



Fees for Spectrum Access 28 GHz Licences

Statement

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About this document

This document confirms that, following its consultation on a draft Notice, Ofcom intends to make the Wireless Telegraphy (Licence Charges) (Amendment)(No2) Regulation 2015. These regulations will amend the Wireless Telegraphy (Licence Charges) Regulations 2011 to introduce a fee based on Administered Incentive Pricing (AIP) for the Spectrum Access 28 GHz licences which were auctioned in November 2000. At the time of the Auction the licences were known as the Broadband Fixed Wireless Access (BFWA) licences.

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Section 1

Executive summary

- 1.1 We have decided to make the Wireless Telegraphy (Licence Charges) (Amendment) (No.2) Regulations 2015 (the 'Amendment Regulations'). The Amendment Regulations specify the fees, payable in respect of Spectrum Access 28 GHz Licences, on which we recently consulted (see "*Fees for Spectrum Access 28 GHz Licences Notice of Proposed Regulations*" (the 'Notice') published on 1 October 2015¹).
- 1.2 The Amendment Regulations will implement a decision made in our "*Statement on the Requests for Variation of 28 GHz Broadband Fixed Wireless Access Licences*" of July 2013,² to introduce licence fees for the 28 GHz Spectrum licences after 31st December 2015.
- 1.3 Before making regulations under section 12 of the WT Act, Ofcom is required by section 122(4) of the Act to give notice of our proposal to do so. The Notice set out Ofcom's methodology and policy for calculating the proposed Spectrum Access 28 GHz licence fees, including a draft copy of the Amendment Regulations. The proposed fees were based on the rates currently charged for fixed links using similar frequencies, modified to reflect the preliminary work of the Fixed Link and Satellite Services Fee Review (the 'Fixed Link Fee Review').³ The Notice also included the three update documents that were published alongside the main document.
- 1.4 We received three non-confidential and one confidential response to the Notice. In accordance with section 122(4)(c) of the WT Act, we have considered the comments raised. After considering the responses we have decided to implement the licence charges in line with the methodology set out in the Notice. Table 1 sets out the fees for each region. The table shows the fees per 2 x 112 MHz and the overall cost per region.

¹ <http://stakeholders.ofcom.org.uk/consultations/fees-spectrum-access-28ghz-licences/>

² <http://stakeholders.ofcom.org.uk/consultations/variation-28ghz/statement/>

³ Whilst we have undertaken some preliminary work, we have not yet made specific proposals for revised fixed link fees.

Table 1: Spectrum Access 28 GHz licence fees

Region	Fee per 2x1 MHz	Fee per region
A (Greater London)	£703.63	£78,806.63
B (Greater Manchester, Merseyside and Cheshire)	£520.17	£58,258.69
C (West Midlands, Warwickshire, Staffordshire, Worcestershire, Shropshire and Herefordshire)	£380.20	£42,582.79
I (East Riding of Yorkshire, North Yorkshire, South Yorkshire, West Yorkshire and the areas of North Lincolnshire and North-east Lincolnshire District Councils)	£341.22	£38,216.94
J (Tyne and Wear, Durham, Northumberland, Cumbria and Lancashire)	£263.97	£29,564.35
L (Scotland)	£372.72	£41,744.42
N (Northern Ireland)	£64.40	£7,213.13

- 1.5 In order to implement the licence charges, we have decided to make the Amendment Regulations as proposed, subject to adjustments to some of the original figures (see section 2) and a change to the date on which the first payment becomes due. We have decided to revise the proposed payment date of 1 January 2016 to 5 January 2016 in recognition of the practical difficulties of making a payment on or very close to a Bank Holiday.
- 1.6 Copies of the Amendment Regulations can be obtained at <http://www.legislation.gov.uk/>. The Amendment Regulations will be made on 9 December 2015 and will enter into force on 31 December 2015.

Section 2

Background

Legal Framework

- 2.1 Under section 12 of the Wireless Telegraphy Act 2006 (the 'WT Act'), Ofcom may prescribe in regulations the sums payable in respect of wireless telegraphy licences. Section 12 may apply to licences which have been awarded by auction where the holder of a licence has consented to the inclusion of provisions in the licence enabling the regulations to apply.⁴
- 2.2 Where Ofcom seeks to exercise its power under section 12 of the WT Act to prescribe licence fees, section 13(2) of the Act permits us to recover sums greater than those we incur in performing our radio spectrum management functions. This is having regard to the matters set out in section 3 of the WT Act, for example, the extent to which the spectrum is available for use, or further use, for wireless telegraphy; the demand for the use of the spectrum, both currently and in the future; and the desirability of promoting the efficient management and use of the spectrum available for wireless telegraphy. Setting fees above the level of cost recovery is termed Administered Incentive Pricing (AIP) and is designed to reflect a range of different spectrum management objectives. In particular, AIP helps provide incentives for licensees to use their spectrum more efficiently, which is consistent with our duties under section 3 of the WT Act.

The Spectrum Access 28 GHz licences

- 2.3 The Spectrum Access 28 GHz licences were previously named Broadband Fixed Wireless Access (BFWA) licences. They were auctioned in accordance with the Wireless Telegraphy (Broadband Fixed Wireless Access Licences) Regulations 2000 by the Radiocommunications Agency in November 2000.
- 2.4 As part of the award in 2000, 42 BFWA licences were made available in three packages of 2 x 112 MHz paired spectrum in the 28 GHz band.

Table 2: Frequency bands available in the 2000 award

Lot 1	Lot 2	Lot 3
28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz	28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz	28.3325 – 28.4445 GHz paired with 29.3405 – 29.4525 GHz

- 2.5 The spectrum lots were offered in 14 geographic regions of the UK: 11 regions in England, plus Scotland, Wales and Northern Ireland (see Figure 1).

⁴ Section 12(6) of the Act.

Figure 1: Available regions as part of the 2000 BFWA award



2.6 Of the 42 BFWA licences available, 16 were awarded at this auction. These are detailed in Table 3.

Table 3: Licences awarded in the 2000 BFWA Award

Region	Area	Frequencies
A	Greater London	28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz
		28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
		28.3325 – 28.4445 GHz paired with 29.3405 – 29.4525 GHz
B	Greater Manchester, Merseyside and Cheshire	28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz
		28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
		28.3325 – 28.4445 GHz paired with 29.3405 – 29.4525 GHz
C	West Midlands, Warwickshire, Staffordshire, Worcestershire Shropshire and Herefordshire	28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz
		28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
		28.3325 – 28.4445 GHz paired with 29.3405 – 29.4525 GHz
I	East Riding of Yorkshire, North Yorkshire, South Yorkshire, West Yorkshire and the areas of North Lincolnshire and North-east Lincolnshire District Councils	28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz
		28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
J	Tyne and Wear, Durham, Northumberland, Cumbria and Lancashire	28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
L	Scotland	28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
N	Northern Ireland	28.0525 – 28.1645 GHz paired with 29.0605 – 29.1725 GHz
		28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz
		28.3325 – 28.4445 GHz paired with 29.3405 – 29.4525 GHz <i>(handed back to Ofcom)</i>

2.7 Since the award, one licence has been surrendered while many others have changed ownership through trading⁵ and are no longer held by the original bidders from the 2000 auction. At present, 15 licences are held by the following 5 companies:

- Vodafone Limited (4 licences, bought from Cable & Wireless which bought from Thus PLC (formerly Your Communications, formerly Norweb), the first holder);
- Chorus Communications Limited (1 licence);
- Telefonica UK Limited (6 licences, bought from Cambridge Broadband, which bought from Fastnet Spectrum Holdings, which bought from Energis, the first holder);
- Urban Wimax Limited (1 licence, bought from Broadnet, the first holder);
- UK Broadband Limited (3 licences, bought from Faultbasic, the first holder);

⁵ The Spectrum Access 28 GHz licences can be traded in a number of ways. The 28 GHz bands are listed in Part 11 to the Schedule of the Wireless Telegraphy (Spectrum Trading) Regulations 2012. <http://www.legislation.gov.uk/ukxi/2012/2187/contents/made>

- 2.8 The licences were originally awarded for a period of 15 years, expiring on 31 December 2015. However, we received requests from Urban Wimax (August 2012) and Cable & Wireless (December 2012) to extend the duration of their licences indefinitely beyond this expiration date.
- 2.9 Having consulted on these variation requests in December 2012⁶ Ofcom decided to:
- extend the duration of the Spectrum Access 28 GHz licences indefinitely, beyond the current expiry date of 31 December 2015;⁷
 - apply, where applicable, the technical terms of Interface Requirement 2048 (IR 2048) to the Spectrum Access 28 GHz licences in order to align them with other 28 GHz licences⁸; and
 - apply, from 1 January 2016, licence fees based on Administered Incentive Pricing (AIP) per geographic region at a rate to be determined as part of (or in parallel with) the Fixed Link Fee Review.
- 2.10 This variation was available, on request, to all Spectrum Access 28 GHz licence holders. Since then, all but one of the licences have been varied.⁹ The setting of AIP fees, in this instance, applies only to the Spectrum Access 28 GHz licences awarded in the November 2000 auction and subsequently varied so as to extend the duration of the licence indefinitely.¹⁰

Proposed fee rates

- 2.11 In the Notice we proposed the following fee rates as set out in Table 4. The rates were derived by using the current fee rate for fixed links in the adjacent 26 GHz band. We chose the 26 GHz band as a proxy to inform our estimate of the opportunity cost of the 28 GHz band as it is the fixed link band which is closest to 28 GHz and is considered substitutable for 28 GHz.

⁶ http://stakeholders.ofcom.org.uk/binaries/consultations/variation-28ghz/summary/28_GHz_Consultation.pdf

⁷ the two licences were varied in July 2013

<http://stakeholders.ofcom.org.uk/binaries/consultations/variation-28ghz/statement/statement.pdf>

⁸ In February 2008, Ofcom awarded further licences in the 28 GHz spectrum band. However, as per the approach taken towards the 2009 technical variation of the licences held by Urban Wimax and UK Broadband, the administrative terms of the Spectrum Access 28 GHz licences maintain the distinction between those licences and the licences that were awarded in February 2008.

⁹ Chorus Communications, Region N – Northern Ireland, package 2 has not, to date, requested a variation. Should no licence variation request be received, the licence shall expire on 31 December 2015.

¹⁰ See Annex 5 for a definition of the regions covered by 28 GHz Spectrum Access licences.

Table 4: fee per 2 x 1 MHz for each of the Regional licences

Region	Area	Fee per 2x1 MHz
A	Greater London	£703.63
B	Greater Manchester, Merseyside and Cheshire	£484.30
C	West Midlands, Warwickshire, Staffordshire, Worcestershire Shropshire and Herefordshire	£350.28
I	East Riding of Yorkshire, North Yorkshire, South Yorkshire, West Yorkshire and the areas of North Lincolnshire and North-east Lincolnshire District Councils	£264.25
J	Tyne and Wear, Durham, Northumberland, Cumbria and Lancashire	£234.17
L	Scotland	£371.59
N	Northern Ireland	£64.40

2.12 However, during the course of the consultation, we identified an error in the calculation used to set the fees in Table 4. Whilst working through the model used to calculate the fees for each region we discovered that in some regions not all of the transmitters had been included in the calculation. This error arose as a result of omissions in the relevant mapping software, where certain districts had not been included. As a result, the final calculation of fixed links in certain regions was lower than it should have been. Consequently, the proposed fees calculated for those regions were also lower than they should have been. Table 5 sets out the revised fixed link count by region.

Table 5: Revised Fixed Link count by area by bandwidth

Region	3.5 MHz	7 MHz	14 MHz	28 MHz	56 MHz	112 MHz	Total
A (Greater London)	30	44	22	355	121	0	572
B (Greater Manchester, Merseyside and Cheshire)	29	109 (+13)	69 (+1)	291 (+14)	52 (+7)	0	550 (+35)
C (West Midlands, Warwickshire, Staffordshire, Worcestershire, Shropshire and Herefordshire)	36 (+4)	138 (+10)	73 (+1)	213 (+23)	24	0	484 (+38)
I (East Riding of Yorkshire, North Yorkshire, South Yorkshire, West Yorkshire and the areas of North Lincolnshire and North-east Lincolnshire District Councils)	94 (+5)	125 (+8)	68 (+17)	121 (+17)	52 (+20)	0	460 (+67)
J (Tyne and Wear, Durham, Northumberland, Cumbria and Lancashire)	69 (+5)	102 (+19)	43 (+8)	114 (+13)	32 (+2)	0	360 (+47)
L (Scotland)	183	144	52	209 (+1)	18	0	606 (+1)
N (Northern Ireland)	86	0	36	12	34	4	0

2.13 We recalculated the proposed licence fees per region in accordance with the methodology outlined in the Notice (published on 1 October 2015¹¹) and additional detail published on 13 October 2015¹². The recalculated proposed licence fees per region were published in an update to the Notice¹³ and are set out in Table 6 below.

Table 6: Revised Spectrum Access 28 GHz fees

Region	Original fee per region	Revised fee per region	Original fee per 2 x 1 MHz	Revised fee per 2 x 1 MHz	Change
A (Greater London)	£78,806.63	£78,806.63	£703.63	£703.63	0
B (Greater Manchester, Merseyside and Cheshire)	£54,240.85	£58,258.69	£484.29	£520.17	£4017.84 (7.4 %)
C (West Midlands, Warwickshire, Staffordshire, Worcestershire, Shropshire and Herefordshire)	£39,229.31	£42,582.79	£350.26	£380.20	£3353.45 (8.5 %)
I (East Riding of Yorkshire, North Yorkshire, South Yorkshire, West Yorkshire and the areas of North Lincolnshire and North-east Lincolnshire District Councils)	£29,595.99	£38,216.94	£264.25	£341.22	£8620.95 (29.1 %)
J (Tyne and Wear, Durham, Northumberland, Cumbria and Lancashire)	£26,226.69	£29,564.35	£234.17	£263.97	£3337.66 (12.7 %)
L (Scotland)	£41,617.87	£41,744.42	£371.59	£372.72	£126.55 (0.3 %)
N (Northern Ireland)	£7,213.13	£7,213.13	£64.40	£64.40	0

¹¹ http://stakeholders.ofcom.org.uk/binaries/consultations/fees-spectrum-access-28ghz-licences/summary/Spectrum_Access_28GHz_Notice.pdf

¹² http://stakeholders.ofcom.org.uk/binaries/consultations/fees-spectrum-access-28ghz-licences/28_GHz_Fee_base_data.pdf

¹³ http://stakeholders.ofcom.org.uk/binaries/consultations/fees-spectrum-access-28ghz-licences/151110_28_fee_notice_final.pdf

Section 3

Responses to the Notice

Introduction

- 3.1 This section sets out the comments that we received in relation to the Notice and our responses to these.
- 3.2 We received three non-confidential and one confidential response. The non-confidential responses are published in full on our website.¹⁴ Following consideration of the responses, as outlined below, we have decided to proceed with our proposal to make the Amendment Regulations, subject to:
- the recalculations described in the previous section; and
 - a change to the date on which the fees first become payable along with other minor editorial changes described at the end of this section.

Consideration of responses to the Notice

General fee approach

- 3.3 Vodafone responded that their long-standing position was that the pricing of spectrum should be on an equitable basis and that they were generally supportive of the methodology adopted in the Notice. They noted that the approach taken would reward licensees if they achieve greater density of fixed links than the spectrum re-use factor assumed in the fees calculation.
- 3.4 A respondent who wished to remain confidential stated they were concerned that the setting of fees was being rushed and that the analysis was not as rigorous as it could have been. However, given the time pressure Ofcom was under, they saw merit in the pragmatic approach that Ofcom was proposing to take and that, of the three options presented, the approach taken forward was an acceptable compromise given the limited time available to carry out the work.

Our response

- 3.5 Ofcom's main policy objective is to set fee levels that provide appropriate incentives to licensees to use the spectrum efficiently. In general, we do this by charging a fee that reflects the opportunity cost of the spectrum or a cost based fee (if the opportunity cost is below this). Whilst we note the concern over the timing of the consultation, the analysis presented in the document set out our initial findings based on existing fees for broadly substitutable spectrum and has taken into account the preliminary work of the Fixed Link and Satellite services Fee Review. We have undertaken significant analysis on the comparable 26 GHz fixed link band and therefore do not consider the calculation of fees for the Spectrum Access 28 GHz licences has been "rushed".

¹⁴ <http://stakeholders.ofcom.org.uk/consultations/wta-licence-charges-2015/?showResponses=true>

Level of demand

- 3.6 Luminet (trading as Urban WiMAX) did not agree that AIP should be applied to these bands. They stated that it was clear from existing use that demand is low and future demand is far from certain, citing an example of mobile network operator (MNO) network sharing and consolidation that would likely reduce demand for the band. They argued that given this and Ofcom's 'AIP Principle 2' (as set down in our revised Framework for Spectrum Pricing, published on 17 December 2010)¹⁵, AIP should not be applied to this band.
- 3.7 The confidential respondent stated that the approach Ofcom was proposing to take did not appear to entirely reflect the analysis or findings of the Plum Consulting Report. They were concerned that the Plum Consulting Report found that there is falling demand in Ofcom managed bands above 20 GHz and that the current AIP rate is set 10 – 100 times more than the 2000 (and subsequent 2008) auction values. Whilst the respondent acknowledged that this may underestimate the opportunity cost of the spectrum, they believed that the true opportunity cost is well below the AIP level proposed. They pointed out that the Plum report concluded that fees should fall or even be set at cost-based levels. They also argued that the compromise suggested by Ofcom of a reduction of 50 percent was not sufficient as the 28 GHz band sits in the transitional zone closer to 30 GHz where there is little excess demand. They stated that a reduction of 66 percent should be used as this would align more closely with the Plum Consulting Report analysis.

Our response

- 3.8 As we said in paragraph 5.7 of the Notice, we accept that the actual level of demand for links in the bands between 20 to 30 GHz, at this stage, is not entirely clear. However, we note that there has been a history of significant trading of the "Spectrum Access 28 GHz" spectrum licences, indicating there is demand for the spectrum. Given the uncertainty in the likely level of demand and the outcome of the Fixed Fee Review we have applied a downward modification to the rate of 50 percent. We indicated in the Notice that we expect to apply a 'smoothing' function between bands where fees are charged based on AIP and those where fees are charged to reflect cost. The purpose of doing so is to ensure that we do not create a cliff edge that might result in an over correction by the market, leading to users moving into a higher band simply as a result of the level of the fee.
- 3.9 The confidential respondent suggested that 66% would be a more appropriate modification to use than 50 % as the 28 GHz band is closer to 30 GHz than 20 GHz. For a 66% modification to be more appropriate the lower end of the smoothing function would need to be near 20 GHz with the other end being near 30 GHz. However, we do not think it is appropriate to take 20 GHz as the lower end for a smoothing function given the evidence of demand indicated by the trading of these 28 GHz licences. For example, when we make proposals in the fixed link fee review, it might be appropriate to apply a smoothing function between (say) the 26 GHz fixed link band and the 38 GHz fixed link band. In this case, the 28 GHz band would be closer to the 26 GHz than the 38 GHz end of the smoothing function. The choice of modification factor to use for current purposes is clearly a matter of judgement – however, we consider that 50% is appropriate.
- 3.10 As set out by Ofcom in paragraphs 3.18 to 3.20 of the Notice, the Plum Consulting Report was published alongside our Call for Input on the Fixed Link Fee Review. The

¹⁵ <http://stakeholders.ofcom.org.uk/binaries/consultations/srsp/statement/srsp-statement.pdf>

Plum Consulting Report is only one input in our decision relating to the fees for the Spectrum Access 28 GHz licences. In addition, we have used evidence from our licensing database, our own knowledge of the market, and the responses to the Call for Input to help shape our early thinking on the direction of travel of these fees. It is therefore to be expected that our fees proposals may differ from the analysis and findings of the Plum Consulting Report.

Charges in rural and urban areas

- 3.11 Luminet did not agree with Ofcom's proposed methodology which (in Luminet's view) resulted in charging disproportionately more in urban areas compared to rural regions. It argued that the approach did not take into account a number of factors, including different least-cost alternatives available in urban areas. It also stated that, in order for the innovative use of this spectrum to succeed, a spectrum pricing mechanism which is more supportive of early market development needed to be put in place. Luminet proposed that a modest fee-per-transmitter be applied at a fixed rate, similar to the 70/80 GHz frequency band fixed links, instead of the fees proposed in the Notice. In Luminet's view, such a fee would be sufficient for Ofcom to cover its administrative cost but low enough to encourage innovation and investment.

Our response

- 3.12 We do not agree with Luminet's assertion that the methodology we propose to calculate the fees results in a disproportionately high charge for urban areas. The methodology reflects the geographical demand for fixed links in the 26 GHz band, a band we believe to be broadly substitutable to the 28 GHz band. The fee, therefore, reflects higher fees in areas of higher demand and thus higher opportunity cost.
- 3.13 The Spectrum Access 28 GHz licences provide the licensees with the exclusive right to use the spectrum in the region for which it is granted, so long as the licensees meet the conditions of the licence. A fee mechanism, as suggested by Luminet, that only charges on a link by link basis would, therefore, not reflect the opportunity cost of the use of the spectrum. Charging on the basis of individual links is only appropriate where the licences providing spectrum access are defined for individual links, available on a 'first come, first served basis', which is the case for bands where we manage the assignment process for individual links e.g. fixed link bands. It is not appropriate where a licensee has exclusive access to a block of spectrum, as is the case for the Spectrum Access 28 GHz licences.

Choice of availability factor

- 3.14 The confidential respondent argued that the choice of an Availability Factor (Avf) of 1.0 should not have been used as part of the calculation. They argued that Ofcom's position on this indicated that in order to get a higher availability you need more transmit power and that this increases the risk of interference to other users. In their view the Avf should be set at 0.7 as, in practice, any inference risks can be mitigated by a number of factors including good antenna design and self-coordination.

Our response

- 3.15 In deriving the UK-wide fee for the 28 GHz band, the existing fixed link fee algorithm was used and considered alongside a number of assumptions (based on the typical technical parameters for a fixed link in the 26 GHz band). The current fixed link fee regulations are based on an availability of 99.99% as the normal or typical value. Therefore, for consistency we have used the 99.99% availability value as the

reference, which translates to an Avf of 1.0. Regarding the point on interference management, propagation availability is a function of the overall EIRP; so while interference with respect to third party links can in some cases (dependent upon the geometry) be reduced or mitigated by using higher performance antennas (and/or other operational measures), a higher overall EIRP will still have a greater impact on the overall interference environment than a lower EIRP link.

Use of 26 GHz band as a proxy for 28 GHz

- 3.16 Vodafone was supportive of the approach of choosing the 26 GHz band as the nearest comparator band and using the demand for fixed links in this band as a proxy for demand in the 28 GHz band.
- 3.17 Luminet stated that, although largely equivalent in terms of propagation, using historic 26 GHz point to point fixed links should not be used as a proxy for the 28 GHz band. They stated that the equipment ecosystem is smaller than that for 26 GHz fixed link equipment and the likely future use of the 28 GHz band will be different to that of the 26 GHz band, for example, deployment of mesh networks. Luminet pointed out that sections 6.1 and C.8 of the Plum Consulting report comment that the AIP algorithm is not suited to such new technologies.
- 3.18 Luminet also noted that an assumption of the methodology is that the demand for 28 GHz is proportional to the current density of 26 GHz fixed links. They argued, however, that this assumption is based on a network model providing backhaul to MNO macro base stations and that there is no evidence to show that this will be the same driver of demand for this band.
- 3.19 Luminet further suggested that existing 26 GHz fixed links may have been installed before least-cost alternatives, such as fibre, had been rolled out. Therefore, were operators faced with a similar decision today as to how to build their networks, they may not make the same choice.

Our response

- 3.20 Ofcom recognises that the 26 GHz band may not be an *identical* proxy for the 28 GHz band and that, for example, the size of the equipment ecosystem may differ. However, we continue to believe that the use of the 26 GHz band is the closest proxy available and is appropriate for estimating likely demand for deployments at 28 GHz. Whilst we accept that some licensees may use the 28 GHz spectrum to deploy mesh networks, we understand that the main use of this spectrum is for fixed link type deployments.
- 3.21 We also looked at the geographical spread of demand in the two adjacent fixed link bands of 23 GHz and 38 GHz. Analysing the data we noted that fixed link uses in these bands were broadly similar to the 26 GHz band. Therefore, we are confident that the use of the 26 GHz band as a proxy reflects the likely demand for spectrum in the 28 GHz band.
- 3.22 On Luminet's suggestion that existing fixed links in the 26 GHz band may have been installed before cheaper alternatives were available, we note that a significant number of licences issued in the 26 GHz band have been issued within the last three years with only a small proportion of licences being over 10 years old. We, therefore, conclude that this suggestion is incorrect and that most fixed links in the 26 GHz band have been installed relatively recently when other alternatives were available.

Reuse factor

- 3.23 Our proposed methodology, to calculate the fees for the Spectrum Access 28 GHz licences based on the existing fixed link fees, required us to make an assumption about how many times a specific frequency in the band could be re-used across the country. This was then used in combination with the fee for a typical fixed link in the 26 GHz band to estimate the opportunity cost of the 28 GHz band. We proposed a re-use factor of 400 in light of a current re-use of 200 and Plum's opinion that the re-use factor could potentially be 600 in future.
- 3.24 Vodafone agreed that on first look a re-use factor of 400 is appropriate as it is positioned half-way between the current utilisation and the future potential re-use identified in the Plum Consulting report. However, they stated that this is only prudent when assessed on a national scale. They stated that the regional nature of the licences led to inefficiencies that would mean that the link density would be lower than that of a national licence. They argued that in view of the regional nature of the licences, Ofcom should exclude cross-regional links from the analysis, as by including these links Ofcom is punishing 28 GHz licence holders for the inefficiency of the licensing regime, rather than for their own inefficiency.
- 3.25 Vodafone noted that undertaking an analysis to calculate the number of inter-regional links may be onerous and take time. In light of this they suggested alternative approaches; one was to take the average path length and exclude any transmitters within (say) 50 percent of that distance from the edge; another was to take a 'pragmatic' solution and estimate an amount of fixed links that would be inter-regional. If, for example, we estimated that 20 percent of links were inter-regional, this would result in a revised re-use factor of 320.
- 3.26 Luminet argued that in practice a re-use factor of 200 should be used for dense urban areas due to the shorter link paths compared to sparse rural deployments.

Our response

- 3.27 Ofcom has given careful consideration to Vodafone's submission. In our view, however, the argument regarding the inefficiency inherent in regional licences fails to consider that the market has the ability to address these inefficiencies. This could be through trading to obtain a nationwide licence or through leasing spectrum from an adjacent licensee in order to accommodate the end of a cross-region fixed link that is in its neighbouring region.
- 3.28 We do not therefore believe that applying a reduction to the re-use factor used is appropriate. We also note that, having calculated the number of 26 GHz links that are cross-region (with reference to the regions in the 28 GHz licences), we have found the number to be only 4.2 percent of the total number of links across the UK.
- 3.29 It is unclear from Luminet's response why they believe that the re-use factor should be less in urban areas if the link lengths are shorter. A reduction in link length would usually provide a greater opportunity to deploy more links in an area. This would be possible due to the lower power needed for shorter links and/or the impact of clutter in urban areas reducing the risk of interference. As such we believe that there would likely be a higher re-use potential for short links in urban areas, not lower.

Link to the Fixed Link Fee Review

- 3.30 Vodafone stated that the Fixed Link Fee Review should be completed on its own merits and not driven by the outcome of the 28 GHz fee review. They stated that the proposed application of a 50 percent modifier in the 28 GHz calculation appeared realistic. Vodafone also stated that should the AIP review of fixed links result in a greater reduction in the fixed link fees for 26 GHz than reflected in the proposed fees for the Spectrum Access 28 GHz licences, they expected the 28GHz annual licence fee levels to be revisited.
- 3.31 However, Vodafone questioned the policy of increasing the fees to reflect the outcome of the Fixed Link Review in the event that this indicates that fees should be higher than those calculated. Vodafone argued strongly that this scenario should not result in 28 GHz fees increasing. They noted that if there is a risk of the price of 28 GHz annual licence fees increasing this would create regulatory uncertainty at the very time when mobile operators are seeking to roll out their networks. Vodafone stated that any subsequent licence fee revision should only be downwards in order to correct future arbitrage opportunities.

Our response

- 3.32 We agree that the Fixed Link Fee Review should be completed on its own merits. Given the relevance of the Review to these 28 GHz licences, we agree that regulatory uncertainty, cannot fully be removed until the outcome of the Fixed Link Fee Review is known. However, we will only seek to revise the fees for these 28 GHz licences if it turns out that there is a material misalignment between these fees and the fees for comparable and substitutable spectrum as a result of the Review (noting the desirability of retaining equitability between different bands).

Other issues

- 3.33 O3b stated that, although these Spectrum Access 28 GHz licences may have fitted the UK's needs 15 years ago, the UK has an opportunity to adjust and tailor this regime to take advantage of new satellite technology that the rest of Europe and the world already enjoys. They requested that Ofcom reconsider UK Footnote 207 in the Frequency Allocation Table, to allow full access to the bands 27.5-30.0 GHz for coordinated earth stations in the Fixed Satellite Service. They stated that, in doing so, Ofcom would lay the groundwork for adopting regulations for uncoordinated earth stations across the whole of the band 28.4445-28.9485 GHz (in accordance with ECC/DEC/(05)01).

Our response

- 3.34 This consultation was in relation to the fees that we were proposing to charge for licences in the 28 GHz band. We note that the issue regarding allocating the band for satellite services has already been considered as part of our variation consultation in 2012. In response to this request from the satellite industry we advised that uncoordinated satellite applications (HDFSS) are already authorised to use more than 1.2 GHz of bandwidth at other frequencies in the 27.5 GHz and 30 GHz ranges along with Permanent Earth Stations (e.g. satellite gateways).
- 3.35 The Spectrum Access 28 GHz licences are issued on a technology and service neutral basis. The technical schedule of the licences were developed specifically to accommodate access by Fixed Satellite Services. In addition to the licences already available to satellite users, it is possible for satellite communication providers to

obtain access to the frequency ranges covered by the Spectrum Access 28 GHz licences through trading (or under leasing arrangements) with the licensees of this spectrum.

Our decision

- 3.36 Having considered carefully the responses received from stakeholders, as set out above, Ofcom has concluded that it would be appropriate to make the Amendment Regulations in order to charge fees for the Spectrum Access 28 GHz licences as set out in section 3. The Amendment Regulations will be as set out in the Notice, modified to take account of the revised figures set out in Section 1, Table 1 and the minor changes outline below. We intend to make the Amendment Regulations on 9 December which will enter force on 31 December 2015.

Minor changes to the amendment regulations

- 3.37 We considered the practical implications of a payment due date of 1 January and concluded that it would be prudent to set the payment date as 5 January. This is in recognition of the practical difficulties in making a payment on, or very close to, a Bank Holiday.
- 3.38 We will also make a couple of minor editorial changes. We will insert into the definitions the term “Ofcom”, as this was missing from the Principal Regulations. Finally, in regulation 7 we will make some further minor drafting changes to regulation 4¹⁶ in order to provide further clarity as to the basis on which the Spectrum Access 28 GHz licences have been awarded Section 4

Scope of the Amendment Regulations

Ofcom’s decision

- 4.1 Ofcom has decided to make the Amendment Regulations as proposed, subject to the changes described in paragraphs 2.13, 3.37 and 3.38 of this Statement.
- 4.2 The Amendment Regulations will come into force on 31 December 2015. The effect of the Amendment Regulations is summarised below.

Extent of application

- 4.3 The Amendment Regulations will apply in the United Kingdom, the Channel Islands and the Isle of Man.

The Amendment Regulations

- 4.4 The Amendment Regulations will set fees for the Spectrum Access 28 GHz licences on an AIP basis, in accordance with the policy decision taken by Ofcom in our “*Statement on the Requests for Variation of 28 GHz Broadband Fixed Wireless Access Licences*” of July 2013.¹⁷

¹⁶ See above.

¹⁷ <http://stakeholders.ofcom.org.uk/consultations/variation-28ghz/statement/>

- 4.5 The way that the Amendment Regulations will achieve Ofcom's policy objectives is by amending the Wireless Telegraphy (Licence Charges) Regulations 2011 (the 2011 Regulations) to insert:
- 4.5.1 a new definition in regulation 2 of the 2011 Regulations to make reference to the Wireless Telegraphy (Broadband Fixed Access Licences) Regulations 2000 ('the 2000 Regulations'). The 2000 Regulations set out definitions of the Regions in which the Spectrum Access 28 GHz licences were originally auctioned; and
 - 4.5.2 a new regulation 7 to set fees for the Spectrum Access 28 GHz licences in the particular Regions in which those licences were auctioned in 2000. Such fees will become payable once the period for which the licences were initially awarded comes to an end, i.e. 31 December 2015.
- 4.6 In addition, for the sake of improving the clarity and completeness of the 2011 Regulations more generally, we will also insert a definition of 'Ofcom' into regulation 2 of those Regulations.

Annex 1

Respondents

Luminet

O3b

Vodafone

One confidential response