

Annual licence fees for 900 MHz and 1800 MHz spectrum

Ofcom provisional decision and further consultation

February 2015

Telefónica UK Ltd response

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Section 1

I. EXECUTIVE SUMMARY

1. Telefónica UK Ltd (“Telefónica”) is grateful for the opportunity to provide comments on Ofcom’s provisional decision and further consultation on Annual Licence Fees¹.
2. There is broad consensus in support of the four stepped approach adopted by Ofcom and summarised at §1.8 – 1.11. However, Telefónica has serious concerns about Ofcom’s analysis under each of those steps. This leads Ofcom to propose ALFs which are far too high and are likely to act against consumers’ interests, in breach of Ofcom’s statutory duties.

Step 1: UK market value of spectrum in the 4G auction

3. We are pleased that Ofcom no longer intends to rely on the marginal bidder methodology to determine the value of 800 MHz spectrum. For the reasons we set out in our response to the August 2014 consultation, that approach was unsound.
4. However, given what Ofcom is offering up to replace it, this is very much a case of jumping out of the frying pan and into the fire. We are surprised by (with respect) the crudeness of Ofcom’s proposed new assessment (its third in as many consultation documents about the matter), which involves – after so much consultation and analysis – nothing more than an arbitrary combination of two data points (the larger of which is clearly a high outlier with no credibility). The resulting valuation of 800 MHz spectrum is excessively high.
5. Telefónica remains of the view that no one method for assessing the value of 800 MHz spectrum is necessarily better than any other and that the correct approach is to consider the broad range of valuations and, applying a conservative approach, select a value at the lower end of this range. We think that a reasonable estimation of the value of 800 MHz spectrum falls within a range of between £24.16m per MHz (the lowest linear reference price) and £27.5m per MHz (the price paid by Telefónica for an 800 MHz lot in the 2013 auction).

Step 2: Lump-sum values of ALF spectrum

6. There is broad support in favour of the use of price ratios across bands in other European countries to derive UK lump-sum values of ALF spectrum. However, we continue to have major reservations about the way that Ofcom has carried out this exercise, in practice. In

¹ Ofcom, Annual licence fees for 900 MHz and 1800 MHz spectrum, Provisional decision and further consultation, 19 February 2015: <http://stakeholders.ofcom.org.uk/binaries/consultations/annual-licence-fees-900-MHz-1800-MHz/summary/condoc.pdf>.

particular, we strongly object to some of the revisions that Ofcom has made to the weighing of certain evidence points, which are based on spurious evidence, and the continued emphasis it places on the Austrian 4G auction outcome, which is a high price outlier.

7. Separately, latterly in the consultation response process, we have become aware of a series of apparent errors in Ofcom's calculations. We set these out in greater detail in section 5 of this response. As a result of these, we have serious reservations about the numbers Ofcom presents in the consultation document.
8. Telefónica's view, based on a proper assessment of international benchmarking, is that the ratio of 900:800 MHz falls within a range of between 60% and 65%.
9. Considering the first two steps in the round, we find it surprising that Ofcom, having rightly abandoned the marginal bidder methodology in its August 2014 consultation for valuing 800 MHz spectrum after the flaws were explained to it, should have reached precisely the same conclusion regarding the appropriate figure for the value of 900 MHz spectrum as before, in consequence of an adjustment to the ratio of 900 and 800 MHz values. We are concerned that the arbitrary nature of its new methodology, and the lack of any difference at all in the value it yields, may leave Ofcom open to allegations that its approach is subjective, i.e. that it picked the methodology to produce a target number, rather than the other way round; and we would welcome any comfort that Ofcom is able to give in this respect.

Step 3: Discount Rate

10. We have a number of serious concerns about Ofcom's implementation of the cost of debt approach and, in particular, its newly introduced "risk sharing" premium. We believe that errors in Ofcom's analysis lead to an implausibly large "risk-sharing" premium that does not align with market evidence. In our view, Ofcom should use a discount rate no higher than 0.9% (real, post tax).

ALF

11. Taking the above into consideration, we would propose the following ALF levels (before adjusting for the coverage obligations, in real March 2013 prices):
 - a) 900 MHz: between £0.95m and £1.27m per MHz per annum
 - b) 1800 MHz: between £0.54m and £0.72m per MHz per annum

Impact of the geographical coverage obligation

12. Ofcom's initial view is that the imposition of the geographic coverage obligation will have no impact on market value. We think this is wrong, for three reasons.
13. Firstly, by Ofcom's own admission, the coverage obligation will impose substantial costs on holders of 900 MHz and 1800 MHz spectrum, and this does affect the overall market value of this spectrum.
14. Secondly, given the nature of the obligations, Ofcom should focus on the value impact if a new operator were to acquire the spectrum as a whole with the obligation attached, rather than the value of transferring a marginal unit of spectrum to another operator with the obligation.
15. Thirdly, if no adjustment were made, this would result in the destruction of enterprise value for each MNO, a development that we believe was never the Secretary of State's intention when brokering the coverage obligation agreement.
16. Based on information from the UK auction, we conservatively estimate the generic cost for an operator of meeting the voice coverage obligation at £96m. We propose that this amount be discounted from each operator's lump sum value for their aggregate holdings of 900 MHz and 1800 MHz, before annualisation. Spreading the rebate of fees over the 20-year licence term effectively would remove any concerns about temporary distortions to the enterprise value of MNOs owing to the partial sunk cost nature of the coverage obligation.
17. Adjusting for this would result in Telefónica's ALFs falling within a range of between £33.8m per annum and £46.9m per annum.
18. Finally, we see merit in a phased introduction of the new ALFs, to coincide with the additional burden that MNOs face in meeting the new 90% geographic coverage obligation (i.e. until the end of 2017). We would propose a discount of 50% of the difference between the current and new charges for this period.

Section 2

II. INTRODUCTION

20. Telefonica UK Ltd (“Telefonica”) welcomes the opportunity to comment on Ofcom’s provisional decision and further consultation on annual licence fees (“ALFs”) for 900 MHz and 1800 MHz spectrum.²

21. Our response is divided into six further sections:

- **Section III: A conservative approach to setting ALF**
We set out our position with respect to Ofcom’s commitment to using a conservative approach when setting ALF. A central concern for us is that Ofcom has not properly applied its conservative approach in interpreting data and selecting its methodologies.
- **Section IV: UK market value of 800 MHz and 2600 MHz**
We review Ofcom’s revised methodology for deriving estimates for the lump sum value of 800 MHz and 2600 MHz from UK auction data. Our comments primarily focus on 800 MHz, as this is the more important band for the purposes of setting our ALF. Moreover, Ofcom’s analysis of 800 MHz is particularly flawed and inconsistent.
- **Section V: Assessment of lump sum values for 900 MHz and 1800 MHz**
We address Ofcom’s approach for using benchmarks from European awards to derive the lump sum values for 900 MHz and 1800 MHz. We identify a series of data errors and analytical flaws which indicate that Ofcom’s proposal to increase its benchmark estimate of the value of 900 MHz relative to 800 MHz is clearly wrong.
- **Section VI: Annualisation**
We review Ofcom’s estimate of the appropriate discount rate to transform the lump sum values into ALFs. We welcome some of the changes Ofcom has made from its previous analysis but also identify a number of serious concerns about Ofcom’s implementation of the cost of debt approach and in particular its newly introduced “risk sharing” premium.
- **Section VII: Impact of the Geographic Coverage Obligation**
We set out our view on how the geographic coverage obligation affects the market value of MNO spectrum holdings. Unlike Ofcom, we consider that there is a substantial impact and set out a proposal for addressing this.

² Ofcom, Annual licence fees for 900 MHz and 1800 MHz spectrum, Provisional decision and further consultation, 19 February 2015 (hereafter “February 2015 consultation”).

- **Section VIII: Telefónica's estimate of ALFs**

We set out our calculations for each step in process of estimating ALFs for 900 MHz and for 1800 MHz, based on a conservative estimate of the full market value and taking into account the impact of the coverage obligation. We set out both low and high estimates for market value within which Ofcom might set the values based on regulatory judgement, subject to taking a conservative approach.

22. In addition, in Annex I through Annex IV, we attach expert reports undertaken by relevant subject matter experts at NERA Economic Consulting and the University of Vienna which we refer to in our submission:

- **Annex I: NERA response to Ofcom comments on our paper: Review of country benchmarks used for setting lump sum values for UK 900 MHz and 1800 MHz**

In this paper, Jonathan Falk and Richard Marsden of NERA Economic Consulting examine Ofcom's response to their econometric analysis of the observed auction prices.

- **Annex II: Price Distortion in the Combinatorial Clock Auctions – A Theoretical Perspective**

In this paper, Professor Maarten Janssen, an academic expert on auctions, shows that the use of Combinatorial Clock Auctions (CCAs) for spectrum auctions is often associated with strategic incentives for bidders to drive up the prices that rival bidders pay. These incentives may vary across bands, with the result not only that overall prices may be inflated but also that (implied) relative prices across spectrum bands may be distorted.

- **Annex III: Price Distortion in the Combinatorial Clock Auctions – A Bidder Perspective**

In this paper, Richard Marsden and Dr Soren Sorensen of NERA Economic Consulting, who have advised bidders in multiple CCA auctions, discuss how strategic incentives lead bidders to deviate from straightforward bidding. They further show how such behaviour can inflate absolute prices and distort price ratios across bands.

- **Annex IV: Deriving ALFs from Lump-Sum Valuations – A Response to Ofcom's Third Consultation**

In this paper, a NERA team led by Tomas Haug review Ofcom's revised proposal for determining the discount rate for conversion of ALF lump sums to annual fees. In particular, their analysis focuses on Ofcom's proposed risk premium to compensate for the alleged risk-sharing properties on the licence fee structure.

23. Finally, our responses to the specific questions raised in the consultation document are provided in Annex V. These refer the reader directly back to the detailed responses in Sections I through VIII of this submission.

Section 3

III. A CONSERVATIVE APPROACH TO SETTING ALF

24. Telefónica welcomes the fact that Ofcom has reaffirmed its position, originally set out in the August 2014 Consultation, that it should take a conservative approach when setting the level of ALFs³. Regrettably, in its latest proposals for setting the level of ALF for 900 and 1800, it has not, in practice, done this.
25. While we broadly support the high-level methodology developed by Ofcom to set ALFs, we observe that Ofcom's choice of evidence points is partial and that it repeatedly favours evidence that leads to more aggressive pricing. We welcome this new consultation as an opportunity for Ofcom to take a step back and reassess all available evidence points in the round.
26. In this section, we highlight three issues which explain Ofcom's failure to date to implement a conservative approach:
1. A flawed implementation of its own framework which prevents Ofcom from exercising proper regulatory judgement;
 2. Errors in interpreting technical and commercial evidence; and
 3. Failure to carry out a full impact assessment.

A. Flawed implementation of Ofcom's own framework

27. At §1.44, Ofcom states that:

“We consider that licensees have misunderstood what we mean by adopting a conservative approach when interpreting the evidence. We have always recognised that there is inherent uncertainty in deriving ALFs for the 900 MHz and 1800 MHz bands to reflect full market value. Nevertheless, in order to implement the Government Direction we must conclude on an appropriate amount for ALFs going forward, and that process necessarily involves us exercising regulatory judgement when considering the evidence.”

28. While we cannot speak for the other MNOs, this is not an accurate representation of Telefónica's position, as put forward in our previous responses. We have always understood that some degree of regulatory judgement by Ofcom will be required when considering the evidence available for setting ALFs. As Ofcom says, there is inherent uncertainty in deriving ALFs. In particular, in relation to both the UK auction bids (used to derive the lump sum

³ See, for example paragraphs 1.41 – 1.45

value of the 800 MHz and 2600 MHz bands) and European benchmarks (used to derive the value of the 900 MHz and 1800 MHz bands) there are many, often contradictory, evidence points.

29. The approach that a reasonable regulator should take is to consider all this evidence in the round. This is not the same as treating all evidence equally. Ofcom should prioritise arguments supported by intellectual rigour, and give greater weight to data points that are considered reliable and verifiable. It should put less weight on arguments and data that do not meet such criteria in full. When looking at data, whatever the size of the sample, it should treat outliers with particular caution. And at every stage of its analysis, Ofcom must remember the basic reason why it is duty-bound to adopt a conservative approach: that from the point of view of Ofcom's regulatory objectives as prescribed by law, there are asymmetric risks in the assessment of market value; an approach that yields an overstated value carries much greater risk than an understatement.
30. A fundamental error by Ofcom is to suppose that it fulfils its duty to adopt a conservative approach by simply asking itself the question whether its chosen estimates "are more likely to understate than overstate market value" (§2.213). Ofcom's answer to that question is erroneous in any event, as we explain below in Section IV, but this is also the wrong question: a conservative approach implies not only a sense-check of the final figure but a cautious and rigorous process for selecting one.
31. In our response to the August 2014 consultation, we set out a broad framework in which Ofcom could systematically consider all evidence points in the round. In essence, this has four steps:
- **Step 1: For each issues, set out all the available evidence.** All relevant evidence, from all sources, no matter the origin or merit, should be laid out. This is the one step where Ofcom has done a comprehensive job.
 - **Step 2: Use qualitative and quantitative tools to pare down and weight the evidence.** This is where Ofcom goes wrong. It is inconsistent in its use of quantitative and qualitative analysis and, in an apparent eagerness to jump straight to the answer, has a tendency to dismiss most evidence points outright, whatever their relative merits. This leads it to de facto reject or ignore valuable evidence that it should weigh heavily when applying its regulatory judgement in setting final values.
 - **Step 3: Based on the remaining, weighted evidence, identify a plausible range in which the relevant value lies.** Given that the values being determined are, as Ofcom says, "inherently uncertain," a prudent approach is first to identify a plausible value

range before picking a specific number. However, Ofcom, instead, prefers to jump to a single value number based on a specific methodology. Even though Ofcom may then proceed to compare its number to the results from other approaches, it is just going through the motions at this point, as its approach leaves no flexibility for adjustment.

- **Step 4: Set the value towards the lower end of this range, consistent with the commitment to take a conservative approach.** The point in the range where Ofcom sets the final value is a matter of regulatory judgement, subject to its statutory objectives and the limited guidance provided in the Government Directive. In this case, Ofcom's commitment to a conservative approach implies that final values should be towards the lower end of the relevant range. Unfortunately, because Ofcom has already picked a single number before getting to this point, it no longer has any flexibility to exercise its regulatory judgement, especially with respect to its commitment to setting values conservatively.

32. The flaws in Ofcom's approach are evident from the repeated changes it has made to its valuation estimates across the three consultations, as it has jumped between particular methodologies. For example, its estimate of the value of 800 MHz has shifted from £26.85 to £32.63 to £30.0 per MHz. This is entirely driven by Ofcom changing its preferred methodology, as the available pool of evidence based on UK bid data is largely unchanged. Notably, it has gone from putting all its weight behind the LRP with revenue constraint approach to abandoning this in favour of various versions of the marginal bidder approach. The fact is that all these approaches are noisy estimates of the same thing. Rather than engaging stakeholders in a public beauty contest to pick a single methodology, Ofcom should, instead, be focused on assessing the relative merits of each approach, and picking a number based on a rounded assessment.
33. Ofcom's lack of a proper analytical framework also leads it to make inconsistent use of quantitative and qualitative analysis when comparing evidence points. Quantitative analysis works best when you have a large sample of data points that may reasonably be expected to be clustered around the true value. Manifestly, this is not the case when comparing results from methodologies for valuing 800 MHz; therefore the high level analysis should be qualitative. However, for European benchmarks, one would expect values to be correlated. If there were a large sample, one might rely exclusively on quantitative analysis. As the available samples are small in volume and "noisy", Ofcom necessarily falls back primarily on qualitative analysis, but this does not mean it should ignore quantitative analysis entirely, as this may be very effective in flagging outliers.

34. The two most egregious examples of inconsistent use of quantitative and qualitative data by Ofcom are as follows:

1. For the lump sum value of 800 MHz, Ofcom proposes to apply a spurious quantitative step to derive its fixed estimate of £30m/MHz, based on averaging two numbers, one of which is a clear high-end outlier amongst available estimates. This arbitrary averaging of two very different estimates of value has no intellectual basis. It is at odds with Ofcom's otherwise sensible position that qualitative rather than quantitative analysis should be used to weigh the merits of different methodologies.
2. For the analysis of European benchmarks, Ofcom relies exclusively on its own qualitative assessment of individual data points, and eschews any quantitative comparison of the data. This is a gross error, for it leaves Ofcom with no cross-check on its qualitative conclusions, and apparently blind to mistakes it makes when weighing one set of factors against another. Notably, with respect to both its Tier 1 countries, Austria and Ireland, Ofcom identifies flimsy evidence why 900 MHz prices might be too low and uses this as a counter-balance to strong evidence that prices may be too high. Most notably, Ofcom continues to argue that it should keep Austria as a Tier 1 benchmark because its own qualitative analysis suggests that the evidence of price driving at 900 MHz and 1800 MHz is ambiguous, but this position is untenable if one considers the quantitative evidence that Austria is a gross outlier.⁴

35. The fact that Ofcom's implementation of its approach is not conservative becomes obvious if one considers its choice of key data points that ultimately underpin its estimate for the value of 800 MHz and 900 MHz:

- 800 MHz: Amongst all available approaches to estimating value of 800 MHz, Ofcom takes one point that is roughly in the middle of those put forward by all stakeholders (Ofcom's 2x10 MHz opportunity cost) and takes another that is at the extreme high end of estimates (Ofcom's 2x5 MHz opportunity cost). It takes the weighted average of these two numbers, such that the final value is one-third of the distance above the lower number.
- 900 MHz: Amongst all available European benchmarks, Ofcom takes two points, one roughly in the middle of available benchmarks and backed by all stakeholders (Ireland) and one that is at the extreme high end and only recognised by Ofcom (Austria). It picks a point between these two numbers that is closer to Ireland than it is to Austria.

⁴ Review of country benchmarks used for setting lump sum values for UK 900 MHz and 1800 MHz – A Response to Ofcom's Further Consultation Prepared by NERA Economic Consulting for Telefónica UK 16 September 2014

36. This approach is manifestly not conservative. Taking an average of a mid-point and a high point is not a conservative approach, regardless of the weighting used. Even if Ofcom believes that the points we characterise as mid-points are below true value, averaging them against the highest price estimates available is still not conservative. Adding many pages of analysis justifying these results through comparison with other results also does not make them conservative, especially as none of this analysis appears to have any influence on final value estimates.
37. To be clear, we are not asking Ofcom to start again. It has done a huge amount of detailed work, investigated multiple methodologies and benchmarks, and developed a high level framework that is broadly supported by stakeholders. However, we believe that it does need to take a step back and look again at its process for comparing and weighting methodologies and benchmarks. Its current approach is flawed and is manifestly not producing an answer that could be considered conservative based on any reasonable interpretation of the available evidence.

B. Errors in interpreting technical and commercial evidence

38. Ofcom does not rely directly on technical and commercial evidence in its methodology for estimating the value of 900 MHz and 1800 MHz. However, it does use such evidence qualitatively, namely: as a factor in assessing international benchmarks; as a cross check on its relative value estimates across bands; and to support its rationale for taking a conservative approach.
39. Having reviewed the evidence presented by all stakeholders, our view remains that:
- The intrinsic value of spectrum for mobile use has likely declined since the 2013 auction, owing to greater certainty over the future availability of spectrum, in particular the release of 700 MHz; and
 - The market value of 900 MHz is clearly lower than 800 MHz and will remain so for the foreseeable future. We believe that our estimate that the market value of 2x5MHz of 900 MHz is worth approximately 62% of the value of 800 MHz remains about right.

40. We provide evidence for our views in the following paragraphs.

Future availability of spectrum

41. It is apparent that, over a medium-term horizon, a significant amount of new spectrum will become available in the UK market, something that was highly uncertain at the time of the

auction. (We do have concerns about the short-term availability of spectrum, owing to fast rising demand for data and highly asymmetric holdings across UK operators, but these concerns are not directly relevant to ALFs, given that they will be set with a long term time horizon.) Most notably, the release of 700 MHz has moved from the realms of discussion to concrete planning in an exceptionally short time-scale, with Germany and France scheduling auctions in mid-2015.

42. In this context, we broadly support Vodafone's view, as described at §A9.8, *"that the certainty of future spectrum availability since the time of the 4G auction is much stronger than [Ofcom] considered it to be in [its] August 2014 consultation."* We find it odd that Ofcom, in its assessment at §A9.6-A9.8, feels it necessary to disagree with this point, as this is really just a restatement of the same argument that Ofcom itself makes for adopting a conservative position in setting ALFs, on the basis that *"certainty over the availability of future substitute bands for mobile spectrum use ... might serve to reduce the forward-looking market value of current mobile bands such as 900 MHz and 1800 MHz."* (§A9.3). Ofcom may differ from Vodafone and ourselves with respect to the degree to which this effect matters, but the real point of disagreement is that Ofcom does not actually implement the conservative approach it itself proposes.
43. The German auction of 700 MHz, 900 MHz and 1800 MHz is scheduled to start in May 2015 and likely to conclude within a few weeks (given the use of substantive starting prices, substantive bid increments and an expected average of 8 rounds per day). This will provide the first concrete evidence point of how spectrum values have changed, based on newly available spectrum bands. Given the imminence of the auction and the fact that Germany is a potential Tier 1 benchmark for the UK, we urge Ofcom to take the results of this award into account in its final assessment of ALFs.

The relative market value of 900 MHz and 800 MHz

44. Ofcom expressed the view in the October 2013 consultation that *"900 MHz is unlikely to have a higher value than 800 MHz spectrum in the UK, i.e. the value of the 800 MHz spectrum in the UK is likely to set an upper limit on the value of 900 MHz in the UK"* (§4.42). Ofcom has stuck to this rather vague position in subsequent consultations, despite identifying extensive evidence that the value of 900 MHz is substantially lower than 800 MHz and only one, highly disputed, evidence point that it might be higher (the Austria benchmark). For Ofcom to commence this process with an open mind regarding the relative value of the two bands is fair. However, to cling to this position after three rounds of consultation in which it has estimated the value at 84%, 65% and 70% respectively, is unreasonable.

45. We believe that Ofcom should review its position, based on the evidence. It is manifestly clear from the available evidence that the market value of 900 MHz is lower than 800 MHz. At this point, the only real dispute is whether it is closer to 60% (the view of Telefónica and Vodafone) or closer to 70% (the current view of Ofcom). It is not credible for Ofcom, on the one hand, to claim the value is 70% and, on the other hand, not clarify that it believes the value of 900 MHz is lower than 800 MHz.
46. In this context, Ofcom's continued dependence of the Austria 900 MHz benchmark is also clearly untenable. According to Ofcom's calculations, this auction valued 900 MHz at 115% of 800 MHz, which is clearly not an appropriate benchmark for the UK. We simply do not believe that it is credible for Ofcom to propose a value estimate of 70%, while relying heavily on a single 115% data point to support this (or indeed any data point above 100%). Ofcom's position is not just aggressive, it is, in our view, unsustainable.
47. To support its current stance, Ofcom has put forward evidence suggesting the ecosystem for LTE at 900 is improving. We do agree that this is the crux of the issue: the intrinsic technical characteristics of the two bands are quite similar, so it is differences in the current and future device ecosystem that primarily drive the value difference. While Ofcom makes some valid points regarding LTE device availability at 900 MHz, we think its assessment is partial and does not provide any basis for revisiting country benchmarks.
48. Specifically, Telefónica's view regarding the relative values of the bands in relation to LTE deployment is as follows:
- The LTE 900 ecosystem is improving but still lags behind LTE 800 and will continue to do so for many years.
 - Carrier aggregation across LTE bands is becoming increasingly important. 800 MHz and 1800 MHz are the priority bands for aggregation, whereas 900 is not a priority for manufacturers. For example, the new 1500 MHz mobile band (1452-1492 MHz) is currently standardised as only paired with 800 MHz (i.e. this spectrum is only usable for operators that also have 800 MHz), and pairing with 1800 MHz is likely to be standardised next; we are not aware of any plans to standardise pairing with 900 MHz.
 - These differences are primarily driven by a huge mismatch between the demand profile for LTE at 900 MHz, versus 800 MHz and 1800 MHz, which is unlikely to change in the foreseeable future. The issue here is that 900 MHz is the primary legacy band for both 2G and 3G services, and the band is likely to continue to be used for serving these technologies for at least another 10 years. In most European countries, 900 MHz spectrum is typically split between at least three operators, and holdings are

smaller than in the UK, so – even over the medium-to-long term, these operators will not be able to free up as much spectrum for LTE as Telefónica and Vodafone might conceivably be able to in the UK. This means that manufacturers will continue to make 900 the last priority amongst major bands for LTE deployment for many years to come, especially for LTE aggregation which is ideally based on 2x10 MHz blocks.

49. These differences particularly depress the marginal value of 900 MHz spectrum. It is not only current poor equipment availability that depresses value but also the broader uncertainty about how and when new generation technology will come available for the band. Put differently, for the foreseeable future, any operator that acquires additional blocks at 800 MHz (or 1800 MHz), is buying an option to acquire the latest 4G technology as soon as it comes available. The same operator acquiring 900 MHz faces a potential delay of uncertain duration. In our fast-moving market, avoiding such delays is highly valuable.

C. Failure to carry out a full impact assessment

50. Ofcom at §1.29 mischaracterises Telefónica's argument on the need for a full impact assessment. The critical point is that to the extent that the Direction leaves Ofcom a measure of regulatory judgement – and plainly it does; indeed Ofcom repeatedly invokes that phrase in the consultation document – the judgement has to be exercised in light of the full panoply of Ofcom's duties. Ofcom's acknowledgement that it is required to adopt a conservative approach is a partial recognition of this, albeit that such an approach is not, as we have explained, in fact applied.
51. Our position on this issue remains as stated in our response to the August 2014 consultation (see §26 – 34). There is no suggestion that the current fees (far lower than anyone is proposing under this process) has led to inefficient use of spectrum. Conversely, respondents have argued that an increase in fees could have adverse impacts on prices and investment (to the detriment of consumers). That is, Ofcom faces a risk asymmetry: setting ALFs too low is unlikely to harm consumers; but setting them too high, would. Ofcom's refusal to test these claims by conducting a full impact assessment risks leaving it in the position of setting ALFs too high, in conflict with its statutory duties.

Section 4

IV. UK MARKET VALUES OF 800 MHZ AND 2600 MHZ

52. In this section, we discuss Ofcom's latest proposals for estimating the lump sum value of 800 MHz and 2600 MHz. Our comments primarily focus on 800 MHz, as this is the more important band for the purposes of setting our ALF. Moreover, Ofcom's analysis of 800 MHz is particularly flawed and inconsistent.
53. Over the course of three consultations, Ofcom has identified multiple methodologies for estimating the value of 800 MHz and debated their strengths and weaknesses. It should be clear to all stakeholders by now that there is no single best methodology. Accordingly, Ofcom's statutory role – as an evidence-based regulator – should be to set a price based on a balanced assessment of all plausible approaches. Instead, it continues a futile search for a single 'holy grail' methodology that is somehow superior to all other approaches. Such an approach does not exist.
54. Ofcom's latest proposal for estimating the value of 800 MHz – based on weighted opportunity costs – is entirely arbitrary. Although presented as a new methodology, it is just another way to look at a tiny subset of marginal bids using contentious assumptions. As in previous consultations, Ofcom's undue focus on a single approach leads it to place insufficient weight on other relevant methodologies, notwithstanding its extensive analysis. In turn, this means that Ofcom appears to be paying lip service to its professed commitment to a conservative approach, as each time it picks a preferred methodology, it de facto surrenders any flexibility to adjust the proposed price. We see no reason why the final value has to match a specific methodology.
55. This point matters greatly to Telefónica because we believe Ofcom continues to be aggressive in its proposed values for both bands, and especially for 800 MHz. The available evidence suggests that the fair market value for 800 MHz is between £24.2m/MHz and £27.5m/MHz, which corresponds to a lower bound set by the LRP price for lot A1 with nominal reserve price assuming no change to H3Gs bid and an upper bound set by the price per MHz paid by Telefónica, and for 2600 MHz is between £4.95m/MHz and £5.5m/MHz, which correspond to the low estimate under LRP and an upper bound set by the level of reserve price at which a 2600 MHz lot would have gone unsold. Ofcom's proposed numbers are either above or at the very high end of these ranges, at levels which are at odds with its commitment to a conservative approach.
56. Our further analysis of Ofcom's latest proposals on market values for 800 MHz and 2600 MHz is divided into three parts:

- Part A: We show that Ofcom's new approach to determining the value of 800 MHz is too narrowly focused and based on arbitrary assumptions.
- Part B: We highlight Ofcom's failure to understand the potential impact of strategic bidding on specific bids, and argue that any methodology that places undue weight on specific bids (especially by EE) is inherently unsafe.
- Part C: We point out that Ofcom's new estimate of the value of 800 MHz and on-going estimate of the value of 2600 MHz are at the high end of any plausible ranges for value, based on bids in the UK auction. This is inconsistent with Ofcom's own conclusion that it should take a conservative approach. We provide our own estimates of appropriate prices for each band, based on a broad review of all plausible methodologies and adopting a conservative but realistic approach.

A. Ofcom's new weighted opportunity cost approach for 800 MHz is based on arbitrary assumptions

57. For the third consultation in succession, Ofcom has proposed a new methodology for deriving the value of 800 MHz. In the first consultation, Ofcom proposed to use linear reference prices (LRP) with a revenue constraint, an approach that attributes the revenue raised in the auction to particular bands. In the second consultation, Ofcom discarded LRP, instead favouring a bespoke marginal value methodology, based on assumptions about EE's bids and implied values. In the latest consultation, Ofcom switches to a weighted opportunity cost approach which is still driven by EE's marginal bid values. It originally estimated the value of 800 MHz at £26.85m / MHz, which it increased to £32.63m / MHz, and has now modestly reduced to £30.0m / MHz.
58. Telefónica welcomes the fact that Ofcom has shifted away from the marginal bidder approach. In our view, that approach has multiple flaws, and Ofcom's approach was heavily criticised by all four mobile operators in their responses to the August 2014 consultation. Notably, this method produced a price/MHz grossly in excess of the actual auction price; depended on highly subjective assumptions about specific bids by one bidder (EE) including imputed values for bids not actually submitted; and disregarded the spectrum cap rules from the auction.
59. Ofcom explains its decision to shift away from the marginal bidder approach at §2.180:

"...the practical difficulties, in particular the absence of directly observed bids by EE for the most relevant packages, mean that we do not derive sufficiently reliable quantified estimates from our marginal bidder analysis."

Put differently, Ofcom has concluded that a methodology that relies on hypothetical bids that were not actually placed in the 4G auction cannot be considered reliable. We strongly agree.

60. Unfortunately, Ofcom's latest approach is no better than the one that preceded it. It is, in fact, just another version of the marginal bidder approach, which relies on cherry picking selected bids to set estimates of value for 800 MHz. Rather than rely on inferred bid values for EE, Ofcom now proposes to consider only two values:

- £26m/MHz, which is the marginal value of a 2x10 MHz block of 800 MHz in the auction, based on an alternative coalition in which EE wins 2x20 MHz of 800 MHz spectrum; and
- £38.4m/MHz, which is the marginal value of a 2x5 MHz block of 800 MHz in the auction, based on an alternative coalition in which EE wins 2x10 MHz of 800 MHz spectrum

61. To reach its proposed value of £30m/MHz, Ofcom proposes to take a weighted average of these two numbers. Specifically, Ofcom weights them using a 2:1 ratio, based on the amount of marginal spectrum associated with each number.

62. This approach is arbitrary. In particular, it has two serious flaws, which we discuss in turn below:

1. It is derived from just two data points, the higher of which has never seriously been considered as a valid reference point; and
2. The choice of weights between the two points is entirely arbitrary.

Only two data points

63. Ofcom's new methodology relies on just two data points, which in turn are derived from cherry picking a few bids amongst the many hundreds of bids submitted in the auction. In our view, this amounts to a very narrow interpretation of Ofcom's mandate from the Government to set prices with "*regard to the sums bid in the UK 4G auction.*"⁵ While we recognise that some bids are more important than others, Ofcom's approach is arbitrary in that it fails to consider many other bids that are potentially relevant in interpreting the value of the spectrum. Moreover, the rationale for focusing on these two particular data points is not at all obvious.

⁵ Ofcom, August 2014 consultation, §1.16.

As Ofcom makes clear in its assessment, it has serious concerns about both these data points:

- **2x10 MHz.** At §2.152, Ofcom states that, *“The opportunity cost in the auction set out above for a 2x10 MHz increment of about £26m per MHz is likely to be too low compared to the forward-looking market value of 2x10 MHz to serve as a basis for 900 MHz. This is because the overall cap in the 4G auction of 210 MHz being non-binding on a forward-looking basis implies a higher value.”*
- **2x5 MHz.** At §2.143, Ofcom states that *“The differences in circumstances relating to the overall cap, contiguity premium and rearrangements imply that the opportunity cost in the auction set out above for a 2x5 MHz increment of £38.4m per MHz is likely to be too high compared to the value of 2x5 MHz to serve as a basis for 900 MHz. Although there are effects in different directions, as explained below, the exclusion of a contiguity premium seems likely to lead on balance to a lower value, even taking into account the overall cap in the 4G auction being non-binding on a forward-looking basis.”* And previously, in the August consultation, Ofcom said that, *“...this value may not provide a suitable indication of the value of 900 MHz spectrum for the purpose of ALF, in particular because of complications related to a contiguity premium and a coverage premium.”*⁶

64. Given these reservations, it seems odd that Ofcom now intends to base its estimate of value solely on these numbers. The data points are also very far apart. The higher value is some 48% higher than the lower value, and is at the very upper end of the set of values ever discussed. They represent two fundamentally different views of the value of the spectrum which cannot obviously be reconciled in a single methodology.
65. Furthermore, the concerns associated with the 2x5 MHz value of £38.4m/MHz are of a different order of magnitude than Ofcom’s concerns with the 2x10 MHz value of £26m/MHz. Hitherto, no one has seriously proposed £38.4m/MHz as a candidate value for 800 MHz, even if Ofcom has mentioned it as a relevant number for the purpose of broader analysis. This data point is derived from a set of bids that could not have won in the context of the UK auction rules, given the bidding strategy adopted by H3G. Moreover, it depends on a specific bid by EE that all parties agree reflects a substantial contiguity premium for a second 800 MHz lot that is not relevant when considering the value of 900 MHz. Various stakeholders have also voiced concern that EE’s bid structure may have been distorted by strategic factors, and EE itself has stated that relying on its bids in the way Ofcom proposes is unsound (we comment further on this issue in Part B of this section).

⁶ Ofcom, August 2014 consultation, §2.69.

66. By contrast, the £26m/MHz data point is a much more plausible candidate for the true market value of 800 MHz. It is similar to the values produced using the LRP with revenue constraint methodology (Ofcom's original preferred approach) and the price actually paid by Telefónica, £27.5m. Moreover, Ofcom's argument that it underestimates the forward-looking market value of the band if the spectrum caps were relaxed is highly contentious, for multiple reasons. Firstly, Ofcom's argument that EE would have bid for an incremental block of 800 MHz spectrum over its winning package if uncapped is possible but speculative. Secondly, Ofcom was directed to set prices based on bids in the auction not hypothetical bids based on a future world in which caps are relaxed. Finally, the basis for a future relaxation of caps is the release of new spectrum bands, including 700 MHz, but as Ofcom points out elsewhere its consultation, this may reduce spectrum scarcity and erode the value of both the 800 MHz and 900 MHz relative to the time of the auction.⁷

The choice of weights is arbitrary

67. Ofcom's proposal to use a 2:1 weighting ratio between its 2x10 MHz and 2x5 MHz marginal values is entirely arbitrary. Ofcom provides no rationale for why the 2x10 MHz is weighted only twice as high as the 2x5 MHz value, even though it has previously argued that 2x10 MHz is the more appropriate metric for assessing opportunity cost. Why not three, four, five or even ten times? The implicit link to the amount of spectrum is entirely spurious, as this ratio is not a relevant consideration when attempting to estimate the value of 800 MHz.
68. Put differently, there is no intellectual basis underpinning Ofcom's new methodology. All Ofcom is doing is picking a point between two disparate estimates of value based on an arbitrary weighting.
69. As Ofcom itself argues at §3.29 in relation to its work on international benchmarks, this is not good economics:

"In deriving lump-sum value estimates, we should consider the benchmarks in the round, rather than relying on summary statistics such as weighted averages."

70. We urge Ofcom to adopt a more consistent, credible approach across its entire consultation, in accordance with its statutory duties. Just as with the international benchmarks, it should consider all the estimates for the lump sum value of 800 MHz in the round. Relying on just two points with an arbitrary weighting between them is not a sound basis for assessing value. We return to this point in Part D below.

⁷ August 2014 Consultation, §1.40, February 2015 Consultation, §7.41

B. The impact of strategic bidding

71. In their responses to the August 2014 consultation, Telefónica, H3G and Vodafone all submitted arguments that EE's bids were likely inflated by strategic bidding. In our view, the collective submissions from these parties provide very powerful evidence that EE's behaviour was strategic and deviated greatly from Ofcom's notion of "straightforward" bidding based on a single set of valuations for feasible packages of spectrum. This does not mean that Ofcom should "*ignore or adjust EE's bid*" (§2.142) but it should be cautious about placing too much weight on methodologies that rely on individual EE bids, especially those that were unlikely to win but might have set prices for other bidders. Of course, the ultimate question is not whether EE's conduct amounted to strategic investment or price driving within the definitions adopted by Ofcom (§§2.137-2.142). The question is whether, in light of EE's incentives and behaviour, the price it bid for a 2x5 MHz block of 800 MHz spectrum is a reliable data point from which to derive an estimate of the general market value of 900 MHz, in relation to which the same incentives would be inapplicable – let alone where it is used as one of only two data points.
72. Ofcom's response to allegation of strategic bidding in relation to CCAs in general, and in particular the UK and Austrian CCAs, reveals a naivety regarding how bidders actually behave in such auctions. Ofcom still seems to be operating under the misguided and mistaken notion that the CCA is somehow less vulnerable to strategic bidding than other formats, such as the SMRA. For example, at §A8.122, Ofcom states that "*[t]he fundamental rationale for the CCA as an auction format is that it provides incentives for straightforward bidding by bidders.*" This statement is fundamentally flawed, as any company that has actually participated in a multi-band CCA can testify. We can only assume that Ofcom's naivety in this regard stems from the fact that the authors of its consultation document have no experience with participating in a CCA as a bidder. Accordingly, we commissioned two papers, one from Professor Maarten Janssen and one from NERA, which discuss the incentives for bidders to deviate from straightforward bidding in a CCA.
73. Our view, based on our parent company's experience from participating in multiple CCAs and advice from experienced auction consultants, is that the CCA is just as vulnerable to distortion from strategic bidding as other multi-round formats. However, the types of strategic behaviour can be very different. To provide Ofcom with a broader perspective, we commissioned two studies – attached as annexes to this submission – that explore the incentives for strategic bidding, one by Professor Maarten Janssen of Vienna University and the other by NERA Economic Consulting. The two papers approach the topic from very different perspectives, one theoretical, the other practical, but both conclude that CCAs often introduce strong

incentives for strategic bidding, and that these can and have distorted the price outcomes of recent multi-band auctions.

74. A particular problem we have with Ofcom's analysis is its failure to consider the broader competitive context in which bidders develop their bid strategy and consider individual bids. For example, Ofcom refutes allegations that EE may have inflated its bid for packages containing 2x20MHz of 800 MHz on the basis that "*EE could not have safely assumed [that such a bid] ... was riskless.*" (§A6.141) This is simply untrue because EE could confidently predict that Vodafone would not bid for less than 2 lots of 800 MHz and that Telefónica, even if budget constrained, would prioritise 2 lots at 800 MHz and never drop below 1 lot at 800 MHz. It could do so because it was generally understood that Vodafone and Telefónica planned to share LTE network roll-out costs, and that this would require them to each buy 800 MHz. Accordingly, while such bids may not be riskless, they certainly would have carried very minimal risk up to very high price levels – a point that is demonstrated by (a) the large premiums that both Vodafone and Telefónica bid for 800 MHz spectrum over the final clock prices and (b) the fact that both bidders did not even submit supplementary bids for packages with less than 2 lots of 800 MHz.
75. In light of the concerns expressed by other operators about EE's bids, Ofcom wrote to EE asking it to comment on them. Ofcom uses EE's response to support its claim that there is no evidence of strategic bidding by EE in the auction. However, this conclusion cannot be supported by a proper analysis of EE's letter. Contrary to Ofcom's assertion at §2.140, EE does not say that "*it did not engage in strategic bidding*"; rather, it merely asserts that it did not engage in certain types of strategic behaviour under its own narrow definitions.
76. More specifically:
- EE states that all its bids were "*within our valuations for the relevant spectrum.*"⁸ However, EE may have had many sets of valuations, each underpinned by different assumptions. It is not clear that it used the same valuation assumptions across all its bids, so this statement is rather meaningless without further clarification.
 - EE states that all its bids fall within the definition of "*what Ofcom refers to as 'intrinsic value'*" and that "*our valuations did not incorporate any elements relating to the value of depriving other parties usage of the spectrum concerned (e.g. by*

⁸ EE's Letter to Ofcom, 13 November 2014 (responding to an Ofcom letter of 28 October 2014). http://stakeholders.ofcom.org.uk/binaries/consultations/annual-licence-fees-further-consultation/Letter_to_Ofcom_from_EE.pdf.

weakening a competitor).⁹ Spectrum valuation models are typically particularly sensitive to assumptions about gains or losses in market share relative to competitors. We suspect, based on EE's unusual bid profile, that it had fairly aggressive assumptions about its potential to gain market share based on winning more spectrum. Exactly where this tips over into "strategic investment value", based on depriving rivals of critical spectrum, is a matter of regulatory judgement. It is hardly surprising that EE claims its bids are on the "right" side of this line.

- EE also says that its *"our valuations did not incorporate any elements relating to ... increasing the costs of our competitors."*¹⁰ Note that EE uses the term "valuations" here and says nothing about bid amounts. As it may have had multiple valuation profiles, this certainly does not preclude the possibility it made specific bids in the clock and supplementary rounds with the objectives of (a) driving up the knock out bid for two lots of 800 MHz, so as to weaken Telefónica and Vodafone as a competitive force at 2600 MHz; and (b) setting floor prices for Telefónica and Vodafone.

77. In short, EE's letter tells us very little about the extent to which it engaged in strategic bidding.

78. Rather than speculate on EE's motives for particular bids, Ofcom should instead focus on a broader analysis of bid patterns across the clock and supplementary round for individual bidders. The reason why there has been such focus on EE's bids in recent responses is three-fold. Firstly, the values derived using the marginal price methodology that Ofcom favours, including its new approach of weighted opportunity costs, depend largely on interpretations of EE bids. Secondly, EE's bid profile is rather peculiar, with inconsistent and non-declining premiums for some incremental lots. As we highlighted in our response to the August 2014 consultation, this contrasts markedly with the orthodox bid structure submitted by Vodafone, which features strictly declining values for incremental lots, consistent with straightforward bidding.¹¹ Thirdly, EE succeeded in winning an exceptional 2x35 MHz of 2600 MHz spectrum, even though it already had the largest spectrum holdings of all UK operators, including 2x45 MHz of 1800 MHz spectrum.

79. EE hints in its letter that its bids may have been affected by a budget constraint and Ofcom uses this at §2.165 to push its argument that some auction bids may understate market value. However, it is not at all obvious to us how EE's bids were affected by financial constraints or if these are in anyway relevant to those EE bids used in the marginal analysis. Ofcom makes

⁹ Ibid.

¹⁰ Ibid.

¹¹ §54 of our response to the August 2014 consultation document refers

no attempt to analyse this. Strictly speaking, market price is based on willingness to pay, not valuation. As EE says, all bidders likely had financial caps of some sort. These are only relevant to Ofcom's analysis if they prevented bidders expressing their maximum willingness to pay at the time of the auction; they are irrelevant if they simply reflect the company's view on the point at which money would be better spent on other activities.

80. The key point here is that Ofcom's default assumption, that EE's bids were straightforwardly reflective of its relative valuations, is unsafe. Given EE's peculiar bid structure and the broader evidence that bidders in CCAs routinely deviate from straightforward behaviour (as described in the papers in Annex II and III), this is not a reasonable assumption. Even EE itself, while not acknowledging it engaged in strategic behaviour, has argued that Ofcom's should not try to estimate 800 MHz value based in interpretations of its specific bids. As Ofcom states at §2.21, EE's view was "*that the marginal bidder analysis was highly subjective, extremely unreliable and overstated the market value of 800 MHz.*"
81. Accordingly, any methodology which places undue focus on specific EE bids is also unsafe. This is obviously true of Ofcom's original marginal value methodology, which went as far as imputing hypothetical EE bids based on observed values differences between its package bids. It is also true of the new methodology, which discards the hypothetical bids in favour of placing exceptional weight on EE's observed high value for an incremental lot of 800 MHz in its losing bid for a package of two 800 MHz lots and four 2600 MHz lots.

C. Ofcom's approach to valuing 800 MHz and 2600 MHz is not conservative

82. Ofcom claims that its estimate of £30m/MHz for 800 MHz is conservative. We strongly disagree. As described above, Ofcom's methodology is in fact highly aggressive, as it places undue weight on a specific high price point. Furthermore, Ofcom justifies its position with a partial analysis of reasons why the market value could be higher than £30m/MHz, while ignoring the many reasons why it may be lower. As previously discussed in Section III, Ofcom's approach is flawed because it leaps straight to an answer based on limited evidence and then attempts to justify this by cherry picking from other evidence. As we show here, a more rounded assessment of all evidence points suggests a market value of no less than £24.2m and no more than £31.2m, a broad range that should be narrowed to between £24.2m and £27.5m, based on Ofcom's conservative approach.
83. In effect, Ofcom's approach is to rely only on only two data points to set the price of 800 MHz. These are: (1) Ofcom's 2x10 MHz opportunity cost, estimated at £26m/MHz, which is roughly in the middle of all those estimates put forward by stakeholders; and (2) Ofcom's 2x5 MHz opportunity cost, estimated at £38.4m/MHz, which is at the extreme high end of

estimates. This is not a conservative approach, as any approach that puts substantial weight on a high price estimate will inevitably tend towards a high price answer.

84. At §2.186, Ofcom argues that there are number of reasons why its value of £30m/MHz “*is more likely to understate rather than overstate value*”, and list five such reasons. This approach is partial and ignores the many reasons why its estimate may overstate value. In Table 1, we list Ofcom’s five reasons why £30m/MHz may understate value, and set these against even more reasons why it likely overstates value. We believe that the arguments for overstatement are significantly stronger than for understatement.

Table 1: Reasons for overstatement vs understatement of 800 MHz market value

Ofcom’s arguments supporting understatement	Alternative arguments supporting overstatement
“Assuming zero reserve prices may yield an underestimate of the opportunity costs in the auction for Telefonica’s and Vodafone’s 2x10 MHz blocks.”	The price proposed by Ofcom is significantly above Telefonica’s auction price for 800 MHz of £27.5m/MHz. All four mobile operators have expressed the view that the sums paid in the auction should represent an upper bound on the market value for 800 MHz.
	The assumption of zero reserve prices is only conservative in the context of the methodology chosen by Ofcom. The risk of understatement owing to this assumption is second order compared to Ofcom’s decision to adopt an aggressive methodology based on a narrow assessment of selected marginal bids.
“£30m per MHz is below the LRP without revenue constraint (£31.2m per MHz) and the linear price that avoids excess supply and minimises excess demand (£31m per MHz).”	£30m per MHz is above the LRP <i>with</i> revenue constraint (with or without a zero reserve price applied). LRP with revenue constraint was Ofcom’s original preferred methodology. As Ofcom stated in October 2013 at : “ <i>the linear prices derived without the revenue constraint are higher overall than the prices actually paid in the auction, which raises a question of whether substantial weight should be placed on them for the purpose of revising annual licence fees. On balance we do not consider there is a stronger case</i>

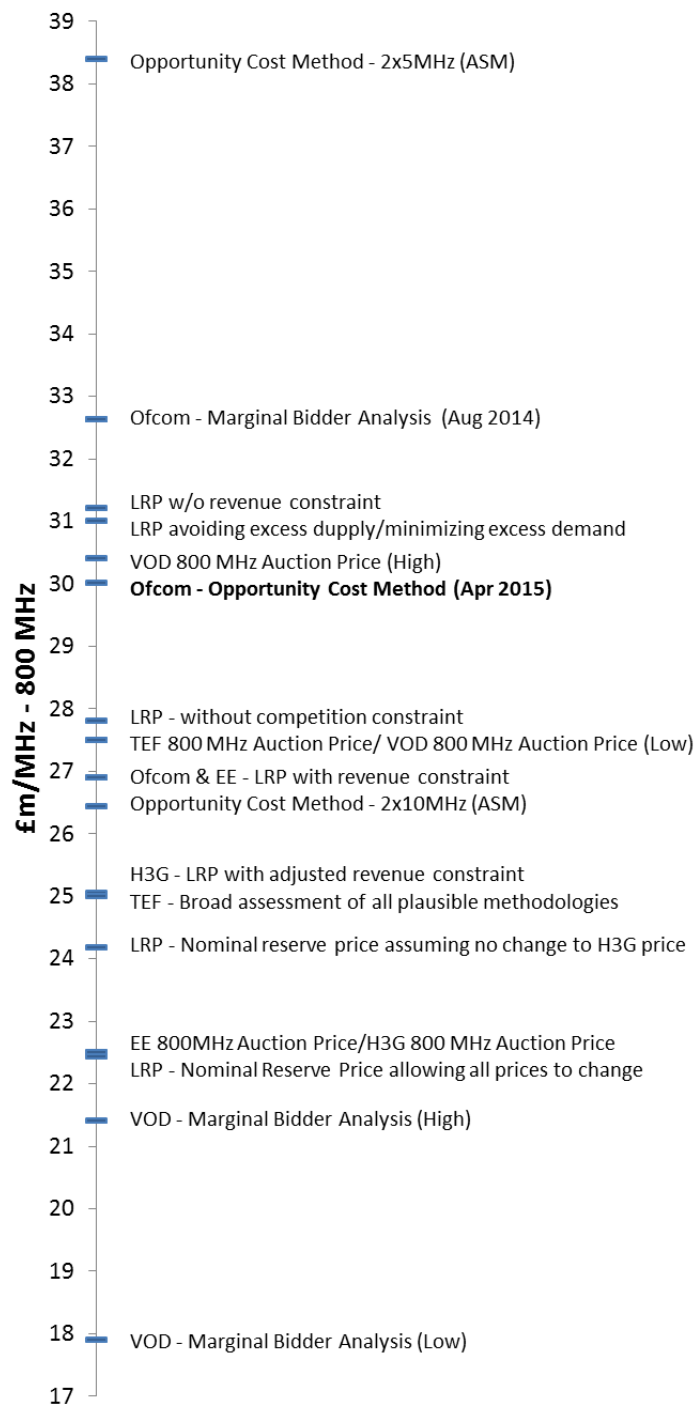
	<p><i>for this approach compared to the base case [of LRP with revenue constraint].”¹²</i></p> <p>LRP with reserve price is the only methodology proposed to date by Ofcom that is accepted by a majority of stakeholders (EE, H3G and Telefónica have all expressed support, to varying degrees). This approach should be given substantial weight in Ofcom’s assessment of available evidence.</p>
<p><i>“We take no account of the potential for at least a proportion of the contiguity premium to be realised even with a 2x5 MHz increment through carrier aggregation between spectrum in the 800 MHz and 900 MHz bands.”</i></p>	<p>As with zero reserve prices, the assumption of a zero contiguity premium is only conservative in the context of the methodology chosen by Ofcom. The risk of understatement owing to this assumption is second order compared to Ofcom’s decision to adopt an aggressive methodology based on a narrow assessment of selected marginal bids. Further, as we noted in Section III, 900 MHz is a low priority band for carrier aggregation, so a conservative assumption is obviously appropriate on this issue.</p> <p>As a more general point, while Ofcom may have been conservative on this detail, it is aggressive on other details. For example, when making adjustment for DTT coordination costs and value of avoiding the coverage obligation, it adds on 100% of its calculated value, notwithstanding evidence that operators had different views regarding these values and ambiguity over the extent they were really incorporated into bids (even if they featured in associated valuation models).</p>
<p><i>“For a 2x10 MHz increment, all EE’s incremental bid values for 2x10 MHz of 800 MHz in packages with at least 2x20 MHz of 2.6 GHz are above £30m per MHz.”</i></p>	<p>As described in the papers on strategic bidding in CCAs by Janssen, and by NERA, attached to this submission, it is well understood that the CCA often creates incentives for overbidding. In the case of the UK 4G auction, it is apparent that EE, in particular, had incentives to overstate value for incremental lots of 800 MHz spectrum.</p> <p>In this context, we regard any methodology that assumes straightforward bidding by EE based on its true preferences between packages to be highly speculative and aggressive. We make this point notwithstanding Ofcom’s attempt to</p>

¹² Ofcom. October 2013 Consultation, §A8.43.

	<p>extract information from EE about its bid strategy in the auction, as EE's comments on this matter are ambiguous. Marginal value methodologies that focus on attempting to dissect individual bids by EE, or any other bidder for that matter, are inherently unsafe. As EE itself argues, Ofcom should put more weight on approaches, such as LRP with revenue constraint, "<i>which takes into account all bids made in the auction in an objective manner, i.e. without requiring any subjective choices as to which are the "most relevant" bids to focus upon.</i>"¹³</p>
<p><i>"The evidence of budget constraints in the 4G auction suggests there is a risk that some auction bids, including those by EE (the marginal bidder for additional 800 MHz spectrum), may understate the full market value of the spectrum."</i></p>	<p>We do not agree that there is any substantive evidence to suggest that budget constraints prevented bidders from expressing their intrinsic value for 800 MHz. Given the strategic incentives for EE to overbid on 800 MHz, it seems far more likely that the opposite is true, and that EE made bids for larger amounts of 800 MHz that it did not want or expect to win but could afford in the very unlikely event that they were successful.</p> <p>As far as we can tell, the only source for Ofcom's spurious claim that the 800 MHz price was affected by budget constraints is one sentence in a letter from EE to Ofcom, which is drafted in an ambiguous way. The fact that EE itself believes that Ofcom's proposed value of £30m per MHz for 800 MHz overstates value clearly contradicts Ofcom's speculative claim regarding budget constraints.</p>

¹³ EE's Letter to Ofcom, 13 November 2014 (responding to an Ofcom letter of 28 October 2014). http://stakeholders.ofcom.org.uk/binaries/consultations/annual-licence-fees-further-consultation/Letter_to_Ofcom_from_EE.pdf.

Figure 1: Ofcom and stakeholder estimates of 800MHz benchmark values



85. In Figure 1, we set out all of the many values per MHz proposed for 800 MHz across the three consultations. As can be seen, there is a huge range in estimates ranging from a low of £18m / MHz to a high of £38m / MHz. Observe, however, that the lower and higher estimates are almost all variations of the marginal bidder approach, which is hugely sensitive to assumptions about which marginal bids are given greatest weight. Meanwhile, the LRP estimates form a much narrower band within this range, from £24.16m up to £31.2m. Furthermore, the key anchor point of the actual price paid by Telefónica lies roughly in the middle of the LRP range. Telefónica's view is that Ofcom should put greater weight on anchor points and LRP methodologies, and lower weight on marginal bidder and other methodologies, given their ambiguous assumptions and wide ranging estimates.
86. In our view, a neutral observer would likely conclude that a plausible range for market value is between £24.16m and £27.5m, bounded by the lowest LRP level and the price paid by Telefónica for an 800MHz lot. Our interpretation of Ofcom's commitment to a conservative approach is that it should set a price at the low end of this range, but we recognise that this may be a matter of regulatory judgement.
87. We view the price actually paid by Telefónica for 800 MHz is a clear anchor point for the upper bound of this range. If Ofcom were to set the value of 800 MHz above this, by implication Ofcom would also be making a statement that its auction outcome did not achieve a market price, which in turn raises the question whether it was good value for the taxpayer. As Ofcom has always maintained that the 4G auction was a success, regulatory consistency dictates that Ofcom should believe that Telefónica's price for 800 MHz is a cap on the market price.
88. With respect to 2600 MHz, our position remains unchanged from our previous submission. We believe that a plausible range for full market value lies somewhere between £4.95m/MHz and £5.5m/MHz, which correspond to the low estimate under LRP and an upper bound set by the level of reserve price at which a 2600 MHz lot would have gone unsold. Ofcom has proposed to set the price of 2600 MHz at the very high end of this range, which we do not think is conservative.

Section 5

V. ASSESSMENT OF LUMP SUM VALUES FOR 900 MHZ AND 1800 MHZ

89. In this section, we address Ofcom's approach for using benchmarks from European awards to derive the lump sum values for 900 MHz and 1800 MHz. Although Ofcom has not changed its methodology since the previous consultation, it has introduced new evidence leading to an upward revision of its estimate of the value of 900 MHz as a proportion of 800 MHz from 65% to 70%. We strongly object to this change, as it is based on a combination of spreadsheet errors in Ofcom's own model and flaws in its analysis, which we outline below. Indeed, we have identified so many errors in Ofcom's own spreadsheet calculations that we have serious reservations about the numbers presented in the consultation document. Accordingly, we ask that Ofcom publish an updated version of the consultation document and associated spreadsheet with all errors corrected, and provide respondents with a suitable time period to amend their consultation responses.
90. Across all stakeholders, there is broad support for Ofcom's use of price ratios across bands in other European countries to derive UK lump sum values. Accordingly, our comments are focused not on the general methodology, but on errors and flaws in Ofcom's application of it. In particular, we strongly object to some of the revisions that Ofcom has made to the weighing of certain evidence points, which are based on spurious evidence, and the continued emphasis it places on the Austrian 4G auction outcome, which is a high price outlier.
91. As Ofcom itself recognises at §A7.188, one of the major challenges in undertaking this exercise is the thin sample of data points for each price ratio, and in particular the shortage of Tier 1 benchmarks. It is fortunate, therefore, that the German auction of 700 MHz, 900 MHz, 1500 MHz and 1800 MHz is scheduled to take place in May 2015, before Ofcom will be ready to make a final decision on ALFs. This will provide new benchmarks for both 800/900 and 800/1800 and a first view on how availability of new spectrum (in this case, at 700 MHz and 1500 MHz) is impacting overall spectrum values. Importantly, Germany is a potential Tier 1 benchmark, given that it is, like the UK, a west European country with a relatively large population and wealthy economy.
92. This section is divided into three parts:
- In Part A, we address the new evidence provided by Ofcom regarding benchmark values;
 - In Part B, we address the evident flaws in Ofcom's approach to estimating the lump sum values of 900 MHz and 1800 MHz; and

- In Part C, we update our own estimate of the lump sum values for 900 MHz and 1800 MHz, taking into account the new evidence but correcting for Ofcom flaws.

A. New evidence on benchmark values

93. In this section, we address all changes to data and weighing of evidence points made by Ofcom between the August 2014 consultation and the February 2015 consultation. In particular we outline our position on Ofcom's changes to benchmark values and changes to the analysis of evidence points.
94. It is standard practice to use price per MHz per pop data from spectrum awards to create benchmark comparisons across countries. As we pointed out in both our previous responses, Ofcom's approach is unusually sophisticated in that it proposes a series of further adjustments to account for other factors that may plausibly influence licence price (but also ignores many others). It remains our view that Ofcom's approach is overly complex, and vulnerable to error and distortion. In the context of Ofcom's approach, many of the new adjustments that it proposes seem reasonable. However, we have identified numerous errors and inconsistencies in the way Ofcom has processed and presented the data which undermine our confidence in Ofcom's approach. Amongst the errors, the most egregious we have identified is the use of grossly high discount rate for Austria.

Changes to benchmark values

95. Table 2 and
96. Table 3 provide a comparison of the benchmark values and tier levels proposed by Ofcom in the August 2014 and February 2015 consultations. Increases are highlighted in red, decreases in blue and new evidence (Greece) in green. The changes proposed by Ofcom on average push up the value of 900 MHz relative to 800 MHz, but decrease the relative value of 1800 MHz. However, in the case of 900 MHz, the increase in the benchmark is being driven by Ofcom's erroneous use of an inflated country-specific discount rate.
97. Please note that in our tables, we report the values from Annex 8, as these appear to be the ones that Ofcom relies on in its provisional decision. The values that Ofcom reports in Tables 3.3 and 3.4 of the main consultation document in some cases differ significantly from the values in Annex 8, even though they should be identical. These types of errors make it very hard for us to audit Ofcom's work.

Table 2: Ofcom benchmark values and tier levels for 900 MHz: August 2014 and February 2015 Consultations

Country	Implied 900 MHz value (£m/MHz)		900MHz relative values (% of 800 MHz)		Tier levels	
	Aug 2014	Feb 2015	Aug 2014	Feb 2015	Aug 2014	Feb 2015
Austria	39.2	37.8	110%	115%	1 st	1 st
Ireland	20.3	18.2	62%	60.7%	1 st	1 st
Portugal	21.8	21.2	67%	70.7%	2 nd	2 nd
Spain	23.2	22.2	65%	67%	2 nd	2 nd
Denmark	6.1	5.7	18%	18%	3 rd	3 rd
Greece	N/A	28.8	N/A	96%	N/A	3 rd
Romania	33.5	30.6	108%	108%	3 rd	3 rd

Source: August 2014 Consultation, Annex 8, p.4; February 2015 Consultation, Annex 8, p.5

Table 3: Ofcom benchmark values and tier levels for 1800 MHz: August 2014 and February 2015 Consultations

Country	Implied 1800MHz value (£m/MHz)		Tier	
	Aug 2014	Feb 2015	Aug 2014	Feb 2015
Austria	25.5	23.0	1 st	1 st
Ireland	14.3	13.3	1 st	1 st
Italy	13.5	12.8	1 st	1 st

Country	Implied 1800MHz value (£m/MHz)		Tier	
	Aug 2014	Feb 2015	Aug 2014	Feb 2015
Germany	5.6	5.6	2 nd	2 nd
Sweden	17.5	16.0	2 nd	1 st
Czech Republic	7.5	7.2	3 rd	3 rd
Greece	N/A	13.3	N/A	3 rd
Portugal	6.1	5.9	3 rd	3 rd
Romania	12.0	11.3	3 rd	3 rd
Slovak Republic	7.5	7.3	3 rd	3 rd

Source: August 2014 Consultation, Annex 8, p.5-6; February 2015 Consultation, Annex 8, p.6-7

98. We accept the following changes by Ofcom:

- *Annual licence fees for Portugal and Spain.* Ofcom has identified annual licence fees payable for spectrum in these countries not previously included in its analysis. We accept the inclusion of this data on grounds of consistency with other countries. However, we have not been able to verify whether Ofcom has correctly calculated ALFs for Spain, especially for the 2600 MHz band. Based on the document referenced by Ofcom (which is only available only in Spanish), it is apparent that the ALFs are calculated using a complex bespoke formula, which includes coefficients not identified by Ofcom.¹⁴.

¹⁴ See <http://www.minetur.gob.es/telecomunicaciones/es-ES/Servicios/Tasas/Paginas/tasaDominio.aspx>, section 2, article 9. The Spanish ALF is calculated as “ $T = [N \times V] / 166,386 = [S \text{ (km}^2\text{)} \times B \text{ (kHz)} \times F \text{ (C1, C2, C3, C4, C5)}] / 166,386$ ” where “N = número de unidades de reserva radioeléctrica (URR) calculado como el producto de S x B, es decir, superficie en kilómetros cuadrados de la zona de servicio, por ancho de banda reservado expresado en kHz”. For national licenses, this calculation is less complex as, “el valor de la superficie S a considerar para el cálculo de la tasa, es el de 505.990 kilómetros cuadrados”. Unfortunately, many of the 2.6GHz licenses are licensed

- *New benchmarks from Greece.* We welcome the addition of the October 2014 auction results from Greece into the set of benchmarks.

99. As in previous consultations, we welcome the expansion of Ofcom's set of benchmarks as new awards come available. In this regard, it is unfortunate that the only new data point to come available is from Greece, which is clearly a Tier 3 observation, so is not greatly relevant. However, the next scheduled auction, in May 2015, will be the German multi-band auction, which includes both 900MHz and 1800MHz. This promises to be of much greater value. Germany already provides a Tier 2 observation for 1800 MHz. Given that Germany and the UK are both large, relatively wealthy European economies, the new auction has the potential to deliver Tier 1 benchmarks for both 900MHz and 1800MHz. Clearly, this is an auction that Ofcom cannot ignore, given the concerns that it and others have raised about the small sample of benchmarks, especially at 900 MHz.

100. We reject the new benchmark values for Austria. Notwithstanding our comments questioning the validity of the Austrian benchmark results owing to the lack of any bid data or stakeholder knowledge of the underlying bids (unlike Ireland), we support Ofcom's decision to rely on LRP with a revenue constraint (indeed, this is our favoured LRP approach for the UK 4G auction too). However, even following Ofcom's methodology, we find that the results presented appear to be incorrect. Firstly, the discount rates that Ofcom uses in its spreadsheet contain errors and are not the same as the rates reported in Ofcom's Table A7.2. Secondly, Ofcom uses an implausibly high country-specific discount rate, which has the effect of inflating the value of 900 MHz relative to other bands. We elaborate on these points below.

Data errors in Ofcom's consultation document and supporting spreadsheet

101. Telefónica has identified many instances where Ofcom presents incorrect values in the Consultation Document, and makes errors in its spreadsheet calculations that materially affect the benchmark results. We detail each of the errors that we have identified to date below. As we only received Ofcom's spreadsheet data on 14 April, 2015, three days before the consultation submission date, we have not had time to undertake a full audit of the spreadsheet and are concerned that there may be many more errors.

102. First, at §4.33, Ofcom states (emphasis ours):

"We published our estimate for the mobile WACC in the context of the MCT market review 2015-18 draft Statement in February 2015. This gives a pre-tax nominal WACC of 9.1%.

on a regional level and will have a unique "S" coefficient, which Ofcom has not provided. Without the S coefficient used by Ofcom, we cannot verify Ofcom's calculation of Spanish ALFs.

This suggests a post-tax nominal WACC of 7.3% is appropriate, giving a post-tax real WACC of 5.2% when incorporating our CPI estimate of 2%.”

103. Additionally, at §4.67, Ofcom states (emphasis ours):

“For the purposes of annualising the lump-sum value, we therefore consider we should apply a discount rate of 2.0%.”

104. However, in Ofcom’s spreadsheet¹⁵, it calculates the benchmarks using a post-tax real WACC of 4.65%¹⁶ and a post-tax real cost of debt of 2.17%¹⁷. This affects the benchmarks values for the Czech Republic, Denmark, Germany, Greece, Italy, Romania, and the Slovak Republic. As a result, it appears that almost all of the benchmarks reported by Ofcom in Table 3.2 are materially incorrect. (In any case, as we discuss below, Ofcom should be using country-specific discount rates for Tier 3 countries, not relying on the UK rate, which is likely to be roughly correct only for Denmark and Germany.)

105. Secondly, at §3.41.C, Ofcom states:

“We use discount rates when we adjust for differences in licence duration or delayed availability of spectrum or to include the present value of annual fees. We now use country-specific discount rates rather than UK discount rates (for Tier 1 and Tier 2 countries), as described in Annex 7, paragraphs A7.26 to A7.55.”

106. Ofcom identifies Germany as a Tier 2 benchmark, yet has failed to use a country-specific discount rate and instead uses UK discount rates.

107. Thirdly, in Table A7.2, Ofcom reports the real post-tax real WACC for Austria at 11.37%. In the Benchmark Spreadsheet, Ofcom uses a post-tax real WACC of 6.66%¹⁸. We do note that 11.37% is reported as the pre-tax nominal WACC.¹⁹ We assume that Ofcom erroneously reported the pre-tax nominal WACC instead of the post-tax real WACC for Austria in Table A7.2. We also note that Ofcom uses a cost of debt of 7.28%²⁰, which makes no sense as it is higher than Austria’s WACC.

¹⁵ Ofcom, Final benchmarking dataset – FOR RELEASE.xlsm, provided to Telefonica on 14/4/2015.

¹⁶ Ibid, CountryData sheet, cell M39.

¹⁷ Ibid, CountryData sheet, cell M40.

¹⁸ Ibid, CountryData sheet, cell M2.

¹⁹ Ibid, CountryData sheet, cell I2.

²⁰ Ibid, CountryData sheet, cell N2.

108. The errors with respect to Austria are particularly material because Ofcom's increase in the 900/800 ratio from 110% to 115% is a key plank underpinning Ofcom's proposal to raise its estimate of the equivalent UK ratio from 65% to 70%. As we discuss below, not only does Ofcom make mistakes in its calculations, but the rates it uses look far too high when compared to other European economies, with the implication that Ofcom's proposed benchmark increase is entirely driven by the use of a false discount rate.

109. In addition to the errors in Ofcom's benchmark calculations, Ofcom also presents incorrect values throughout the Consultation Document. In Table 3.3, Ofcom reports the 900 MHz/800 MHz ratio. These numbers are inconsistent with the ratios presented in Table A8.1. The inconsistencies are presented in the Table 4:

Table 4: Comparison of 900/800 MHz ratios reported by Ofcom

Country	Ofcom Table 3.3	Ofcom Table A8.1
Denmark	17%	18%
Greece	87%	96%
Ireland	55%	61%
Portugal	64%	71%
Romania	93%	108%

110. Likewise, Ofcom presents inconsistent Y/X ratios, used to determine the value of 1800 MHz, in Table 3.4 compared with Table A8.2. The inconsistencies are presented in Table 5:

Table 5: Comparison of Y/X ratios reported by Ofcom

Country	Ofcom Table 3.4	Ofcom Table A8.1
Czech Republic	6%	7%
Greece	29%	32%
Ireland	28%	32%
Romania	21%	25%
Slovak Republic	6%	7%

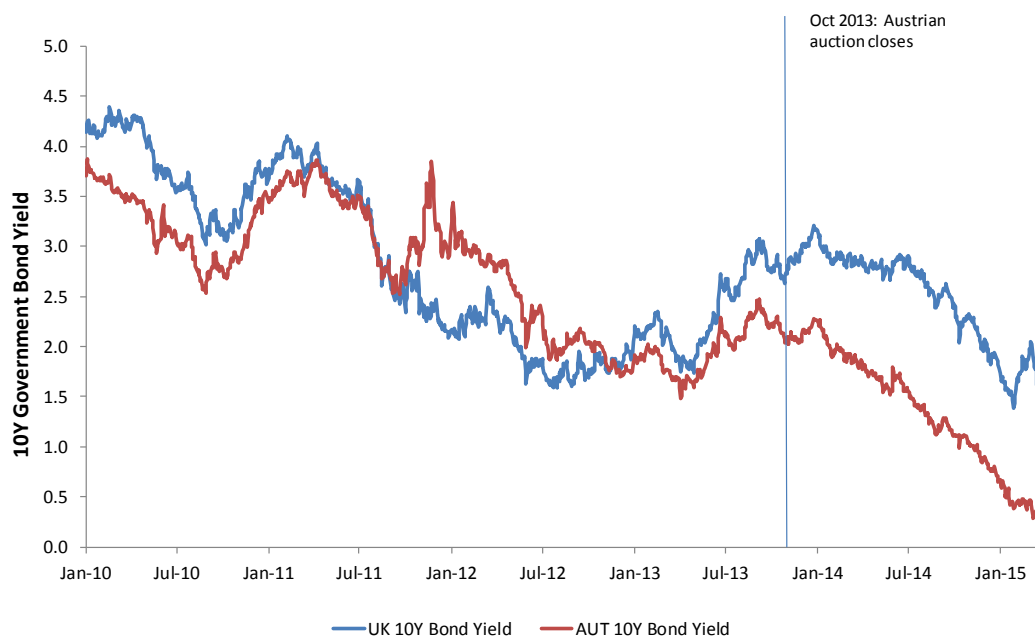
111. In sum, it appears that almost all of Ofcom's published data points are wrong to some degree. Such a high error rate is obviously not acceptable in a document of this importance. While we have had three days at the end of the consultation period to identify and digest the impact of these errors, we suppose that other respondents may have submitted comments based on erroneous data. Accordingly, we believe it is essential that Ofcom publish an updated version of the consultation document and associated spreadsheet with all errors corrected, and provide respondents with a suitable time period to amend their consultation responses.

Use of country specific discount rates

112. In the context of Ofcom's methodology, we welcome the switch to using country-specific discount rates in principle. However, in practice, Ofcom's implementation of this change contains multiple errors and omissions that threaten to undermine confidence in its approach.
113. It is arbitrary for Ofcom to only apply a discount rate adjustment to a sub-sample that does not include some of the countries most likely to show large differences in country-specific discount rate compared to the UK, e.g. Romania (rated Baa3/BB+, i.e. 9 notches below the UK) and Slovakia (rated A/A2; i.e. 3.5 notches below the UK) despite showing in Table A7.1 that higher discount rates in these countries have the potential to lower benchmark values by a non-trivial amount. (We note that country-risk adjustments tend to affect both the WACC and the cost of debt and therefore affect all columns of Table A7.1).
114. A second error is introduced by Ofcom's estimate of the discount rate for Austria:
- First of all we note an inconsistency between Table A7.2, which shows a real, post-tax WACC for Austria of 11.37% and the model we have been supplied with, which shows a real-post tax WACC of 6.66%.
 - Even if we assume that Ofcom has used the 6.66% number, this rate is c. 35-45% higher than the rates Ofcom uses for comparably rated countries [4.6% (UK) and 4.9% (Sweden)²¹] and also higher than the rate that Ofcom uses for countries that were significantly affected by the sovereign debt crisis (e.g. Portugal and Ireland). It is unclear from the Austrian regulator (RTR)'s decision that Ofcom's consultation paper links to why RTR concluded on a number so out of line with European precedent. One indication from the decision is that RTR was still looking to account for the impact of the financial crisis by using an equity risk premium between 5.5% and 12%, a figure Ofcom has never estimated in excess of 5%. While regulators may come to different conclusions about the persistence of the risk-free rate; it is not plausible for Ofcom to assume that investors were expecting the global financial crisis to persist in Austria while not doing so in the UK *at the same time*.

²¹ See our response to the second consultation paper for relative credit ratings: Austria has the same credit rating as the UK while Sweden's rating is 0.5 notches better. The UK value of 4.65% is taken from the model we were supplied with.

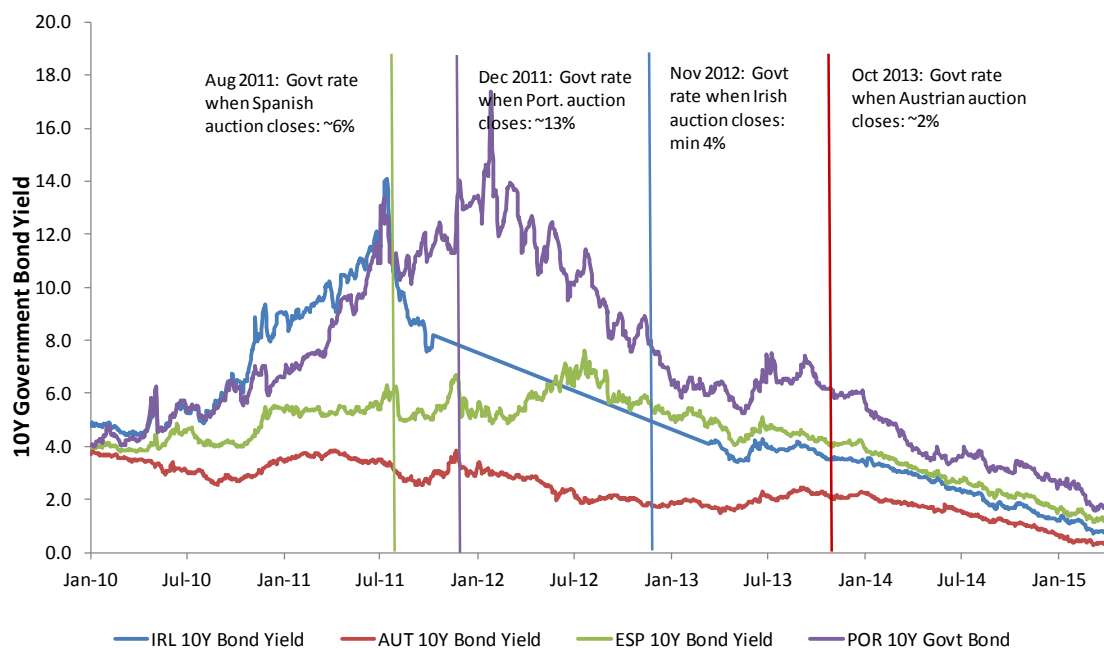
Figure 2: A Comparison of UK and Austrian government bond yields



115. The implausibility of Ofcom's estimate of the Austrian discount rate is further exposed by comparison with market data. Figure 2 shows that when the Austrian auction took place in 2013, Austrian government bond yields were slightly below UK rates rather than significantly above as implied by Ofcom's estimates, i.e. investors were expecting broadly similar risks in both countries. Moreover, given that Austria is rated the same as the UK, it seems implausible for its discount rate to be about two percentage points higher instead of being broadly comparable.

116. The error in Ofcom's estimate of the Austrian WACC is further highlighted by comparison to the other country-specific discount rates that Ofcom uses. Figure 3 shows that government bond yields for all other comparable countries for whom Ofcom uses country-specific discount rates were *at least twice as high* as the Austrian government bond rate time at the time of auction. In light of this, it is entirely implausible for Ofcom to use *lower* discount rates for each of them when compared to the Austrian number. According to the model we were supplied with by Ofcom, Ofcom used the following discount rates: 6.66% (Austria), 6.58% (Ireland), 6.19% (Spain), 6.08% (Portugal), placing countries in reverse order of risk compared to what the market rates at the time of auction would suggest.

Figure 3: A Comparison of Austrian and other government bond yields



117. We further note that it is unclear whether Ofcom has used discount rates that refer to short-run or long-run estimates, which may further distort its estimates.

118. This error matters greatly because Ofcom's decision to raise the 900/800 ratio from 65% to 70% is primarily attributable to its increase in the Austrian benchmark, but this is based on an inappropriate discount rates. As illustrated in Table 6, If Ofcom were to use the same WACC as the UK (5.2%), Austria's 900/800 ratio returns to a similar level to the August 2014 consultation. Furthermore, if it were to use a slightly lower rate of 4.65%, consistent with differences in government bond yields at the time of the auction, the Austrian rate would actually fall relative to the August consultation. These errors alone clearly demonstrate that Ofcom's proposal to raise the UK 900 MHz price ratio has no evidential basis.

Table 6: Austria benchmarks with different discount rates

Discount Rate	WACC (%)	800 MHz	900 MHz	1800 MHz	2600 MHz	900/800	1800/800
Austria WACC*	11.37%	65.2	85.1	48.1	1.8	130%	74%
Austria WACC**	6.66%	68.3	78.2	44.2	1.9	115%	65%
UK WACC	5.20%	69.5	76.2	43.0	2.0	110%	62%
Proposed Austria WACC	4.65%	70.0	75.5	42.6	2.0	108%	61%

Notes: *post-tax real WACC as reported in Table A7.1; **post-tax real WACC used in calculations based on benchmark model supplied by Ofcom

Changes to analysis of evidence points

119. Ofcom has also made changes to the analysis of evidence points between the consultations of August 2014 and February 2015. Here we provide our opinion on the changes in Ofcom's assessment of the relevance of evidence from each country.

Austria

120. While still not addressing the underlying issues, the adjustment to the assessment of risk for Austria to a risk of overstatement for both 900 MHz and 1800 MHz is a step in the right direction. However, Ofcom's refusal to downgrade Austria from a Tier 1 to Tier 3 observation is perplexing. In responses to the August 2014 consultation, there was unanimity amongst those stakeholders that commented that the 900 MHz and 1800 MHz prices from the Austrian multi-band auction are gross outliers to the set of benchmarks, with both absolute and relative benchmarks almost certainly distorted by strategic bidding behaviour. It is hugely disappointing that Ofcom has not seriously considered this evidence. As discussed below, we provide new evidence in the annexes to this submission which clearly demonstrates that Austrian auction data should not be given the prominence it has to date in this process.

Germany

121. We agree with Ofcom's assessment of Germany 1800 MHz as a Tier 2 observation with risk of under-statement, based on available information to date. However, we note that this is a data point subject to significant comment from stakeholders, with several arguing that Ofcom underweights the German auction as a benchmark for the UK. Fortunately, there is an

opportunity for Ofcom to revisit its assessment once we have results for the May 2015 auction, which will include large amounts of 1800 MHz than was available in 2010, as well as the full 900 MHz band.

Greece

122. We strongly agree with Ofcom's assessment that Greece is a Tier 3 country. The data is not particularly informative with respect to the relative value of available bands and Greece, owing to its small relative size and troubled economic circumstances, is not a good benchmark for the UK.

Ireland

123. We do not agree with the adjustment to the assessment of risk associated with the Ireland benchmark for 900MHz, from a risk of over-statement to a risk of under- or over-statement. Ofcom presents two arguments for this adjustment, one of which is, we believe, completely flawed and the other disputable and second order.
1. Ofcom inexplicably argues that the existence of a 'focal point' (predictable division of demand) in the Irish 4G auction may have facilitated lower prices for 900 MHz auction. In effect, Ofcom is arguing that the Irish CCA may have been affected by demand reduction; this notwithstanding the fact that the CCA is very robust to demand reduction and much more vulnerable to demand inflation (see, for example, the Annexed paper by Janssen). We do not disagree that there was a high degree of predictable demand in the Irish auction, but in the context of a CCA, this had the opposite effect from the one Ofcom now suggests. It created strong incentives for H3G to overbid for incremental 900 MHz, knowing that it could fall back to one lot at zero opportunity cost, owing to the spectrum caps. No one who was involved in the Irish auction seriously believes that H3G underbid for 900 MHz spectrum. For Ofcom to present this theory as one demanded equal weight to the risk of strategic over-bidding is stretching credulity. For further evidence that H3G engaged in strategic overbidding, please refer to the annexed paper by NERA on strategic behaviour in CCAs.
 2. Ofcom argues that the LTE ecosystem for 900MHz has advanced more than expected since the time of the auction in 2012. This assertion is based on one possible interpretation of commercial evidence regarding LTE 900, which we question (see Section III). It is also a second order effect relative to the robust reasoning underpinning Ofcom's original assessment.
124. We note that Ofcom's previous conclusion that the Irish benchmark likely over-stated UK value sat uneasily with its decision to propose a value estimate significantly above the Irish

level. Given that Ofcom now proposes to increase the gap between the Irish benchmark 900 / 800 ratio and its own estimate for the UK ratio even further (61% vs 70% respectively), it would seem a surprising coincidence that Ofcom has suddenly identified evidence why Ireland might under-estimate value as well as over-estimate value. However, the reality is that there is no new evidence here and no reason for Ofcom to revise its previous finding that Ireland likely overstates UK value for 900 MHz.

Sweden

125. We disagree with the decision to promote the benchmark value for 1800 MHz for Sweden from Tier 1 from Tier 2. As we discussed at length in our previous response, the use of a proxy value introduces uncertainty and risk of error. While Sweden is, in principle, one of the better benchmarks for the UK, we are of the opinion that a Tier 2 rating was appropriate given the benchmark is based on partial evidence.
126. We note that Ofcom accepted our argument that “*there is no uniquely correct methodology to derive a 2.6 GHz proxy*” (§A7.1.01), but rejected our proposal that it take account of other proxy measures. Ofcom’s position is inconsistent with its view that Sweden should be promoted to Tier 1 evidence point. While Ofcom may believe that its method is more likely to be accurate than others that we propose, its recognition that there are other plausible methods that produce different estimates of the proxy highlights the fact that this estimate is particularly noisy. Given the associated margin of error and the particular uncertainty over 2.6 GHz value in Sweden (owing to the actual value in the 2007 auction was much lower than the proxy), we do not agree that Sweden should be raised to Tier 1 evidence.

Spain

127. We disagree with Ofcom’s proposal to adjust Spain from risk of over-statement to risk of under- or over-statement. Ofcom proposes to do this based on an assertion that the LTE ecosystem for 900MHz has advanced more than expected since the time of the auction in 2011. This assertion is based on one possible interpretation of commercial evidence regarding LTE 900, which we question (see Section III). It is also a second order effect relative to the robust reasoning underpinning Ofcom’s original assessment.
128. As with Ireland, it would seem a surprising coincidence that Ofcom has suddenly identified new evidence for risk of over-statement, given its proposal to set the UK 900 MHz value above the level of the Spanish benchmark (70% vs 67%, as a proportion of 800 MHz, respectively).

B. Flaws in Ofcom's approach to estimating lump sum values of 900 MHz and 1800 MHz

129. In addition to the multiple errors in Ofcom's analysis, its qualitative analysis is also flawed in three respects. Firstly, its qualitative analysis is prone to bias owing to its refusal to undertake any quantitative checks on its conclusions. Secondly, its qualitative analysis of CCAs is particularly weak, reflecting an underestimation of the incentives for strategic behaviour under this format. Thirdly, its inclusion of Austria as a Tier 1 evidence point lacks any basis in evidence. We address each of these points below.

1. Absence of any quantitative analysis to screen for outliers

130. As part of our response to the August 2014 consultation, we submitted a statistical analysis of the country benchmark data that is being used by Ofcom to derive lump sum values of UK 900 MHz and 1800 MHz spectrum. In that paper, NERA proposed that Ofcom undertake a "top down" econometric evaluation to screen for potential outliers amongst its country benchmarks, as a complement to Ofcom's "bottom up" qualitative analysis of individual observations. This approach provided a potential framework for allocating observations to Ofcom's three tiers of evidence which could then be refined through qualitative reasoning. In particular, in cases where lack of evidence may make qualitative reasoning difficult, it provides an objective basis for tier designation. Using this approach, NERA put forward a number of recommendations, which we strongly support, including downgrading the Austria 900 MHz and 1800 MHz benchmarks from Tier 1 to Tier 3.

131. Ofcom's views on NERA's submission are set out at in Annex 7, paragraphs A7.185-A7.191. In short, Ofcom rejects NERA's proposal to carry out any quantitative analysis of the benchmarks, arguing that an exclusively qualitative approach is more appropriate. We asked Jonathan Falk and Richard Marsden at NERA to examine Ofcom's response to its paper, and their comments are set out in Annex I of this submission.

132. In summary, NERA argue that Ofcom's conclusions are unpersuasive for two main reasons:

1. Ofcom misunderstand NERA's methodology itself. Ofcom seem to assume that the analysis that NERA employed provides something akin to proof that certain auction results have been misclassified. This was never NERA's intention – the analysis is offered as a complement to rather than a replacement for the qualitative analysis.
2. Ofcom's critique of the specifics of the econometrics that NERA use are simply wrong, particularly with regards to complaints about functional form, weighting, and the superiority of relative measures to absolute measures.

133. For the avoidance of doubt, both Telefónica and NERA agree with Ofcom that the data are too sparse to permit firm conclusions about how to classify particular results on a purely mathematical basis. For example, NERA does not claim that the econometric analysis proves that Austria's auction results are unreliable. What they do, however, is provide strong, objectively based reasons to suspect that Austria's results are unreliable. They provide a context for the specific objections that multiple stakeholders have made to Ofcom's interpretation of the Austrian process.

134. Accordingly, any of the comments from Ofcom that suggest that NERA's econometric analysis is unreliable because the data sample is small miss the point. NERA's work was not intended (nor would they suggest it be used) as a mechanistic way to separate tiers.

135. Based on the comments from NERA, we request that Ofcom revisit their analysis of the econometric study, as Ofcom's initial critique is flawed and misguided. The quantitative exercise that NERA propose would provide a valuable cross-check on a qualitative process which otherwise proceeds without objective standards. In the absence of such a cross-check, it appears that Ofcom is unable to identify outlying data points, such as the Austrian benchmarks, and subject them to the critical scrutiny they deserve.

2. *Poor qualitative analysis of CCAs*

136. There is a material difference in the quality of Ofcom's analysis regarding CCA and SMRA auction formats. Whereas Ofcom displays a sophisticated understanding of the potential impact of strategic bidding on allocation and price outcomes in SMRAs, it appears blind to the extent of strategic bidding in CCAs, especially multi-band CCAs.

137. Whenever Ofcom identifies prices it thinks are low in a SMRA setting, it typically attributes this to demand reduction, and lowers the Tier rating for that country accordingly. For example, in the case of the German 2010 multiband award, which is widely recognised as a very competitive process, it downgrades the 1800 MHz benchmark because it believes this band might have been subject to demand reduction, even while competition for 800 MHz was robust. In general, we agree with Ofcom analysis on SMRAs, even if we may differ over the magnitude of demand reduction effects in some cases.

138. In sharp contrast, whenever Ofcom identifies high prices in a CCA setting, for example in relation to some of EE's marginal bids in the UK auction or with respect to the Austrian auction in general, Ofcom's default position is that these must reflect straightforward bidding. Ofcom's approach appears to be rooted in naïve belief that CCAs encourage straightforward bidding and that strategic deviations, if they take place at all, will be modest. Indeed, at §A8.122, Ofcom even goes so far as to say:

“The fundamental rationale for the CCA as an auction format is that it provides incentives for straightforward bidding by bidders.”

139. This statement is wrong in many ways. Firstly, our understanding is that the fundamental rationale for the CCA is that package bidding mitigates aggregation risk for bidders. Secondly, the CCA – like other complex auction formats – only provides incentives for straightforward bidding under limited conditions. Such conditions often do not apply in practice, especially in multi-band auctions with a small number of competing incumbents each with predictable demand.
140. To help Ofcom better understand the incentives for deviations for straightforward bidding that may exist in a CCA, we commissioned two papers. The first paper, by Professor Maarten Janssen of the University of Vienna, explores these incentives from a theoretical perspective. The second paper, by Richard Marsden and Dr Soren Sorensen of NERA, explores these incentives from the perspective of bidders preparing for a multi-band CCA. The two papers are available as Annex II and Annex III to this submission.
141. Both papers reach similar conclusions regarding the potential for substantial distortions in pricing in CCAs, typically in an upwards direction:
- Professor Janssen observes that spectrum auctions using the CCA format are often associated with strategic incentives for bidders to drive up the prices that rival bidders pay. These incentives may vary across bands, with the result not only that overall prices may be inflated but also that (implied) relative prices across spectrum bands may be distorted. The circumstances in which CCAs are most vulnerable to strategic bidding and resulting price distortion are similar to those in the SMRA, i.e. situations where there are only a small number of bidders, each having a predictable demand for spectrum in some or all available bands. Especially in auctions with few, asymmetric bidders where spectrum that is currently in use (so-called legacy bands) is re-auctioned and where the spectrum caps are so weak that one or two bidders can buy up (almost) all spectrum, bidders in a CCA have the ability and the incentive to bid up competitors’ prices without engaging in relatively risky bidding strategies.
 - Marsden & Sorensen identify five different motives why bidders in CCAs may not bid straightforwardly. They identify budget constraints, preference for good relative outcomes and strategic investment incentives as the most important motivations. All three motives may introduce strategic incentives for over-bidding relative to market value for some bidders, potentially by a large amount. Furthermore, in multi-band auctions, the incentives for overbidding are asymmetric, with some bands likely to have prices pushed up much more than others, depending on the predictability of rival

demand. Legacy bands, such as 900 MHz, are particularly vulnerable to overbidding because incumbents typically have irreducible minimum demands.

142. We hope that these papers, and the many references that they cite, will provide the evidence that Ofcom needs to develop a more sophisticated analysis of bidding behaviour in CCAs. In particular, as we explain below, if Ofcom considers the circumstances when auctions and specific bands are most vulnerable to over-bidding in CCAs, it should see the Austrian auction outcome in a much less positive light with respect to its suitability as a benchmark for UK prices.

3. *Inclusion of Austria as a Tier 1 benchmark for 900 MHz and 1800 MHz*

143. Ofcom continues to maintain that Austria is a Tier 1 benchmark in its qualitative analysis of European benchmarks for the price of the UK spectrum, despite copious evidence that the results are unreliable. For the 900 MHz price, it is one of only two Tier 1 benchmarks and has a huge influence on Ofcom's choice of price point. Indeed, the 5% increase in the 800/900 ratio for Austria that Ofcom identifies in its consultation document (which we have shown to be based on incorrect data) is the primary driver behind its proposed 5% increase in the UK ratio from 65% to 70%.

144. Frankly, we regard Ofcom's position on Austria as untenable. This is because the evidence that prices in Austria were distorted by strategic bidding is overwhelming. Every single incumbent operator in their responses to the last consultation argued that the Austrian results were unreliable. The key pieces of evidence include:

- The results themselves. NERA's quantitative analysis shows that both the absolute values for Austria and the 900 MHz and 1800 MHz price ratios are high price outliers to Ofcom's sample of European benchmarks.²²
- The exceptional level of the 900 MHz benchmark, which is above 100% of the 800 MHz price, and therefore inconsistent with technical evidence and industry wisdom that 800 MHz is the more valuable band. It is simply not credible for Ofcom to believe simultaneously that its Austrian 900/800 ratio of above 100% is a sound benchmark for the UK, and that the value of 900 MHz spectrum in the UK is 70% of the value of 800 MHz (see our discussion regarding technical evidence in Section III).

²² NERA Economic Consulting (2014), Review of country benchmarks used for setting lump sum values for UK 900 MHz and 1800 MHz, submitted to Ofcom by Telefonica UK.

- Statements by the bidders involved arguing that the auction format encouraged them to make exceptionally large bids for strategic reasons.²³
- A statement published by the Austrian regulator, RTR, that tells us that aggregate revenues were roughly doubled from Euro 1 billion to over Euro 2 billion, as a result of bidders making very large bids for very large packages of spectrum that had no chance of winning.²⁴

145. In addition, stakeholders have put forward multiple arguments explaining how the specific rules and circumstances of the Austrian CCA auction created incentives for strategic bidding which likely had the effect of grossly distorting prices. Stakeholders highlighted incentives for overbidding, especially with respect to the 900 MHz band, scope for submitting large bids in the supplementary round purely for price-setting purposes, and potential inflation of bid values owing to strategic investment opportunities, owing to the very high proportion of mobile spectrum available in the auction and lax spectrum caps.

146. We consider these arguments to be compelling but Ofcom rebuffs each one. For example, Ofcom states that:

- “[W]e recognised that there can be opportunities for price driving in auctions, including in CCAs. However ... price-driving can be a risky strategy for operators, as they are unlikely to have full knowledge of rival bidders’ intrinsic value of spectrum and/or budget constraint in the auction.” (§A8.47)
- “The allegations put forward by stakeholders included suggestions that there were some bids that bidders knew would not win. However, the evidential basis for bidders having such certainty was unclear to us.” (§A8.48)
- “Furthermore, as for strategic investment, even if price driving occurred, it would only lead to a risk of understatement or overstatement in the relative values if it disproportionately affected some bands compared to others. It was unclear this would be the case for the allegation of price driving in general, or for the suggestion of price driving by H3G.” (§A8.49)

147. Ofcom’s response begs the question whether there are any circumstances under which it would believe that prices in a CCA could have been distorted by strategic bidding. RTR’s statement effectively tells us all that there was a billion dollars of opportunity cost created by bidders making very large bids for large packages that they could not expect to win (and would have involved them winning far more prime spectrum than allowed under equivalent UK

²³ For a list of example statements, see the NERA paper at Annex III to this submission.

²⁴ See, <https://www.rtr.at/en/pr/PI28102013TK>.

rules). We accept that the level of price distortion across bands cannot be determined with any precisions given the lack of published bid data, but it is surely clear that there is a possibility, indeed likelihood, of gross distortion given the excess of opportunity cost associated with big, unwinnable bids. Against this background, the lack of bid data should be a compelling reason to downgrade Austria, not an excuse for Ofcom to claim lack of evidence for distorted prices.

148. We understand that Ofcom may be naturally sceptical of arguments put forward by operators against the Austrian benchmark, as downgrading it would clearly necessitate a reduction in the benchmark ratios for both 900 MHz and 1800 MHz. Therefore, in an effort to demonstrate how likely it is that the Austrian results are flawed, we asked both Professor Janssen and NERA to examine the Austrian auction situation and outcome. They both conclude that the auction was affected by incentives for over-bidding and that prices across bands were likely distorted, perhaps grossly so, by this behaviour. In particular, they highlight the vulnerability of the 900 MHz band to over-bidding. We refer you to their analysis in Annexes II and III.

149. We also refer Ofcom to a recent published paper by the economists Jonathan Levin and Andrzej Skrzypaczy, which explore the properties of the CCA. They highlight Austria as an example of a CCA producing remarkably high prices, and point out that “*the pricing outcome in the Austrian auction resembles the predatory example*” that they develop in their paper.²⁵

150. In summary, Ofcom’s argument that strategic bidding likely had no impact or only a small impact on Austrian prices is not credible. There is substantial evidence of over-bidding and gross price distortion across bands. Accordingly, Austria cannot be a Tier 1 benchmark for the UK and must be downgraded.

C. Updated estimate of values for 900 MHz and 1800 MHz

151. There is broad support in favour of the use of price ratios across bands in other European countries to derive UK lump-sum values of ALF spectrum. However, we continue to have major reservations about the way that Ofcom has carried out this exercise, in practice. In particular, we strongly object to some of the revisions that Ofcom has made to the weighing of certain evidence points, which are based on spurious evidence, and the continued emphasis it places on the Austrian 4G auction outcome, which is a high price outlier. Separately, latterly in the consultation response process, we have become aware of a series of apparent errors in Ofcom’s calculations, as described above.

²⁵ 151. Jonathan Levin and Andrzej Skrzypaczy (September 2014), Are Dynamic Vickrey Auctions Practical?: Properties of the Combinatorial Clock Auction, NBER Working Paper No. 20487.

152. Ofcom's proposal to increase the UK ratio of 900 /800 from 65% to 70% is primarily driven by an increase in its Austria benchmark from 110% to 108%. However, this is based on an incorrect country specific discount rate. If an appropriate rate is used, the benchmark falls to 108%. Accordingly, even with Austria included as a Tier 1 benchmark (which we dispute), there is no basis for a five percentage point increase in the ratio.
153. Telefónica's view, based on a proper assessment of international benchmarking, is that the ratio of 900:800 MHz falls within a range of between 60% and 65%. We continue to believe that a 62% ratio, as we proposed in our previous consultation is a fair reflection of true relative values of these two bands. On the same basis, for 1800 MHz, we consider that a fair reflection of the Y/X ratio for determining the 1800 MHz price is between 22% and 27% of the 800 MHz price, and that Ofcom should adopt a ratio at the lower end of this range.

Section 6

VI. ANNUALISATION

154. Ofcom applies a discount rate of 2.0% to convert the lump-sum values into an equivalent annual rate (as compared with a discount rate of 2.6% in the August 2014 consultation). This reflects two main changes from the August 2014 consultation: Telefónica welcomes the fact that, in its revised proposal, Ofcom uses the current cost of debt for annualisation, which is the conceptually correct approach. However, we have a number of serious concerns about Ofcom's implementation of the cost of debt approach and in particular its newly introduced "risk sharing" premium. They concern, in particular, the inconsistency between the use of a long-run estimate (MTC WACC) in the upper polar case and the correct current cost of debt in the lower polar case as well as the lack of consideration of offsetting issues. In sum, these errors lead to an implausibly large "risk-sharing" premium that does not align with market evidence. For a more detailed discussion, we refer to the NERA expert report, annexed to this submission.

A. Ofcom's Approach generates implausible results

155. Ofcom calculates a (post-tax) risk premium of 1.1%, a more than doubling of the rate before risk sharing drawing on the reasoning set out in section 2.2. When also accounting for the corporate tax rate, the risk sharing premium increases to 1.32%. The disproportionate magnitude of the "risk sharing" premium becomes clear when comparing the premium Ofcom uses to the actual observed differences between corporate bond yields with different credit ratings.

156. NERA compared Ofcom's estimate of the premium for risk sharing to the risk premiums faced by corporate bonds with different credit ratings (i.e. different levels of risk). NERA find that a 2 rating grade difference (i.e. a move from AA to BBB) only increases financing costs by about 55 basis points (bps). Ofcom's risk sharing premium (132bps when accounting for tax) is therefore equivalent to a difference in rating of about four rating grades or a move well into sub-investment grade ("junk") territory from the MNOs' current BBB rating. It is highly implausible for the government to attach so much "default risk" when Ofcom has ruled out a renegotiation for at least 5 years and linked any future review to the breaching of a materiality threshold.

B. Ofcom's approach builds on incorrect methodological foundations

157. Part of the excessive "risk-sharing premium" is driven by Ofcom's use of an inappropriate and inconsistent upper polar case. Ofcom uses the MCT WACC, a long-run estimate of the

WACC despite recognising for the lower polar case (the cost of debt) that *the ALF annualisation exercise starts from a notional one-off transaction (A10.11)*. It is inconsistent for Ofcom to recognise the one-off nature only for the lower polar case (cost of debt) and not under the upper polar case. NERA calculates this error to be worth up to about one percentage point on the WACC and by corollary 25 bps on the “risk sharing” premium.

158. Furthermore, Ofcom’s approach to the “risk sharing” premium lacks methodological foundation as Ofcom recognises itself when concluding that *“the share of risk that should be incorporated in the discount rate is inevitably a matter of judgement rather than of fact”* (4.59). In concluding so Ofcom overlooks that in finance terms the risk sharing mechanism can be modelled under a real options approach (see the attached NERA report for more details). Widely recognised methods exist to price real options.

159. NERA finds that when grounded in option theory, it is far from clear that the risk sharing has a relevant net cost to the government given its symmetric nature. Under a number of plausible scenarios the risk premium for risk sharing is offset by other factors (see the attached NERA report for more details). Ofcom therefore errs when setting a risk sharing premium based on weak theoretical foundations and erroneous empirical underpinnings.

C. Ofcom’s estimate overstates the current cost of debt

160. Ofcom’s use of a 12 months average as a measure of the current cost of debt lies significantly above truly short-run estimates of 1 month or 3 months averages, which are better proxies for the current cost of debt.

D. The appropriate discount rate

161. Ofcom’s U-turn with regard to the risk-sharing premium is not substantiated. In light of the above there is no reason for Ofcom to use a discount rate in excess of 0.9% (real, post-tax).

Section 7

VII. IMPACT OF THE GEOGRAPHIC COVERAGE OBLIGATION

162. On 17 December 2014, the Government and the four MNOs signed a Statement of Commitment in which each MNO agreed to implement 90% geographic voice coverage throughout the UK by no later than 31 December 2017. This commitment has been given legal effect through the variation of each of the MNOs' 900 MHz and 1800 MHz licences to include the coverage obligation. Following this agreement, the Secretary of State wrote to Ofcom asking it to consider the impact of this obligation on the market value of 900 MHz and 1800 MHz spectrum.

163. Ofcom's initial view is that the imposition of the geographic coverage obligation will have no impact on market value. In this section, we show that this analysis is flawed for three reasons. Firstly, by Ofcom's own admission, the coverage obligation will impose substantial costs on holders of 900 MHz and 1800 MHz spectrum, and this does affect the overall market value of this spectrum. Secondly, given the nature of the obligations, Ofcom should focus on the value impact if a new operator were to acquire the spectrum as a whole with the obligation attached, rather than the value of transferring a marginal unit of spectrum to another operator with the obligation. Thirdly, if no adjustment was made, this would result in the destruction of enterprise value for each MNO, a development that we believe was never the Secretary of State's intention when brokering the coverage obligation agreement.

164. Based on information from the UK auction, we conservatively estimate the generic cost for an operator of meeting the voice coverage obligation at £96m. We propose that this amount be discounted from each operator's lump sum value for their aggregate holdings of 900 MHz and 1800 MHz, before annualisation. Spreading the rebate of fees over the 20-year licence term effectively removes any concerns about temporary distortions to the enterprise value of MNOs owing to the partial sunk cost nature of the coverage obligation.

A. The coverage obligation will impose real costs on MNOs

165. As Ofcom itself recognises at §6.7, operators will "*incur incremental costs to meet the geographic coverage obligation which could, therefore, reduce the overall value that they attach to their current spectrum holdings.*" This must be the case because, if it was economic to make the investment in incremental voice coverage, operators would presumably have already made this investment and the Government would not have felt it necessary to intervene.

166. Although not identical, the 90% geographic area voice obligation is somewhat similar to the 98% population 4G coverage obligation associated with Telefonica's 800 MHz licence. Both obligations are subject to same completion date of end-2017 [3].
167. In the context of the ALF consultations, Ofcom has attempted to estimate the additional cost of the coverage obligation. To do this, it looked at the difference in LRP between the price for the coverage obligation lot and other 800 MHz lots without the coverage obligation. It estimated this at £31m, a value that is attributable to the difference in value that Vodafone expressed between its winning package and a package with the same amount of spectrum in each band but including the coverage obligation. While this is the correct value for the purposes of estimating the lump sum value of 800 MHz spectrum according to Ofcom's methodology, we also observe that both H3G and EE made bids that suggest a much higher willingness to pay to avoid the coverage lot. Specifically, their observed differentials range from £85m up to £400m. If we ignore their bids containing 2x20 MHz of 800 MHz (which one may reasonably suppose were unwinnable), their lowest observed differential is £96m.²⁶ Therefore, we use this number as a conservative estimate of their value in avoiding a coverage obligation.
168. A further reason why the lowest observed bid difference for the coverage obligation in the auction may be a conservative estimate of the costs associated with the new voice obligation is that the latter obligation applies to all four MNOs. In the 2013 auction, when we valued the coverage obligation lot, we anticipated that only the winner would be under the coverage obligation. [3]. One effect of the new voice obligation is to nullify any competitive advantage for Telefonica from acquiring the coverage obligation, as all operators will now likely roll out 4G to a higher population level as a by-product of meeting the voice obligation. Had bidders anticipated the new voice obligation in 2013, they might all have demanded a larger discount for the coverage obligation lot.
169. The incremental cost of meeting the new voice obligations are specifically associated with the licenses for 900 MHz and 1800 MHz. Although operators can meet the obligations using these or other bands, the legal obligation is solely associated with these bands. For example, if Vodafone was to surrender both its 900 MHz and 1800 MHz licences, it would no longer be obliged to meet the voice coverage obligation.

²⁶ Specifically, using bid data from the UK auction, we identified all examples where EE and H3G had made pairs of otherwise identical packages, one with and one without the 4G coverage obligation. We then narrowed our focus to those bids containing exactly 2x10 MHz lots of 800, as the larger bids were unlikely to be winnable and therefore less likely to be an accurate reflection of value difference.

170. In this context, the 2013 4G auction firmly establishes the principle that the costs associated with a coverage obligation should be reflected in the market price of the spectrum with which the spectrum is associated. In the award, Ofcom made a deliberate decision to identify one license with the obligation and sell this as a distinct category within the auction, such that bidders could use their bids to express their relative preference between the 800 MHz lot with the coverage obligation and other 4G spectrum without the coverage obligation. Subsequently, Ofcom has used the associated bid data to derive the value of the coverage obligation as an input into the setting of ALF payments for both 900 MHz and 1800 MHz. In summary, we conclude that the coverage obligations impose a real cost on all MNOs. We conservatively estimate this cost at £96m. This cost is specifically associated with owning licences at 900 MHz and 1800 MHz, so it is appropriate to take this cost into account when setting ALFs for these licences.

B. These costs represent a reduction in market value

171. We have established that each operator faces increased net costs as a result of the new voice obligation, costs that are solely tied to owning 900 MHz and 1800 MHz spectrum. We have conservatively estimated them at up to £96m per operator, based on bid information from the 2013 auction. The capex element will be incurred in the period until end-2017, after which they will be sunk; some opex costs will continue through the lifetime of the licences. Put differently, the voice obligation will extract up to £96m per operator out of the industry, with the bulk of this being spent over the next 30 months.

172. In our view, this means that the current market value of each operator's collective 900 MHz and 1800 MHz holdings will be reduced by up to £96m. In accordance with the Government's request for Ofcom to review the levels of ALFs, each operator's proposed annual fees should be reduced accordingly. We propose a methodology below.

173. In contrast to our position, Ofcom's initial view is that the coverage obligation will have a zero impact on market value. However, such a view is inconsistent with Ofcom's argument that Telefónica's 800 MHz licence has a lower market value owing to a coverage obligation. To maintain this position whilst arguing that the market value of our 900 MHz licence is unaffected by adding an equivalent coverage obligation, is clearly inconsistent. The only difference between the two situations is that, in the case of 900 MHz, some potential buyers of the spectrum (other MNOs) are already subject to the same obligation. In effect, Ofcom is arguing that any obligation that is imposed symmetrically on all MNOs can have no impact on the market value of spectrum, regardless of how onerous this might be.

174. Ofcom's argument is clearly flawed and results from false reasoning. Specifically, Ofcom makes two clear errors in its analysis:

- Firstly, Ofcom assumes that the marginal bidder for incremental 900 MHz and 1800 MHz spectrum must be another MNO that is already subject to the obligation. Just because this was the case for the 800 MHz spectrum in the 4G auction, it does not follow that this will be the case for potential future transactions involving 900 MHz and 1800 MHz. For example, BT has had an offer accepted to purchase EE, a transaction that includes EE's 1800 MHz holdings. As such, BT presumably must take on EE's coverage obligation. It will, we suppose, consider both the costs of this obligation and the expected level of ALF for 1800 MHz when negotiating the purchase price.
- Secondly, Ofcom assumes that it should focus on the same marginal unit of capacity as it does in its ALF analysis under Steps 1 and 2 of its process, i.e. 2x5 MHz and 2x10 MHz. However, this makes no sense in this case, as the obligations are associated with entire holdings of 900 MHz and 1800 MHz, and do not vary with the amount of the holdings. Indeed, while one may reasonably suppose that the coverage obligation would transfer with the licence if the licence was sold as a whole, it is not clear what would happen if there was only a partial sale of the spectrum. Therefore, for the purposes of considering the impact on market value, Ofcom has to look at each operator's holdings as a whole.

175. Furthermore, Ofcom's approach of refusing to take into account here the real costs of holding 900 and 1800 MHz spectrum in attributing a market value to them is flatly inconsistent with its "grossing up" of the value of 800 MHz spectrum as a basis for deriving the value of 900 MHz spectrum to take account of the lack of DTT co-existence costs for the latter (§2.184).

C. Failure to adjust ALF would destroy enterprise value

176. Ofcom also needs to consider the distorting impact on MNO businesses if no adjustment to ALF is made to cover the costs of meeting the voice obligation. We have identified two side effects if ALF is not adjusted which, we believe, the Government did not intend when brokering the deal on the coverage obligations with the MNOs.

177. Firstly, a zero adjustment would depress the value of each MNO's business. This is because the costs associated with meeting the voice obligation will largely be sunk, but there is no off-setting future revenue stream through which they can be recouped. This loss in value is entirely borne by the current ownership, and derives entirely from their ownership of 900 MHz and 1800 MHz spectrum.

178. Secondly, effectively penalising mobile operators in the way Ofcom has proposed would completely remove any incentive on future co-operation with the Government. Why should private companies agree to undertake socially beneficial initiatives which adversely affect their enterprise value, if they are not to be reasonably compensated? The Government can expect short shrift in the future if Ofcom proceeds with its current approach.

D. How Ofcom should account for the geographic coverage obligation when setting ALFs

179. When taking account of the geographic coverage obligation when setting ALFs, Ofcom should have regard to the following principles:

- It should consider the impact on the total value of each operator's holdings as a whole;
- It should assume the potential buyer is not already subject to the coverage obligations; and
- It should have regard to the incentives that the fee structure may have on the value of each MNO business and incentives for further co-operation with the Government

180. We previously conservatively estimated the cost of the coverage obligation at up to £96m per operator. We propose that each operator's total lump sum ALF for combined 900 MHz and 1800 MHz holdings be discounted by £96m to reflect this increase in costs. As ALF payments are annualised based on a 20-year license term, this would effectively spread the cost adjustment over 20 years. This, in turn, creates a stream of future lower payments through which each operator can recoup the costs of its non-economic investment in coverage.

181. As this expected stream of lower ALF payments offsets the expected costs of the coverage obligation, the value of each operator's current business should be unaffected. Finally, we see merit in a phased introduction of the new ALFs, to coincide with the additional burden that MNOs face in meeting the new 90% geographic coverage obligation (i.e. until the end of 2017). We would propose a discount of 50% of the difference between the current and new charges for this period, consistent with Ofcom's current glidepath proposals.

182. We believe that our proposals are consistent with the intent of the Secretary of State when asking Ofcom to look again at ALFs, in light of the variation in 900 MHz and 1800 MHz licences to include the coverage obligation. Ofcom has a statutory duty to implement ALF in a way that creates minimum distortions to both the market for spectrum and the broader market for provision of mobile services. This can only be achieved by making adjustments to the ALF for 900 MHz and 1800 MHz to offset the negative impact on the market value of the spectrum otherwise created by the coverage obligation.

Section 8

VIII. TELEFONICA'S ESTIMATE OF ALFs

183. We follow Ofcom's 4-step approach, as set out in Table 7 of the February 2015 consultation, to derive a conservative estimate of the full market value of ALFs for 900 MHz and 1800 MHz, before adjusting for the coverage obligation. In addition, we add a 5th step in which we adjust for the change in market value associated with the coverage obligation.
184. At each step, we set out the plausible range (low and high) of relevant values based on available evidence, consistent with the rationales put forward in this response. We accept that within these ranges, some degree of regulatory judgement is required regarding where to set values. Consistent with Ofcom's commitment to a conservative approach, we believe that the values should be set towards the lower end of the applicable ranges.
185. Using these figures results in an ALF of between £0.95m and £1.27 / MHz for 900 MHz and an ALF of between £0.54m and £0.72m / MHz for 1800 MHz, before adjusting for the impact of the geographic voice coverage obligation.
186. In Step 5, we calculate the total ALF associated with Telefónica's holdings, after adjusting for the cost of the coverage obligation, using the methodology we described in Section VII. Specifically, we deduct the estimated cost of the obligation (£96m) from the estimated aggregate lump sum value of Telefónica's 900 MHz and 1800 MHz spectrum holdings (between £675m and £900m), and convert this to an annual fee using the discount rate in Step 3. This results in a total ALF for Telefónica's holdings of between £24.7 and £31.3m per annum during the phase-in period, and between £33.8m and £46.9m thereafter.

Table 7: Plausible value ranges for determination of ALFs

	900 MHz		1800 MHz	
	Low*	High	Low*	High
STEP 1				
Lump sum value 800 MHz based on UK auction (£m/MHz)	24.2	30.5	24.2	30.5
Lump sum value 2600 MHz based on UK auction (£m/MHz)	na	na	4.95	5.5
STEP 2				
Value of band, % 800 MHz based on European benchmarks (%)	60%	65%		
Y/X ratio to determine value of 1800MHz			22%	27%
Lump sum values based on European benchmarks (£m/MHz)	16.3	21.8	9.2	12.3
STEP 3				
Discount factor for determining ALFs (%)	0.9%	0.9%	0.9%	0.9%
STEP 4				
Annual licence fee (ALF) (£m per MHz pa) before adjusting for coverage obligation*	0.95	1.27	0.54	0.72
STEP 5 (coverage obligation)	900 & 1800 Low		900 & 1800 High	
Aggregate lump-sum value of Telefónica's holdings (£m) <i>before</i> adjusting for coverage obligation	674.5		899.9	
Estimated value impact per operator associated with coverage obligation	96		96	
Aggregate lump-sum value of Telefónica's holdings (£m) <i>after</i> adjusting for coverage obligation	578.5		803.9	
Annual licence fee (ALF) (£m pa)**	33.8		46.9	
Reduced ALF until end-2017 (£m pa)***	24.7		31.3	

Source: Telefónica calculations as set out in this response and our response to the August 2014 Consultation.

*Low 800MHz excludes Ofcom premium for DTT costs; **Calculated using the formula in Ofcom, August 2014 consultation, para. 4.38, with a TAF of 1.08, before adjustment for inflation indexation.; ** *Same formula, but with 50% reduction in difference between current fees and the new ALFs for phase-in period.

ANNEX I

RESPONSE TO OFCOM COMMENTS ON NERA’S REPORT ON DERIVING ALFS FROM LUMP SUM VALUATIONS

187. We asked Jonathan Falk and Richard Marsden of NERA Economic Consulting to set out their response to Ofcom comment on their report, “Deriving ALFs from Lump Sum Valuations”, which was submitted as part of our response to the August 2014 consultation. This is attached as Annex I to our response.

ANNEX II

PRICE DISTORTION IN COMBINATORIAL CLOCK AUCTIONS, A THEORETICAL PERSPECTIVE

By Professor Maarten Janssen, University of Vienna

188. We asked Professor Maarten Janssen to explain the incentives for strategic bidding in Combinatorial Clock Auctions (CCAs) from a theoretical perspective, and explain how these incentives may affect outcomes, including relative prices across bands.

ANNEX III

PRICE DISTORTION IN COMBINATORIAL CLOCK AUCTIONS, A BIDDER PERSPECTIVE

**By Richard Marsden, Senior Vice President, Auctions & Market Design
and Dr Soren Sorensen, Vice President, Auctions & Market Design
NERA Economic Consulting**

189. We asked Richard Marsden and Dr Soren Sorensen to explain the incentives for strategic bidding in Combinatorial Clock Auctions (CCAs) from a bidder perspective, and explain how these incentives may affect outcomes, including relative prices across bands.

ANNEX IV

ANNUALISATION

190. We asked a NERA team led by Tomas Haug to review Ofcom's revised proposal for determining the discount rate for conversion of ALF lump sums to annual fees.

ANNEX V

RESPONSE TO CONSULTATION QUESTIONS

1. Please find here our responses to the specific questions raised in the consultation document:

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

No. We think that Ofcom's approach is wrong, for three reasons.

Firstly, by Ofcom's own admission, the coverage obligation will impose substantial costs on holders of 900 MHz and 1800 MHz spectrum, and this does affect the overall market value of this spectrum.

Secondly, given the nature of the obligations, Ofcom should focus on the value impact if a new operator were to acquire the spectrum as a whole with the obligation attached, rather than the value of transferring a marginal unit of spectrum to another operator with the obligation.

Thirdly, if no adjustment were made, this would result in the destruction of enterprise value for each MNO, a development that we believe was never the Secretary of State's intention when brokering the coverage obligation agreement.

We refer Ofcom to Section VII, Parts A - C of this response for further information.

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

No. We refer Ofcom to Section VII of this response.

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

We refer Ofcom to Section VII, Part D of this response.

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

Based on information from the UK auction, we conservatively estimate the generic cost for an operator of meeting the voice coverage obligation at £96m. We propose that this amount be discounted from each operator's lump sum value for their aggregate holdings of 900 MHz and 1800 MHz, before annualisation. Spreading the rebate of fees over the 20-year licence term effectively removes any concerns about temporary distortions to the enterprise value of MNOs owing to the partial sunk cost nature of the coverage obligation.

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

Please see Section VII of this response for a broad discussion of the issues.