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Sent by e-mail to:
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Dear David,

Request to review 1800 MHz Annual Licence Fees

We welcome Ofcom's recent statements in its review of ALFs for Government, and at the January Westminster eForum conference, indicating it will review ALFs if there is sufficient evidence of a material misalignment between fees and the underlying market value of the spectrum.

Annex 1 sets out strong evidence that the level of fees charged for the 1800 MHz spectrum is materially misaligned with the current market value of this spectrum given:

- material inconsistencies in relative spectrum fees for different bands today, with 1800MHz fees 49% higher than 2.1GHz;
- significant changes in supply and demand conditions since fees were set;
- the risks to efficient spectrum use, and consumer benefits, from misaligned fees; and
- if left unaddressed, today's distortions are likely to be exacerbated over time.

BT therefore requests a review of the fees for this band. We suggest a pragmatic outcome from that review would align 1800MHz fees with the current 2.1GHz fees. We also ask that Ofcom considers a simplification and rationalisation of future approaches to fee setting, that better fits a changing technology and market environment in the UK. For example, we believe there would be merit in imminent ALFs (e.g. 1.4 GHz ALFs due next year) to be aligned with more recent UK auctions, potentially with a simple cross-check against the most relevant benchmarks elsewhere to avoid UK specific "anomalies", instead of the "distance method."

In the past setting ALFs has been a complex exercise. However, today a combination of factors makes now a good time to align 1800 MHz fees with market value. Specifically:

- We are 5 years into the 1800 MHz ALF term (a formal misalignment review is now permitted).
- Previously benchmarks in other UK bands and from hard to compare overseas auction benchmarks were required to identify market value; whereas today we have a single UK mid-band benchmark based on 2100 MHz ALFs (implemented in 2022).
- Ofcom itself recognises 1800 MHz and 2100 MHz are functionally equivalent, hence there is a good economic argument that 1800 MHz ALFs should be aligned with 2100 MHz ALFs.
- There is no need to set ALFs for key MNO spectrum bands i.e. 800 MHz and 2.6 GHz for another ten years i.e. 2033.
- There is minimal risk to fees in existing AIP band i.e. maritime and private radio where relative prices are already aligned.

We would welcome a conversation with you on the detailed points set out in this letter.

Yours sincerely,

Clive Carter

ANNEX – EVIDENCE TO SUPPORT REQUEST FOR A REVIEW OF 1800 MHz LICENCE FEES DUE TO MATERIAL MISALIGNMENT WITH CURRENT MARKET VALUES

Introduction

BT and Ofcom continue to hold differing views on the continued appropriateness of charging annual licence fees for mobile spectrum based on Ofcom’s estimate of its full market value. Nevertheless, we welcome Ofcom’s recent statements (in its published review of ALFs, January 2024 and at the recent Westminster eForum on 18 January 2024) indicating that it will review ALFs if there is sufficient evidence of a material misalignment between its fees and the underlying market value of the spectrum.

Material inconsistencies in relative spectrum fees point to material misalignment

Regarding the 1800 MHz Band, MNOs are currently¹ paying 49% more for 1800 MHz than they are for 2100 MHz (£1.002m vs £0.671m per MHz) despite the two mid-band frequencies being functionally equivalent according to Ofcom’s own assessment:

“We also expect the value of the paired 2100 MHz spectrum to be relatively close to the value of the 1800 MHz spectrum given both bands are mainstream coverage bands with similar propagation characteristics and established equipment ecosystem”²

MNOs are also paying more for the 1800 MHz than they did to acquire the low frequency 700 MHz band in the most recent UK award in 2021 (Lump Sum Value (LSV) of £17.6m/MHz vs. £16.9m/MHz).³ This is despite the fact Ofcom has recognised that low frequency spectrum is more valuable than mid-band spectrum. For instance, in its 2100 MHz fees consultation Ofcom stated:

“Our expectation is that the value of the paired 2100 MHz spectrum would lie somewhere between the value of the higher frequency spectrum bands and sub-1 GHz spectrum.....”⁴

The misalignment between 1800 MHz and 2100 MHz fees is a result of different estimates of lump sum value (LSV) for the two bands, as well as different annualization rates determined at the time they were each set. The difference in LSV taken on its own, is partly due to use of different UK reference bands and the different sets of international auction benchmarks that were available at the different times they were set.

Ofcom determined the 2.1 GHz LSV at £12.6 million vs £17.6m for 1800 MHz (at December 2023 prices). In other words a 39% higher LSV was estimated for 1800 MHz than was estimated for 2100 MHz only a few years later. This difference in LSV from reference UK auctions (blue bars), and

¹Fees applicable as of present date as set out in relevant statutory instruments (for 1800 MHz see <https://www.legislation.gov.uk/ukxi/2018/1368/contents/made> as amended by <https://www.legislation.gov.uk/ukxi/2019/127/regulation/1/made> and for 2100MHz see <https://www.legislation.gov.uk/ukxi/2021/1412/contents/made>).

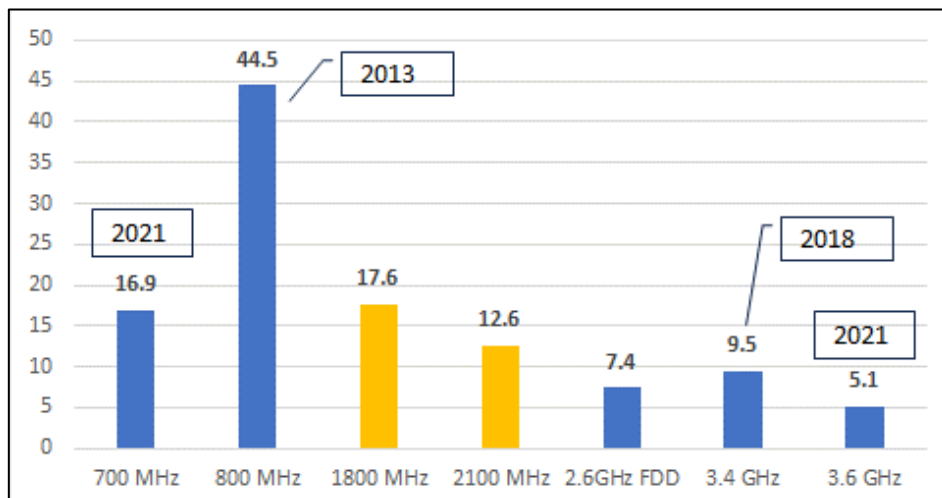
² https://www.ofcom.org.uk/data/assets/pdf_file/0027/229428/1900_2100-mhz-statement.pdf December 2021, para 4.22.

³ The stated LSVs are BT’s calculation and expressed in December 2023 real terms.

⁴ https://www.ofcom.org.uk/data/assets/pdf_file/0032/221999/1900_2100-mhz-condoc.pdf, para 4.19.

Ofcom’s estimates for 1800 MHz and 2100 MHz LSVs derived from the UK reference auctions and international auction data, is illustrated in Figure 1 below.⁵

Figure 1: UK LSV by band (2013-2021) at December 2023 prices (£m)



This misalignment is not surprising: supply and demand conditions have changed materially

There are a number of reasons why the underlying market value of spectrum has dropped; both supply side and demand side factors have significantly changed in the last 5 years: as a result spectrum values have fallen.

More spectrum has become available as key 5G bands have been released whilst, at the same time, spectral efficiency has vastly improved. Looking forward to the emerging roadmap for an even more efficient 6G, and the likelihood of the release of more spectrum bands for this purpose, both trends are more likely than not to continue.

Spectrum supply

The limited and fragmented spectrum released in 2018, at a time when all operators were looking for additional spectrum as a route to 5G, created a relative scarcity of spectrum and put upward pressure on prices in that award⁶. Since then there has been a large increase in supply through further awards. In addition, a potential spectrum roadmap from Ofcom and international bodies has emerged, providing greater certainty over future awards. For example:

- The 2021 auction made a further **200 MHz** available⁷ (combined, the 2018 and 2021 auctions together made an additional **390 MHz** available).
- Ofcom plans a further auction of **25 MHz** of **U1.4 GHz** from as early as 2025.

⁵ See https://www.ofcom.org.uk/data/assets/pdf_file/0020/130547/Statement-Annual-licence-fees-900-MHz-and-1800-MHz.pdf and https://www.ofcom.org.uk/data/assets/pdf_file/0027/229428/1900_2100-mhz-statement.pdf. These LSVs have been converted into equivalent December 2023 prices.

⁶ The 2018 auction made available 40 MHz of 2.3 GHz and 150 MHz of 3.4 GHz.

⁷ The 2021 auction made available 80 MHz 700 MHz and 120 MHz of 3.6 GHz.

- Ofcom will also be making **5400 MHz** of **mmWave** spectrum available from as early as 2025 (26 GHz and 40 GHz) (in addition to the currently assigned **1119 MHz** of non mmWave spectrum).
- Availability of **600 MHz** and **U6 GHz** bands for mobile could be in prospect, in the long-term and medium-term respectively, as Ofcom considers how the recent and future international decisions on these bands may be reflected in the emerging UK spectrum roadmap.

The cumulative effect of this increased supply described means that there has been a reduction in spectrum scarcity which is unlikely to be reversed in the next 10 years putting sustained downward pressure on the market value of spectrum (including 1800 MHz).

Spectrum demand

At the same time as supply has expanded, on the demand side, a number of factors have led to downward pressure on the market value for spectrum (and the ability to pay for it).

Between 2017 and 2022, the data in Ofcom’s CMR 2023 report⁸ reveals that mobile retail revenues fell by 32% in real terms, i.e. from £19.07bn in 2017 (at 2022 prices) to £12.91bn in 2022. By contrast, the 1800 MHz fees have remained constant in real terms over the past 5 years (2018-2023) and have risen by 23% in nominal terms.

Unlike in 2013 when operators required access to the 800/2600 MHz auction bands to launch 4G, and to the 3.4-3.6 GHz band in 2018 to launch 5G, later auctions (700 MHz, 3600 MHz) have been more about incremental spectrum for capacity growth, i.e., commercial imperatives to secure spectrum have changed significantly over time. The additional spectrum available more recently (e.g. 2021) has reduced the costs of capacity, rather than being a “must have” to introduce a new technology where access to a minimum quantity of the new spectrum becomes essential to launch a new capability.

At the same time, the slow-down in the rate of traffic growth and higher capacity offered by 5G (including when deployed in re-farmed spectrum as much less efficient legacy networks are switched off) has further lowered the market value of spectrum needed for capacity.

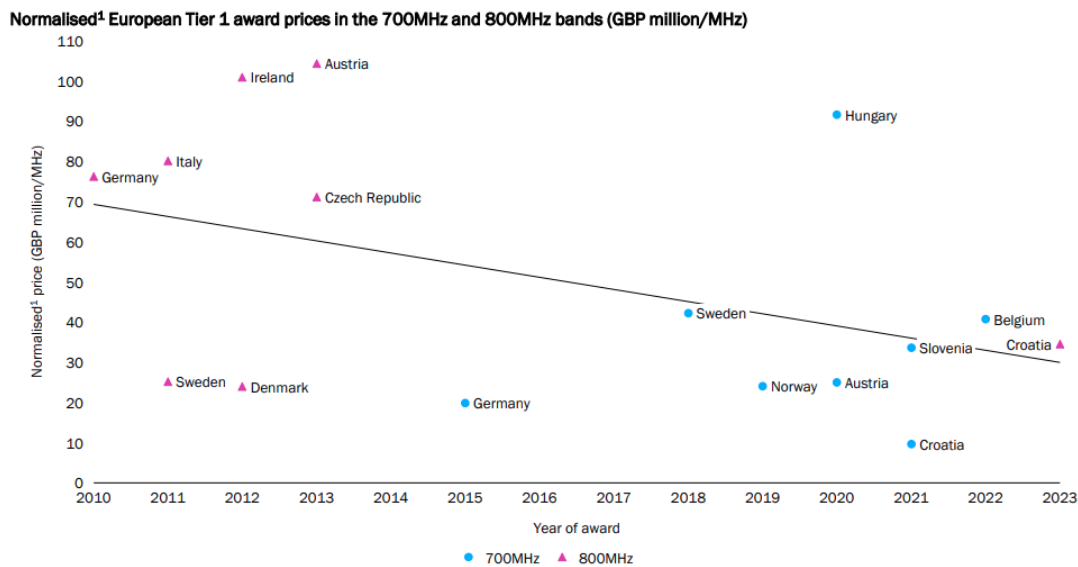
Technological developments since 2018 mean spectral efficiency is greatly improved, and more can be delivered with less. For example, massive MIMO 5G deployments at 3.4-3.6 GHz have more than doubled the spectral efficiency that the older 4G technology can deliver in other bands where it is deployed. As time progresses the penetration of 5G capable mobile devices continues to increase, meaning that a greater number of customers can be supported on the more efficient latest generation of technology deployed on the networks.

Similar supply and demand changes are reflected in falling values internationally, too

Figure 2 below illustrates, as an example, how changes in demand and supply have resulted in a reduction in low band spectrum even in real terms also elsewhere (values adjusted for inflation and purchasing power parity). This is noteworthy given the significant impact historic 800 MHz prices had in setting the level of 1800 MHz ALFs (see previous Figure 1).

⁸ <https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/2023/interactive> [Mobile retail revenue by service type (£bn)].

Figure 2: Illustration of falling spectrum values in auctions that we anticipate Ofcom might regard as “Tier 1” under the criteria used previously



¹ Normalising to a licence duration of 20 years, adjusted to Dec 2023 real terms and using forex at PPP; ALFs are included where applicable and public. Note that the trendline is the linear regression line calculated by the graphing software.

Furthermore, as we have set out elsewhere⁹ recent CPI increases in ALFs bear no relationship with long term changes in real opportunity cost. External shocks increasing inflation have reduced – not increased – opportunity cost (and value) by reducing the revenue generating capacity of spectrum further. This is because the same economic shocks causing inflation to increase also caused the Bank of England to increase interest rates and reduce households’ and business’ purchasing power – including spend on mobile networks and the services delivered over them. This exacerbates the gap between the value of spectrum and the fees paid for it yet further.

When relative spectrum fees are misaligned with relative value, efficiency is distorted

Ofcom’s stated purpose in setting spectrum licence fees is to promote efficient use of spectrum. However, when the system of fees in place does not reflect the relative value of different spectrum bands, their prices can’t hold any meaningful information to guide efficient use of spectrum. If anything, they send distorted signals to the market – undermining the very goal they seek to achieve.

MNOs face very different price tags for functionally equivalent spectrum holdings and as a result operate with different cost bases, depending purely on the moment in time the fee review for their spectrum holdings was undertaken. Thus, operators more reliant on the 1800 MHz band for mid-frequency spectrum pay licence fees that are 49%¹⁰ higher than those using the functionally equivalent 2100 MHz, simply because the fees were set using outdated benchmarks, and just prior to significant changes in the supply of spectrum to the market (i.e. the 700 MHz and 3.6 GHz auction).

⁹ Ofcom’s Review of Annual Licence Fees (ALFs): Confidential BT’s response to Ofcom’s letter of 19 May 2023.

¹⁰ The 49% is derived as £1,002,812.50 - £671,059.93 / £671,059.93 where the fees are expressed on a per MHz basis.

These distortions are likely to worsen over time: Ofcom should move away from past approaches to simplify and ensure a more future proof approach to setting fees

This issue will only get more pronounced over time, and Ofcom will see itself having to apply ever more complex and subjective judgement calls if it chooses to preserve the current methodology.

Benchmarks are proliferating with each new overseas award (since 2018 19 countries have held auctions that have generated nearly 50 more 1800 MHz benchmarks of which c. 30 might be considered as “Tier 1”) – but despite having considerably more information than at the time of the 2018 determination, it is not likely to get any easier to meaningfully infer spectrum values. International auction benchmarks tend to reflect the fact that individual award outcomes are be driven by idiosyncratic factors – and are not actually a good indicator of what UK MNOs would pay today to acquire that spectrum, i.e., more ‘noise’ than ‘information’. This trend is likely to continue over time, in particular as different countries take different approaches to spectrum management (including auction design, reservation for shared use, sub-national licensing, etc). The time is right to remove unnecessary and inappropriate complexity from estimating spectrum values.

In addition, and in a similar vein, use of outdated benchmarks, even if these are UK specific, and uprating them by CPI as a way to infer up to date values may be an acceptable approximation over short time periods. However, over longer time periods they are likely to be much less reflective of supply and demand factors specific to spectrum.

The options described below would allow Ofcom to develop a simpler, and more future proof methodology to set fees, prioritising recent UK auction benchmarks, potentially with a simple cross-check against benchmarks elsewhere to avoid UK specific “anomalies”. This would mean no longer using the “distance method” as the preferred solution for setting fees.

We consider there is a good case for, at the very least, aligning UK 1800 MHz fees with the current UK 2100 MHz fees.

This would be a pragmatic and justifiable solution to one of the problems BT has identified, i.e. the fact that signals for efficient use of spectrum are distorted by the current system of prices in which functionally equivalent mid-band spectrum incurs very different licence fees.

An alternative approach would be to estimate value of UK 1800 MHz spectrum using only the most recent UK spectrum auction values.

The annualised fee level would be based on estimating a LSV value from linearly interpolating between the UK 700 MHz and 3600 MHz auction lump sum values. Using 700MHz LSV of £16.9m/MHz and 3.6GHz LSV of £5.1m/MHz (both at December 2023 prices), linear interpolation would calculate the 1800 MHz LSV as:

$$5.1+(16.9-5.1)*(3700-1800)/(3700-700) = £12.6m/MHz$$

Coincidentally this suggests the same LSV as Ofcom’s current estimated 2100 MHz LSV of £12.6m/MHz (at December 2023 prices).¹¹ If our proposed method of linear interpolation were

¹¹https://www.ofcom.org.uk/data/assets/pdf_file/0027/229428/1900_2100-mhz-statement.pdf. We have converted Ofcom’s LSV into equivalent December 2023 prices.

instead applied to the 2100 MHz it would bring the 2100 MHz LSV down to £11.4m/MHz, i.e. a reduction of 10%.

We consider that either aligning 1800MHz fees to 2100 MHz fees or setting them by linear interpolation between the 700 MHz and 3600 MHz recent UK auction prices would satisfy the concerns over material misalignment that we have raised.

Aligning ALFs with more recent auctions saves the complexity and subjectivity of relative value benchmarks (including the distance method), which becomes less and less representative of value as well as more subjective as market conditions change. It would also avoid use of outdated UK benchmarks and better alignment with forward looking supply and demand factors.

We do not think Ofcom’s thresholds for review of “material misalignment” set out in the 2010 SRSP remain relevant

We have shown above why we consider that the fees for the 1800 MHz spectrum are likely to be materially misaligned with value due to material changes in supply conditions and as well as demand (step 1 in Ofcom’s process set out in the 2010 SRSP). In addition, MNOs would not only need to show that misalignment was material, but a fee change would increase the efficiency of use more effectively than another spectrum management response” (step 2 in the process set out in the 2010 SRSP); and that the “existing fee level is causing serious detriment such as such as a majority of users unexpectedly vacating a band without realistic prospect of new users taking up the available spectrum – or that a very valuable band is, or is likely to become, severely congested without a change in fee level.”

We consider these thresholds to be inappropriate from today’s perspective. Each MNO has made significant and complementary investments that are driven by their specific circumstances including which spectrum bands they hold, their sites portfolio and their specific business model. Network design matches existing assets (spectrum, electronics etc) to deliver optimal customer experience.¹² MNOs differentiate differently in the market place, e.g. consistency of quality and outdoor coverage for BTEE, others will differentiate more through speed and more localised capacity such as Three.

The investments complementary to spectrum are material averaging around £2.7bn per year for the industry in aggregate between 2017-2021.¹³ These historic, MNO specific investments mean returning spectrum to Ofcom would be complex and costly. It would entail not just the loss of spectrum (minus the fees), but loss of the revenue streams associated with the complementary investments, i.e. asset stranding. Use of alternative bands instead, would incur high costs in making changes to the complementary assets set out above.

Similarly, a review threshold that a change in fees must be shown to be necessary to enable a specific spectrum trade appears equally unreasonable as a threshold. There can still be material misalignment between fees and value, even when there is no other potential buyer of the spectrum but for the fee. A market-based approach to spectrum management should not need to rely on Ofcom every time a trade is considered in order to understand whether, and the extent to which

¹² Furthermore, the existing investments in mobile base stations and antennas are generally frequency band specific and in most cases the same equipment cannot simply be re-tuned to other channels or spectrum bands if an existing spectrum assignment had to be vacated. A large proportion of the historical total mobile capex relates to the frequency specific network equipment.

¹³ See section 4.34 of https://www.ofcom.org.uk/data/assets/pdf_file/0036/248769/conclusions-mobile-spectrum-demand-and-markets.pdf.

fees, purportedly set at market value, should be changed to enable that trade. This introduces unnecessary market friction, lost time and resource cost and considerable uncertainty.¹⁴

Such extremely high hurdles for a review of spectrum fees introduce investment risk. It is not reasonable to require an MNO to demonstrate considering giving up all (or a material part) of the anticipated returns to sunk complementary investments and to incur significant network reconfiguration (and other costs) to meet the threshold for a fee review.

Now is a good time to revisit these spectrum fees

There is little risk and much to gain from simplifying the process for setting ALFs on a forward-looking basis because:

- SRSP (2010) does not constrain Ofcom to relative value benchmarks such as the distance method.
- Government's Direction (2010) only envisages 800 MHz/2.6 GHz benchmarks for setting 1800 MHz initially (we have requested this be annulled by DSIT to remove any doubt here).
- Ofcom can reset current 1800 MHz ALFs on the basis they don't need to be looked at again until well after 2030.
 - Aside from setting ALFs for L1.4 GHz (which should have been done in 2023 and must now be imminent), there are no ALF determinations for licensed mobile spectrum until 2033 i.e. 800 MHz and 2.6 GHz.
 - Aside from the U1.4GHz auction next year (25 MHz only) there are also no planned auctions of sub-mmWave spectrum.
- Unlike ALFs, AIP fees that apply in other sectors (e.g., maritime, private radio) are all aligned and do not encounter the same problem of very different fees for similar mobile spectrum. Accordingly, the rationale for revisiting ALFs now in mobile would not apply in relation to AIP fees in other sectors.

In addition, as Ofcom is overdue to set fees for the lower 1.4GHz SDL band¹⁵ it may wish to take the opportunity to align all mobile spectrum fees with the most relevant recent UK auction evidence to ensure the fees are more reflective of value on a forward-looking basis for at least the next decade.¹⁶

¹⁴ We consider that the risk of misalignment is not balanced between Government and MNOs if Ofcom has the discretion to or does set unreasonably high thresholds for review. A supplementary threshold to material misalignment between cost and value itself would imply an asymmetry in risk. We consider that if that were Ofcom's position then the risk sharing mechanism between MNOs and government would then need to be revised to ensure the discount rate recognises that MNOs bear the full risk of changes in market value. As Ofcom itself recognises, the cost of debt represents an approximation of the case where the ALFs are fixed for 20 years and do not vary with market value and where the MNO licence holder bears the entire risk of changes in market value.

¹⁵ Vodafone and Three each have 20MHz of spectrum in this band that is used for additional downlink capacity provision used in combination with other bands.

¹⁶ Ofcom may also consider waiting for a review of fees until after the extended 1.4 GHz SDL award. However, it's not clear how relevant award values would be for the lower 1.4GHz SDL band because in its latest proposals Ofcom suggest significant constraints on where the spectrum would be available due to the need to protect MSS terminals. The award of the additional 1400 MHz SDL spectrum may therefore not be very informative for estimating value of the existing assigned 1400 MHz SDL spectrum. It's possible that the linear interpolation described above could be relevant to estimating the existing assigned 1400 MHz spectrum value, but it could be debated as to whether some adjustment would be needed to reflect that it is "downlink" only.