

Shared Access Licence

Guidance document

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1. Overview

- 1.1 On 25 July 2019, Ofcom published a Statement, *Enabling wireless innovation through local licensing*, which sets out two new licence products we are introducing to make it easier for a wider range of users in the UK to access radio spectrum on a shared basis.¹
- 1.2 These are:
 - a) the Shared Access licence, which gives access to four spectrum bands which support mobile technology; and
 - b) **the Local Access licence**, which provides a way for other users to access spectrum which has already been licensed to the UK's Mobile Network Operators (MNOs), in locations where an MNO is not using their spectrum.
- 1.3 This document is about the **Shared Access licence**, and is intended to outline everything that new users (who might not be familiar with obtaining licences from Ofcom or be aware of what spectrum options are available) need to know about the new Shared Access licence product. It includes information on how much the licence costs, how you can apply for a licence, and what terms and conditions you have to adhere to if you have a licence.
- 1.4 You can find the guidance document for the Local Access licence on the Ofcom website.²
- 1.5 The Shared Access licence may open up new options for users, such as small businesses and community groups which could support innovation and enable new uses. The licence could be useful for all sorts of different businesses and industries, such as those set out in the graphic below.

² Ofcom, Local Access licence: Guidance document, 25 July 2019,

¹ Ofcom, Enabling wireless innovation through local licences: Shared access to spectrum supporting mobile technology, 25 July 2019, <u>https://www.ofcom.org.uk/__data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-local-licensing.pdf</u>

https://www.ofcom.org.uk/__data/assets/pdf_file/0037/157888/local-access-licence-guidance.pdf



Figure 1: Possible users of the new Shared Access licence product

1.6 You might find the Shared Access licence useful if you'd like to provide wireless connectivity to your business or site, in a way which is more secure than licence exempt technology like Wi-Fi, but more customisable than using a solution from an MNO.

Frequencies available using the Shared Access licence

- 1.7 There are four different spectrum bands available using the Shared Access licence under the Spectrum Sharing framework outlined in the Statement. We call these "the shared access bands", and they are:
 - a) **1781.7-1785 MHz paired with 1876.7-1880 MHz** (which we refer to as "the 1800 MHz shared spectrum"): This is part of the wider 1800 MHz mobile band (although this particular portion has not been licensed for national mobile services) and is supported by commercially-available mobile base stations and equipment, including most mobile handsets. There is a total of 2 x 3.3 MHz available in the band.
 - b) 2390-2400 MHz (which we refer to as "the 2300 MHz shared spectrum"): This is part of the 2300 MHz mobile band and sits just above the 2350-2390 MHz band which is used for mobile in the UK. It is supported by commercially-available mobile base stations and equipment, and is included in some of the latest smartphones. There is 10 MHz available in this band.
 - c) **3.8-4.2 GHz**: This band sits just above the 3.6-3.8 GHz mobile band, and chipsets for this band which support 5G technology are currently available. There is 390 MHz of spectrum available in the band.
 - d) **24.25-26.5 GHz** (which we refer to as "the lower 26 GHz band"): This band is available for <u>indoor low power licences</u> only (see sections 2 and 3 for more details). This is part of one of the pioneer 5G bands in Europe and has 2.25 GHz of spectrum available in total.

- 1.8 In the future, we may look to make additional bands available under the same spectrum sharing framework as appropriate.
- 1.9 The type of application you want to provide will determine which band is most appropriate for you, as the characteristics and bandwidth available in each band differs.
- 1.10 For example, lower frequencies such as in the 1800 MHz or 2300 MHz shared spectrum have better propagation characteristics; this means that transmissions in these bands can "bend" around obstacles or penetrate through buildings much more easily than at higher frequencies. However, the smaller amount of bandwidth available in these two bands (2 x 3.3 MHz and 10 MHz respectively) means that you probably can't use these bands for applications that need to transmit large amounts of data. If you need larger bandwidth, the 1800 MHz shared spectrum could be coupled with licence exempt LTE in the 5150-5925 MHz band (3GPP Band 46) to provide additional channels to support higher capacity applications.
- 1.11 It is not permitted to use the 3.8-4.2 GHz band to provide national mobile broadband services; we're preparing to award national licences for spectrum in the 3.6-3.8 GHz band for that purpose.

2. Introduction to the Shared Access licence

The Shared Access licence is part of a new framework for enabling shared use of spectrum

- 2.1 Our spectrum sharing framework is intended to provide a simple method for users to access spectrum in a number of frequency bands.
- 2.2 One of the aims of this new framework is to make it easier for people and businesses to access spectrum which can be used to support a wide range of local wireless connectivity applications.
- 2.3 Our spectrum sharing framework enables access to a number of bands under a common process as outlined below:
 - a) **New users will apply to Ofcom** to get licences for the locations, bands and bandwidths that they need to provide their service.
 - b) **Ofcom will assess applications** to see if any interference would be caused to, or received from, other licensees in the band.
 - c) **Ofcom will grant individual licences** for the requested locations, bands and bandwidths on a first come, first served basis, provided that the application passes this coordination process.
 - d) Users will pay licence fees to Ofcom, which are due annually.
- 2.4 There may be some differences between conditions in the different bands. For example, each of the bands has different existing users and therefore our approach to assessing applications may look different from band to band because of different existing users and therefore different interference risk.
- 2.5 The Shared Access licence which we are making available under this new framework is currently available in four different bands:
 - a) the 1800 MHz shared spectrum;
 - b) the 2300 MHz shared spectrum;
 - c) 3.8-4.2 GHz; and
 - d) the lower 26 GHz band.
- 2.6 These bands all support widely-available conventional mobile technology, or are adjacent to other mobile bands where this is the case. This is good for users because lots of equipment is already available using these bands, which means this equipment is cheaper than using bespoke or proprietary technology.
- 2.7 In the future we expect to add more bands to this same framework as appropriate.
- 2.8 This guidance sets out the approach Ofcom generally expects to take when assessing and issuing Shared Access licences. However, we may consider exceptional applications on a

case-by-case basis and we retain the discretion to amend our approach, and to make exceptions or disapply the guidance if it is appropriate to do so in the particular circumstances. We will also keep this general guidance under review and may amend it from time to time as appropriate, as we gain experience of how these licences are used in practice.

There are two kinds of licence: low power and medium power

2.9 To provide a range of options for new users, we're offering two different versions of the Shared Access licence, which authorises uses in slightly different ways:

Low power licence

- 2.10 We think the low power licence product could be suitable for industrial and enterprise users looking to deploy their own private networks. This could be to support voice and text applications or other wireless data applications around their sites; it could also potentially be used for indoor mobile coverage extension schemes, for example through a neutral host model.
- 2.11 The low power licence will authorise users to deploy as many base stations as they require within a circular area with a radius of 50 metres, centred on a coordinate provided to us by the user when they apply for the licence. Users will have the flexibility to move their base stations around within the licensed area without requiring further coordination by Ofcom.
- 2.12 Users looking for the flexibility to place base stations anywhere within a larger area can apply for multiple low power licences, which could be contiguous or spaced out over a larger area. You can see some examples of this in Figure 4 and Figure 5 below.
- 2.13 There will be an indoor-only option available, as well as an indoor/outdoor option for users looking to deploy either partly or wholly outdoors.
- 2.14 Base stations covered by the low power Shared Access licence can connect to fixed, nomadic or mobile terminals.
- 2.15 "Fixed terminals" are those which are at a fixed location and do not move; we refer to these as "fixed/installed terminals" in our Statement. "Nomadic terminals" are terminals that can move around, but typically only transmit when stationary. "Mobile terminals" can transmit and receive while moving.

Medium power licence

2.16 We think that this licence could be suitable for users who need a longer transmission range from their base station, but don't expect to need to change the locations of base stations once they're deployed. This could suit providers of Fixed Wireless Access (FWA) services in rural areas, along with industrial or enterprise users with sites spread over a larger area, such as ports, agriculture or forestry. It could also be suited to providing mobile coverage extension schemes in rural areas, as the 1800 MHz and 2300 MHz shared spectrum bands are in wider bands which already support mobile technology.

- 2.17 The medium power licence will authorise **a single base station**. The base station can connect to fixed, nomadic or mobile terminals.
- 2.18 Medium power base stations are generally only permitted in rural areas, as their increased power and transmitting range mean that if they were deployed in urban areas, they could potentially prevent a large number of low power users from deploying.
- 2.19 Figure 2 below shows how the two types of licence differ, with the low power licence authorising an area where the base stations could operate, and the medium power licence authorising each base station individually.

Figure 2: Low power (left) and medium power (right) Shared Access licences



Licence authorises all base stations within 50 metres of a given location (max EIRP 24 dBm), and any connected terminals.

Licence authorises a base station at a given location (max EIRP 42 dBm) and any connected terminals.

Legend

- ▲ Base station
- Fixed/installed terminal
- Mobile/nomadic terminal

2.20 Airborne use is not permitted for both the low and medium power licences.

Where in the UK the Shared Access licence will be available

- 2.21 Although generally speaking, the Shared Access licence is available all around the UK, there are some exceptions to this:
 - a) The medium power licence is generally only available in rural areas. (We define what we mean by "rural areas", and discuss this restriction in more detail, in Section 3.)
 - b) The 2300 MHz shared spectrum is currently not available in Northern Ireland.
 - c) The 2300 MHz shared spectrum will initially only be available for indoor low power licences.³
 - d) In the 3.8-4.2 GHz band, we are not initially accepting applications within 5km of the following MOD sites:

³ We will need to gather more evidence before making outdoor low power and medium power uses more generally available

- i) GCHQ Bude, Cornwall
- ii) RAF Menwith Hill, North Yorkshire
- e) In the lower 26 GHz band, we are not initially accepting applications within 1km of Harwell Earth Exploration Satellite Service earth station, Oxfordshire.
- f) There are some restrictions in the Crown Dependencies:
 - i) On the Isle of Man, neither the 1800 MHz or 2300 MHz shared spectrum bands are available. Use of the other bands may be possible but you might need to talk to the Isle of Man Communications Commission⁴ as well as Ofcom.
 - ii) On the Channel Islands, the 1800 MHz shared spectrum is currently unavailable.
 Use of the other bands may be possible but you might need to talk to the Channel Islands Competition & Regulatory Authorities⁵ as well as Ofcom.
- 2.22 Additionally, while these are not restrictions, users should also be aware of the following:
 - a) 1800 MHz shared spectrum: It's possible that users of the 1800 MHz shared spectrum could experience periodic interference from MOD use of this band in some locations. This could happen near three specific sites: RAF Colerne in Wiltshire, RAF Oakhanger in Hampshire, and RAF Menwith Hill in North Yorkshire. We consider the risk of interference to be very low.
 - b) 2300 MHz shared spectrum (in band): Users of this band should be aware that the band is shared by amateur radio users. These uses are mainly temporary and we expect the risk of interference to be very small. However, it is possible that Shared Access licence users in this band could experience interference from amateur radio users, as Ofcom does not coordinate these. If you do receive interference to your licensed equipment, you can report this to Ofcom although it should be noted that Ofcom cannot guarantee spectrum will always be free of interference.⁶
 - c) 2300 MHz shared spectrum (adjacent band): The 2400 MHz band, adjacent to the 2300 MHz shared spectrum, contains a number of different services. These include Wi-Fi, Zigbee (used, for example, in smart meters and home automation) and Assistive Listening Devices (ALDs), devices used in conjunction with hearing aids to help people with hearing impairments hear properly.
 - To avoid interference to Wi-Fi and Zigbee, it's probably best to make sure your Wi-Fi access point or smart meter is not located next to (i.e. within a few metres of) your 2300 MHz shared spectrum base station.
 - Regarding ALDs, we'd advise prospective users of the 2300 MHz shared spectrum to consider very carefully if they intend to install a base station anywhere ALDs are likely to be used. In particular, we'd advise against using this band inside a school

⁴ <u>https://www.iomcc.im/</u>

⁵ <u>https://www.cicra.gg/</u>

⁶ You can find more information on doing this on the Ofcom website: <u>https://www.ofcom.org.uk/spectrum/interference-enforcement/troubleshooting-interference/reporting-interference</u>

and recommend that you consider if any of the other shared access bands might suit your intended application instead. This is because younger school pupils who use hearing aids and ALDs are much less likely than adult users to understand why their devices are not working correctly, if these were receiving interference from mobile terminals or base stations in the 2300 MHz shared spectrum in the same location.

d) **3.8-4.2 GHz band:** We don't expect that this spectrum will be used as part of national mobile networks. Users looking to provide wide-area coverage should look for spectrum in other bands.

How to apply for a licence

- 2.23 To apply for a Shared Access licence, you'll need to fill in an application form. You'll be able to access the form on the Ofcom website⁷.
- 2.24 Once you've filled in the licence application form, email it to the Ofcom Licensing Team at spectrum.licensing@ofcom.org.uk.
- 2.25 Once you send in your completed application form, we'll carry out a technical assessment to make sure your new deployment wouldn't interfere with anyone else's equipment and that their equipment won't interfere with your deployment. We'll notify you of the result of our assessment, and if your application is successful we'll assign you a frequency to transmit on.
- 2.26 If you're happy with the frequency we've assigned you, we'll then send an invoice and request payment. You have 30 days to pay for the invoice. Once you pay your licence fees, we'll then issue you with your licence.
- 2.27 This process is summarised briefly in the graphic below.

Figure 3: Shared Access licence application process



Dynamic Spectrum Access and how this might affect your licence

2.28 In the future, we would like to move towards a Dynamic Spectrum Access (DSA) approach if appropriate, where users' equipment would communicate directly with a central

⁷ <u>https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/shared-access</u>

database in order to access spectrum. This means that you will only be assigned frequencies when you request for one directly from the spectrum assignment database.

- 2.29 This would help to ensure that the shared spectrum is being used effectively and efficiently, and would mean that if a user no longer transmits in their assigned frequency in a particular place, this would automatically become available again for other users.
- 2.30 However, we are not yet in a position to implement a DSA approach in the shared access bands, so in the meantime we are embedding the DSA concept in the Shared Access licence to achieve the same outcome. There may be further changes to your licence in the future if we do implement a DSA approach.
- 2.31 You'll have to start transmitting within six months of being issued your licence, and continue to remain operational after this. If you need to switch your equipment off from time to time (e.g. for maintenance) this is fine; this condition is more about making sure that licensees who've stopped transmitting for good aren't blocking access to spectrum for new users.
- 2.32 Your Shared Access licence will also allow Ofcom to request that you change frequency from time to time; we may do this for spectrum planning purposes, or if we need to deal with interference.
- 2.33 If we need to do this, we will email you the frequency you need to change to, and the time by which you will need to have changed frequency by. This means that you should deploy equipment that can be tuned across an entire band (that is, for the 3.8-4.2 GHz band and 26 GHz band where this is relevant) to ensure continuity in access.
- 2.34 We are now starting work to assess whether it would be appropriate to transition towards DSA, supported by a fully automated authorisation database. This will include setting specifications for equipment to enable it to contact the future DSA database. We think setting these specifications is best done in collaboration with industry, particularly equipment vendors. This would allow us to best consider the costs and complexity of implementing this, both in relation to users' radio equipment and the spectrum assignment database.
- 2.35 If we decide to transition to DSA in the future, we will vary the Shared Access licences.When we do this, the new licence may include an additional requirement for equipment to be able to contact any future DSA database.
- 2.36 If we introduce DSA in the shared access bands, the first come, first served principle will remain. This means that existing installations would generally be able to continue their deployment as long as their equipment remains operational and, once an automated database is in place, they continue to request spectrum from the database and comply with any technical parameters, for example, in relation to maximum transmission power, etc.

3. The low power Shared Access licence

- 3.1 Rather than authorising one specific base station, the low power licence authorises any number of base stations located in a circular area with a radius of 50 metres, centred on a coordinate provided to Ofcom by the user.
- 3.2 You can connect fixed, mobile or nomadic terminals to any base stations operating within the area covered by your licence, and these terminals will also be authorised by your licence.
- 3.3 Additionally, mobile and nomadic terminals connected to base stations using the 1800 and 2300 MHz shared spectrum will also be licence exempt.
- 3.4 Users are free to deploy as many base stations as they like in the licensed area, and can move base stations around within this area without needing to inform Ofcom of such changes.
- 3.5 If you want to deploy base stations in a larger area, you can apply for multiple areas as part of the same licence application. It could be that you need these areas to be next to each other and overlapping, as shown in Figure 4 below, or spaced out around a larger site, like in Figure 5 further down.





Legend

- Registered location
- ---- 50m radius from registered location
- Wall of building
- --- Perimeter of outdoor yard area

Simple deployment with one registered low power licence area. Licensee has opted for an indoor-only licence as they do not anticipate needing to deploy base station equipment outdoors.

More complex deployment with four areas licensed in order to give the user the flexibility to move base stations anywhere on their premises, which is made up of one large T-shaped building, an outbuilding on the left of the image, and two outdoor yard areas on the left and right. Licensee intends to install base stations in the yards, so has chosen licences valid for both indoor and outdoor use.

- Base station
- Fixed/installed terminal
- Mobile/nomadic terminal
- ----- Base station/terminal connection
- 3.6 Remember that you can only deploy **base stations** within the licensed 50 metre-radius areas, but **terminals** just need to be connected to a base station in a licensed area. Terminals don't need to be situated inside a licensed area. In practice the coverage provided by base stations is likely to be more than the 50 metre-radius circle we license especially when deployed outdoor. It will therefore be possible to connect devices across a larger site area without needing to obtain low power licences to cover the entire area, unless you want to have the flexibility to move your base stations anywhere within your coverage area. You can see an example of how this might work in Figure 5 below.

Figure 5: Example of terminal stations outside the areas licensed by the Shared Access low power licence, but connected to licensed base stations within these areas



- 3.7 Users can apply for an indoor-only licence or one which allows both indoor and outdoor use. The exception to this rule is the 2300 MHz shared spectrum; initially we expect that the 2300 MHz band will only be available for indoor-only licences.
- 3.8 In this context, "indoors" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed.
- 3.9 If you have an indoor-only licence, it is not permitted to deploy base stations or fixed terminals outdoors; if you do, you'll be breaking your licence conditions. If you are looking to provide both indoor and outdoor coverage, you should apply for an indoor and outdoor licence.
- 3.10 If you have base stations outdoors, these can be a maximum of 10 metres above ground level. For indoor base stations, these can be at any height within your building.
- 3.11 The price of the licence will stay the same regardless of whether or not you opt for an indoor-only licence. However, we would encourage users who do not expect to deploy any equipment outdoors to apply for an indoor-only licence, as this is more likely to pass coordination than an application for both indoor and outdoor use and is therefore more likely to be approved. Conversely, if you do expect to deploy any equipment outdoors, you should not apply for an indoor-only licence in order to pass coordination, as you will be

restricted to indoor use only and will be breaking your licence conditions if you deploy outdoors.

Technical conditions

3.12 The following table contains the technical conditions for the low power Shared Access licence. You should consult the licence for the full technical conditions.⁸

	Parameters (by band)							
Condition	1800 MHz shared spectrum	2300 MHz shared spectrum	3.8-4.2 GHz	Lower 26 GHz band				
Permitted deployment	Indoor and outdoor Outdoor antennas limited to 10m height above ground	Initially likely to be widely available for indoor only Outdoor antennas limited to 10m height above ground	Indoor and outdoor Outdoor antennas limited to 10m height above ground	Indoor only				
Authorised bandwidth	2 x 3.3 MHz	10 MHz	10, 20, 30, 40, 50, 60, 80 and 100 MHz	50, 100, 200 MHz				
Maximum base station power	24 dBm / carrier (up to 3 MHz) ⁹ (EIRP)	24 dBm / carrier (up to 10 MHz) (EIRP)	24 dBm / carrier for carriers ≤ 20 MHz; or 18 dBm / 5 MHz for carriers > 20 MHz (EIRP)	23 dBm / 200 MHz (TRP)				
Maximum terminal station (TRP for	23 dBm	25 dBm ¹⁰	28 dBm ¹¹	23 dBm				

Table 1: Technical licence conditions for low power Shared Access licence

⁸ Ofcom, Enabling wireless innovation through local licences: Annexes 6-10, 25 July 2019,

https://www.ofcom.org.uk/ data/assets/pdf file/0036/157887/annexes-6-10-licences-and-interface-requirements.pdf ⁹ This power will only be available over 3 MHz of the 3.3 MHz bandwidth as existing power density requirements restrict the power in the first 200 kHz and last 100 kHz of the bandwidth

¹⁰ The authorisation will list this as 25 dBm **including** a 2 dB tolerance consistent with the European harmonisation.

¹¹ The authorisation will list this as 28 dBm **including** a 2 dB tolerance consistent with the European harmonisation.

Parameters (Condition1800 MHzsharedspectrum	Parameters (by band)						
	1800 MHz shared spectrum	2300 MHz shared spectrum	3.8-4.2 GHz	Lower 26 GHz band			
mobile/nomadic; EIRP for fixed)							
Frame structure requirements	N/A	3:1 structure for all outdoor deployments	N/A (but see notes below)	N/A			

3.13 The tables on the following pages outline the out of channel and in band/ out of band emissions limits for the four Shared Access bands. You need to ensure your equipment complies with these limits.

Frequency offset from the lower frequency of the band edge	Maximum mean EIRP density			
0 to 0.05 MHz	-33.6 + 153.3 x Δ_{FL}^* dBm / kHz			
0.05 to 0.1 MHz	-26 + 60 x (Δ _{FL} *- 0.05) dBm / kHz			
0.1 to 0.2 MHz	-23 + 230 x (Δ _{FL} *- 0.1) dBm / kHz			
0.2 to 3.2 MHz	24 dBm / carrier			
3.2 to 3.3 MHz	-23 + 230 x (3.3 - Δ _{FL} *) dBm / kHz			

* Note: Δ_{FL} in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range 0 to +0.2 MHz and +3.2 to +3.3MHz)

Frequency offset from the lower frequency of the band edge	Maximum mean EIRP density
-6.2 to -3.2 MHz	-55 dBm / kHz
-3.2 to 0 MHz	-45 + 10 x (Δ _{FL} *+ 0.2)/3 dBm / kHz
Frequency offset from the upper frequency of the band edge	Maximum mean EIRP density
0 to 0.05 MHz	-23 - 60 x Δ _{FH} * dBm / kHz
0.05 to 0.1 MHz	-26 - 153.3 x (Δ _{FH} * - 0.05) dBm / kHz
0.1 to 2.8 MHz	-45 - 10 x (Δ _{FH} * + 0.2)/3 dBm / kHz
2.8 to 5.8 MHz	-55 dBm dBm / kHz

Table 3: 1800 MHz shared spectrum base station out of band emission limits

* Note: Δ_{FL} in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range -3.2 to 0 MHz)

 Δ_{FH} in MHz is the offset from the upper edge of the permitted frequency band at 1880 MHz (it has values in the range 0 to 2.8 MHz)

Table 4: 2300	MHz shared	spectrum	base station	out of band	emission limits

Frequency	Maximum mean EIRP density
2385 to 2390 MHz	(Pmay - 40) dBm / 5 MHz EIPP per antenna
2400 to 2403 MHz	(Fillax - 40) dbill / 5 MHz Elke per antenna
2300 to 2385 MHz	(Pmax - 43) dBm / 5 MHz EIRP per antenna
Above 2403 MHz	-17 dBm / 5 MHz EIRP*

* The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antenna.

Pmax is the maximum mean carrier power for the base station in question.

Table 5: 3.8-4.2 GHz base station out of channel emission limits

Frequency offset	Maximum mean EIRP density
-5 to 0 MHz offset from lower channel edge	(Pmax - 40) dBm / 5 MHz
0 to 5 MHz offset from upper channel edge	EIRP per antenna
-10 to -5 MHz offset from lower channel edge	(Pmax - 43) dBm / 5 MHz
5 to 10 MHz offset from upper channel edge	EIRP per antenna
Out of block baseline power limit (BS) < -10 MHz offset from lower channel edge > 10 MHz offset from upper channel edge	(Pmax - 43) dBm / 5 MHz EIRP per antenna

Table 6: 3.8-4.2 GHz base station out of band emission limits

Frequency	Maximum mean EIRP density
3795 MHz-3800 MHz	(Pmax - 40) dBm / 5 MHz
4200 MHz-4205 MHz	EIRP per antenna
3760 MHz-3795 MHz	(Pmax - 43) dBm / 5 MHz
4205 MHz-4240 MHz	EIRP per antenna
Below 3760 MHz	-2 dBm / 5 MHz
Above 4240 MHz	EIRP per antenna

Table 7: 24.25-26.5 GHz base station and terminal station out of channel and out of band emission limits

Condition	Parameters
Maximum base station out of channel power (TRP)	Up to 50MHz below or above channel edge: 12dBm / 50MHz Beyond 50MHz below or above channel edge: <4dBm / 50MHz
Maximum base station power in the frequency range 23.6-24.0 GHz (TRP)	Initial limit before 1 January 2024: -33 dBW / 200 MHz Final limit from 1 January 2024: -39 dBW / 200 MHz
Maximum terminal station power in the frequency range 23.6-24.0 GHz (TRP)	Initial limit before 1 January 2024: -29 dBW / 200 MHz Final limit from 1 January 2024: -35 dBW / 200 MHz

Synchronisation

- 3.14 Synchronisation is not required in
 - a) the 1800 MHz shared spectrum;
 - b) the 2300 MHz shared spectrum for indoor deployment;
 - c) the 3.8-4.2 GHz; and
 - d) the lower 26 GHz band.
- 3.15 Synchronisation is required in the 2300 MHz shared spectrum for outdoor deployment. There may be some circumstances where it is required in the 3.8-4.2 GHz band and for indoor deployment in the 2300 MHz shared spectrum.

2300 MHz shared spectrum

3.16 If you have a licence for the 2300 MHz shared spectrum and you have deployments outdoors, you will need to make sure your transmissions are synchronised with those of the adjacent user in the 2350-2390 MHz band (this is Telefónica). You will need to use the frame structure in the diagram below and Coordinated Universal Time (UTC) as the common reference time. A new frame should start at the start of the UTC 1 second boundary.

Figure 6: Frame structure for 2300 MHz shared spectrum¹²

DL/UL ratio	Subframe number									
	0	1	2	က	4	5	60	7	8	9
3:1	D	S	U	D	D	D	S	U	D	D

3.17 This frame structure means:

- timeslots (or subframes) 0, 2 to 5 and 7 to 9 must be allocated to Downlink (D) or Uplink (U) transmissions as indicated or may be left with no transmissions;
- the licensee must ensure that the special subframe (S) in timeslots 1 and 6 has a structure that is compatible with TD-LTE special subframe configuration 6, also known as 9:3:2;
- all timeslots must be 1 millisecond in duration and the frame must start at a common reference time so that frames are aligned with Telefónica and transmissions synchronised; and
- TD-LTE frame configuration 2 (3:1) is compatible with this frame structure. Other technologies are permitted provided that the requirements are met.
- 3.18 If you have an indoor-only deployment this does not have to be synchronised however, if other users (including Telefónica in the 2350-2390 MHz band as well as other users in the 2390-2400 MHz band) reports that they are receiving interference from an indoor base

¹² We refer to this as Frame Structure A in our Statement.

station, we may require this to be synchronised to the same frame structure so that all users can coexist without causing interference.

3.19 If Telefónica requests a variation of its licence to change the way it transmits, you will also need to have your licences varied and ensure that your transmissions still synchronise with Telefónica's. If this needs to happen, we will consult on this at the same time we consult on any proposed variation to Telefónica's licence, and licensees in the 2300 MHz shared spectrum will be notified so they can have their say.

3.8-4.2 GHz

- 3.20 We're not planning on imposing a synchronisation requirement in the 3.8-4.2 GHz band. However, we reserve the rights to mandate synchronisation at a later date if this turns out to be necessary to ensure spectrum is being used efficiently.
- 3.21 This means there's a small chance that if licensees in this band operating in very close proximity to each other happen to be using adjacent channels within the band, they may interfere with each other. In these situations, we'd encourage both parties to work together and reach a mutual agreement on how to avoid this. Measures to avoid interference might include users synchronising their transmissions.
- 3.22 If the licensees can't come to a mutual agreement to avoid interference within a reasonable time, say, within a few months, we may require the licensees to adopt a synchronisation regime which we consider to be appropriate in the circumstances. The factors that we may take into account when deciding an appropriate synchronisation regime may include which user deployed first in an area, and the size/extent of networks that have been deployed though we may also consider other factors depending on the circumstances of each case.
- 3.23 There's also a chance that if you use spectrum at the lower end of the band, you could possibly experience interference from users in the adjacent 3.6-3.8 GHz band. If you do have a problem with this, you may want to consider adopting the synchronisation requirement which we have outlined for users of the 3.6-3.8 GHz band.¹³ You could also consider other methods of protecting yourself from interference, such as screening your site from unwanted transmissions.
- 3.24 Since it's possible that you might have to synchronise with other users, or adopt a different synchronisation regime if we do in the future choose to impose one, we would recommend that you bear this in mind when procuring your radio equipment. If the equipment you buy isn't capable of synchronising with other users in these ways, you may have to replace it if we mandate synchronisation in the future.

¹³ This is outlined in paragraphs 11.32-11.36 of the consultation on the award of the 700 MHz and 3.6-3.8 GHz spectrum (<u>https://www.ofcom.org.uk/ data/assets/pdf file/0019/130726/Award-of-the-700-MHz-and-3.6-3.8-GHz-spectrum-bands.pdf</u>) and in conditions 12 and 13 of the draft 3.6-3.8 GHz licences (<u>https://www.ofcom.org.uk/ data/assets/pdf file/0019/130726/Award-of-the-700-MHz-and-3.6-3.8-GHz-spectrum-bands.pdf</u>) and in conditions 12 and 13 of the draft 3.6-3.8 GHz licences (<u>https://www.ofcom.org.uk/ data/assets/pdf file/0019/130726/Award-of-the-700-MHz-and-3.6-3.8-GHz-spectrum-bands.pdf</u>) and in conditions 12 and 13 of the draft 3.6-3.8 GHz licences

⁽https://www.ofcom.org.uk/__data/assets/pdf_file/0014/130730/Annexes-19-26-licences-and-licence-procedures.pdf)

4. The medium power Shared Access licence

- 4.1 The medium power licence will authorise a single base station and any connected terminal stations. Additionally, mobile terminal stations in the 1800 MHz and 2300 MHz shared spectrum will be licence exempt.
- 4.2 The medium power licence is available for the 1800 MHz and the 3.8-4.2 GHz band, but it's not available for the lower 26 GHz band. It's also not currently available in the 2300 MHz shared spectrum. We will need to gather more evidence before making outdoor low power and medium power uses more generally available in the 2300 MHz shared spectrum.
- 4.3 We think that this licence could be suitable for users who need a longer transmission range from their base station, but don't expect to need to change the locations of base stations once they're deployed. This could suit providers of Fixed Wireless Access (FWA) services in rural areas, along with industrial or enterprise users with sites spread over a larger area, such as ports, agriculture or forestry. It could also be suited to providing mobile coverage extension schemes in rural areas, as the 1800 MHz and 2300 MHz shared spectrum bands are in wider bands which already support mobile technology.
- 4.4 Users will not be permitted to deploy wide area networks in the 3.8-4.2 GHz band; this includes national or regional mobile networks.

Availability in rural areas

- 4.5 In our Statement, outlining how we came to our decision on the approaches for these new licence products,¹⁴ we explained that we think users of the low power Shared Access licence are more likely to want to deploy in urban areas. We expect that if we allowed medium power users to deploy in urban areas, with their higher power and increased range, this could risk low power users suffering from limited or no availability of spectrum.
- 4.6 For this reason, we will generally only consider applications for medium power in rural areas. We currently define "rural areas" as:
 - any location in England or Wales in an ONS 2011 Census Output Area which falls into categories D1, D2, E1, E2, F1 or F2 (i.e. "town and fringe", "villages" and "hamlets and isolated dwellings");¹⁵
 - b) any location in Scotland which falls into categories 3-8 based on the Scottish Government's 8-fold Urban Rural Classification;¹⁶ and

¹⁵ Office of National Statistics, "2011 Rural/Urban Classification",

¹⁴ Ofcom, Enabling wireless innovation through local licences: Shared access to spectrum supporting mobile technology, 25 July 2019, <u>https://www.ofcom.org.uk/__data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-locallicensing.pdf</u>

https://www.ons.gov.uk/methodology/geography/geographicalproducts/ruralurbanclassifications/2011ruralurbanclassific ation

¹⁶ Scottish Government, "Scottish Government Urban Rural Classification",

https://www.gov.scot/Topics/Statistics/About/Methodology/UrbanRuralClassification

- c) any location in Northern Ireland which falls into bands E-H of the Northern Ireland Statistics and Research Agency's settlement classification bands.¹⁷
- 4.7 We're currently working on an interactive map for the Ofcom website, so that users can check to see if locations where they'd like to deploy are categorised as "rural" or "urban". We expect this tool to be ready to use by the time we open applications for Shared Access licences by end 2019.

Medium power operation in urban areas

- 4.8 Our general guidance on the availability of medium power licences being limited to rural areas means there could be some legitimate users who may not be able to deploy using this licence.
- 4.9 If you think you are one of these users, you can contact <u>spectrum.licensing@ofcom.org.uk</u> to discuss your application. We may consider exceptions to allow medium power licences in urban areas on a case-by-case basis.
- 4.10 In assessing whether to allow a medium power licence application in an urban area, there are several factors we'll be looking for as the applicant, you'll have to provide us with some evidence supporting your case that we should allow your application.
- 4.11 Here are some of the key factors we're likely to consider (although this list is not exhaustive, and it could be that in your particular case some other factor not listed here is relevant):
 - a) What you want to do would not be technically possible using one or more low power licences; for example, you need the extra range made possible by the higher power limit in the medium power licence.
 - b) Emissions from your site, to the extent that these would be likely to reduce access to spectrum for other users, would not be higher using a medium power base station than they would using low power base stations. For example, this could be because in practice nobody else would be able to deploy anything near enough to your site to make any difference, because the land is owned or operated only by the one user. This could also be because your site is in some way shielded from the outside, for example if it is underground.
 - c) The boundaries between what's classed as a rural area and an urban area can be quite irregular. It could be that these boundaries place your site in an "urban" area even though surrounding locations with similar conditions on the ground have been classed as "rural".

¹⁷ Northern Ireland Statistics and Research Agency, "Urban-Rural Classification", <u>https://www.nisra.gov.uk/support/geography/urban-rural-classification</u>

Using the licence at sea

- 4.12 Any location which falls outside one of the "rural areas" defined in paragraph 4.6 above, but which falls inside the limits of the UK's territorial seas, will also be treated as a rural area.
- 4.13 For any location further out to sea than this, you should consider a different licence product, such as a Spectrum Access Offshore licence. Any equipment installed on a ship may also have to be recorded on a separate Ship Radio licence. You can find more information about these on the Ofcom website.¹⁸

Technical conditions

4.14 The table below outlines the technical licence conditions for the medium power Shared Access licence. You should consult the licence for the full technical conditions.¹⁹

¹⁸ <u>https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences</u>

¹⁹ Ofcom, Enabling wireless innovation through local licences: Annexes 6-10, 25 July 2019,

https://www.ofcom.org.uk/__data/assets/pdf_file/0036/157887/annexes-6-10-licences-and-interface-requirements.pdf

	Parameters by band						
Condition	1800 MHz shared spectrum	2300 MHz shared spectrum	3.8-4.2 GHz				
Permitted deploymentRural areasOutdoor antenna systems limited to 10m height above ground		Rural areas Outdoor antenna systems limited to 10m height above ground Initially limited availability	Rural areas				
Authorised bandwidth	2 x 3.3 MHz	10 MHz	10, 20, 30, 40, 50, 60, 80 and 100 MHz				
Maximum base station power (EIRP) per sector	42 dBm / carrier (up to 3 MHz) ²⁰	42 dBm / carrier (up to 10 MHz)	42 dBm / carrier for carriers ≤20 MHz; or 36 dBm/5 MHz for carriers > 20 MHz				
Maximum terminal station (TRP for mobile/ nomadic or EIRP for fixed/ installed)	23 dBm	25 dBm ²¹	28 dBm ²² TRP 35 dBm / 5 MHz EIRP				
Frame structure requirements Not applicable		3:1 structure for all deployments	Not applicable (but see notes below)				

Table 8: Technical	licence conditions	for the medium	power Shared	Access licence
		for the meanant	porter onarea	/

4.15 The following tables outline the out of channel and in band/ out of band emissions limits for the three bands available under the medium power Shared Access licence.

²⁰ This power will only be available over 3 MHz of the 3.3 MHz bandwidth as existing power density requirements restrict the power in the first 200 kHz and last 100 kHz of the bandwidth.

²¹ The authorisation will list this as 25 dBm **including** a 2 dB tolerance consistent with the European harmonisation.

²² The authorisation will list this as 28 dBm **including** a 2 dB tolerance consistent with the European harmonisation.

Frequency offset from the lower frequency of the band edge	Maximum mean EIRP density
0 to 0.05 MHz	-33.6 + 153.3 x Δ _{FL} * dBm / kHz
0.05 to 0.1 MHz	-26 + 60 x (Δ _{FL} *- 0.05) dBm / kHz
0.1 to 0.2 MHz	-23 + 300 x (Δ _{FL} *- 0.1) dBm / kHz
0.2 to 3.2 MHz	42 dBm / carrier
3.2 to 3.3 MHz	-23 + 300 x (3.3 - Δ _{FL} *) dBm / kHz

Table 9: 1800 MHz shared spectrum base station in band emission limits

* Note: Δ_{FL} in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range 0 to +0.2 MHz and +3.2 to +3.3MHz)

Table 10: 1800 MHz shared spectrum	base station out of band	emission limits
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Frequency offset from the lower frequency of the band edge	Maximum mean EIRP density
-6.2 to -3.2 MHz	-55 dBm / kHz
-3.2 to 0 MHz	-45 + 10 x (Δ _{FL} *+ 0.2)/3 dBm / kHz
Frequency offset from the upper frequency of the band edge	Maximum mean EIRP density
0 to 0.05 MHz	-23 - 60 x Δ _{FH} * dBm / kHz
0.05 to 0.1 MHz	-26 - 153.3 x (Δ _{FH} * - 0.05) dBm / kHz
0.1 to 2.8 MHz	-45 - 10 x (Δ _{FH} * + 0.2)/3 dBm / kHz
2.8 to 5.8 MHz	-55 dBm dBm / kHz

* Note: Δ_{FL} in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range -3.2 to 0 MHz)

 Δ_{FH} in MHz is the offset from the upper edge of the permitted frequency band at 1880 MHz (it has values in the range 0 to 2.8 MHz)

Frequency	Maximum mean EIRP density	
2385 to 2390 MHz	(Dmay 40) dDm / E MUZ EIRD par antenna	
2400 to 2403 MHz	(Pmax - 40) dBm / 5 MHz EIRP per antenna	
2300 to 2385 MHz	(Pmax - 43) dBm / 5 MHz EIRP per antenna	
Above 2403 MHz	(Pmax - 41) dBm / 5 MHz EIRP*	

Table 21: 2300 MHz shared spectrum base station out of band emission limits

* The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antenna.

Pmax is the maximum mean carrier power for the base station in question.

Table 32: 3.8-4.2 GHz base station out of channel emission limits

Frequency offset	Maximum mean EIRP density
-5 to 0 MHz offset from lower channel edge	(Pmax - 40) dBm / 5 MHz
0 to 5 MHz offset from upper channel edge	EIRP per antenna
-10 to -5 MHz offset from lower channel edge	(Pmax - 43) dBm / 5 MHz
5 to 10 MHz offset from upper channel edge	EIRP per antenna
Out of channel baseline power limit (BS) < -10 MHz offset from lower channel edge > 10 MHz offset from upper channel edge	(Pmax - 43) dBm / 5 MHz EIRP per antenna

Table 4: 3.8-4.2 GHz base station out of band emission limits

Frequency	Maximum mean EIRP density
3795 MHz-3800 MHz	(Pmax - 40) dBm / 5 MHz
4200 MHz-4205 MHz	EIRP per antenna
3760 MHz-3795 MHz	(Pmax - 43) dBm / 5 MHz
4205 MHz-4240 MHz	EIRP per antenna
Below 3760 MHz	-2 dBm / 5 MHz
Above 4240 MHz	EIRP per antenna

Synchronisation

- 4.16 Synchronisation is not required in
 - a) the 1800 MHz shared spectrum,
 - b) the 3.8 4.2 GHz and
 - c) the lower 26 GHz band.
- 4.17 Synchronisation is required in the 2300 MHz shared spectrum. There may be some circumstances where it is required in the 3.8-4.2 GHz band.

2300 MHz shared spectrum

4.18 If you have a licence for the 2300 MHz shared spectrum, you will need to make sure your transmissions are synchronised with those of the adjacent user in the 2350-2390 MHz band (this is Telefónica). You will need to use the frame structure in the diagram below and Coordinated Universal Time (UTC) as the common reference time. A new frame should start at the start of the UTC 1 second boundary.

Figure 7: Frame structure for 2300 MHz shared spectrum²³

DI/III ratio	Subframe number									
DL/UL ratio	0	1	2	3	4	5	6	7	8	9
3:1	D	S	U	D	D	D	S	U	D	D

4.19 This frame structure means:

- timeslots (or subframes) 0, 2 to 5 and 7 to 9 must be allocated to Downlink (D) or Uplink (U) transmissions as indicated or may be left with no transmissions;
- the licensee must ensure that the special subframe (S) in timeslots 1 and 6 has a structure that is compatible with TD-LTE special subframe configuration 6, also known as 9:3:2;
- all timeslots must be 1 millisecond in duration and the frame must start at a common reference time so that frames are aligned with Telefónica and transmissions synchronised; and
- TD-LTE frame configuration 2 (3:1) is compatible with this frame structure. Other technologies are permitted provided that the requirements are met.
- 4.20 If Telefónica requests a variation of its licence to change the way it transmits, you will also need to have your licences varied and ensure that your transmissions still synchronise with Telefónica's. If this needs to happen, we will consult on this at the same time we consult on any proposed variation to Telefónica's licence, and licensees in the 2300 MHz shared spectrum will be notified so they can have their say.

3.8-4.2 GHz

- 4.21 We're not planning on imposing a synchronisation requirement in the 3.8-4.2 GHz band.However, we reserve the rights to mandate synchronisation at a later date if this turns out to be necessary to ensure spectrum is being used efficiently.
- 4.22 This means there's a small chance that if licensees in this band operating near each other happen to be using adjacent channels within the band, they may interfere with each other, particularly if deploying antenna heights significantly above the surrounding clutter. In these situations, we'd encourage both parties to work together and reach a mutual agreement on how to avoid this. Measures to avoid interference might include users synchronising their transmissions.

²³ We refer to this as Frame Structure A in our Statement.

- 4.23 If the licensees can't come to a mutual agreement to avoid interference within a reasonable time, say, within a few months, we may require the licensees to adopt a synchronisation regime which we consider to be appropriate in the circumstances. The factors that we may take into account when deciding an appropriate synchronisation regime will probably include which user deployed first in an area, and the size/extent of networks that have been deployed though we may also consider other factors depending on the circumstances of each case.
- 4.24 There's also a chance that if you use spectrum at the lower end of the band, you could possibly experience interference from users in the adjacent 3.6-3.8 GHz band. If you do have a problem with this, you may want to consider adopting the synchronisation requirement which we have outlined for users of the 3.6-3.8 GHz band. You could also consider other methods of protecting yourself from interference, such as screening your site from unwanted transmissions.
- 4.25 Since it's possible that you might have to synchronise with other users, or adopt a different synchronisation regime if we do in the future choose to impose one, we would recommend that you bear this in mind when procuring your radio equipment. If the equipment you buy isn't capable of synchronising with other users in these ways, you may have to replace it if we mandate synchronisation in the future.

5. Licence fees and non-technical licence conditions

Licence fees

- 5.1 We've set the fees for the Shared Access licence to be cost-based; this means the amount we charge has been calculated to make sure Ofcom recovers the costs of administering the licence.
- 5.2 Demand for these new licences is currently uncertain and we will keep fees under review as we gather more evidence on actual use. We expect to consult on proposals to change the fee if we believe there is evidence to do so.
- 5.3 The fees below are all applicable per licence this means you'll pay for each low power area you have a licence for, and each medium power base station you have a licence for. The fees are payable annually.

1800 MHz and 2300 MHz shared spectrum, and 3.8-4.2 GHz band

5.4 For the lower three shared access bands, we are charging fees based on the bandwidth used – this only makes a big difference for the 3.8-4.2 GHz band, as the 1800 MHz and 2300 MHz shared spectrum only have one channel each. This means that licence fees for the lower three shared access bands look like this:

Table	54:	Licence	fees by	v bandwidth	for the	Shared	Access	licence
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Channel size	Price per channel
2 x 3.3 MHz	£80
10 MHz	£80
20 MHz	£160
30 MHz	£240
40 MHz	£320
50 MHz	£400
60 MHz	£480
80 MHz	£640
100 MHz	£800

26 GHz band

- 5.5 For the 26 GHz band, the fee we are charging does not change based on the bandwidth the user applies for; this is because there is more spectrum available in this band compared to the lower three bands.
- 5.6 For the 26 GHz band a licence will cost **£320** regardless of how much bandwidth you use.

Non-technical licence conditions

- 5.7 Below is an overview of the main non-technical licence terms and conditions which are common to both the low power and medium power Shared Access licences.
- 5.8 It is your responsibility to ensure that you understand and can meet the licence obligations, and you should look at the example licences we have included in our Statement to see these and the other conditions in full.²⁴

Licence duration and revocation

Duration

- 5.9 The Shared Access licence is indefinite; as long as you pay your licence fees each year and don't break any of the licence terms and conditions, you can keep it for as long as you like.
- 5.10 If, however, you would like a licence of less than one year, we can issue a short-term licence. This would mean you would not have to pay the full annual licence fee as we would charge you pro rata per month, based on how long you wanted the licence for. There is a minimum licence fee of £32 per licence if you do this, however, as we have to recover the cost to Ofcom of issuing and administering the licence.

Revocation, including for non-use

- 5.11 You should also be aware of the requirement in the licence to continue transmitting, which is in clause 6 of the Shared Access licence. This clause means that if you don't start transmitting within six months of getting your licence and remain operational after this, we can revoke your licence with one month's notice. We're including this condition so that new users aren't prevented from deploying their equipment by existing users who are no longer operational but have not surrendered their licences, or by users who acquired more spectrum than they needed in order to make it harder for other companies to compete.
- 5.12 We can also revoke your licence for spectrum management reasons. We normally only do this if we intend to change the way the band is used, and we currently do not have any plans to do this as we have only just introduced the new licensing regime. Should we consider repurposing the band for alternative use, we will give a reasonable notice period. This will be longer than one month and would not occur without us first conducting a

²⁴ Ofcom, Enabling wireless innovation through local licences: Annexes 6-10, 25 July 2019, <u>https://www.ofcom.org.uk/__data/assets/pdf_file/0036/157887/annexes-6-10-licences-and-interface-requirements.pdf</u>

formal consultation, of which current users would be notified. The timing of any such process would be informed by an assessment of the impact of our decision.

5.13 Finally, if you break the terms of your licence, or if you're causing interference to other users and don't cooperate with us to stop the interference, we can also revoke your licence because of this. Again, you would be given one month's notice for this.

Trading the licence to someone else

- 5.14 Users are allowed to transfer their rights to access spectrum (and their obligations to pay the associated fees, and stick to the licence conditions) to another party by trading them.This might be especially relevant if one company is acquired or bought out by another.
- 5.15 We allow two kinds of trade:²⁵
 - a) **Outright total trades**, where all the rights and obligations of the licence are completely transferred to one user; or
 - b) **Concurrent total trades**, where all the rights and obligations of the licence are completely transferred to two or more users.

Keeping records and providing information to Ofcom

- 5.16 As part of Ofcom's duty to manage spectrum efficiently, our standard licence terms and conditions include a provision which says that licensees are required to provide information to us if we request it. The Shared Access licence includes this condition, and you'll therefore need to keep records of your deployments in case we ask you for them.
 - a) If you have a **low power licence**, you'll need to keep a record of the address, antenna type and antenna height above ground for all base stations.
 - b) If you're using **fixed terminals**, with either the low or medium power licence, you'll need to keep a record of the location (using the National Grid Reference system to 1m resolution), antenna type and antenna height above ground.
 - c) If you're using mobile terminals in the 3.8-4.2 GHz band, with either the low or medium power licence, you'll need to keep a record of the number of terminals, and the address of the site or building where the terminals will be operating. This is to make sure that mobile terminals are only used within the user's site, and are not used to form part of a regional or nationwide public mobile network, as the Shared Access licence is not intended for this.
- 5.17 Recording this information is important because if somebody has a problem with interference, it will help us narrow down the source if we need to investigate it. This information will also be needed if we move towards a DSA approach in the future (see Section 2) and all equipment will need to be recorded in order to access spectrum.

²⁵ You can find more information on trading in Ofcom's Trading Guidance Notes (<u>https://www.ofcom.org.uk/___data/assets/pdf_file/0029/88337/Trading-guidance-notes.pdf</u>)

5.18 Any commercially sensitive information which you give to us is subject to a number of different legal provisions which govern how we keep and use it. These provisions include the Wireless Telegraphy Act 2006, the Communications Act 2003, the Data Protection Act 2018, the Freedom of Information Act 2000 and the Environmental Information Regulations 2004.

Accessing, modifying and shutting down your equipment if something goes wrong

- 5.19 The Shared Access licence includes terms that allow Ofcom to instruct you to provide access to, modify or shut down your equipment but we will only do this if there is a problem of some sort that we consider requires such action.
- 5.20 For example, we could need to do this are if an emergency meant that some sort of equipment for public safety needed to be deployed, and your equipment would interfere with this.
- 5.21 Another example might be if your equipment was causing interference to another user. We might request that you modify your equipment parameters and change the way it transmits so that both you and the other user can transmit without interference. For instance, if we were to require users to synchronise their transmissions (we talk about this at the ends of Section 2 and 3), this provision allows us to do that.

Changing frequency if we ask you to do so

- 5.22 In Section 2, we outlined that your Shared Access licence will also allow Ofcom to request that you change frequency from time to time. We may do this because we want to accommodate new users in the same area or on the same frequency, or if we need to deal with interference.
- 5.23 If we need to do this, we will email you the frequency you need to change to, and the time by which you will need to have changed frequency by. This means that you will have to deploy equipment that can be tuned across an entire band (that is, for the 3.8-4.2 GHz band and 26 GHz band where this is relevant).

6. Mobile Network Codes and telephone numbers

Introduction

- 6.1 For some mobile technologies to work, they may require the mobile network to be identified by a Mobile Network Code (MNC) and may require the use of telephone numbers.
- 6.2 It is Ofcom's duty to administer the UK's National Telephone Numbering Plan, including MNCs and telephone numbers. Allocations of numbers to communications providers for public network use is carried out via Ofcom's Number Management System (NMS).²⁶ Our policy is not to allocate an exclusive MNC or telephone numbers for use in private networks.

MNCs

- 6.3 For private networks needing to input an MNC, the International Telecommunications Union (ITU) has made available the Mobile Country Code (MCC) 999 for internal use within a private network.²⁷ Users are able to select any two- or three-digit code for their network. No interaction with ITU or Ofcom is required for using an MNC under this MCC for internal use within a private network. However, please note that as they are not subject to assignment, they are not unique.
- 6.4 Licensees wishing to deploy a public network and in need of an MNC should apply for allocation via NMS. Any questions may be directed to Ofcom's Numbering Team directly by emailing <u>numbering@ofcom.org.uk</u>.

Telephone numbers

- 6.5 Ofcom's NMS allows communications providers to apply for the allocation of numbers and to manage their existing resource. Communications providers are required to provide certain information when applying for numbers. Ofcom will only allocate numbers to communications providers and only for use in public networks.
- 6.6 For those companies wanting to provide telephony services using VoIP and/or WiFi, and for interconnection with other networks, various number ranges are available. We encourage providers to consider the number types available for allocation, including, for example, 056 Location Independent ECS numbers. We also allocate National Signalling Point Codes (NSPCs), if required. Further information is available on Ofcom's website.²⁸

²⁶ <u>https://ofcom.force.com/NMS_LoginPage</u>

²⁷ Appendix III ITU-T E.212, <u>https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-E.212-201807-I!Amd1!PDF-E&type=items</u>

²⁸ <u>https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/numbering</u>

7. Contact details

Ofcom, Riverside House, 2a Southwark Bridge Road, London, SE1 9HA Tel: 020 7981 3000 Fax: 020 7981 3333 Website: <u>Ofcom | Spectrum</u>

All enquiries to **Spectrum Licensing Team** Email: <u>spectrum.licensing@ofcom.org.uk</u>

8. Document history

8.1 This is a live document, and we may change it from time to time to update it with new information. Any changes that have been made on the document history is outlined at the table below.

Version	Date	Changes
1.0	July 2019	First published
1.1	December 2019	Changes to reflect that licences are now available for application
1.2	July 2020	Clarification that airborne use is not permitted, users have up to 30 days to pay for invoice and users should deploy equipment that can tune across entire band to ensure continuity of access
1.3	July 2022	Changes to Section 7 Contact Details
1.4	September 2022	Update 26 GHz out of band transmission limits.