Three's response to Ofcom's Consultation on proposed annual licence fees for 2100MHz spectrum

Non-confidential

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Executive Summary

Three welcomes the opportunity to respond to Ofcom's Consultation on proposed Annual Licence Fees (ALFs) for 2100MHz spectrum.

As we explained at length in response to Ofcom's Consultation on 900MHz and 1800MHz ALFs, we believe Ofcom has not made a convincing case for applying ALFs to spectrum that is freely tradeable. Ofcom's rationale for applying ALFs on tradable licences is based solely on its view that MNOs 'may be' less responsive to the opportunity cost (foregone revenues) of holding spectrum than to ALFs.

On this basis alone, Ofcom already imposes an ALF bill of £250m on the UK mobile industry and the proposed 2100MHz ALFs would increase this by £70m. However, MNOs are equally responsive to opportunity cost, so ALFs are at best redundant and at worst harmful to the efficient use of spectrum. Ofcom should therefore either evidence its assertion that MNOs are less responsive to opportunity cost or drop it.

In any event, we believe that Ofcom's proposed ALFs for the 2100MHz unpaired spectrum are inappropriate. Ofcom should not apply an ALF to Three's spectrum in the unpaired band (1914.9-1920MHz), as our block will necessarily be a guard band between paired and unpaired 2.1GHz spectrum – no mobile use is possible.

We then explain that Ofcom has significantly overestimated the UK value of the 2100MHz paired spectrum. Ofcom includes several distance method benchmarks that we do not think are appropriate and fails to give proper weight to the Netherlands benchmarks. We believe that applying Ofcom's same reasoning to a corrected set of distance method benchmarks suggests that the UK value of 2100MHz spectrum is £8.5m-£9m per MHz instead of the £10.5m per MHz proposed by Ofcom. In order to be truly conservative, given the asymmetric risk when setting ALFs, we believe Ofcom should value the 2100MHz paired spectrum at no more than £8.5m per MHz for the purpose of setting the ALF.

Lastly, we propose some adjustments to the Annualisation Rate, which converts the estimated lump-sum value of the 2100MHz spectrum to ALF payments. We explain that Ofcom's proposed lower and upper polar cases are too high, and that in any case no risk-sharing adjustment should be applied in this instance because there are no more relevant spectrum auctions expected to take place in the foreseeable future in the UK. We believe the appropriate Annualisation Rate to be 4.61% instead of the 5.4% proposed by Ofcom.

Though not the focus of this Consultation, we reiterate that Ofcom should now consult on reducing 3.4-3.8GHz ALFs payable on UKB's spectrum. Ofcom's policy is to revise ALFs if there is evidence of a likely and material misalignment. As we have previously explained to Ofcom, the recent 700MHz and 3.6GHz auction has revealed a very material misalignment between the lump-sum value on which 3.4-3.8GHz ALFs are based (£40m per 5MHz in today's prices) and the opportunity cost of the spectrum revealed by the auction (£20m per 5MHz). We explain why Ofcom should now reduce the lump-sum value on which ALFs are based to £20m per 5MHz to promote the efficient use of spectrum and promote potential trades in the 3.4-3.8GHz band.

Contents.

1. Ofcom has not made a convincing case for applying ALFs to 2100MHz spectrum.

Summary

1.1. In this Section, we explain that Ofcom has not made a convincing case for applying ALFs to 2100MHz spectrum. Ofcom wrongly presumes that MNOs may be less responsive to opportunity cost than to ALFs. Ofcom must either robustly evidence this assertion or drop it, as it alone is responsible for an annual bill of over £250m on the UK mobile industry, and the proposed 2100MHz ALFs would increase this by approximately £70m.

1.2. For spectrum that can be freely traded, such as the 2100MHz paired and unpaired spectrum, ALFs are at best redundant (if set at or below market value) and at worst harmful (if inadvertently set above market value). Even without ALFs, tradable spectrum will find its way to the highest-value users, which have an incentive to make the most efficient use of it. Taken together, these two factors ensure the efficient use of spectrum without ALFs.

Ofcom wrongly presumes that MNOs may be less responsive to opportunity cost than to ALFs

1.3. Ofcom's Strategic Review of Spectrum Pricing (SRSP)[1] considers two circumstances where secondary markets may not provide sufficient incentives for the optimal use of spectrum:

- Where trading is limited by barriers such as transaction costs, coordination problems and/or a lack of price information; and
- Where licensees are more responsive to ALFs than to the possibilities offered by trading (opportunity cost).

1.4. As we explained at length in our response to Ofcom's Consultation on 900MHz and 1800MHz ALFs[2], Ofcom's rationale for applying ALFs only follows from its presumption that MNOs may be less responsive to opportunity cost (foregone revenues) than to ALFs. On this presumption alone, Ofcom already imposes an annual bill of £250m on MNOs and Ofcom's proposed 2100MHz ALFs would increase this by a further £70m per year.[3]

1.5. Ofcom has relied on insufficient and flawed evidence to conclude that MNOs may be less responsive to opportunity cost. Ofcom's view is based on one MNO's confidential submission in response to a 2014 Consultation, in which it warned of price increases and delayed investment if ALFs increased. Ofcom cannot simply rely on a priori reasoning, particularly when its conclusions are contrary to generally accepted economic principles, impose enormous costs on the mobile industry and actually risk harming the efficient use of spectrum (as has happened in the 3.4-3.8GHz band, see Section 5).

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[1] https://www.ofcom.org.uk/__data/assets/pdf_file/0024/42909/srsp-statement.pdf
[2] https://www.ofcom.org.uk/__data/assets/pdf_file/0025/119293/Three.pdf
[3] ALFs for 900MHz, 1800MHz and 3.4-3.8GHz ALFs are £254m in April 2021 prices. Ofcom's proposed 2100MHz ALFs are £67.5m in April 2021 prices.

1.6. Ofcom must either drop this presumption or sufficiently evidence it, e.g. by using its formal information-gathering powers to look at MNOs' internal documents and test the hypothesis that mobile managers face stronger pressure to reduce operating budgets (including ALFs) than to realise untapped revenues (including the opportunity cost of their spectrum holdings).

For spectrum that can be freely traded, ALFs are at best redundant and at worst harmful regarding the efficient use of spectrum

1.7. If MNOs are fully responsive to the opportunity cost of their spectrum holdings (as we believe they are) then ALFs are at best redundant (if set at or below market value) and at worst harmful (if set above market value) to the efficient use of spectrum:

- ALFs set at or below market value will not improve the efficient use of spectrum, because trading alone will ensure spectrum is held by the highest-value users. Instead, they will only serve to extract revenue (which is not one of Ofcom's objectives in setting ALFs); and

- ALFs set above market value will harm the efficient use of spectrum because licensees will return the spectrum to Ofcom (as there would be no willing buyers).

1.8. Even without ALFs, tradeable licences such as those for the 2100MHz paired and unpaired spectrum held by MNOs will find their way to the highest-value users. With only four MNOs, trading of mobile licences cannot be said to be limited by transaction costs, coordination problems and/or a lack of price information. Further, MNOs have incentives to make the best possible use of their spectrum holdings, as Ofcom previously accepted in its 2018 Statement on 900MHz and 1800MHz ALFs.[4] These two factors combined ensure that spectrum is used in the most efficient way without any ALFs.

1.9. This is supported by empirical examples:

- BT's recent sale of 2.6GHz TDD spectrum to Telefonica UK;

- MNOs have been actively trying to trade licences within the 3.4-3.8GHz band – ahead of the 700MHz and 3.6GHz auction, during the auction itself (in the Negotiation Phase) and following the auction. Three in particular has been open to trade and has held commercial discussions with [✂]; and

- Qualcomm's sale of 1400MHz spectrum to Three and Vodafone UK – Qualcomm purchased the spectrum in an auction in 2008, intending to use the spectrum for media broadcasting. It subsequently found the deployment of a media broadcasting network in the UK not to be commercially viable. The band was then harmonised to be used for mobile as Supplemental Downlink (SDL) and so a greater value use case appeared. Qualcomm responded to this opportunity cost by putting its spectrum on the market and selling it to Three and Vodafone in 2015.

[4] Para 5.35, https://www.ofcom.org.uk/__data/assets/pdf_file/0020/130547/Statement-Annual-licence-fees-900-MHz-and-1800-MHz.pdf

2. No ALF should apply to our unpaired 2100MHz spectrum at 1914.9-1920MHz.

2.1. Ofcom said in its 700MHz and 3.6GHz Auction Statement (2020) that the 2100MHz unpaired spectrum was "*unlikely to be able to be used for high power macro sites in practice due to compatibility with the adjacent uplink band of the paired 2100 MHz spectrum*".[5]

2.2. We are therefore very surprised that Ofcom now believes that the band could be used in a similar way to 2.3GHz and proposes to apply ALFs from 1 January 2022. Ofcom's SRSP (Principle 3) explains that ALFs should apply only to spectrum that is "*expected to be in excess demand from existing and/or feasible alternative uses, in future, if cost-based fees were applied*."[6]

2.3. This clearly does not apply to our spectrum block at 1914.9-1920MHz:

- The only way that the 2100MHz unpaired band can be used for high-power mobile TDD (as Ofcom envisages) is if our block at 1914.9-1920MHz is unused, i.e. kept as a guard band. Our 5.1MHz cannot be used because the downlink would cause interference with Three's uplink in the 2100MHz paired spectrum; and
- [✂].

2.4. This is similar to the 700MHz and 2.6GHz bands:

- In the 700MHz band there is a 5MHz guard band between the 700MHz SDL (downlink) spectrum and the uplink frequencies of the 700MHz paired spectrum[7]; and
- In the 2.6GHz band Vodafone's TDD spectrum (2570-2595MHz) sits next to EE's 2.6GHz FDD spectrum (2640-2690MHz downlink paired with 2520-2570MHz uplink). We understand that RAN vendor equipment does not cover the 5MHz from 2570-2575MHz (i.e. this 5MHz is a guard band).

2.5. Therefore, we believe that there is no case to apply an ALF on our block at 1914.9-1920MHz, as the block will not be subject to excess demand now or in the future.

[5] Para A4.59, https://www.ofcom.org.uk/__data/assets/pdf_file/0017/192410/annexes-award-700mhz-3.6-3.8ghz-spectrum.pdf
[6] Para 4.158, https://www.ofcom.org.uk/__data/assets/pdf_file/0024/42909/srsp-statement.pdf
[7] Figure 2.1, https://www.ofcom.org.uk/__data/assets/pdf_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf

3. Ofcom has significantly overestimated the UK value of 2100MHz paired spectrum.

Summary

3.1. In this Section, we explain how Ofcom has significantly overestimated the UK value of the 2100MHz paired spectrum. We believe that Ofcom has used an incorrect set of distance method benchmarks and has also failed to take a truly conservative interpretation of them.

3.2. Ofcom should disregard any distance method benchmarks that use the UK 3.4GHz (2018) price, which is now superseded by the 3.6GHz (2021) price. Ofcom should also disregard any distance method benchmarks that use the German and Slovenian 700MHz prices, as these are unreliable benchmarks. In both of these countries, the 2100MHz paired spectrum sold for more than the 700MHz spectrum, which is non-sensical as it would imply that the UK value of 2100MHz paired spectrum is higher than the UK value of the 700MHz spectrum.

3.3. Ofcom should give the Netherlands distance method benchmarks (where Ofcom had to proxy the high-frequency prices of 2.3GHz, 2.6GHz and 3.4-3.8GHz) the same weight as other Tier 1 benchmarks. In estimating the UK value of 1800MHz spectrum, Ofcom used the distance method analysis with 800MHz and 2.6GHz spectrum, and for two countries had to proxy the 2.6GHz price. Ofcom however gave these benchmarks the same weight as its other Tier 1 benchmarks. The Netherlands benchmarks all point to a UK value of 2100MHz paired spectrum below the £10.5m per MHz proposed by Ofcom.

3.4. Ofcom exercises considerable regulatory judgement in interpreting the distance method benchmarks. We believe that using Ofcom's same reasoning but applied to a corrected set of benchmarks would suggest that the UK value of 2100MHz spectrum is £8.5m to £9m per MHz.

3.5. To be truly conservative, given the asymmetric risk of setting ALFs below or above market value, we believe Ofcom should value the 2100MHz spectrum at no more than £8.5m per MHz for the purposes of imposing any ALFs.

Ofcom should disregard distance method benchmarks that use the UK 3.4GHz (2018) price and those based on the German and Slovenian 700MHz prices

3.6. When considering its Tier 1 distance method benchmarks, Ofcom considers that the 2100MHz paired spectrum would be "*unlikely to be valued at significantly more than*" the UK 700MHz price of £14.1m per MHz and "*unlikely to be valued at significantly less than*" the UK 3.4GHz price of £7.9m per MHz.[8]

3.7. As we explain in Section 5, bids and values in the UK 2018 3.4GHz auction were dependent on assumptions about the outcome of the subsequent 3.6GHz auction (which awarded further spectrum in the band). The UK 3.6GHz auction from 2021 gives the best and most recent evidence on the current UK value of

[8] Para 4.19, https://www.ofcom.org.uk/__data/assets/pdf_file/0032/221999/1900_2100-mhz-condoc.pdf

3.4-3.8GHz spectrum on a forward-looking basis, and so we believe that Ofcom should disregard any benchmarks that use the UK 3.4GHz price.

3.8. We therefore believe that the UK value of 2100MHz paired spectrum is likely to be between the UK 3.6GHz price of £4.2m per MHz and the UK 700MHz price of £14.1m per MHz and that Ofcom should disregard any distance method benchmarks that suggest a value outside of this range, including the German and Slovenian benchmarks that use the 700MHz price.[9]

3.9. In both Germany and Slovenia, the 2100MHz paired spectrum sold for more than the 700MHz spectrum (in Slovenia it sold for 11% more). As a result, Ofcom calculates Y/X ratios of more than 100% for these distance method benchmarks, which when applied to UK spectrum values imply that the UK value of 2100MHz paired spectrum would be higher than £14.1m per MHz (the UK 700MHz price). These are clearly unreliable benchmarks because there is no reason for believing that the UK value of 2100MHz paired spectrum would exceed the UK value of 700MHz spectrum, and as such we believe that Ofcom should place no weight on these benchmarks.

Ofcom should give the Netherlands proxy values the same weight as other Tier 1 benchmarks, consistent with its approach in its 900MHz and 1800MHz Statement

3.10. In Ofcom's Consultation on 2100MHz ALFs, Figure 4.1 only shows the Tier 1 countries where Ofcom has been able to calculate auction prices for all three bands: low-frequency spectrum, the 2100MHz paired spectrum and high-frequency spectrum.

3.11. Ofcom does not have high-frequency spectrum prices for the Netherlands, so estimated proxy values for 2.3GHz, 2.6GHz and 3.4-3.8GHz and then used these proxy values as part of the distance method calculation.[10] Ofcom appears to use the benchmarks in its Figure 4.1 (without the Netherlands) as the core basis for its analysis.

3.12. The distance method benchmarks from the Netherlands range from £7.2m per MHz to £10.4m per MHz, with an average of £9.1m per MHz. Ofcom notes that this evidence "*points to a lump-sum value estimate of UK 2100 MHz below £10.5m per MHz*," but nevertheless proposes a lump-sum value estimate of £10.5m per MHz.[11]

3.13. This approach suggests that Ofcom has not given full Tier 1 weight to benchmarks originating from the Netherlands. If so, this would be inconsistent with the approach Ofcom adopted when using the 800MHz-2.6GHz distance method to estimate the UK value of 1800MHz spectrum. Ofcom included in its core analysis two countries where the 2.6GHz value was proxied (Ireland and Sweden) and appeared to give them the same weight as other Tier 1 countries where it had clear prices for both the 800MHz and 2.6GHz spectrum. This is shown by Figure 4.2 from Ofcom's 1800MHz ALF Statement and Table A1.2 from the Annexes to the Statement, which we show below.[12]

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[9] After disregarding benchmarks using the UK 3.4GHz (2018) price, there are four benchmarks remaining that use the German or Slovenian 700MHz prices, which we believe should also be disregarded.

[10] Ofcom estimates ranges of proxy values for each of the 2.3GHz, 2.6GHz and 3.4-3.8GHz, which then results in ranges for the implied UK value of 2100MHz paired spectrum via the distance method.

[11] Para 4.42, https://www.ofcom.org.uk/__data/assets/pdf_file/0032/221999/1900_2100-mhz-condoc.pdf

[12] Figure 4.2, https://www.ofcom.org.uk/__data/assets/pdf_file/0020/130547/Statement-Annual-licence-fees-900-MHz-and-1800-MHz.pdf and Table A1.2, https://www.ofcom.org.uk/__data/assets/pdf_file/0021/130548/Annexes-1-6.pdf

Figure 4.2: 1800 MHz distance method benchmarks in £m per MHz

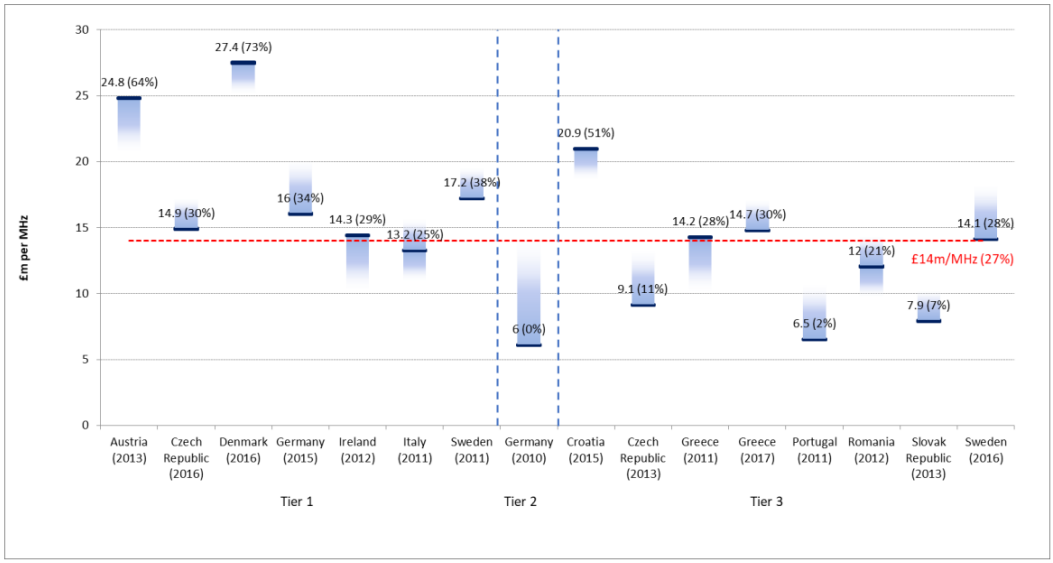


Table A1.2: Timing of 1800MHz, 800MHz and 2.6GHz auctions used to construct the distance method[9]

Tier	Country	800 MHz	1800 MHz	2.6 GHz	Max gap between auctions
1	Austria (2013)	10/13	10/13	10/10	36 months
	Czech Republic (2016)	11/13	6/16	6/16	31 months
	Denmark (2016)	6/12	9/16	5/10	76 months
	Germany (2015)	5/10	6/15	5/10	61 months
	Ireland (2012)	11/12	11/12	Proxy[10]	No gap
	Italy (2011)	9/11	9/11	9/11	No gap
	Sweden (2011)	3/11	10/11	Proxy	7 months

3.14. Ofcom should therefore give the Netherlands distance method benchmarks the same weight as the other Tier 1 benchmarks. However, consistent with what we have explained in paras 3.7 and 3.8, Ofcom should not include the Netherlands distance method benchmark that uses the UK 3.4GHz price (which implies a UK 2100MHz paired value of £9.8m-£10.4m per MHz). The relevant benchmarks from the Netherlands are therefore:

- 700MHz-2.3GHz (proxy): £8.5m-£9.2m per MHz;
- 700MHz-2.6GHz (proxy): £9.2-£10m per MHz; and
- 700MHz-3.4/3.8GHz (proxy): £7.2m-£8.2m per MHz (UK 3.6GHz price).

3.15. The average of the relevant Netherlands distance method benchmarks is therefore even lower than the £9.1m per MHz Ofcom refers to. Taking a simple midpoint of the above ranges (due to the ranges in the proxied high-frequency prices) implies an average UK 2100MHz paired value of £8.7m per MHz.[13]

[13] Average of £8.9m (700MHz-2.3GHz proxy), £9.6m (700MHz-2.6GHz proxy) and £7.7m (700MHz-3.4/3.8GHz proxy).

By using a corrected set of benchmarks, we believe that Ofcom's reasoning would suggest the UK value of 2100MHz paired to be £8.5m-£9m per MHz

3.16. Ofcom uses considerable regulatory judgement in reaching a provisional view on the UK value of 2100MHz paired spectrum, which it believes to be conservative (due to the asymmetric risks of setting ALFs below or above market value). We first attempt to replicate Ofcom's reasoning set out in the Consultation but applied to our view on the relevant distance method benchmarks.

3.17. Ofcom explains that its proposed value of 2100MHz paired spectrum (£10.5m per MHz) is 28% less than its estimated 1800MHz value (£14.6m per MHz in today's prices). Ofcom notes that this is a "*fairly significant difference for what we consider to be similar spectrum bands*".[14] However, we believe that the 1800MHz price has been shown to be overvalued following the 700MHz auction price of £14.1m per MHz, potentially significantly, and as such we do not believe this should impose a constraint on Ofcom's proposed value of the 2100MHz paired spectrum.

3.18. Table 1 below sets out Ofcom's reasoning relating to its Tier 1 benchmarks and our view on how Ofcom would apply this same reasoning to our view on the relevant benchmarks. We believe that were Ofcom to adopt our view on the relevant benchmarks, it would value the 2100MHz spectrum at between £8.5m and £9m per MHz.

3.19. Ofcom does not refer to the median but we note that the median of its proposed Tier 1 benchmarks (excluding the Netherlands) is £10.6m per MHz, almost identical to the £10.5m per MHz value that Ofcom has proposed. When using our view on the relevant distance method benchmarks, we calculate a median of £8.7m per MHz.

[14] Para 4.55: https://www.ofcom.org.uk/__data/assets/pdf_file/0032/221999/1900_2100-mhz-condoc.pdf

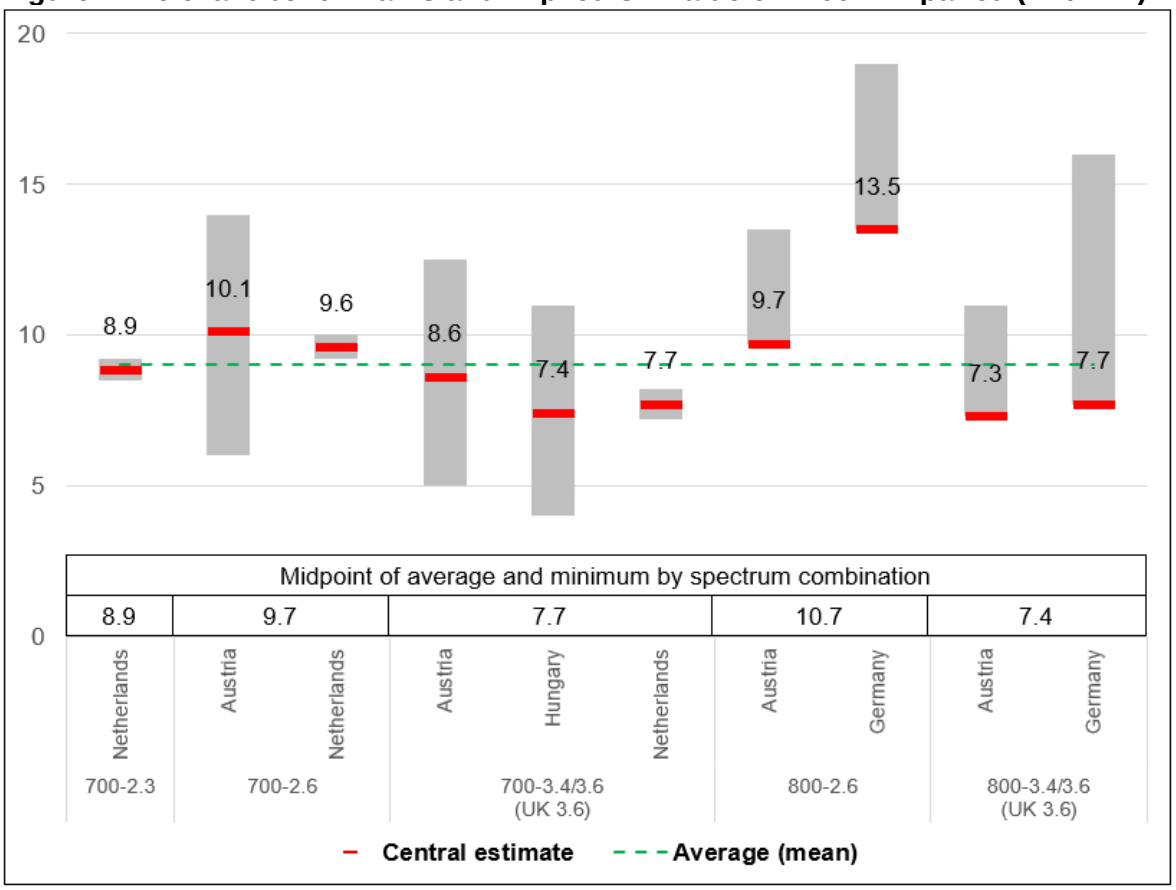
Table 1: Ofcom's reasoning applied to our view of the relevant distance method benchmarks

	Ofcom's proposal	Our view
Relevant benchmarks	All Tier 1 benchmarks excluding the Netherlands proxies	Adjustments: • Remove benchmarks that use UK 3.4GHz price • Remove German and Slovenian benchmarks that use 700MHz price • Treat Netherlands proxies the same as other Tier 1 benchmarks
Likely range	£7.9m (3.4GHz) to £14.1m (700MHz)	£4.2m (3.6GHz) to £14.1m (700MHz)
Relationship to UK 1800MHz paired value	Expect 2100MHz to be "*relatively close*" to 1800MHz	Ofcom's estimate of 1800MHz value (£14.6m) is overstated, potentially significantly
Large majority of benchmarks	13 of 17 are >£9.5m	6 of 10 are >£8.5m
Average (mean)	£11.5m	£9.0m
Median	£10.6m (note: Ofcom does not mention this)	£8.7m
Midpoint of av. and min. by spectrum combination	• 4 of 7 midpoints are £10.5m-£11.5m • £10.5m is < 6 of 7 combinations	• 3 of 5 midpoints are £7.4m-£8.9m • £8.5m is < 3 of 5 combinations
Value below majority of observations	£10.5m	£8.5m (highest possible value that remains below most observations)
UK 2100MHz paired value per MHz	**£10.5m**	**£8.5m-£9.0m**

3.20. In Figure 1 below, we show our view on the relevant distance method benchmarks.[15] We show Ofcom's central estimates and Ofcom's assessment of the likelihood or scale of possible under- or over-statement (as per Ofcom's Figure 4.1). We also show the simple average (mean) of £9m per MHz and the "lower midpoint" for each spectrum combination. The lower midpoint is calculated as per Ofcom's approach, equal to halfway between the average and lowest value within each spectrum combination, e.g. 700MHz-2.6GHz.

[15] We have disregarded any distance method benchmarks that use the UK 3.4GHz (2018) price, as well as German and Slovenian benchmarks that use the 700MHz price. We have included the Netherlands proxy values (except the one using the UK 3.4GHz price).

Figure 1: Relevant benchmarks and implied UK value of 2100MHz paired (£m/MHz)



Source: Benchmarks shown as described in paras 3.6 to 3.14. Average (mean) of £9.0m.

We believe that a truly conservative estimate of the UK value of 2100MHz paired spectrum is no higher than £8.5m per MHz

3.21. Ofcom explains that it takes a conservative approach to interpreting the distance method results to reflect the asymmetric risk regarding the effects on the efficient use of spectrum from inadvertently setting ALFs either below or above market value, given the uncertainty on the correct estimate of market value.

3.22. We believe that to be truly conservative and because of the new evidence of 3.4-3.8GHz ALFs harming trades, Ofcom should estimate the UK value of 2100MHz paired spectrum to be no more than £8.5m per MHz for the purpose of imposing any ALFs. As explained above in para 3.17, Ofcom should not allow the 1800MHz UK value (£14.6m per MHz in today's prices) to constrain its view on the 2100MHz paired value, and should instead adopt a conservative approach in interpreting the relevant distance method benchmarks.

4. Ofcom should use a lower Annualisation Rate.

Summary

4.1. In this Section, we explain how Ofcom should use a lower Annualisation Rate, which converts Ofcom's estimate of the lump-sum value of the spectrum to annual payments.

4.2. Firstly, Ofcom incorrectly rounds some of the inputs into the Annualisation Rate calculation. Instead, Ofcom should use the unrounded inputs and only apply rounding once the ultimate Annualisation Rate is calculated.

4.3. Secondly, Ofcom's lower polar case (based on the pre-tax nominal cost of debt from 10-year BBB bonds) is too high. ALF payments are less risky than debt interest payments (because ALFs must be paid before debt payments) and ALFs are secured debts, where government can recover the market value of the spectrum if an MNO defaults (by recovering and auctioning the spectrum). As a result, Ofcom should reduce its pre-tax nominal cost of debt, which would result in a lower post-tax real cost of debt.

4.4. Thirdly, Ofcom should deduct the inflation risk premium and the liquidity risk premium from the upper polar case (real post-tax WACC) for the same reasons that it deducts them from the lower polar case. ALF payments are increased in line with inflation so the government bears no inflation risk and as Ofcom explains when considering the lower polar case, there is no prospect of the government selling the ALF payment stream so it does not require any compensation for liquidity risk.

4.5. We then explain that Ofcom should not apply a 25% risk-sharing adjustment to estimate a real post-tax discount rate between the lower and upper polar cases. The proposed 25% adjustment is carried over from Ofcom's 2015 Statement on 900MHz and 1800MHz ALFs, but there is now no prospect of future UK spectrum auctions (of relevant spectrum) that could cause Ofcom to review ALFs. Unless Ofcom can demonstrate why such an adjustment is appropriate in these specific circumstances, Ofcom should not apply any adjustment and the real post-tax discount rate should be equal to the post-tax real cost of debt estimated in the lower polar case.

4.6. Finally, we explain that as a result of the adjustments we have set out, we believe the appropriate Annualisation Rate is 4.61% instead of the 5.4% proposed by Ofcom.

Ofcom incorrectly rounds the inputs into the Annualisation Rate

4.7. Notwithstanding our view that Ofcom has miscalculated some of the inputs that feed into the calculation of the Annualisation Rate (discussed below in paras 4.11 to 4.26), we believe Ofcom's process of calculating the Annualisation Rate is flawed because it rounds some of the inputs that feed into the calculation:

- Post-tax real cost of debt: Ofcom estimates a pre-tax nominal cost of debt of 1.3% and then reduces this by the corporation tax rate of 24.9%. This should result in a post-tax nominal cost of debt of 0.976% but Ofcom rounds this to 1%. This then affects the post-tax real cost of debt, which is 2% lower

due to CPI inflation: the rate should be minus 1.024% but Ofcom uses minus 1%; and

- Post-tax real discount rate (r): Replicating Ofcom's calculation (even with Ofcom's rounded estimate of the post-tax real cost of debt (minus 1%) results in a post-tax real discount rate (r) of 0.15%, but Ofcom rounds this to 0.2%.

4.8. As a result, Ofcom calculates the Annualisation Rate to be 5.4%. We believe that Ofcom should use the unrounded post-tax real cost of debt (minus 1.024%) which would result in a post-tax real discount rate (r) of 0.132%. Ofcom should then use this post-tax real discount rate (r) of 0.132% in its Tax Adjustment Factor model, which would reduce the Tax Adjustment Factor from 1.06 to 1.058.

4.9. After making these adjustments, the Annualisation Rate would be calculated to be 5.36% to two decimal places. This level of precision would be consistent with the Annualisation Rate set for 900MHz, 1800MHz and 3.4-3.8GHz ALFs, which was 5.75%.[16]

4.10. In Table 2 below, we show the effect of the above changes.

Table 2: Impact of rounding on the Annualisation Rate

	Ofcom's proposal	**Without rounding**
Post-tax real cost of debt	-1%	-1.024%
Post-tax real discount rate (r)	0.2%	0.132%
TAF	1.06	1.058
Annualisation Rate	5.4%	5.36%

Ofcom's proposed lower polar case (based on the cost of debt) is too high because ALF payments are less risky than debt payments and are secured debt

4.11. In the lower polar case, MNOs bear the full risk associated with changes in the market value of spectrum: government would always receive the same ALF revenue streams regardless of any changes in the market value of the spectrum. In this scenario, ALFs would be akin to the repayment of a loan from government to the MNO.

4.12. For this lower polar case, Ofcom estimates the post-tax real cost of debt by:

- Observing the pre-tax nominal cost of debt on a 10-year BBB bond index (1.9% for the year to October 2020 as part of its WFTMR Statement[17]);
- Deducting 0.1% (inflation risk premium) and 0.5% (liquidity risk premium), resulting in a pre-tax nominal cost of debt of 1.3%; and
- Removing corporation tax at 24.9% and then removing CPI of 2%, resulting in a post-tax real cost of debt of -1%.

4.13. We believe that the pre-tax nominal cost of debt (based on from Bloomberg's BVCSGU10 Index) is not appropriate when considering ALF payments because:

[16] Para 3.47, https://www.ofcom.org.uk/__data/assets/pdf_file/0013/151231/statement-annual-licence-fees-uk-3.4-ghz-and-3.6-ghz-spectrum.pdf
[17] Para A20.92, https://www.ofcom.org.uk/__data/assets/pdf_file/0021/216084/wftmr-statement-annexes-1-26.pdf

- ALF payments are less risky than debt interest payments because MNOs must first pay ALFs before debt interest payments (i.e. ALFs are a prior claim on MNOs' cashflows to debt interest payments); and

- ALF payments are secured debt because government is able to recover the market value of the spectrum in the event that an MNO defaults, i.e. does not pay its ALFs, by recovering the spectrum and then auctioning it. This offers a level of security that corporate bonds do not.

4.14. The government therefore has more certainty in getting its ALF payments than debt holders have in receiving their interest payments. As a result, Ofcom should use a pre-tax nominal cost of debt strictly lower than that observed by the 10-year BBB bond index. This would then reduce the post-tax real cost of debt after corporation tax and CPI are removed. Ofcom should attempt to quantify the two factors listed above, for example by observing the difference between secured and unsecured debt rates, and converting this into a discount factor that could be applied to the observed pre-tax nominal cost of debt from the bond index.

4.15. We note that in its response to Ofcom's 2018 Consultation on 900MHz and 1800MHz ALFs, NERA (on behalf of Telefonica) suggested a reduction of 0.1% to 0.12% was appropriate to adjust for security.[18] If Ofcom is unwilling or unable to quantify the effect of security using the latest information, Ofcom could use 0.1% as a sensible estimate.

Ofcom should deduct the inflation risk premium and the liquidity risk premium from the upper polar case (real post-tax WACC)

4.16. In the upper polar case, government bears the full risk associated with changes in the market value of spectrum. If ALFs were to vary in line with future post-tax cash flows of MNOs (e.g. through some form of revenue-sharing arrangement between MNOs and government), the government would be fully exposed to the underlying systematic risk resulting from any changes in the value of the spectrum.

4.17. Ofcom estimates this upper polar case using the forward-looking, real post-tax WACC (3.6%) which reflects the riskiness of a UK MNO. However, Ofcom does not apply reductions to the upper polar case as it does in the lower polar case for the inflation risk premium (0.1%) and the liquidity risk premium (0.5%).

4.18. Ofcom's rationale for deducting both the inflation risk premium and the liquidity risk premium both apply equally to the lower and upper polar cases:

- Inflation risk: ALF payments are increased in line with inflation (using the latest CPI data before invoices are sent to MNOs) so the government bears no inflation risk; and

- Liquidity risk: As Ofcom explains when discussing the lower polar case, there is no prospect of the government re-selling ALF payment streams and so it does not require any compensation for liquidity risk.

4.19. Ofcom should therefore reduce its upper polar case (real post-tax WACC) by 0.6% (the combination of the inflation risk premium and the liquidity risk premium). This would imply an upper polar case of 3%.

4.20. However, as we explain below we believe Ofcom should put no weight on the upper polar case because the prospect of ALFs being revised (due to observed

[18] Para A5.20a, https://www.ofcom.org.uk/__data/assets/pdf_file/0021/130548/Annexes-1-6.pdf

changes in the market value of ALF spectrum) is severely reduced compared to when Ofcom set ALFs for 900MHz/1800MHz and 3.4-3.8GHz spectrum.

Ofcom should not include a risk-sharing adjustment

4.21. Ofcom explains that the discount rate that would leave MNOs indifferent between paying ALFs and paying a lump-sum amount depends on the extent to which they (rather than government) are exposed to the effects of changes in the market value of spectrum over time.

4.22. Ofcom's proposed risk-sharing adjustment of 25% has been carried across from its 2015 Statement on 900MHz and 1800MHz ALFs. Since 2015 there have been two spectrum auctions in the UK. We understand that there are no more auctions planned to take place in the foreseeable future that would be indicative of the market value of current ALF spectrum bands. Ofcom is planning to auction the 26GHz band following a Consultation due to be published later this year, but this is fundamentally different spectrum which will not give any information regarding the market value of existing ALF spectrum bands.

4.23. While Ofcom always retains the ability to revise ALFs if a material misalignment arises, we believe that there will be no new information on the possible market value of existing ALF spectrum bands that would cause Ofcom to consider revising ALFs in the foreseeable future. While MNOs may trade spectrum between themselves or to other parties, Ofcom's SRSP makes clear that market valuations (whether from auctions or trades) will be "*interpreted with care and not applied mechanically to set AIP fees*".[19]

4.24. Ofcom should therefore set a lower risk-sharing adjustment than that set for the 900MHz/1800MHz and 3.4-3.8GHz ALFs, because the prospect of ALFs changing is much lower. Unless Ofcom can demonstrate why such a risk-sharing adjustment is now appropriate in light of the specific circumstances, we believe no such adjustment should be made, i.e. the real post-tax discount rate should be equal to the post-tax real cost of debt estimated in the lower polar case.

We believe that the appropriate Annualisation Rate is 4.61%

4.25. Ultimately, the Annualisation Rate is calculated using the real post-tax discount rate (r) and the Tax Adjustment Factor (TAF). As we have explained above, we believe Ofcom should adjust several of the inputs that feed into real post-tax discount rate (r), which then also affect the Tax Adjustment Factor. We also believe Ofcom should not apply any rounding except to the ultimate Annualisation Rate.

4.26. In Table 3 below, we set out Ofcom's proposals as well as our view on how the Annualisation Rate should be calculated. As a result, we believe the appropriate Annualisation Rate is 4.61% instead of the 5.4% proposed by Ofcom.

[19] AIP Principle 8, page 71, https://www.ofcom.org.uk/__data/assets/pdf_file/0024/42909/srsp-statement.pdf

Table 3: Comparison of Ofcom's proposed Annualisation Rate and our view

		Ofcom's proposal	Our view
Upper polar case (post-tax real WACC)		3.6%	3% (paras 4.16 to 4.20)
Lower polar case (post-tax real cost of debt)	Pre-tax nom. cost debt	1.3%	1.2% (paras 4.11 to 4.15)
	Post-tax nom. cost debt	1%	0.901% (due to lower pre-tax nom. cost debt)
	Post-tax real cost debt	-1%	-1.099% (after 2% CPI)
Risk-sharing adjustment		25%	0% (paras 4.21 to 4.24)
Real post-tax discount rate (r)		0.2%	-1.099% (equal to lower polar case)
Tax-adjustment factor (TAF)		1.06	1.027 (due to lower "r")
Annualisation Rate		5.4%	4.61%

5. Ofcom should reduce UKB's 3.4-3.8GHz ALFs following the 3.6GHz auction.

Summary

5.1. In this Section, we explain why Ofcom should Consult on reducing the existing 3.4-3.8GHz ALFs, following the recent 3.6GHz UK auction in 2021.

5.2. As explained in Ofcom's Strategic Review of Spectrum Pricing (SRSP), Ofcom's policy is to revise ALFs if a material misalignment arises. This was re-iterated in Ofcom's Statement ahead of the 700MHz and 3.6GHz auction, in which it said it could not preclude revisiting 3.4-3.8GHz ALFs after the 3.6GHz auction if a material misalignment occurred.

5.3. The recent 3.6GHz auction has revealed a very material misalignment between ALFs and the opportunity cost of the spectrum. Current ALFs are based on a lump-sum value of £40m per 5MHz in today's prices, equal to the market-clearing price from the 3.4GHz (2018) auction. However, the market-clearing price for 3.6GHz in the recent auction was between £21m and £22.05m per 5MHz, and the opportunity cost can be inferred as £20m per 5MHz (based on the value that MNOs expressed for additional spectrum above and beyond the 80-90MHz they each now have in the band).

5.4. Ofcom's Statement on 3.4-3.8GHz ALFs raised questions of fairness and discrimination in charging different MNOs different prices for identical spectrum. Ofcom originally proposed to base UKB's ALFs on the marginal opportunity cost to other users, but ultimately set ALFs based on the market-clearing price. This was due to concerns that Three would be receiving a "subsidy" and because Ofcom wanted to put "*all operators on a fair, level playing field*". For the same reason, charging Three a much higher fee than the larger MNOs have just paid in the recent 3.6GHz auction for equivalent spectrum would not be fair and would raise questions of discrimination.

5.5. Moreover, the current level of ALF payable in the 3.4-3.8GHz band (and significant uncertainty on the future level) is preventing potential spectrum trades that would help defragment the band. Ofcom should therefore reduce the lump-sum value on which 3.4-3.8GHz ALFs are based to £20m per 5MHz, to promote the efficient use of spectrum consistent with the policy set out in the SRSP, and also to facilitate potential trades in the band.

Ofcom's policy is to revise ALFs if a material misalignment arises and Ofcom could not preclude a revision of 3.4-3.8GHz ALFs following the 3.6GHz auction

5.6. Ofcom's ALF policy is set out in its SRSP. The SRSP states that Ofcom will "*propose to conduct a fee review only where the evidence suggests that a review would be justified, including evidence of a likely and sufficiently material misalignment between the current rates and the opportunity cost of the spectrum for fees based on AIP*".[20]

[20] Para 6.30, https://www.ofcom.org.uk/__data/assets/pdf_file/0024/42909/srsp-statement.pdf

5.7. The SRSP states that it is Ofcom's responsibility to monitor changes in spectrum value and that if the value has "*changed substantially in either direction (up or down) compared to the fee set … the appropriate regulatory response is to identify this in a timely fashion and revise the fee levels up or down as appropriate*".[21]

5.8. The 700MHz/3.6GHz auction Statement reiterated that Ofcom "*always retain[s] the ability to revise fees in the future in appropriate circumstances, including after the forthcoming auction of 700 MHz and 3.6-3.8 GHz spectrum, if we consider there is evidence to suggest a revision to fees is warranted*". Ofcom said that it "*cannot preclude that we may need to revisit fees if a material misalignment between fees payable and the value of the relevant spectrum occurs*".[22]

The recent 3.6GHz auction has revealed a very material misalignment between ALFs and the value (opportunity cost) of the spectrum

5.9. The current ALFs in the 3.4-3.8GHz band are based on a lump-sum value of £40m per 5MHz (in today's prices), based on the market-clearing price from the 3.4GHz (2018) auction. The same ALF applies uniformly across Three's 3.4GHz and 3.6GHz spectrum because Ofcom previously found that the long-term value of 3.4GHz and 3.6GHz will be the same on a per-MHz basis.[23]

5.10. However, in the recent 700MHz and 3.6GHz auction, the market-clearing price for the 3.6GHz spectrum was between £21m per 5MHz (the amount paid by EE and O2) and £22.05m per 5MHz (the amount paid by Vodafone). The highest losing bid was Vodafone's bid for a total of 60MHz at a price of £20m per 5MHz. This reveals the next-highest value of Three's spectrum to an organisation other than Three (i.e. the opportunity cost to others), relative to post-auction holdings, to be £20m per 5MHz.

5.11. The recent 3.6GHz auction provides the most direct and recent evidence on the long-term value (opportunity cost) of UKB's spectrum, whereas bids in the 3.4GHz (2018) auction have now been superseded and were dependent on bidders' expectations about the subsequent 3.6GHz auction. There is therefore a very material misalignment between the lump-sum value on which 3.4-3.8GHz ALFs are based (£40m per 5MHz in today's prices) and the opportunity cost of the spectrum (£20m per 5MHz).

Ofcom's Statement on 3.4-3.8GHz ALFs raised questions of fairness and discrimination in charging different MNOs different prices for identical spectrum

5.12. In Ofcom's Consultation on 3.4-3.8GHz ALFs, Ofcom proposed to base UKB's ALFs payable on 3.4-3.8GHz spectrum on the marginal opportunity cost to other users from the 3.4GHz (2018) auction. This was equal to the highest losing bid from an MNO other than Three for more spectrum that it ultimately won in the auction, which was Telefonica's losing bid of £33m per 5MHz in today's prices.

5.13. However, following Consultation responses from other MNOs, Ofcom instead charged ALFs based on the market-clearing price from the 3.4GHz auction (~£40m in today's prices). One MNO commented that Ofcom was proposing to deviate "*from the standard approach of charging the same price for the same thing to all operators*" and Ofcom explained that if Three's ALFs were set below the market-clearing price, Three would pay less than other operators had paid for equivalent spectrum. Ofcom was concerned that this raised questions

[21] Para 4.339, https://www.ofcom.org.uk/__data/assets/pdf_file/0024/42909/srsp-statement.pdf
[22] Paras 5.46 and 5.48, https://www.ofcom.org.uk/__data/assets/pdf_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf
[23] Para 2.12a: https://www.ofcom.org.uk/__data/assets/pdf_file/0013/151231/statement-annual-licence-fees-uk-3.4-ghz-and-3.6-ghz-spectrum.pdf

around discrimination and fairness and also could have an adverse impact on competition, as Three would be considered to be receiving a "subsidy" relative to other operators.[24]

5.14. In its Statement, Ofcom cited its general policy of setting fees which are agnostic to the identity of the licensee and decided to charge ALFs based on the market-clearing price to "*put all operators on a fair, level playing field*".[25] Ofcom considered this to be simpler, fairer and more consistent with the promotion of competition and the efficient and effective management of spectrum.

5.15. For the same reason, charging Three a much higher fee than the larger MNOs have just paid in the recent 3.6GHz auction for equivalent spectrum would not be fair and would raise questions of discrimination, as Ofcom has previously found.

Ofcom should reduce 3.4-3.8GHz ALFs to facilitate spectrum trades within the band

5.16. Ofcom has devoted a lot of effort to facilitating defragmentation within the 3.4-3.8GHz band. Ofcom issued an entire Consultation on the topic[26] and imposed rules and processes in the recent 700MHz and 3.6GHz spectrum auction. In the auction, "small winners" of 3.6GHz had restricted bidding options in the Assignment Stage and Ofcom added a new Negotiation Phase where winners of 3.6GHz spectrum could agree to have their new spectrum adjacent (to facilitate post-auction trades).

5.17. Three remains open to trades that would help defragment the 3.4-3.8GHz band. We can confirm that Three has held commercials discussions [✂] to explore potential spectrum swaps [✂].

5.18. Discussions have stalled, however, due to the ALF currently payable for UKB's 3.4-3.8GHz spectrum [✂] and also uncertainty on the future level of ALF payments, which complicates potential trading discussions:

- There is uncertainty as to whether or not Ofcom will reduce the lump-sum value on which 3.4-3.8GHz ALFs are based, which could approximately halve the future ALF payments if Ofcom used a lump-sum value of £20m per 5MHz from the recent 3.6GHz auction; and
- [✂].

5.19. It has become apparent that no progress is possible unless Ofcom decides to reduce the ALF payable in respect of UKB's spectrum. Ofcom should therefore reduce the lump-sum value on which 3.4-3.8GHz ALFs are based to £20m per 5MHz, both to promote the efficient use of spectrum (consistent with the policy set out in the SRSP to set ALFs which reflect the forward-looking value of the spectrum), and also to facilitate potential trades in the band.

[24] Para 4.46, https://www.ofcom.org.uk/__data/assets/pdf_file/0013/151231/statement-annual-licence-fees-uk-3.4-ghz-and-3.6-ghz-spectrum.pdf
[25] Para 1.5, https://www.ofcom.org.uk/__data/assets/pdf_file/0013/151231/statement-annual-licence-fees-uk-3.4-ghz-and-3.6-ghz-spectrum.pdf
[26] https://www.ofcom.org.uk/__data/assets/pdf_file/0011/152102/consultation-defragmentation-spectrum-holdings.pdf