum. Ofcom identifies the mid-point between the average estimated LSV for Tier 1 benchmarks (£28m) and the lower LSV of the two Tier 1 benchmarks (£18m), which is £23m, as the appropriate estimate from the Tier 1 benchmark. Ofcom then considers the Tier 2 benchmarks, but concludes that there is not a strong basis to adjust its estimate from the Tier 1 benchmarks, as Ofcom places significantly less weight on Tier 2 benchmarks compared to Tier 1 benchmarks.

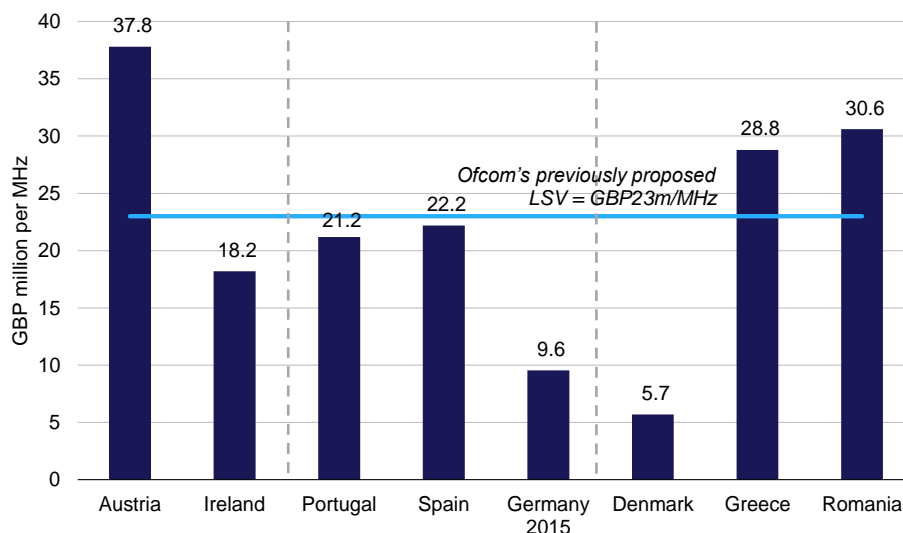
Figure 2 shows Ofcom's current relative benchmark analysis for the 900MHz relative benchmarks with the 2015 German benchmark included in Tier 2. The inclusion of the 2015 German benchmark in Tier 2 of the analysis leaves the average Tier 1 and Tier 3 benchmark unchanged, but lowers the average Tier 2 benchmark to £18m. Clearly there would be no basis within Ofcom's present approach for it to make an adjustment to its current estimate of the LSV for 900 MHz spectrum, since Ofcom places its weight almost entirely on Tier 1 benchmarks and the average LSV from the Tier 1 benchmarks is unchanged. As with the benchmark analysis for 1800 MHz, the inclusion of the 2015 German benchmark in Tier 2 may strengthen the case for placing some weight

²⁸ Ofcom, The Update, Para 71

²⁹ Ofcom, PD&C, Para 1.9

on Tier 2 benchmarks, however the average Tier 2 benchmark is not substantially below Ofcom’s proposed 900 MHz LSV estimate of £23m and this estimate is already towards the lower end of Ofcom’s Tier 1 benchmarks.

Figure 2 - 900MHz benchmarks assuming Ofcom’s UK values for 800MHz and 2.6GHz



Source: AM/Aetha

Cross-check of the LSV for 900 MHz and 1800 MHz

Having established that the inclusion of the 2015 German benchmark in Tier 2 provides no basis for Ofcom to adjust its current LSV estimates for 900 MHz and 1800 MHz, AM/Aetha undertook a cross-check of the LSV estimates. This includes comparing the ratio of the estimates of 900 MHz and 1800 MHz lump-sum values in the UK, which is 57% (i.e. £13m per MHz divided by £23 m per MHz), against the within-country ratios of the absolute values of 1800 MHz to 900 MHz, including the 2015 German benchmark. The within-country ratios are shown in Table 2 below.

Table 2: 900MHz and 1800MHz UK equivalent values, in £ million per MHz

	900MHz	1800MHz	1800MHz/900MHz ratio
Ireland	36.1	23.4	65%
Austria	78.2	44.2	56%
Greece	32.9	14.5	44%
Denmark	2.9	1.3	43%
Germany 2010	15.5	1.8	12%
Germany 2015	15.5	20.0	129%
Romania	47.7	19.2	27%
Portugal	29.3	8.0	40%
Geometric mean			43%

Source: Ofcom, AM/Aetha

First, EE notes that, if the 2015 German benchmark is excluded from the dataset in Table 2, the range of the benchmark ratios is between 27% and 65% and the geometric mean is 37%. It is clear therefore that, when compared to these benchmark ratios, the 2015 German benchmark ratio of 129% is a large outlier. As noted in section 4 of this response, on the basis of the evidence

provided in the AM/Aetha report, we have serious concerns that the relative prices of the 900 MHz and 1800 MHz bands from the 2015 German auction were not driven by intrinsic spectrum valuations and should therefore not be included in Tier 1 of Ofcom's analysis. We consider that the fact that the 2015 German benchmark ratio is such a clear outlier, only serves to support this case.

Second, the ratio of the estimates of 900 MHz and 1800 MHz lump-sum values is still above the geometric mean of the benchmark ratios, even when the 2015 German benchmark ratio, a clear outlier, is included. The geometric mean of all of the benchmark ratios, including the 2015 German benchmark ratio, is 43%. This is somewhat lower than the 57% ratio of Ofcom's current estimates of UK LSVs for 900 MHz and 1800 MHz spectrum. This suggests that Ofcom's proposed 1800 MHz LSV remains, if anything, too high compared to the proposed 900 MHz LSV.

EE also notes that AM/Aetha conducted a further cross-check by calculating the weighted average LSV of benchmarks in Ofcom's analysis, using Ofcom's proposed tiering categorisation³⁰ and weightings³¹. This showed that the inclusion of the 2015 German benchmarks in Tier 2 results in the weighted average 1800 MHz benchmark LSV being unchanged and a slight decrease in the weighted average 900 MHz benchmark LSV.³² This cross-check therefore also provides no basis to adjust Ofcom's current LSV estimates.

5.2 Weak case for adjusting LSV for 1800 MHz even if the 2015 German benchmark is included as Tier 1 in Ofcom's analysis

In section 4 of this response we explained that, based on Ofcom's Tier 1 criteria, the 2015 German benchmark should not be included in Tier 1 of Ofcom's analysis. The evidence provided by AM/Aetha on the 2015 German benchmark indicates that, at best, the benchmark should be included in Tier 2 of Ofcom's analysis. Moreover, if Ofcom were to include the 2015 German benchmark in Tier 1 of its analysis, this would be clearly inconsistent with its previous categorisation of other benchmarks, such as the 2010 German benchmark and Danish benchmark. Such an approach would be both irrational and in breach of Ofcom's duty of regulatory consistency, and hence would be unlawful. Notwithstanding this, even if Ofcom were to incorrectly include the 2015 German benchmark in Tier 1, it is not clear to EE that this would, on its own, necessitate any adjustment to Ofcom's current estimate of the LSV for 1800 MHz spectrum.

The Tier 1 average LSV for 1800 MHz is lowered by the inclusion of the 2015 German benchmark

As explained in section 4.1 of this response, Ofcom's approach to estimating the LSV for 1800 MHz relies almost exclusively on its Tier 1 benchmarks.

³⁰ Ofcom, PD&C, Figures 3.1 and 3.2

³¹ Ofcom, August 2014 Consultation, Table 3.4

³² AM/Aetha Report, Figures 4.3 and 4.4

Ofcom's starting point is to consider the mid-point of the lowest benchmark value in Tier 1 (£12.8m) and the average of the Tier 1 benchmarks (£16.3m), which is £14.6m. Ofcom then reduces its estimate from this starting point in an attempt to take account of the potential overstatement of at least one of its Tier 1 benchmarks.³³

EE notes that the 2015 German benchmark proposed by Ofcom for 1800 MHz spectrum is £15.2m which is below the average for 1800 MHz Tier 1 benchmarks (£16.3m). If Ofcom were to incorrectly include the 2015 German benchmark in Tier 1 of its analysis, this would (all else equal) reduce the average Tier 1 benchmark from £16.3m to £16.0m, and therefore Ofcom's starting point for estimating the LSV for 1800 MHz from £14.6m to £14.4m, a moderate reduction. EE would therefore expect that even if Ofcom were to incorrectly include the 2015 German benchmark in its analysis, under its current framework there would be no case for an upward adjustment to its LSV estimate for 1800 MHz spectrum.

³³ As set out in EE's responses to Ofcom's PD&C, the selection of a slightly lower LSV estimate only partly reflects the overstatement of UK market value inherent in the Irish benchmark and does not reflect the large overstatement in the Austrian benchmark, which we have argued should be corrected to £8.8m per MHz or relegated to Tier 3 in any event.

6. Conclusion

In conclusion, we believe it is quite clear what Ofcom must now do as a minimum in order to comply with its statutory duties in setting ALFs:

- Place at least as much weighting on cost modelling results to reduce the sensitivity/subjectivity and take account of recent developments in the UK market that are relevant to estimating the forward looking market value of spectrum.
- Make a significant downward adjustment to the Austria benchmark for and place more weight on non-Tier 1 benchmarks for 1800 MHz spectrum to ensure that its estimate for 1800 MHz do not reflect the significant overstatement in Austria and Ireland and are not overly sensitive to changes in the treatment of data points.
- Include both the 2010 German benchmark and 2015 German benchmark in Tier 2 (reflecting the fact that the benchmarks are relevant but do not meet Ofcom's Tier 1 criteria).
- Applying a consistent regulatory approach and in the interests of regulatory certainty, make no adjustment to its LSV estimates, particularly for 1800 MHz spectrum, purely on the basis of the 2015 German auction evidence.