Enhancing the Shared Access framework

Statement on further measures to support licensees and enable new use cases

Statement

Published 2 December 2024

For more information on this publication, please visit Statement and further consultation: Supporting increased use of shared spectrum

Contents

Section

1. Overview....3
2. Introduction....5
3. Supporting new use cases and facilitating efficient use of spectrum....13
4. Impact assessment and legal framework....29
5. Implementation and next steps....37

Annex

A1. Greater London Area Definition....40
A2. Shared Access Licences....41

1. Overview

1.1 Ofcom made Shared Access spectrum available in 2019 to support a range of emerging wireless services, and meet demands from new and existing players for localised access to mobile spectrum. Our aim was to support innovation and enable the growth that such new use cases promised, and to ensure efficient use of the spectrum by facilitating sharing between existing users and emerging demands.

1.2 We began a review in 2023, to learn from stakeholder experiences and our own experience of administering the framework. We wanted to identify best practice and ensure that the framework continued to support sustainable growth and innovative use cases. In our July Statement[1] we confirmed a package of measures to provide more flexibility to users, facilitate more effective spectrum sharing and increase spectrum supply. We also took steps to simplify and improve the licensing experience for users and have recently published an updated map of spectrum supply, to assist stakeholders in making their applications.

1.3 As a result of the increased spectrum supply, we identified new opportunities to support users. We therefore consulted on additional proposals to liberalise access to Medium Power licences in urban areas and remove a terminal registration requirement from Low Power licences (to allow more 'neutral host' style deployments). This document sets out our decisions on these additional proposals.

1.4 The decisions we are taking today, in combination with those we made in July, give licensees increased freedom to innovate and support more shared use of the spectrum.

What we have decided – in brief

- **We will remove the Terminal Registration Requirement (TRR) for all Low Power deployments (including outdoor use) in the 3.8-4.2 GHz band.** At present, users are required to keep records for mobile terminals connected to base stations in this band. This change opens new opportunities for 'neutral host' style deployments, with the potential to improve network coverage for outdoor and campus locations.
- **We will allow licensees easier access to Medium Power in most urban areas in the UK, in the 1800 MHz and 3.8-4.2 GHz bands.** This will streamline the licensing process, making it simpler and quicker to access Medium Power licences, which can unlock the business case for new applications.
- **We will also implement three balancing measures to ensure that Medium Power use is managed appropriately:**
- *limit to 100 MHz the spectrum that can be held by a Medium Power user in a given urban location*. This aims to ensure no single user exhausts spectrum supply in an area.

[1] Statement and consultation: supporting the increased use of shared spectrum. Ofcom, July 2024.

- *retain our 'exceptions process' in Greater London, to help manage supply and demand.*[2] This aims to encourage carefully planned deployments that preserve opportunities for more sharing.
- *set a new price point of £160 per 10 MHz, per annum, for urban Medium Power licences.* This is designed to incentivise Low Power usage where it would still meet user needs.

Next Steps

1.5 We will now move to implement the decisions we have confirmed today (alongside those steps set out in our July Statement which remain in our implementation pipeline).[3]

1.6 We are keen to make changes quickly to deliver benefits for stakeholders. To ensure the best user experience, we also need to ensure that more complex system changes are thoroughly tested and integrated with our wider programme of work to evolve our licensing platform. Consequently, whilst we can make some changes today, measures that require system changes to our spectrum management software, or require new regulations to be made (e.g. fee changes), will take longer.

1.7 Our implementation plan for these measures is set out below. We will use our licensing updates page to share any updates on our Shared Access implementation pipeline.[4]

Table 1: Implementation plan for changes being confirmed today

Timing	Change to be made
Changes we are making now	○ New Low Power licences in 3.8-4.2 GHz will omit the TRR (with variations available on request for existing licensees) ○ Medium Power licences available in urban areas (with a 100 MHz limit, and an exception process in Greater London)
Changes we will implement in the second half of 2025	○ New fee for Medium Power in urban areas in the 1800 MHz and 3.8-4.2 GHz bands

1.8 Effective spectrum sharing requires a balance between each user's preferences and the needs of other users with whom they share spectrum. In undertaking this review, we have sought to strike that balance, in light of stakeholder feedback and our experience of administering the Shared Access framework. We have benefitted from the openness and spirit of sharing in which licensees have engaged with us, and each other.

1.9 We will continue to engage with stakeholders and learn from experiences in the coming years. If new opportunities for further sharing were to emerge, we would expect to consult on any new measure to ensure our framework continues to support the innovation and growth we want to enable.

[2] The existing requirement to submit an exception request for antenna above 10m remains in all urban areas. We are not changing our approach to rural areas, so this process continues to apply in rural areas for the 1800 MHz band but is not required for rural areas in the 3.8-4.2 GHz band.
[3] This pipeline includes making 2320-2340 MHz available for Low Power indoor use in the first half of 2025, a step we confirmed in our July Statement subject to a formal agreement from the MoD, which is now in place.
[4] Information on significant updates to this pipeline will also be cascaded through Ofcom's spectrum update emails, which can be subscribed to here.

2. Introduction

2.1 In 2019, we recognised emerging demand from new and existing stakeholders for direct access to spectrum, on a localised basis, in bands with existing or developing ecosystems for mobile equipment.

2.2 We envisaged that the Shared Access framework - offered across a range of bands - could support a broad set of potential use cases, from new private networks for industrial connectivity to Fixed Wireless Access for rural broadband.

2.3 We made spectrum available to support this diverse mix of potential users across four frequency bands: 1800 MHz, 2.3 GHz, 3.8-4.2 GHz, and 26 GHz. These spectrum options give users the opportunity to design their own networks and tailor solutions to meet their needs, such as specific latency and reliability requirements.[5]

2.4 We introduced a mix of Low Power and Medium Power licences across these bands, with cost-based fees (that increase with bandwidth).

2.5 Licensees share spectrum, with a variety of different users coordinated by Ofcom to ensure they can coexist in the same spectrum band. To support this flexible sharing, we also ask licensees to be frequency agile with the equipment they use.

Figure 1: Overview of typical Shared Access uses

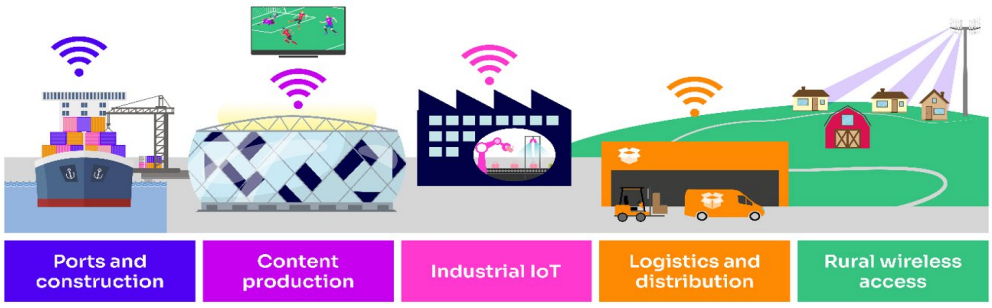


Table 2: Overview of Technical Parameters put in place in 2019 (yellow highlights indicate 2019 parameters that will be changed as a result of this review)

	Low Power	Medium Power Rural	Medium Power Urban
1.8 GHz	24 dBm per carrier Outdoor antenna up to 10m	42 dBm per carrier Antenna up to 10m	Exception Only
2.3 GHz	24 dBm per carrier Indoor only	NA	NA

[5] Dedicated spectrum access can support very high bandwidth applications and meet stringent quality of service requirements in ways other models may sometimes not.

	Low Power	Medium Power Rural	Medium Power Urban
3.8-4.2 GHz	24 dBm for carriers up to 20 MHz[6] Outdoor Antenna up to 10m	42 dBm for carriers up to 20 MHz[7] No height limit	Exception Only
26 GHz[8]	23 dBm per 200 MHz Indoor Only	NA	NA

Current demand and supply

2.6 We have seen significant demand and take up for Shared Access licences since the framework was introduced in 2019.

2.7 In our July Statement we noted that from late 2023, we observed a reduction in the total number of licences on issue. We attributed this to changes from a small number of licensees, and said we considered there remained a steady demand for new licences.[9] We now see this reflected in an overall increase in licences on issue from 875 in July 2024 to 988 in November 2024. This includes an increase of almost 70 licences in the 3.8-4.2 GHz band.

Table 3: Live Shared Access licences by band and power level as of 5th November 2024 (plus comparison with overall levels reported in July 2024)

	1800 MHz	2.3 GHz	3.8-4.2 GHz	26 GHz	Total
Low Power Licences	268	29	212	1	510
Medium Power Licences	126	NA	352	NA	478
Total November Licences	394	29	564	1	988
Delta to July Totals	+45	-	+68	-	+113

2.8 Our ability to issue licences and meet stakeholder demand is impacted by the amount of spectrum available in the locations of interest in each band.

2.9 In response to stakeholder feedback, we have introduced a new searchable map of spectrum supply across the UK for the popular 3.8-4.2 GHz band. This enables prospective applicants to check likely spectrum availability before making an application.

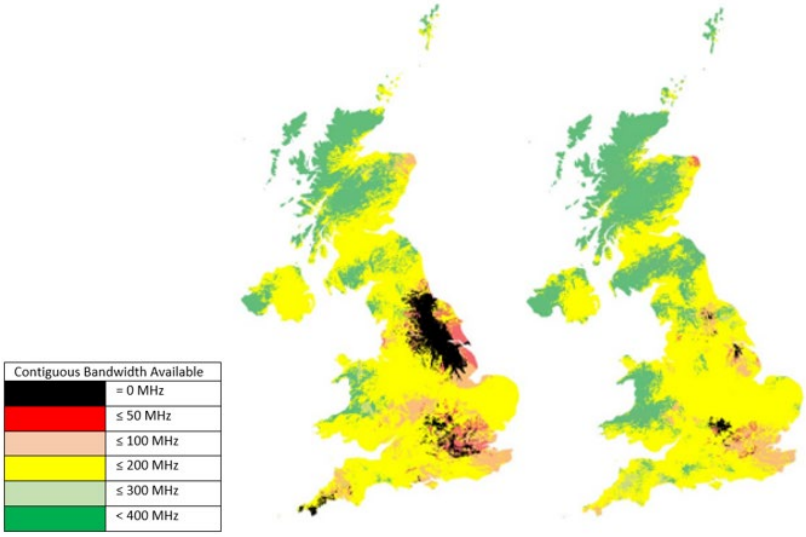
2.10 Today, our online map illustrates spectrum supply based on the coordination rules established in 2019. We will update this snapshot of spectrum supply as our licensing

[6] Or 18 dBm / 5 MHz EIRP per cell for carriers ≤ 20 MHz. NB these limits will increase by 3 dB after this review.
[7] Or 36 dBm / 5 MHz EIRP per cell for carriers > 20 MHz.
[8] We confirmed our decision to add additional spectrum to the framework at 26 GHz (including for outdoor and medium power use) in September 2023. We expect the new 26 GHz spectrum to be available shortly.
[9] We said in our July Statement that the reduction in 1800 MHz licences came almost entirely from BT surrendering some legacy licences that predated Shared Access. In 3.8-4.2 GHz, a significant proportion of surrendered licences relate to equipment upgrades (where old equipment required multiple licenses per site).

systems integrate the new coordination approach set out in our July Statement. We will also update the map quarterly to ensure this view of spectrum supply remains relevant.[10]

2.11 The map in Figure 2 below provides a view of this spectrum supply based on our 2019 coordination rules, and how this will evolve as we update our coordination approach. This improved supply should make it simpler and quicker to meet future demand for the spectrum.

Figure 2: Contiguous spectrum supply in the 3.8-4.2 GHz band, based on our 2019 rules (left) and new 2024 coordination rules (right), from the perspective of a Medium Power user [11]



Our Approach to this Review

2.12 We began reviewing our approach to Shared Access in 2023, to learn more about user experiences and likely use cases, and reflect on our own experience of administering the framework.

2.13 Through this review, we want to ensure our framework provides the best possible platform for innovation and growth. We also want to ensure the optimal use of the spectrum by providing opportunities for an increasing set of use cases and business models. To enable this innovation and growth, we also want to maintain a simple, user-friendly and relatively low-cost process to obtain a licence.

2.14 To do this we explored options to increase the available spectrum supply by updating our coordination approach. We focused particularly on how to ensure as many users as

[10] We are unable to publish details of every assignment in the 3.8-4.2 GHz band for confidentiality reasons. These maps are indicative and there are limited cases where an application could be rejected even if the map suggests that spectrum is available.

[11] Map based on analysis of June 2024 licensing data. Total spectrum supply across the band may exceed the amount of contiguous spectrum available.

possible can access the spectrum while managing the risk of interference. In light of this improved coordination approach and enhanced spectrum supply, we then explored further options to provide more freedom and flexibility for users.

Our July Statement

2.15 Our July Statement confirmed a number of changes aimed at improving the experience for stakeholders and supporting more user opportunities, summarised in Table 4 below.

Table 4: Summary of decisions taken in July

Outcome	Summary of decisions taken in July
Improvements to spectrum supply	In the 3.8-4.2 GHz band, we confirmed steps to significantly reduce separation distances between Shared Access users, based on changing our assumption that base stations are unsynchronised to the assumption that they are synchronised and that the dominant interference path is therefore between users' base stations and terminals.
	In 3.8-4.2 GHz we also confirmed an updated approach to coordinating with UK Broadband, and new Building Entry Loss assumptions.
	Across all Shared Access bands, we freed up applicants to make their own local coordination agreements (and will in future also allow users to select antenna envelopes from an antenna library as part of our coordination process to support more sharing).
	We confirmed that we would add 2320-2340 MHz to our Shared Access framework for Low Power indoor use only, reflecting the sharing arrangements agreed with the MoD.
Liberalising rules to support more use cases	We confirmed that in the future we will increase by 3 dB the maximum power limit of our 'Low Power' product in 3.8-4.2 GHz, supporting wider coverage and improving access to available equipment.
	We removed a requirement to maintain records for mobile terminals connected to Low Power indoor base stations in the 3.8-4.2 GHz band (the TRR'), enabling more 'neutral host' style solutions.

2.16 We also said that we were aiming to increase responsiveness and predictability for many Shared Access applications within our licensing process. As part of this, we confirmed a simple 'premises sterilisation test' to streamline our exceptions process.[12] We also indicated that we would provide a new map of spectrum availability (as shown above) and continue work with our spectrum management system supplier to support online applications for Shared Access licences.[13]

Our July Consultation

2.17 As a result of the improved supply that these decisions support, we considered whether there was an opportunity to go further in enhancing our framework, and provide even more flexibility in our Shared Access rules.

[12] This premises sterilisation test considers if the impacts of a deployment are equivalent to Low Power impacts (based on the coordination rules we established in 2019). If the number of premises impacted by the planned deployment does not exceed 44,200 for the 3.8-4.2GHz band or 57,000 for the 1800MHz band, we will grant the exception.

[13] In July, we said we planned to move applications online later this year. We provided an update on 25 October indicating that we had experienced delays in this programme of work. Online applications will now be made available next year, with further updates to be provided on our Licensing updates - Ofcom page.

2.18 We recognised that our framework for spectrum sharing must balance responsiveness to individual users' preferences with impacts on the wider sharing ecosystem, and overall efficient use of spectrum. The package of measures we proposed was configured to address this by providing more opportunities, whilst still managing how far a single user impacts others. By making it simpler for stakeholders to request higher operating powers without needing to request an 'exception,' we also envisaged we could speed up the process for stakeholders to access the spectrum.

2.19 We therefore proposed the measures set out in Table 5 below.

Table 5: Summary of July consultation proposals

Core Proposal	Further Explanation
○ **To enable new business models by removing the TRR for mobile terminals connected to Low Power outdoor base stations in the 3.8-4.2 GHz band**	○ We considered this could support new 'campus' style networks and local mobile capacity enhancements. ○ The proposal built on our decision to remove this requirement for Low Power indoor use. ○ We stopped short of proposing to remove the TRR for Medium Power, in part because of our wider policy objective that the band is not used for wide area mobile networks.
○ **Providing users with more freedom to operate at Medium Power in most urban areas (in the 1800 MHz and 3.8-4.2 GHz bands, at heights up to 10m)**	○ We recognised that easier access to Medium Power could reduce deployment costs and improve business cases in certain scenarios. ○ We sought to balance potential impacts on other sharers by proposing a 100 MHz limit on the amount of spectrum a user could hold in a single urban location,[14] and retaining our 'exceptions' process in the busy Greater London area. ○ We also proposed to double the fee for urban Medium Power licences. This reflects the greater impact that they have compared with Low Power. The higher fee would encourage users to consider whether Low Power could meet their needs.

2.20 In total, we received 17 responses to our consultation. Stakeholders provided very strong support for our proposal to remove the TRR from Low Power licences, with 13 responses in favour of this approach. Stakeholders did not raise any major objections, although a small number suggested we consider whether this requirement remained necessary for Medium Power too.

2.21 A majority of respondents supported our proposals to liberalise access to Medium Power licences (although two stakeholders opposed this proposal – Shure and DECT Forum). Our proposed balancing measures (and especially our proposal to double the fee for such licences) received a more mixed response. Many stakeholders acknowledged our objectives, but hoped we could provide localised flexibility and encouraged us to keep our approach - especially on fees - under review.

2.22 We provide more detail on our proposals, the responses we received and our decisions in light of this feedback, in Section 3. Our decisions continue to be informed by our overarching objectives for Shared Access to support innovation and growth, and to

[14] We defined this limit as applying within 500m of any urban base station for which a licensee held a licence.

encourage more sharing. In taking these steps to enhance our framework, we continue to seek the right balance between the preferences of individual users, their impacts on others and the best outcome for the ecosystem as a whole.

International and Technology Developments

2.23 Our approach to Shared Access has developed alongside ongoing international and technical developments to localised spectrum sharing.

2.24 Since we began our review, CEPT[15] have consulted on harmonising a sharing approach in the 3.8-4.2GHz band. These proposals and associated technical conditions were approved by the Electronic Communications Committee (ECC) in November 2024, in EEC Decision (24)01.

2.25 We welcome these steps towards building a broader sharing framework that supports a Europe wide ecosystem. We also consider that there is a strong overall alignment between the measures adopted by ECC, and our existing Shared Access framework. However, we will take time to consider the newly adopted proposals and consider whether any differences with the UK regime should be incorporated into our framework.[16]

2.26 Alternative models for localised spectrum access also continue to evolve. We note, for example, the Federal Communications Commission's consideration of changes to the CBRS framework, including changes to out of band limits, permitted power levels and the sensing protocol in the band.[17]

2.27 We also remain actively engaged in the Spectrum Sandbox projects announced by the Department for Science, Innovation and Technology in April 2024.[18] These projects include studies into opportunities for more dynamic and dense sharing in certain scenarios in the popular 3.8-4.2 GHz band. Alongside this wider work, Ofcom has also consulted on technical changes that would allow Three to use 5G Fixed Wireless Access technology under its licence for 3925-4009 MHz, and reduce the area sterilised by its assignments for other sharers in this band.[19]

2.28 We recognise the potential role that new technologies and data can play in improving sharing conditions, and will continue to monitor progress in these areas and consider opportunities to innovate in our own approach. We set out more detail on some of the issues we are considering in Section 5.

2.29 As a result, the development of the Shared Access framework will need to remain an iterative process and respond to demand and new technologies where appropriate. We consider that this responsiveness should be balanced with a continuity within the core regulatory framework that enables users to innovate with confidence. As we bring this review to a close, we will remain open to new developments that might allow more

[15] The European Conference of Postal and Telecommunications Administrations.
[16] We note that the ECC measures include 2 dB more power for Medium Power users (although they also include a lower limit for Low Power) and alternative provisions for out of band emissions.
[17] The Citizens Broadband Radio Service (CBRS) is a tiered approach to sharing spectrum at 3.5 GHz in the United Stated of America. See the FCC notice of proposed rule making for more details.
[18] More detail on the Spectrum Sandbox programme and ongoing projects can be found here.
[19] Consultation on optimal use of 3.9 GHz. Ofcom, May 2024.

freedom for licensees but also retain the opportunities for other users that a sharing framework must support.

Ofcom's Duties

2.30 Ofcom's statutory powers and duties in relation to spectrum management are set out primarily in the Communications Act 2003 (the "2003 Act") and the Wireless Telegraphy Act 2006 ("WT Act").

Communications Act 2003

2.31 Our principal duties under the 2003 Act are to further the interests of citizens and consumers in respect to communications matters, where appropriate by promoting competition. In doing so, we are also required (among other things) to secure the optimal use of spectrum and the availability throughout the United Kingdom of a wide range of electronic communications services.

2.32 When carrying out our spectrum management duties we must have regard to:

a) the desirability of promoting competition in relevant markets;
b) the desirability of encouraging investment and innovation in relevant markets;
c) the different needs and interests, so far as the use of the electro-magnetic spectrum for wireless telegraphy is concerned, of all persons who may wish to make use of it;
d) the desirability of ensuring the security and availability of public electronic communications networks and services; and
e) the different interests of persons in the different parts of the United Kingdom, of the different ethnic communities within the United Kingdom, and of persons living in rural and in urban areas.

2.33 In performing our duties, we are required under section 3(3) of the 2003 Act to have regard in all cases to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed, and any other principles appearing to Ofcom to represent best regulatory practice.

2.34 Further, in exercising certain regulatory functions, we must have regard to the desirability of promoting economic growth.[20]

Wireless Telegraphy Act 2006

2.35 We permit the use of the radio spectrum by granting wireless telegraphy licences under the WT Act. It is unlawful and an offence to install or use wireless telegraphy apparatus without holding a licence granted by Ofcom, unless the use of such equipment is exempted.

2.36 In carrying out our spectrum functions we have a duty under section 3 of the WT Act to have regard in particular to:

a) the extent to which the spectrum is available for use, or further use, for wireless telegraphy;

[20] Deregulation Act 2015, s108. Section 111 defines 'regulatory function'. The Economic Growth (Regulatory Functions) (Amendment) Order 2024 applies the duty set out in s108 to Ofcom.

b) the demand for use of that spectrum for wireless telegraphy; and
c) the demand that is likely to arise in future for such use.

2.37 We also have a duty to have regard to the desirability of promoting:

a) the efficient management and use of the spectrum for wireless telegraphy;
b) the economic and other benefits that may arise from the use of wireless telegraphy;
c) the development of innovative services; and
d) competition in the provision of electronic communications services.

2.38 Section 8(3B) of the WT Act says the terms, provisions and limitations specified in licences must be:

a) objectively justifiable in relation to the wireless telegraphy stations or wireless telegraphy apparatus to which they relate;
b) not such as to discriminate unduly against particular persons or against a particular description of persons;
c) proportionate to what they are intended to achieve; and transparent in relation to what they are intended to achieve.

Structure of this document

2.39 The remainder of this document is structured as follows:

a) Section 3 sets out our analysis and decisions on our consultation proposals;
b) Section 4 sets out the Impact Assessment that has informed our analysis and decisions;
c) Section 5 provides more detail on our implementation timeline and next steps.

3. Supporting new use cases and facilitating efficient use of spectrum

3.1 In this chapter, we set out the changes we are making to support greater user flexibility within the Shared Access framework, in light of our analysis and stakeholder feedback. We cover our decisions to:

a) enable new business cases by removing the TRR from Low Power licences in 3.8-4.2 GHz, to the extent that it applies to outdoor base stations and any mobile terminals connected to them;
b) enable easier access to Medium Power in urban areas in the 3.8-4.2 GHz and 1800 MHz bands, by removing the requirement for users to obtain an exception in most locations;

3.2 As part of our proposals to liberalise access to Medium Power licences, we also explain our decision to adopt three 'balancing measures' we proposed in July:

a) a limit of 100 MHz of spectrum that can be held per user in any urban location;
b) retaining exceptions in Greater London, to help manage supply and demand;
c) a new price point of £160 per 10 MHz, per annum, for these licences.

Removal of Terminal Registration Requirement for outdoor Low Power deployments

Introduction

3.3 In our July Statement we removed the TRR for Low Power indoor deployments, in light of stakeholder feedback and our own analysis.[21] We considered that this would open up new indoor use cases while having minimal impact on other users in the band.

Our July Proposal

3.4 In our July Consultation, we proposed removing the TRR for outdoor Low Power usage in the 3.8-4.2 GHz band. In making this proposal, we were responding to suggestions from several stakeholders to relax the TRR to enable more outdoor Low Power usage in the band. The proposal also reflected our analysis that this could support additional benefits. This included 'campus' style neutral host deployments, and scenarios where the ability to supplement an outdoor private network with additional mobile traffic tipped the business case in favour of a deployment.

3.5 Our July 2024 consultation considered three policy options:

a) Option 1: removing the TRR for all Low Power outdoor deployments;

[21] We introduced the TRR for all 3.8-4.2 GHz licences in 2019, alongside a general policy position that this spectrum should not be used to deliver wide area mobile networks.

b) Option 2: only removing the TRR for Low Power deployments in hybrid indoor/outdoor locations; or
c) Option 3: removing the requirement for all Medium Power deployments (in addition to Low Power outdoor use cases).

3.6 We considered Option 1 would best support our objectives, because it would provide increased flexibility and support for new business models with limited risk of unduly crowding out other users. We noted that Option 2 could entail significant complexity in generating new definitions for hybrid locations. We also noted that Option 3 appeared to increase the risk of mobile coverage focussed uses crowding out other innovations, and might pose a risk to our policy objective that this band is not used to assemble wide area mobile networks.

3.7 We therefore proposed Option 1, to remove the TRR for outdoor Low Power use in 3.8-4.2 GHz.

Summary of Responses

3.8 We received 13 substantive responses to this issue in our July Consultation, all of which supported our proposal to remove the TRR for Low Power outdoor use in 3.8 – 4.2 GHz.[22]

3.9 We received supportive responses with limited further comment from DECT Forum, Shure, The Federation of Communication Services, Nextivity and VMO2.

3.10 HP Enterprise, Dynamic Spectrum Alliance and UKWISPA also welcomed our proposal, and indicated that the removal of this requirement would support new applications in the band, including neutral hosts, FWA services and outdoor private networks. The BBC also supported our proposal on the basis that "mobile and nomadic terminal equipment used in Content Production operates in conjunction [with] and in close proximity to base station equipment."

3.11 Dense Air and Freshwave also supported our proposal to remove the TRR for Low Power outdoor use. However, they suggested we should go further and remove the TRR from Medium Power licences as well. Freshwave indicated that removing the TRR for Medium Power was important as such higher powers were needed to improve the technical viability of many outdoor neutral hosts solutions. They acknowledged that public mobile usage could impact other innovative use cases, but suggested we could mitigate this risk by confining non-TRR use to specific sub-band(s). Alternatively, Freshwave also suggested setting a lower premises sterilisation threshold to help limit impacts on other users.

3.12 BT also expressed support for our proposal on the basis that Ofcom clarified we would "not preclude use by individual MNOs to improve coverage and facilitation of neutral host providers". BT also asked us to clarify that the TRR does not apply to the 1800 MHz and 2300 MHz Shared Access bands, and to clarify our position on the use of these bands to support public mobile networks.

[22] We received 3 additional responses (marked 'non applicable') from Nokia, the Radio Society of Great Britain and an individual respondent. A further respondent did not comment on this issue.

Our Decision

3.13 Following careful consideration of stakeholder responses, we are **confirming the removal of the TRR for outdoor Low Power use cases** in the 3.8 – 4.2 GHz band.

3.14 Stakeholder responses strongly supported this approach, and provided further support for our analysis that lifting this requirement can potentially unlock additional use cases and improve the business case for certain private network deployments.

3.15 We received no significant evidence that there could be detrimental impacts from the proposal. There were no concerns that removing the TRR here would significantly increase the risk that spectrum supply would be exhausted by new applications benefitting from this change. We continue to think that, as set out in our July Consultation, any impact on spectrum supply is effectively mitigated by limiting the TRR removal to Low Power licences. This is because these deployments have small sterilisation and coverage areas, and are unlikely to be attractive for building out wide area networks that could preclude other users.

3.16 It remains our policy that the 3.8-4.2 GHz band should not be used to provide wide area networks. However, in response to BT's comments, we clarify that we are removing the TRR from all Low Power licences made available in the future.[23] [24] We see neutral hosts as one of the use cases - but not necessarily the only one - that could benefit from this change. We can also confirm that the TRR does not apply in the 1800 MHz and 2.3 GHz Shared Access bands.[25]

3.17 Whilst we have further considered the request from two stakeholders to remove the TRR for Medium Power, we remain of the view that this is not appropriate at this time. We explained in paragraph 5.41 of our July Consultation that our position had been developed in light of our policy that the band is not used to build wide area networks. We remain concerned that removing the TRR for Medium Power deployments could enable such an outcome and so reduce opportunities to access spectrum for other stakeholders.

3.18 We recognise Freshwave's suggestion that some bespoke solutions might be found to address our concerns. However, we do not currently consider their proposals practicable:

a) Because of the way that Shared Access licences have been issued, and the presence of other users of the spectrum, the frequencies available in an area vary from location to location. Consequently, it is not possible to identify a single channel for a specific purpose. Even if we sought to make changes to currently allocated frequencies to facilitate this, it would still have a limiting effect on wider spectrum supply.
b) Whilst different premises sterilisation thresholds could potentially be developed to incentivise more carefully planned deployments, this could also have the obverse effect

[23] We envisage that at Low Power it will not be practical to assemble a wide area network (and we would not wish any user to do so) but place no restriction on any user (including an MNO) deploying a small number of Low Power licences to provide capacity in limited locations.
[24] Existing Low Power licensees can also benefit from the same changes, but currently would need to request a licence variation from spectrum.licensing@ofcom.org.uk.
[25] The TRR was put in place in 2019 specifically for the 3.8-4.2 GHz band. We consider it unlikely that the relatively small amounts of spectrum available in the 1800 MHz and 2.3 GHz bands would be used to assemble wide area networks. As such the 1800 MHz and 2.3 GHz bands may be used by anyone who obtains a licence and meets those licence conditions, including MNOs.

of limiting more deployments, depending on how it was applied. Defining such a threshold or thresholds appropriately would also add to overall complexity for users.

3.19 We will closely monitor the adoption of Low Power outdoor licences with the TRR removed before considering further steps in this area.

3.20 We see the future of Shared Access as an iterative process and will continue to engage with stakeholders to understand any evolution in the risks and benefits we have identified with the remaining TRR provisions. We explain this approach further in Section 5, where we also outline potential developments we are exploring, which might in future provide new options to manage some of the risks we have identified.

Simplifying Access to Medium Power

Introduction

3.21 In our July Statement, we confirmed that we would continue to consider 'exceptions' for the use of Medium Power in urban areas and for antenna heights exceeding 10m.[26] [27] We streamlined this process by simplifying the tests we use to assess an exception.[28]

3.22 At the same time, we noted that our updated coordination approach in 3.8-4.2 GHz (and more modest changes in 1800 MHz) meant that the area sterilised by Medium Power deployments will be reduced in future. Our new coordination approach will also improve the overall levels of spectrum supply. This means (as shown in Figure 2 above) that many urban areas of the UK will have at least 200 MHz of spectrum available.

3.23 We considered that easier access to Medium Power could reduce deployment costs and so improve the business case for some deployments, potentially increasing the scope for investment and innovation. Given the reduced impact this would have on others, and the improved spectrum supply, we considered there was an opportunity to provide users in these frequencies with more flexibility, by relaxing the need to use 'exceptions' to access Medium Power. We also considered that this change could make it simpler and quicker for stakeholders to access the spectrum.

3.24 We acknowledged that we were not making the same reductions in sterilisation areas for 1800 MHz, since the new coordination approach we adopted for 3.8-4.2 GHz was not applicable to this band. However, we noted that some improvements were expected (largely because of improvements to the propagation model we are moving to). Given this, and the relatively geographically dispersed nature of licensees, we considered that the chances of easier access to Medium Power substantively limiting opportunities for others was also limited in the 1800 MHz band.

[26] When we established our Shared Access framework in 2019, we said that we would only allow Medium Power to be used in urban areas under exceptional circumstances. We set out a process to consider such 'exceptions', where a deployment would not have a major impact on opportunities for others.

[27] Exceptions are required for antenna heights exceeding 10m for all locations in the 1800 MHz band, and for urban locations only in the 3.8-4.2 GHz band.

[28] We grant exceptions when a proposed deployment impacts fewer than 57,000 premises in the 1800 MHz band, or 44,200 in the 3.8-4.2 GHz band.

Our July proposals

3.25 In light of our updated coordination approach and the potential benefits to users, we proposed to make Medium Power licences more readily available in urban areas.

3.26 **Specifically, we proposed that we would grant applications for Medium Power in urban areas that passed coordination with other users, in both the 1800 MHz and 3.8-4.2 GHz, for antenna heights of 10m or less, without needing to go through our exceptions process.**

3.27 However, we considered it would be sensible to include three balancing measures, to help ensure that demand did not outstrip supply in the longer term. We did this because we thought that unconstrained use of Medium Power in urban locations might in the long-term allow less sharing than Low Power use, all other things being equal. We considered this most relevant in busy locations or where very large bandwidths were being applied for, especially if an alternative Low Power use would have been sufficient.

3.28 Our proposed balancing measures were:

a) a requirement that a licensee not use more than 100 MHz of spectrum in a given location in the 3.8-4.2 GHz band.
b) retaining the exception process for Medium Power licences in Greater London, where spectrum supply is more limited, and there is significant Low Power use.
c) a new price for Medium Power licences in urban areas in 3.8-4.2 GHz and 1800 MHz, to encourage users to only request this extra power where it is required.

3.29 We summarise each of these proposals below.

Detail of our 100 MHz limit proposal

3.30 Although our licensed channels are limited to a maximum of 100 MHz, it has been possible for licensees to apply for multiple licences in the same location. Whilst we considered the incentives to do so in rural areas were limited (as each licence has a cost), we thought there might be more risk associated with Medium Power licences in an urban area. We did not want a single user in a particular location to exhaust the spectrum supply and foreclose opportunities for other users.

3.31 Consequently, we proposed a restriction that would limit a single urban user of Medium Power to 100 MHz in a given location. The specific elements of this proposal were:

a) the restriction would apply where:
    i) the licensee is granted a Medium Power licence in the 3.8-4.2 GHz band;
    ii) the same licensee holds another 3.8-4.2 GHz Medium Power licence(s) in an urban area within a radius of 500 m from the base station(s) authorised by their existing licence;
    iii) the frequencies authorised by the licences, taken together, cover more than 100 MHz of the 3.8-4.2 GHz band;
b) where the restriction applies, the licensee would not be able to use the base station authorised by the licence.

3.32 We noted that we intended to monitor this restriction (and take appropriate action where needed) through an audit process.[29] We explained that where we found the restriction had been breached there would be an opportunity for the licensee to request to vary one or more of its licences so that the restriction would no longer bite. We set out that we could also exercise our power under the licence to require the licensee to change its frequency within a timescale that we specify, or consider exercising our power under the licence to revoke one or more of the licensee's licences.[30]

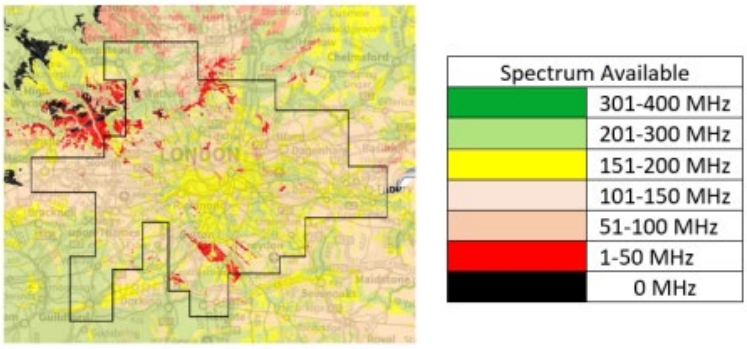
Details of our London exceptions proposal

3.33 We proposed to retain our 'exceptions' process for any Medium Power applications in Greater London (even for antenna heights below 10m). Under this process, we would assess whether the number of premises sterilised by a planned deployment exceeded a limit of 44,200 in 3.8-4.2 GHz and 57,000 in 1800 MHz. We did this because we expected there could be significant demand for Shared Access in London (as the UK's largest and most densely populated urban area) and supply was already quite limited.

3.34 Our demand assessment took account of the approximately 30 Low Power licensees we found were already operating in this area in July 2024, whilst our supply assessment took account of the significant impact of other services – including incumbent Fixed Links and Earth Stations in this area.

3.35 The relatively limited spectrum supply is shown below for the area we proposed to define as Greater London (based on the definition used to define High-Density areas in our 2023 mmWave Statement)[31].

Figure 3: Illustration of the available bandwidth in Greater London



A new price for Medium Power licences in urban areas in 3.8-4.2 GHz and 1800 MHz

3.36 Under the WT Act, we may, if we consider it appropriate in light of the matters to which we must have regard under section 3 of the WT Act, set licence fees which are higher than the costs incurred by carrying out our spectrum functions. These matters include the extent to which the spectrum is available; present and likely future demand; and the

[29] We acknowledged that an alternative to this audit approach might be to build in a requirement in our licensing software that precluded us from issuing licences that exceeded this limit, but that this came with potential costs and complexity which we did not consider proportionate.
[30] In considering this we would have regard to our policy position that a single licensee holding rights to more than 100 MHz under Medium Power licences in a single urban location may limit access for others.
[31] See page 37 of Annex 5 to our Statement Geographical boundaries of the 'Spectrum Access High Density 26 GHz' licences and the 'Spectrum Access High Density 40 GHz' licences

desirability of promoting efficient management and use of the spectrum, economic and other benefits, innovation and competition.

3.37 When determining an appropriate fee level, our proposal sought to balance the incentive towards efficient use with the potential impacts on user take up, and related investment and innovation. Setting higher fees creates a risk that we could inadvertently discourage efficient entry, investment or innovation.

3.38 We noted in our July Consultation that although our new coordination approach significantly improves spectrum supply, it remains the case that Medium Power will sterilise a much larger area than Low Power. [32] This could therefore reduce the number of innovative users we can accommodate in future.

3.39 Consequently, we proposed setting a moderately higher fee for Medium Power in urban areas than for Low Power. We considered this moderate increase could both help mitigate the risk of discouraging investment and encourage efficient use of spectrum (similar to the way existing Shared Access fees increase with bandwidth).

3.40 We considered an appropriate initial balance would be to set prices for Medium Power in urban areas at double the price of other Shared Access licenses, because:

a) a higher price reflects the potential for the increased range of Medium Power applications to limit more opportunities that could be available to other users;
b) this price increase would be conservative relative to the difference in the sterilisation effect;[33] and
c) we think it unlikely that this conservative price increase would materially harm business cases where Medium Power would be beneficial.

3.41 In line with the fees for other Shared Access licences, we proposed that the urban Medium Power fee would increase with bandwidth (at a consistent per MHz price), as set out below:

Table 6: Existing fees for urban Medium Power (by exception) and proposed new fees

Bandwidth	Current Fee Per Annum	Proposed Fee Per Annum
Up to 10 MHz[34]	£80	£160
20 MHz	£160	£320
30 MHz	£240	£480
40 MHz	£320	£640
50 MHz	£400	£800
60 MHz	£480	£960
80 MHz	£640	£1,280
100 MHz	£800	£1,600

[32] We estimated Medium Power might typically sterilise between 3-7 times as many premises as Low Power.
[33] We also considered that a conservative increase was appropriate given the uncertain impacts of a higher fee (and the location dependent uncertainties in actual sterilisation effects).
[34] This includes the fee for 2x3.3 MHz of the 1800 MHz spectrum for urban Medium Power.

Summary of responses and analysis

3.42 In this section we summarise and analyse stakeholder responses on:

a) Our general approach to Medium Power licences in urban areas;
b) Our 100 MHz limit proposal;
c) Our proposal regarding the exceptions process in Greater London;
d) Our proposed new price for urban Medium Power.

Summary of responses to our general approach to Medium Power

3.43 There was broad support for our proposals to make Medium Power more widely available in urban areas. This support was particularly strong for the 3.8-4.2 GHz band where several respondents noted that this could improve the business case for various deployment scenarios. This included VMO2, BT, Dense Air, Nextivity, the BBC, UKWISPA, HPE and Freshwave, who all agreed with our proposal.[35]

3.44 Nokia supported this proposal subject to Ofcom clarifying that the power limit in urban areas would align with the limit in rural areas. FCS also indicated that they were supportive, provided that there were no restrictions on who could apply for a licence.

3.45 Shure and DECT Forum both objected to our proposal to make Medium Power more widely available in most urban areas. This was for the following main reasons:

a) **Spectrum supply concerns:** They noted that one of Ofcom's 2019 objectives in launching the Shared Access framework had been to facilitate access and ensure that spectrum supply did not become a barrier to innovation. They noted that more use of Medium Power was likely to increase the risk of spectrum being consumed, and that this could crowd out future Low Power use. They noted that this issue was exacerbated in the 1800 MHz band. Shure explained this was because of the more limited bandwidth available while DECT Forum also said it was because we had not made significant changes to improve spectrum supply in this band.
b) **Coexistence concerns:** Both Shure and DECT Forum suggested that Ofcom had not explored the risk of negatively impacting existing DECT users above 1880 MHz.[36] They noted that risks from out of band emissions did not appear to have been considered by Ofcom, although these would become more common in urban areas where DECT users were also commonly present. DECT Forum highlighted previous studies by Real Wireless (2014-2015) indicating that there were potential issues co-existing with adjacent band LTE uses, and that Ofcom's impact assessment on this matter appeared lacking.

Our analysis on the overall approach to Medium Power in light of comments

3.46 We consider that easier access to Medium Power in urban areas has the potential to support more innovation and growth, by enabling improved coverage and capacity. Given the improved spectrum supply available in most urban areas (especially for 3.8-4.2 GHz) we also continue to consider that the prospect of such uses sterilising opportunities for other innovators is markedly reduced.

[35] We note that Freshwave's response related to the 3.8-4.2 GHz band only.
[36] Digital Enhanced Cordless Telephony operating in 1880-1900 MHz. Cordless telephones have been declared licence exempt by Ofcom. See: Ofcom, Licence Exempt Devices, 2023

3.47 The majority of respondents affirmed this analysis. We also clarify in response to Nokia's question that this proposal involves the same power levels as those in rural areas.[37]

3.48 We note the concerns raised by Shure and DECT Forum that, by enabling more Medium Power usage, there could be a potential impact on spectrum supply in the future.

3.49 We recognise that, all else being equal, a given area can likely support more Low Power users than Medium Power. However, in proposing easier access to Medium Power, we were also conscious of the practical requirements of users and the demand profile we have seen since launching Shared Access. This real-world take up is an important consideration in evaluating the efficient use of spectrum.

3.50 With the exception of London, we have seen relatively low demand for Low Power in urban locations, especially in the 3.8-4.2 GHz band. Medium Power use is more popular here, despite being largely limited to rural locations.[38] We expect our July decision to increase the power limit for Low Power by 3 dB in 3.8-4.2 GHz will improve the utility of that product, but consider it unlikely that further Low Power take up will exhaust supply in most locations. We recognise that there is less spectrum supply available in the 1800 MHz band, but also note that (as set out in paragraph 5.10 of our July Consultation) users of this band appear quite geographically dispersed, which should limit the practical impact of an increased coverage area. Our experience of exception requests also indicates that Low Power is unlikely to support all the use cases that could benefit from easier access to this remaining spectrum at Medium Power, for both the 1800 MHz and 3.8-4.2 GHz bands.

3.51 We recognise that there may be potential scenarios where very high uptake of Medium Power - which could bring its own benefits - could impact other users' access in future. Our updated coordination approach lessens sterilisation areas (especially for 3.8-4.2 GHz), meaning that the impact on other users resulting from a Medium Power deployment is decreased. We have further proposed certain balancing measures to address this risk and safeguard the efficient use of the spectrum (which we discuss in more detail at paragraph 3.60-3.89 below).[39] We therefore think that expanding access to Medium Power will help facilitate an increased level of take up to support a sustainable sharing framework over time, provided suitable mitigations are put in place to address potential future risks to spectrum supply.

Coexistence issues

3.52 There were no coexistence concerns raised by stakeholders regarding 3.8-4.2 GHz. However, we have carefully considered the concerns of Shure and DECT Forum regarding easier access to Medium Power licences outside Greater London in the 1800 MHz band.

3.53 We already permit Medium Power deployments in this band, and considered the impacts of this on other users as part of our 2019 decision. At that time, we considered that because we were not materially changing the existing technical conditions from previous regimes in this spectrum, potential impacts of adjacent band users were already factored into our rules.

---

[37] For the avoidance of doubt, the Medium Power product allows powers of 42 dBm for carriers ≤ 20 MHz and 36 dBm / 5 MHz for carriers > 20 MHz.

[38] We recognise that take up for Low Power has been proportionately greater for the 1800 MHz band.

[39] We set out in our consultation that we would continue to take an iterative approach to optimising this framework and that in future certain measures (including pricing) might need further amendments to secure the best outcomes as and where demand increases.

3.54 We are not proposing any change to these technical licence conditions. Whilst we have issued licences for Medium Power predominantly in rural areas, we have also issued a small number of Medium Power licences in urban areas under these rules. We have received no interference reports from these deployments.

3.55 Nevertheless, we have considered, given the concerns expressed, if the potential for more use in urban areas might raise new issues.

3.56 We acknowledge that, as highlighted by DECT Forum, a 2015 report by Real Wireless[40] identified circumstances in which high-power mobile use in an adjacent band might have an impact on some DECT channels. However, in the round this report and several other previous studies (Real Wireless 2014[41], ECC report 297[42] and CEPT Report 41[43]) have suggested that co-existence is possible between DECT and high-power mobile use in adjacent spectrum in the 1800 MHz band.

3.57 The risk of interference increases where both users are outdoors, but studies have suggested that problems are likely to be limited only to couple of DECT channels nearest to any interfering transmitter. Given DECT's flexible approach to channel selection, we consider this significantly mitigates any potential impacts.

3.58 We also note the presence, in other countries (including France and Germany) of high-power mobile licensed at up to 65 dBm/5 MHz, operating between 1805 to 1880 MHz. DECT typically operates in the 20 MHz between 1880-1900 MHz. As DECT systems are already functioning alongside users with higher out-of-band emissions in these countries, it can similarly operate with UK Shared Access users transmitting at 42 dBm.

3.59 Given our 2019 assessment, the findings of these ECC studies and our own further technical assessment, we remain satisfied that Medium Power use will not materially increase the risk of adjacent band interference to DECT services.

Summary of responses on 100 MHz limit in light of comments

3.60 Relatively few respondents commented on our proposed 100 MHz limit. We summarise these responses below:

a) VMO2, Dense Air, Freshwave and BT agreed with the proposal.
b) Shure and DECT Forum suggested the 500m range for the cap was too small and should be adjusted to better reflect typical operational ranges. They also asked Ofcom to clarify how the 500m figure had been derived.
c) A small number of respondents (UKWISPA, the Dynamic Spectrum Alliance and HPE) indicated that they understood our intentions, but noted that urban areas are not homogenous and considered that the cap should be more flexible in areas where congestion is lower. They noted that there might be scenarios where supporting a larger bandwidth was appropriate - especially where demand was otherwise low.

[40] RF co-existence analysis of (DECT) guard-band LTE to DECT and GSM. Real Wireless report, 2015. Published as Annex 6 to our Statement on Talk Talk's variation request, Ofcom, 2016.
[41] Out of Band Emissions in the DECT Guard band. Real Wireless report, 2015. Published as Annex 5 to Ofcom's 2016 Statement.
[42] Analysis of the suitability of regulatory technical conditions for 5G MFCN in 900 MHz and 1800 MHz bands. ECC report 297, published 2019.
[43] Report from CEPT to European Commission on the 900/1800 MHz bands.

Analysis of comments on our proposed 100 MHz limit

3.61 We recognise that there could be benefits from a more flexible approach along the lines suggested by UKWISPA and HPE. For example, the arguments for a 100 MHz limit (compared with a more permissive limit e.g. 200 MHz) might be weaker in urban areas where the majority of 3.8-4.2 GHz is available, and no new demand was expected.[44]

3.62 However, it is challenging for Ofcom to determine in advance which urban areas might have particularly low demand, such that this limit would not be relevant. We are also conscious that demand can evolve.

3.63 We acknowledge that the 500m distance that we have proposed for this limit is unlikely to match the footprint of a Medium Power deployment in many cases.

3.64 However, in setting this 500m distance (i.e. radius) we were not seeking to replicate standard Medium Power sterilisation areas. Instead, we sought to design a relatively simple mechanism that would allow us to check whether a licensee was applying for multiple 100 MHz licences in a single location, and so denying access to other users in that location.

3.65 We could define this limit simply with reference to the spectrum held for a single site, but are conscious that such a rule could be circumvented (for instance by deploying multiple antenna poles on the same rooftop). In defining a wider area, we therefore need to consider the area where it might be simple for a licensee to deploy multiple sites to support a single service, with the effect of sterilising access. We also need to consider the increased complexity of monitoring and enforcing this rule over a wider area (where our licensing tool might legitimately assign different channels to the same user that would exceed this limit). We used our regulatory judgement to establish a distance for this limit that balances these considerations.

3.66 We note that if a licensee was seeking to deny other users by requesting different frequencies (up to the 100 MHz limit) for multiple sites separated by more than 500m, we have other means to address this. For example, Shared Access licences include a condition that allows Ofcom to change the frequencies allocated to a licensee on spectrum management grounds.

Summary of responses to retaining exceptions in Greater London

3.67 VMO2, Dense Air and BT all supported our proposal to retain exceptions for the Greater London area.

3.68 A few respondents thought that this proposal remained conservative and asked us to liberalise our approach further. For example:

a) Freshwave requested that Medium Power be permitted in London without requiring an exception; and
b) The Dynamic Spectrum Alliance suggested this was a conservative first step, whilst HPE asked that we reassess and update guidelines over time based on experience. Similarly, UKWISPA understood Ofcom's rationale but suggested we allow some more targeted deployments in specific areas of London, if the risk of contention was low.

[44] Similarly, we acknowledge the potential for specific scenarios in the future, where using more bandwidth could support very high value services that could provide broad benefits, especially if this demand was known to be deep within a well-shielded building.

3.69 Nokia queried if our current premises sterilisation thresholds were based on London data and suggested that if not, these numbers should be updated based on London specific inputs in order to reflect the density of premises in London specifically.

3.70 DECT Forum suggested that exceptions for Medium Power should remain in place for all urban areas and suggested that insufficient evidence had been provided to explain why a different approach was needed for London only. Similarly, Shure argued that Ofcom had not explained why other urban areas would not be subject to the same restrictions. They also considered that our proposals prioritised administrative ease above securing optimal use of spectrum.

3.71 We received no comments on our proposed definition of Greater London.

Analysis of comments on our proposal to retain exceptions in Greater London

3.72 Responses fell largely into two camps, one suggesting exceptions should be retained more broadly (on the basis that evidence was lacking to justify a different approach in London) and another that retaining them in London was unnecessary.

3.73 Our July Consultation set out the current levels of spectrum availability in London, alongside the rest of the UK. We consider that this clearly demonstrates that compared to the UK as a whole, where most urban locations have at least 200 MHz of spectrum available, the position in London is more constrained. This is evidenced by the greater density of Fixed Links and Earth Stations in these areas, as shown in Figure 2 of our 2016 publication '3.8-4.2 GHz band: Opportunities for innovation'.[45]

3.74 We acknowledge that there are some other locations where spectrum supply may also be limited, often because of these other existing users in the band. However, our assessment is based not only on the existing spectrum supply picture, but also evidence and expectations about future demand.

3.75 London is the largest and most densely populated city in the UK. Whilst population density may not perfectly reflect Shared Access demand, we consider it a useful proxy, given the volume of businesses and infrastructure located around London. We already have evidence of this demand and the potential to support this with Low Power in some cases, with around 30 Low Power licences on issue in July.[46] This combination of likely demand and constrained supply is relatively unique, and so there is a strong case for taking a different, more cautious approach to Medium Power in Greater London.

3.76 We recognise that some users prefer fewer restrictions on accessing Medium Power but our proposal to retain exceptions in Greater London does not preclude this access. It simply encourages users to consider Low Power where appropriate and if not, to minimise the impact of Medium Power use on others.

3.77 We do not think it appropriate to develop a new 'premises sterilisation' limit based specifically on premises density in London. This limit is still being used in a UK-wide

[45] We note that since this publication there has been some evolution in licensed user locations but that it continues to provide a helpful snapshot of main areas of focus for earth station and fixed link usage of this band today. 3.8-4.2 GHz band: opportunities for innovation, page 12.

[46] We note that this number fluctuates over time, and as of November 2024 we have more than 80 Low Power licenses in the London area across the 1800 MHz and 3.8-4.2 GHz bands. However, this includes more than 40 licences for very low power that we had previously captured on our system as Medium Power for administrative reasons. Of the remaining c40 licences, more than half are currently for the 1800 MHz.

context to assess applications for antenna heights above 10m, and so needs to account for premises densities in different locales. We also note that the existing thresholds are already fairly generous, because they are derived from sterilisation levels generated under our 2019 coordination rules. Users who apply under our updated 2024 rules for the 3.8-4.2 GHz band should typically find these conditions relatively straightforward to meet with careful network planning. In these circumstances, we do not consider a bespoke premises sterilisation threshold for different locations to be justified.

Responses on our proposed new price for urban Medium Power

3.78 We received nine responses in relation to our pricing proposal. Some stakeholders agreed with the proposed price increase while others expressed concern about the impact of an increase of fees on smaller users and on business cases more broadly.

3.79 DECT Forum, BT and Shure all broadly agreed with our plan to increase urban Medium Power fees. However, Shure questioned whether the proposed conservative price increase will be sufficient to encourage efficient use of spectrum, and noted that the fee increase did not fully reflect the impact on opportunities for Low Power users.

3.80 Nokia, Dense Air and Freshwave noted that our updated prices still represented a doubling of existing fees for urban Medium Power, and could impact commercial viability for smaller companies. Freshwave was concerned that the price increase could inhibit growth of some use cases and suggested that Ofcom's policy intentions could be more effectively achieved by lowering the cost of a Low Power licence, or setting fees based on the specific sterilisation area of a deployment. UKWISPA also suggested that, particularly for smaller FWA operators, the price could present a challenge and suggested considering a discount rate for smaller bandwidths, or underserved urban areas.

3.81 Several respondents suggested that Ofcom should keep our pricing measure under review, either to ensure that it was not stifling demand, or that it was at a level to provide appropriate incentives. Nokia requested we monitor the impact of prices on future adoption of Medium Power in urban areas. VMO2 also recommended that Ofcom keep Shared Access pricing under review to ensure it remains appropriate.

Analysis of comments on our new price for urban Medium Power

3.82 Overall, there was some limited support for our pricing proposals, with a small number of respondents concerned that the fee might be too high, and a similarly small number of responses indicating the fee might be too low. A small number of stakeholders also requested some localised flexibility to reduce the fee in areas of low demand.

3.83 We have considered the comments from three stakeholders that our proposed price for urban Medium Power deployments still constitutes a doubling compared to the existing price point. They argued that such a price increase may jeopardise investment and impact business cases.

3.84 We took this risk into account in our original proposals, where this was an important factor in proposing a relatively conservative fee differential with Low Power use.[47] It is not our intention to set fees for Medium Power at a level that forces users to request Low

[47] i.e. doubling the fee, compared with an estimated 3-7 fold increase in sterilisation levels, as shown in Table 1 of our previous consultation analysis of premises sterilised by sample Low Power and Medium Power deployments Supporting increased use of shared spectrum - Technical modelling.

Power on cost-efficiency grounds alone. We did not receive any new evidence or specific examples of why this price point would materially harm existing users' business cases.

3.85 In monetary terms, the proposed price increase per licence is modest (an £800 annual increase per licence for the maximum 100 MHz bandwidth). We note that in line with UKWISPA's suggestion, stakeholders do also have the option of applying for smaller bandwidths, which can reduce costs. We consider it reasonable that where very large bandwidths and higher power levels are required, the impact on other users should be reflected in fees. Similarly, we consider it reasonable that where users have multiple urban Medium Power licences, the overall level of fees they pay reflect this impact on other users and is proportionate to achieving our objective.[48]

3.86 We have also considered the converse argument that the increases we propose may be too small to impact investment decisions, and are low compared with our analysis that sterilisation levels are likely to be 3-7 times greater for Medium Power.[49]

3.87 We recognise that in setting fees conservatively, we could go further and still remain on the low end of our estimates for sterilisation impacts. For example, we could consider setting a fee that was 3-4 times greater than Low Power, and remain on the lower end of our estimate that Medium Power sterilisation effects are 3-7 times greater. However, we are conscious that our analysis of these sterilisation effects is not exhaustive and that in some cases (as our results demonstrated), the difference between Low and Medium Power may be smaller. We also consider that at these levels, the potential cost impact on user business cases might become more material (noting the concerns expressed by some users in their consultation responses).[50]

3.88 We acknowledge that the cost of our increased fee will often not outweigh the savings and benefits a licensee could obtain from using Medium Power, and that this may limit the incentive effect of our proposal.[51] However, it is not our intention to set prices for Shared Access licenses at the opportunity cost, and we continue to consider that where Low Power use would be sufficient, even a small price increment should have an incentive effect. We also noted in our consultation that we would keep the impacts of our pricing measures under review. We think it remains reasonable to introduce a more conservative fee and monitor the impacts on demand and supply before going further.

3.89 In that context, we agree with comments requesting that we keep future demand for licences under review and track the adoption of Medium Power licences in urban areas. We will continue to assess our licensing data to ascertain the demand for Medium Power licences over time, and will keep our pricing measures under review to ensure they continue to support the efficient use of spectrum.

---

[48] We discuss the overall financial impact on existing users further in paragraph 4.28.

[49] See footnote 45 above.

[50] As noted in our July Consultation, we also considered pricing according to the specific sterilisation area of a deployment, or the impact on available spectrum supply in a given area. However, the cost and complexity of establishing this system would be considerable and, therefore, Ofcom's costs to manage this system would be increased. Given the relatively conservative fee increment we have suggested, we are not persuaded that there are significant additional benefits to justify this at this point.

[51] We consider our previous analysis showing that Medium Power may typically sterilise 3-7 times as many premises as Low Power indicative of coverage and capacity benefits a user could obtain from Medium Power.

Our Decision

3.90 Following careful consideration of stakeholder responses and in light of the above analysis, we are confirming our decision to **make Medium Power licences (42 dBm EIRP,[52] up to 10m height) more readily available in urban areas for the 3.8-4.2 GHz and 1800 MHz bands.** We consider that this should support more take up, innovation and growth and that by monitoring demand and applying our proposed balancing measures we can maintain a good mix of sharing opportunities for other users.

3.91 Applications for Medium Power with antenna heights of 10m or less will not need to go through our exceptions process for any urban area outside of Greater London. [53]

3.92 We will also proceed to implement our three balancing measures as part of this decision.

3.93 **We will be applying a 100 MHz limit to the amount of spectrum that can be held by any one user in an urban area** (defined as within 500m of an urban located site for which they hold a licence). We consider that this measure helps ensure that Medium Power use does not foreclose opportunities for other users.

3.94 This requirement will be included in new licences that are issued for Medium Power users (and apply in urban areas) after this date. The relevant clause can be found in clause 9, Schedule 1, of the Medium Power licence in Annex 2.

3.95 In order to operationalise this restriction, we will periodically audit Shared Access licences to determine whether there are cases in which this restriction is engaged. In such cases, we will take steps to address this in line with the options set out at paragraph 3.32.

3.96 **We will continue to consider applications for Medium Power licences in Greater London on an 'exceptions' basis.** This approach balances the benefits of accessing Medium Power with an incentive to carefully plan deployments in an area of more limited supply and anticipated high demand.

3.97 Our definition of Greater London will be the same as that adopted in our mmWave work (see Annex 1). We will continue to use our premises sterilisation test to assess these requests, and will grant licences where the number of premises sterilised by the deployment is less than 57,000 in the 1800 MHz band, or 44,200 in the 3.8-4.2 GHz.[54] [55]

3.98 **We will also implement a new fee for this new Medium Power urban product, which will be double the price of a Low Power licence.** This new fee balances the incentives on users not to obtain licences for more spectrum (or higher powers) than they need with concerns that our prices could dampen investment and innovation.

3.99 These fees will be applicable per licence and will be payable annually. The fee structure will be as set out in Table 6.[56]

---

[52] 42 dBm for carriers ≤ 20 MHz and 36 dBm / 5 MHz for carriers > 20 MHz.

[53] We will be retaining the current definition of urban area we use for the purpose of considering Shared Access licence applications. This is set out at paragraph 4.28 of our updated guidance.

[54] Note that the requested power level for these requests should remain within our overall Shared Access rules, and that the sterilisation levels will be assessed based on Ofcom's spectrum management tools.

[55] We encourage those seeking an exception to consider measures to limit the sterilisation area of their proposed deployment (and make use of our new antenna specifications when available) in order to maximise approval chances.

[56] Licences for shorter periods continue to be possible and will be charged on a pro-rated basis.

3.100 As requested by several respondents, we will keep this pricing under review. If new evidence suggests that demand might outstrip supply at these price levels or that the price levels were significantly disincentivising investment, we would seek to reassess our approach.[57]

3.101 Implementation of this price increase will require changes in our licensing system and amendments to our fees regulations. As a result, we expect that the fee increase will be implemented in the second half of 2025. However, applicants should consider this future fee increase when deciding what products (and bandwidth) to apply for now.

3.102 Section 5 sets out more information on our planned implementation timeline.

Further changes to exceptions process

3.103 We said in our July Statement - as part of clarifying our approach to exceptions - that we would continue to consider exceptions requests for antenna heights above 10m.

3.104 Our exception process is intended to support stakeholders where they consider there is significant benefit (for example from a higher antenna) and limited impact on others. In the period since our July Statement, we have been working to migrate Shared Access licences to our new licensing platform. Through this process, we identified that we have never granted a licence for the use of a higher antenna at Low Power. We have also identified that it is difficult to configure our licensing platform to support more online applications for non-standard licence products.

3.105 To support a smoother implementation of Shared Access on our new platforms, we have decided we should no longer consider requests for Low Power antenna heights above 10m (which we have in any case not authorised in the last 5 years). We will continue to consider exception requests for higher antennas for Medium Power through a more manual process. We will update our guidance to reflect this.

3.106 As a result, exceptions requests will be considered in the following cases:

a) If a user wishes to deploy Medium Power with an antenna exceeding 10m in a rural area in the 1800 MHz band;
b) If a user wishes to deploy with Medium Power in Greater London at any antenna height;
c) If a user wishes to deploy Medium Power with an antenna exceeding 10m in an urban area in both the 1800 MHz and 3.8-4.2 GHz band.

3.107 For the avoidance of doubt, any use of Medium Power in Greater London would continue to be considered under our 'exceptions' process, regardless of antenna height.

[57] We would expect to consult on any future changes to our pricing framework.

4. Impact assessment and legal framework

4.1 This chapter sets out:

i) our impact assessment supporting our decisions;
ii) how we have had regard to our legal duties;
iii) our equality impact assessment; and
iv) our Welsh language impact assessment.

Impact Assessment

4.2 Section 7 of the Communications Act requires us to carry out and publish an assessment of the likely impact of implementing a proposal which would be likely to have a significant impact on businesses or the general public, or when there is a major change in Ofcom's activities.

Removal of the TRR

4.3 In arriving at our decision to remove the TRR for Low Power outdoor deployments in 3.8-4.2 GHz, we began by considering a 'no change' scenario where we relied solely on our July decision to remove this requirement for indoor Low Power licences in 3.8-4.2 GHz.

4.4 We considered that the changes we confirmed in our July Statement would already support a mix of new use cases. However, we also considered that (based on stakeholder feedback) there were several promising use cases that would not be supported by indoor only use. This included potential campus style networks, and hybrid indoor/outdoor locations such as train stations and stadiums, where we are aware of demand.

4.5 We also recognised that if the TRR was removed only for Low Power indoor scenarios, this could limit or prevent opportunities for some of these beneficial use cases to materialise.

4.6 We do not have strong grounds to believe that uptake of such Low Power use cases (even when enabled outdoors) will occur so widely as to substantially limit opportunities for other users. This is because the coverage area of Low Power deployments is small, and the costs of building a wide area network (with more sites) are likely to be significant.

4.7 Consequently, the benefits of relaxing this requirement outdoors are likely to be greater (for consumers and businesses) than any negative impact via impacts on spectrum supply. Consultation responses indicate that stakeholders strongly agreed with this assessment.

4.8 We considered whether there would be benefits of going further and dropping the TRR for Medium Power deployments. However, we consider that removing the TRR for these higher power levels could present a greater risk of impacting opportunities for other users. We consider that maintaining the TRR requirement for Medium Power deployments is unlikely to significantly limit further use cases, noting that only two respondents indicated a specific desire to remove or amend the TRR for Medium Power. We will continue to engage with stakeholders to understand any evolution in the risks and benefits we have identified with the Medium Power TRR in the future.

Liberalising Medium Power

4.9 We are confirming our decision to ease access to Medium Power in urban areas at heights up to 10m across most of the country, for the 3.8-4.2 GHz and 1800 MHz bands.

4.10 We reached this decision by considering whether our 2019 position - that we would only offer Medium Power licences in urban areas by exception - risked limiting the best sharing outcomes. We found there were several reasons to revisit this position:

i) the improved spectrum supply that our new coordination approach provides meant that many urban areas will in future have at least 200 MHz of spectrum available. Our new coordination approach also means that the sterilisation impact of Medium Power in urban areas is reduced (especially in the 3.8-4.2 GHz band);
ii) stakeholder feedback (and our experience administering exceptions) indicated that easier access to Medium Power could reduce deployment costs, increase certainty for applicants, and improve the business case for various uses;
iii) removing the need to obtain an exception to access Medium Power would simplify the licensing process for users and enable speedier access to the spectrum.

4.11 This potential for more take up of Shared Access licences could support the investment, innovation and growth we are seeking from the Shared Access framework. We consider that if this could be achieved without significantly reducing sharing opportunities for others, there would be a net benefit from updating our approach.

4.12 In reaching this view, we acknowledged that easier access to Medium Power could have some impact on how tightly users can be packed together. We therefore went on to consider how this risk could be managed with certain 'balancing measures' (which we assess below).

4.13 We did also consider the benefits of allowing access to even higher powers, or higher antenna heights in urban areas (which some stakeholders have previously requested). However, the potential impact of such uses could extend for tens of kilometres and so materially reduce sharing opportunities across a wide area. Given these greater impacts on sharing and the many successful deployments we have seen at Medium Power, we do not think the benefits would outweigh risks within our current framework.

Impact on other existing users (and potential future users)

4.14 We consider that this decision should not have a negative impact on existing in-band users, because their usage will continue to be protected through our coordination approach. If a new Medium Power deployment was likely to present an interference risk, it would not our pass coordination checks.

4.15 We also consider that impacts on adjacent band users should be minimal in both the 1800 MHz and 3.8-4.2 GHz bands. The power levels we have considered here are the same as those we already authorise in rural areas (and in urban areas by exception). We set out our assessment of such co-existence issues in 2019, which we briefly revisit below.

i) For the 3.8-4.2 GHz, we assessed impacts to and from public mobile usage below 3.8 GHz. Medium Power Shared Access licensees are operating at a lower power than national mobile deployments, and that there is 5 MHz of separation between these uses. We considered that consequently the risk of interference to or from base stations or terminals was low. We also considered potential impacts for Radio Altimeters above 4.2 GHz, and concluded that Medium Power should not cause any

undue interference.[58] We have received no new evidence in this period to alter this assessment.

ii) For the 1800 MHz band, the relevant adjacent bands are the 1800 MHz public mobile band and the DECT band. We explained in our 2018 consultation[59] that we considered the technical conditions applicable to this band had already been set to protect adjacent users.[60] We explained in paragraphs 3.55-3.59 how we have carefully reviewed this assessment, and consider that the risk remains low.

Impact of 100 MHz limit

4.16 As we discuss in Section 3, this measure seeks to ensure that users can access the spectrum that they need to support their use case whilst ensuring continued availability of spectrum for other users.

4.17 By setting a cap at 100 MHz, we have sought to have as small an impact as possible on individual users, whilst protecting other and future users.

4.18 A cap set at a lower level (e.g. 50-80 MHz) could ensure more spectrum supply was preserved for sharing opportunities in the future. However, this might also limit the benefits we identified in liberalising Medium Power in the first place. This is because our experience suggests many users prefer 80-100 MHz for their use cases.

4.19 A higher cap would be more permissive to individual users. However, this would increase the risk that an individual user could exhaust spectrum supply, especially given there are many locations with c200-250 MHz available today. Only three respondents raised concerns that this level of cap might be restrictive, and largely pointed to potential scenarios for the future.

4.20 We will apply this limit only in a small area (within a 500m radius of a given base station). This small area should minimise impacts on individual users whilst protecting the wider spectrum environment. We set out in paragraphs 3.64-3.66 the factors informing our judgement on why 500m is an appropriate distance for this limit.

Impact of retaining exceptions for London and higher antenna heights

4.21 Our assessment is that retaining the premises sterilisation test for Greater London will not prevent carefully planned deployments. However, it provides an incentive for users to minimise their impact on others in a location with higher demand and more limited supply. We expect this to facilitate more users (and net benefits) in London than if we removed this requirement.

4.22 We reached this position having first considered maintaining our 2019 position that exceptions were required in all urban areas across the UK. This might preserve more spectrum unused for the future and would provide consistency across urban areas. However, we concluded that access to the benefits of Medium Power should not be unduly constrained in areas where we see fewer spectrum supply issues.

[58] See Annex 5 of our 2018 consultation Enabling opportunities for innovation - page 98 onwards.
[59] Enabling opportunities for innovation - consultation, Ofcom 2018.
[60] See paragraph 5.89 of our 2018 consultation.

4.23 We also explored a range of options for how we define the Greater London area that we will use to administer this process.

a) One option would have been to define the area more narrowly, for instance by limiting the requirement to the inner London Boroughs. However, Borough boundaries can be subject to change, which would require periodic updates and so increase uncertainty for users and administrative costs. We also think there are demand drivers in the industrial estates around the outskirts of London, which this option would not address.
b) Another option would have been to apply a broader, simpler shape contour to include a wider area in our exceptions process. This might have benefits in being easy to apply and understand. However, a broader shape would also bring more sparsely populated, lower demand areas within our exceptions process, and could be unduly restrictive. Given we had already defined a Greater London area for 26 GHz, we concluded it would be more complex and confusing to introduce an alternative shape, however simple.

4.24 Consequently, we concluded that applying an extant definition of Greater London, and using this to encourage carefully planned applications for Medium Power is likely to secure long term benefits for overall spectrum supply, without unduly restricting users.

Impact of the new fee for urban Medium Power

Impact on existing users

4.25 Medium Power licences in urban areas are currently authorised via the exceptions process. As a result, there are a relatively modest number of these licences (130 licences held by 19 licensees across the 1800 MHz and 3.8-4.2 GHz bands).[61] These licensees will experience a price increase as a result of our decision.

4.26 Some licensees have raised concerns about the fee increase in their consultation responses, especially citing the effect on smaller businesses (see paragraph 3.80). However, we did not receive any new evidence or specific examples demonstrating that this price point would materially harm existing users' business cases.[62]

4.27 We recognise that the increase is a doubling of the current fee. However, for the reasons we set out in paragraphs 3.85-3.88 we consider that the fees are set conservatively.

4.28 We also recognise that stakeholders with many licences (especially licences for larger bandwidths) would see a larger total increase across their full set of licences. However, the vast majority of affected licensees (17 out of 19) will face an increase less than £5,000 per annum. The two licensees facing the largest impact will face an additional annual fee of £18,400 (for 23 Medium Power licenses at 100 MHz each) and £14,240 (for 22 Medium Power licenses of various bandwidths) respectively. We explained in paragraph 3.85 that such users have options to mitigate this increase (e.g. switching to lower bandwidths) and that we consider higher fees reasonable for users with higher bandwidth and power uses.

Impact on potential future users

4.29 Our pricing for Medium Power in urban areas is intended to reflect the larger sterilisation area of a Medium Power licence compared to a Low Power licence, and to provide an incentive to opt for the Low Power licence where appropriate. This is in line with our

[61] Based on license data as of 5 November 2024.
[62] We also note that we have received several applications for new Medium Power urban licences even as we have been consulting on this higher fee.

policy objective to encourage efficient spectrum use whilst maintaining incentives to invest and innovate.

4.30 One stakeholders pointed out that the increases we propose may be too small to impact investment decisions (see paragraph 3.79), and do not support the efficient use of spectrum in the way that we want. We acknowledge that our fee increase is set at a conservative level. However, we continue to consider that in circumstances where Low Power use would be sufficient, even a small price increment should have an incentive effect. As set out in paragraph 3.89, we will keep the impacts of our pricing measures under review to ensure they are supporting the efficient use of spectrum.

4.31 For future users who can meet their needs in urban areas with a Low Power licence, there should be no negative effect, given the improved levels of spectrum supply which will remain open to them (and which we are committing to keep under review).

4.32 Future users of Medium Power in urban areas will pay higher fees compared to fees in place today (although noting that under today's rules they can only access the spectrum at all if they pass an additional 'exception' process). In any case, as set out in paragraph 3.98, we consider that our pricing proposals strike the right balance between encouraging efficient use of the spectrum and the risk of discouraging future investment. By incentivising urban users to rely on Low Power where this meets their needs, the proposal may benefit some future users, who may otherwise not have access to spectrum resources.

Impact on investment, innovation, and competition

4.33 We do not think the increased price for urban Medium Power would hinder investment by existing and potential users. By encouraging efficient spectrum use, we can also help to create an environment where more sharing is possible in urban locations (including amongst potential competitors) and so encourage innovative use cases and more growth in the two bands.

Impact on consumers and citizens

4.34 We consider that the proposed prices would have a net positive impact on consumers and citizens by allowing more future users to access spectrum and provide innovative services, with only limited additional costs which could be passed on.

How we have had regard to our legal duties

4.35 In formulating our decisions we have taken account of our duties under the 2003 Act, the Wireless Telegraphy Act and have had regard to the desirability of promoting economic growth under the Deregulation Act 2015, (the 'Growth Duty').[63] We consider that our decisions are consistent with these duties.

4.36 In particular, we have taken account of:

i) the need to secure the optimal use of spectrum;
ii) the different needs of persons who wish to make use of spectrum;
iii) the extent to which spectrum is available for use;

[63] Section 108, Deregulation Act 2015 c.20. This new duty applies to Ofcom where it exercises certain regulatory functions.

iv) the future demand for spectrum;
v) the desirability of promoting the efficient management and use of spectrum; and
vi) the desirability of promoting innovation, investment and competition.

4.37 The decisions we set out in Chapter 3 will facilitate the efficient use of spectrum by supporting new use cases that can increase usage of the spectrum, whilst appropriately protecting opportunities for other users in the future.

4.38 Following on from our decision in our July Statement to remove the TRR for all Low Power indoor deployments in the 3.8-4.2 GHz, we are also removing the TRR as it applies to Low Power outdoor deployment in the 3.8-4.2 GHz band. This will facilitate additional use cases, and improve the business case for certain private network deployments. This decision takes account of future demand for spectrum (for example by neutral host providers but also other potential use cases), and promotes investment and innovation, while ensuring appropriate protection for other users.

4.39 The area that will be sterilized by Medium Power deployments will be reduced as a result of our updated coordinated approach as set out in the July Statement in the 3.8-4.2 GHz (and, to a lesser extent, in 1800 MHz). We therefore considered that there was an opportunity to go further and simplify access to Medium Power by making Medium Power licences in urban areas (at heights up to 10m) a standard product without the need to go through the exceptions process (except in Greater London) in the 1800 MHz and 3.8-4.2 GHz bands.

4.40 By removing the need to obtain an exception to access Medium Power in an urban area, we are simplifying the licensing process for users. This will support services that would benefit from additional capacity for users and reduce deployment costs. We also consider that this approach will encourage further innovation.

4.41 This decision strikes an appropriate balance between the needs of different existing users and other potential users (e.g. by balancing easier access to Medium Power in most areas whilst retaining an exceptions process for the busy Greater London area). Mindful of our legal duties to manage spectrum and to ensure that our proposals support the coexistence of different services and users, we have also decided to introduce additional measures to manage the expanded availability of Medium Power (see Paragraphs 4.16, 4.21 and 4.25 above).

4.42 We consider that our decisions are:

a) objectively justifiable insofar as they are likely to meet our policy objectives of supporting and encouraging innovative services and applications using the Shared Access band, and are intended to ensure that more users have greater opportunities to access Shared Access spectrum across the UK;
b) not unduly discriminatory against particular persons or against a particular descriptions of persons in that they are intended to apply to all users of Shared Access spectrum, and any differences in the treatment of different users (e.g. depending on the location of their deployment) are justified;
c) proportionate to what they are intended to achieve, in that our proposals are necessary to ensure that users are able to enjoy the benefits of Shared Access spectrum, support the continuing coexistence of different services and users, and ensure administrative processes remain reasonable; and
d) transparent in relation to what they are intended to achieve, in that they are clearly described and explained in this statement and consultation document.

4.43 We believe that these decisions are consistent with the Growth Duty and are necessary and proportionate to supporting the drivers of economic growth. In particular, our decisions support innovation and investment while ensuring that existing users do not face undue interference from other users or face disproportionate burdens. We also believe these decisions will establish a regulatory framework for licensees which is stable, transparent and responsive to the changing demands for spectrum.

Equality Impact Assessment

4.44 We have carefully considered whether our decisions could have a particular impact on persons sharing protected characteristics, and in particular whether they may discriminate against such persons or impact on equality of opportunity or good relations. We have also had regard to the matters in section 3(4) of the Communications Act. We do not consider that our decisions will affect any specific groups of persons differently to the general population.

4.45 We have not carried out separate equality impact assessments in relation to the additional equality groups in Northern Ireland: religious belief, political opinion and dependents. This is because we anticipate that our decisions would not have a differential impact in Northern Ireland compared to consumers in general.

Welsh Language Impact Assessment

4.46 The Welsh Language (Wales) Measure 2011 made the Welsh language an officially recognised language in Wales. This legislation also led to the establishment of the office of the Welsh Language Commissioner who regulates and monitors our work. Ofcom is required to take Welsh language considerations into account when formulating, reviewing or revising policies which are relevant to Wales (including proposals which are not targeted at Wales specifically but are of interest across the UK).

4.47 Where the Welsh Language Standards are engaged, we consider the potential impact of a policy proposal on (i) opportunities for persons to use the Welsh language; and (ii) treating the Welsh language no less favourably than the English language. We also consider how a proposal could be formulated so as to have, or increase, a positive impact, or not to have adverse effects or to decrease any adverse effects.

4.48 Our assessment is that the decisions we are confirming today do not have any impact on opportunities for persons to use the Welsh language or treat the Welsh language less favourably than the English language. We also do not think there are ways in which our decision could be formulated so as to have, or increase, a positive impact. This is because our decisions relate to a nationwide licensing regime and the relevant licence products are available to anyone within the UK.

4.49 We note comments from UKWISPA that they consider Fixed Wireless Access has the potential to improve connectivity in Welsh speaking regions and consequently to increase access to Welsh language content, in addition to promoting digital inclusion. We agree this a potential positive outcome of our decisions, however we note that our decisions are not targeted at a particular type of service such as Fixed Wireless Access.

4.50 We note that Ofcom's current practice is to offer to produce spectrum licences in Welsh, and when requested does provide licences in Welsh, in accordance with its obligations set

by the Welsh Language Commissioner. Ofcom will continue to take this approach in the future in relation to Shared Access licences.

5. Implementation and next steps

Implementation plan for the changes we are making

5.1 We know that it is important to users that the changes we are confirming today are reflected in our licensing system as soon as possible.

5.2 We will immediately make changes to our Low Power licence template, so that for new applicants there will be no TRR for any Low Power deployments in the 3.8-4.2 GHz band.[64] This will unlock further opportunities for new use cases in this popular band.

5.3 Our decision to allow easier access to Medium Power in urban areas includes an increase in the fee for this product, and changes to our fee structure require consultation on amended fee regulations. We will then need to introduce the revised fees into our licensing system. We expect that the process for introducing this new fee will conclude in the second half of 2025.

5.4 However, we consider that we can and should nevertheless proceed to make Medium Power available more widely immediately. This is because:

a) confirming our plan to introduce this new fee in the future should provide an incentive to applicants to consider this, even if the new fee is not charged immediately.
b) our other balancing measures (and the protections they provide) are ready to be brought into effect at this time.
c) delaying access could unnecessarily delay the benefits that easier access to Medium Power brings (including reductions in the time taken to turn around such applications).

5.5 Therefore, applications for Medium Power in urban areas (at antenna heights of 10m or less) will be possible through our standard application process from today. [65] [66] Applications in Greater London will continue via the exceptions route.

5.6 We will provide more details on the timeline for introducing our new fees when we consult specifically on the regulations that enable this.[67]

5.7 Further background on current implementation timings for the changes we confirmed in our July Statement can also be found on our Licensing Updates webpage here.[68]

---

[64] Existing licensees can contact spectrum.licensing@ofcom.org.uk to request a licence variation to update this condition, if required.

[65] Stakeholders should note that as we prioritise the introduction of our new rules for Medium Power, we are still in the process of embedding and optimising these changes in our systems. As such, our processing time might be affected.

[66] Urban Medium Power deployments will be charged at the current price until we complete our systems update. We emphasise that users should be prepared for a fee increase for licences that they currently hold or obtain before we reflect the fee increase in our system.

[67] Note that given the relatively small unit increase we are making to the fee, we do not expect to provide a further grace period for existing licensees beyond this implementation period.

[68] Note that although, as this page explains, certain implementation measures related to our July Statement have been delayed (as part of wider work to develop our licensing platform) we continue to consider steps we can take to implement some measures more quickly.

Licence changes

5.8 To assist stakeholders, we have set out in Annex 2 the revised template licences that flow from our decisions. These license templates also incorporate changes which we confirmed in July.

5.9 In these template licences, we have highlighted the changes which we are making today in green (and associated deletions in red), as well as changes which we will make as our implementation pipeline progresses (in teal and double underlined).

5.10 As part of updating these templates, we have also made a clarifying change to the definition of 'urban area' appearing in Schedule 1 of the Medium Power licence. This is to make clear that any application for a Medium Power licence in the UK's territorial sea would not be considered in an 'urban area'. This mirrors the position set out in our Shared Access guidance for applicants.

Access to 2.3 GHz

5.11 In our July Statement, we noted that the Ministry of Defence was going through final sign off procedures for a new sharing approach in 2320-2340 MHz. This process is now complete and the MoD have confirmed to Ofcom that this band is now available for indoor Low Power use.

5.12 We will be making this spectrum available next year alongside the wider updates we are making to our licensing tools to support the Shared Access framework.

5.13 Since taking this decision, there has been some stakeholder interest in exploring whether some level of very short-term access to this spectrum could also be provided for outdoor uses. This opportunity might support temporary spectrum requirements, for example a short notice outdoor event that may last 1-2 weeks.[69] We are in the initial stages of exploring what level of coordination would be required with MoD uses (and other users, such as Radio Amateurs) to support this. If further sharing looks possible we would expect to consult next year to better understand the demand for such short term access, and the licence conditions that would be appropriate for it.

Our approach to an evolving ecosystem

5.14 When we made Shared Access available in 2019, we said we would reassess our approach as use cases and demand develop. We initiated this review in 2023 to ensure our framework continues to offer the best support for the innovation and growth we envisaged this local spectrum access could deliver.

5.15 This Statement marks the end of this review process. Through this, we have sought to respond to stakeholders' feedback on how the Shared Access framework could be improved, while remaining true to the original framework objectives and so providing some continuity for users.

5.16 We recognise that demand and use cases may evolve further over the coming years. We will continue to monitor levels of demand and spectrum supply and will remain open to

[69] For example, this kind of short turnaround, short-term licence might be suitable for scenarios similar to the use of 5G technology to support coverage of the King's coronation in May 2023.

further changes to our approach where appropriate. We will also monitor our new coordination approach in action, so that we can apply learnings from this new approach to any future updates of the framework.[70]

5.17 We recognise that (as set out in Section 2) there continue to be important regulatory and technical developments impacting the wider ecosystem for localised spectrum sharing. In particular, the new ECC decision to support a harmonised approach to sharing in the 3.8-4.2 GHz has the potential to enhance the equipment ecosystem in this band and so reduce costs and drive demand.

5.18 The new ECC rules allow a slightly higher power limit for Medium Power base stations, and rely on the RE Directive and the applicable ETSI[71] harmonised standards to manage out of band emission risks. We understand that this approach to out of band emissions is intended to support greater technology neutrality. In principle we would wish for our framework to continue to support a wide mix of users, and we acknowledge the representations we have received from some stakeholders interested in adopting this change in the UK. However, we would need to carefully consider the impact of any such changes on all users, and our ability to manage any out of band interference that might arise, before introducing such a change.

5.19 For now, we consider it is most appropriate to focus on implementing the significant changes we have made through this review, which should provide more freedoms and improve spectrum supply for all users. We will continue to engage with stakeholders to understand the needs of emerging use cases and how our changes impact overall demand in practice.

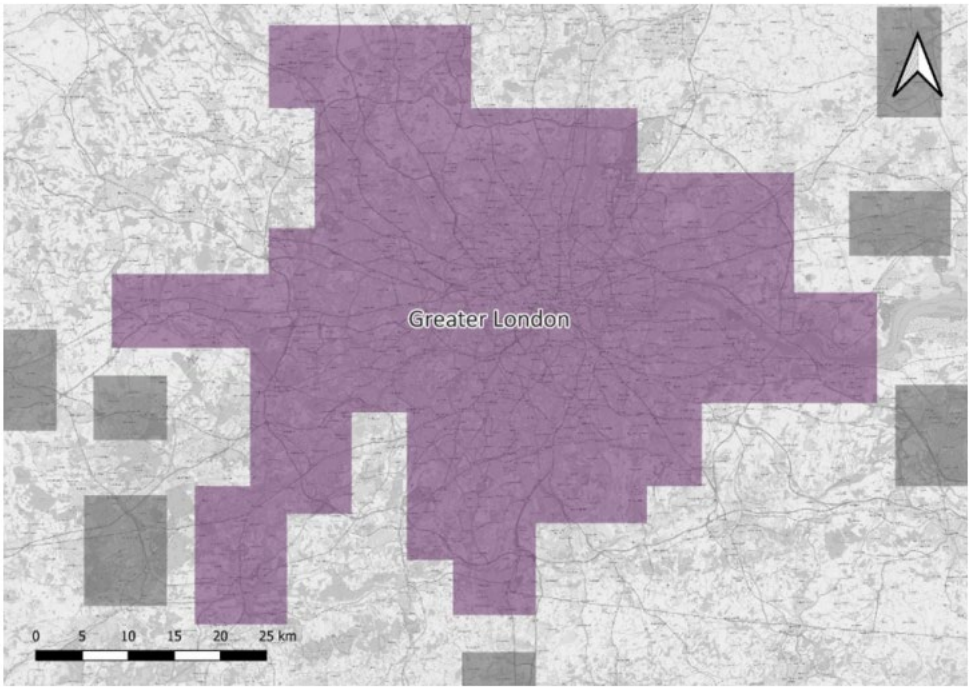
5.20 We will also continue to explore whether additional tools could provide new options to overcome some of the remaining challenges licensees have told us about. In our 2023 Consultation we highlighted that some countries have taken a more 'area-based' approach to coordination, where users must meet defined power limits at the edge of an agreed operational area.[72] We will continue to explore how this model is being rolled out and if it could in future provide an additional way to balance individual user interests (e.g. more freedom from power and TRR restrictions) while protecting sharing opportunities for all.

[70] For example, we said in our July Statement that coordinating on an assumed terminal height of 1.5m did not appear necessary at that point, as coordination at a height of 3m already significantly improved spectrum supply – but that we would keep this approach under review.
[71] The European Telecommunication Standards Institute. See https://docdb.cept.org/document/1038.
[72] We explained that versions of this approach have been adopted in Germany and Sweden. Although relatively limited interest was expressed in this approach in consultation responses, this could provide a future alternative or supplement to Ofcom coordination of individual base stations at fixed transmit powers.

A1. Greater London Area Definition

1.1 We provide below a plot of the Greater London area in which we will apply the exceptions process to authorise any Medium Power requests in this location.

1.2 A detailed definition of this area is available on our website. It is available in shapefile, CSV and KML formats.



A2. Shared Access Licences

In order to aid stakeholders' understanding of the changes we are making, we are providing sample Shared Access Licence's for Low and Medium Power below. Changes are marked as follows:

a) Additions we have decided to make and are implementing today are marked up in green and underlined.
b) Additions we have decided to make either in this Statement or our July Statement and will introduce upon implementation of the relevant measures are marked in teal and double-underlined.
c) Deletions we have decided to make are marked up in ~~red~~ and struck through.

Office of Communications (Ofcom)
Wireless Telegraphy Act 2006

SHARED ACCESS LOW POWER LICENCE

Sector/Class/Product:	615001 - Shared Access (Low Power) / Shared Access
Licence number:	
Licensee:	
Company Registration:	
Licensee Address:	
Email:	
Date of Issue:	
Valid From:	
[Licence end date:]	
Payment Interval:	1 Year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence ("the **Licence**") to [*Licensee's name*] to establish, install and use wireless telegraphy stations and/or wireless telegraphy apparatus as described in the schedules to this Licence (together "the **Radio Equipment**") subject to the terms set out below.

Licence Term

2. This Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee or if it is a Short Term Licence, when it reaches its expiration date.

Licence Revocation

3. Pursuant to schedule 1 paragraph 8 of the Wireless Telegraphy Act 2006 ("the Act"), Ofcom may not revoke this Licence under schedule 1 paragraph 6 of the Act except:

a) at the request, or with the consent, of the Licensee;
b) if there has been a breach of any of the terms of this Licence;
c) in accordance with schedule 1 paragraph 8(5) of the Act;

d) if it appears to Ofcom to be necessary or expedient to revoke the Licence for the purpose of complying with a direction by the Secretary of State given to Ofcom under section 5 of the Act or section 5 of the Communications Act 2003;
e) for reasons related to the management of the radio spectrum provided that in such a case the power to revoke may only be exercised after at least one month's notice is given in writing.

4. Ofcom may only revoke this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

Licence variation

5. Ofcom may only vary this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

Requirement to commence and maintain transmission within 6 months

6. The Licensee must establish, install and use the Radio Equipment to commence regular wireless telegraphy transmissions in accordance with the provisions of this Licence within six months of the date that this Licence is issued, and maintain such transmissions thereafter.

Transfer

7. This Licence may not be transferred. The transfer of rights and obligations arising by virtue of this Licence may however be authorised in accordance with regulations made by Ofcom under powers conferred by section 30 of the Act.[73]

Changes to Licensee details

8. The Licensee shall give prior notice to Ofcom in writing of any proposed changes to the Licensee's name, email address and/or address as recorded above paragraph 1 of this Licence.

Fees

9. The Licensee shall pay to Ofcom the relevant fee(s) as provided in section 12 of the Act and the regulations made thereunder on or before the fee payment date shown above, or on or before such dates as are notified in writing to the Licensee.

10. If the Licence is surrendered, revoked or varied, no refund, whether in whole or in part, of any amount which is due under the terms of this Licence, payable in accordance with any regulations made by Ofcom under sections 12 and 13(2) of the Act will be made, except at the absolute discretion of Ofcom.

Radio Equipment Use

11. The Licensee shall ensure that the Radio Equipment is established, installed and used only in accordance with the provisions specified in the schedules to this Licence. Any proposal to amend any detail specified in any of the schedules to this Licence must be agreed with Ofcom in advance and implemented only after this Licence has been varied or reissued accordingly.

12. The Licensee shall ensure that the Radio Equipment is operated in compliance with the terms of this Licence and is used only by persons who have been authorised in writing by the

[73] See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

Licensee to do so and that such persons are made aware of, and of the requirement to comply with, the terms of this Licence.

Access and Inspection

13. The Licensee shall permit any person authorised by Ofcom:

    a) to have access to the Radio Equipment; and
    b) to inspect this Licence and to inspect, examine and test the Radio Equipment,

at any and all reasonable times or, when in the opinion of that person an urgent situation exists, at any time, to ensure the Radio Equipment is being used in accordance with the terms of this Licence.

Modification, Restriction and Closedown

14. Any person authorised by Ofcom may require the Radio Equipment or any part thereof, to be modified or restricted in use, or temporarily or permanently closed down immediately if in the opinion of the person authorised by Ofcom:

    a) a breach of this Licence has occurred; and/or
    b) the use of the Radio Equipment is, or may be, causing or contributing to undue interference to the use of other authorised radio equipment.

15. Ofcom may require any of the Radio Equipment to be modified or restricted in use, or temporarily closed down either immediately or on the expiry of such period as may be specified in the event of a national or local state of emergency being declared. Ofcom may only exercise this power after a written notice has been served on the Licensee or a general notice applicable to holders of a named class of licence has been published.

Geographical Boundaries

16. Subject to the requirements of any coordination procedures notified to the Licensee pursuant to the schedules to this Licence, the Licensee is authorised to establish, install and use a base station at the location set out the schedules to this Licence and any terminals connecting to it.

Synchronisation requirement

17. Where synchronisation requirements are set out in Schedule 3 to this Licence, the Licensee must transmit within the transmission limits specified.

18. Where synchronisation requirements have not been specified, in the event that harmful interference arises, the Licensee shall endeavour to discuss and agree with the other licence holder(s) how to coordinate their use. If agreement between licence holders cannot be reached, Ofcom may notify the Licensee to comply with additional technical conditions relating to synchronisation requirements.

19. The Licensee must comply with such technical conditions relating to synchronisation requirement notified to it by Ofcom from time to time.

20. The Licensee accepts that they may need to alter or replace Radio Equipment in order to comply with any synchronisation requirement notified from time to time.

Notification in electronic form

21. The Licensee shall accept notifications and other related documents under this Licence electronically to the designated email address as recorded above paragraph 1 of this

Licence. The Licensee must update Ofcom about changes to the designated email address in accordance with paragraph 8.

Interpretation

22. In this Licence:

a) the establishment, installation and use of the Radio Equipment shall be interpreted as establishment and use of wireless telegraphy stations and installation and use of wireless telegraphy apparatus for wireless telegraphy as specified in section 8(1) of the Act;
b) the expression "**interference**" shall have the meaning given by section 115 of the Act;
c) the expressions "**wireless telegraphy station**" and "wireless telegraphy apparatus" shall have the meanings given by section 117 of the Act;
d) the schedule(s) form part of this Licence together with any subsequent schedule(s) which Ofcom may issue as a variation to this Licence; and
e) the Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

Issued by Ofcom

SCHEDULE 1 TO LICENCE NUMBER: [xxx]

Description of Radio Equipment

1. References in this schedule(s) to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this schedule(s).

Interface Requirements for the Radio Equipment

2. Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2103 Shared Access Low power

Special conditions relating to the Radio Equipment

3. This Licence authorises the use of the Radio Equipment within the Permitted Frequency Band and the Licensee warrants that the Radio Equipment is capable of transmitting across the Permitted Frequency Band.

4. However, the Licensee is only authorised to transmit on the Permitted Channel Centre Frequency within the Permitted Frequency Band, as set in Schedule 2 to this Licence or as notified to the Licensee by Ofcom from time to time.

5. The Licensee must comply with any change to the Permitted Channel Centre Frequency notified by Ofcom within the timescale indicated in the notification.

6. During the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

   a) For all base stations the:

      i) postal address (including post code); and
      ii) Antenna height (above ground level), type: and

   b) For all fixed/ installed terminals the:

      iii) postal address (including post code);
      iv) National Grid Reference (to 1m resolution); and
      v) Antenna height (above ground level), type, and boresight bearing east of true north (if applicable).~~; and~~

   ~~c) For all mobile and nomadic terminals in the 3.8-4.2 GHz band connecting to an outdoor base station, the postal address (including post code) of where it will be used.~~

7. The Licensee shall submit to Ofcom in such manner and within such period as specified by Ofcom, such other information in relation to the Radio Equipment, or any wireless telegraphy station or wireless telegraphy apparatus which the Licensee is planning to use, as Ofcom may from time to time request. Such information may include, but is not limited to, information in relation to the radio frequency, transmitted power and date of first use for wireless telegraphy stations or wireless telegraphy apparatus to be established, installed or used within such timeframe and in such areas as Ofcom may reasonably request.

8. The use of the Radio Equipment is not permitted airborne.

Coordination at frequency and geographical boundaries

9. The Licensee shall ensure that the Radio Equipment is operated in compliance with such coordination procedures as may be notified to the Licensee by Ofcom from time to time.

Cooperation between licensees

10. In addition to complying with the specific transmission terms, conditions and limitations set out in this Licence, the Licensee must liaise and co-operate with other holders of licences in the Permitted Frequency Band (if necessary adjusting transmission power and other technical parameters of transmission) in such a way that harmful interference is not caused by one network deployment to that of another licensee within the band.

Interpretation of terms in this schedule

11. In this schedule:

    a) "**Fixed or installed**" means used or installed at specific fixed points.
    b) "**IR**" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with the Radio Equipment Regulations 2017, as amended by the Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019.
    c) "**mobile or nomadic**" means intended to be used while in motion or during halts at unspecified points.
    d) "**Permitted Channel Centre Frequency**" means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies.
    e) "**Permitted Frequency Band**" means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency.

SCHEDULE 2 TO LICENCE NUMBER: [xxx]

Licence category:	Shared Access Low Power

1800 MHz

Transmitter(s)	
Authorised Base Station Deployment Area	Area of 50 m radius from the following location: NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor] NB. Indoors only does not permit the deployment of outdoor base stations and fixed/installed terminal devices.
Permitted Frequency Band	1871.7 - 1880 MHz
Permitted Channel Centre Frequency Tx	1878.35 MHz
Permitted Channel Centre Frequency Rx	1783.35 MHz
Permitted Channel frequency bandwidth	3.3 MHz
Antenna height	maximum 10m outdoors

Maximum power within the Permitted Channel

1. When transmitting, the licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power	
Base Station	1876.7-1880 MHz	24 dBm / carrier (up to 3 MHz) EIRP per cell	
		Frequency offset from the lower frequency of the band edge	**Maximum Mean EIRP density** per cell
		0 to 0.05 MHz	-33.6 + 153.3 x ΔFL* dBm / kHz
		0.05 to 0.1 MHz	-26 + 60 x (ΔFL*- 0.05) dBm / kHz
		0.1 to 0.2 MHz	-23 + 230 x (ΔFL*- 0.1) dBm / kHz
		0.2 to 3.2 MHz	24 dBm / carrier
		3.2 to 3.3 MHz	-23 + 230 x (3.3 - ΔFL*) dBm / kHz

Radio Equipment	Band	Maximum Power
		* Note: ΔFL 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)
Fixed / installed terminal Station[a]	1781.7 - 1785 MHz	23 dBm EIRP
Mobile or nomadic terminal station[a]	1781.7 - 1785 MHz	23 dBm TRP
[a] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.		

2300 MHz

Transmitter(s)	
Authorised Base Station Deployment Area	Area of 50 m radius from the following location: NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor] NB. Indoors only does not permit the deployment of outdoor base stations and fixed/installed terminal devices.
Permitted Frequency Band	2320-2340 MHz, 2390-2400 MHz
Permitted Channel Centre Frequency Tx	
Permitted Channel Centre Frequency Rx	
Permitted Channel frequency bandwidth	10, 20 MHz

Maximum power within the Permitted Channel

2300 MHz shared spectrum

1. When transmitting, the Licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power
Base Station	2320-2340 MHz, 2390-2400 MHz	24 dBm / carrier (up to 20 MHz) EIRP per cell
Fixed / installed terminal Station[a]	2320-2340 MHz, 2390-2400 MHz	25 dBm EIRP (includes a 2 dB tolerance)

Radio Equipment	Band	Maximum Power
Mobile or nomadic terminal station[a]	2320-2340 MHz, 2390-2400 MHz	25 dBm TRP (includes a 2 dB tolerance)
[a] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.		

3.8 – 4.2 GHz

Transmitter(s)	
Authorised Base Station Deployment Area	Area of 50 m radius from the following location: NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor] NB. Indoors only does not permit the deployment of outdoor base stations and fixed/installed terminal devices.
Permitted Frequency Band	3805 – 4195 MHz
Permitted Channel Centre Frequency Tx	
Permitted Channel Centre Frequency Rx	
Permitted Channel frequency bandwidth	[10, 20, 30, 40, 50, 60, 80 and 100 MHz]
Antenna Height	maximum 10m outdoors

Maximum power within the Permitted Channel

3.8 – 4.2 GHz shared spectrum

1. When transmitting, the Licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power
Base Station	3805 – 4195 MHz	27 dBm / carrier EIRP per cell for carriers ≤ 20 MHz; Or 21dBm / 5 MHz EIRP per cell for carriers > 20 MHz
Fixed / installed terminal Station[b]	3805 – 4195 MHz	28 dBm EIRP (includes a 2 dB tolerance)
Mobile or nomadic terminal station[b]	3805 – 4195 MHz	28 dBm TRP (includes a 2 dB tolerance)
[b] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.		

26 GHz and 40 GHz

The technical schedules for 26 GHz and 40 GHz are set out in Annex A4 of the Enabling mmWave spectrum for new uses statement published in September 2023.

All bands

Interpretation of terms in this schedule

2. In this schedule:

a) "**dBm**" means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
b) "**EIRP**" means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain), measured during the "on" part of the transmission;
c) "**Fixed or installed**" means used or installed at specific fixed points;
d) "**Indoor**" or "**indoors**" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
e) "**mobile or nomadic**" means intended to be used while in motion or during halts at unspecified points;
f) "**NGR**" means National Grid Reference;
g) "**outdoor**" or "**outdoors**" means anywhere that is not indoor;
h) **"per cell"** means per specific piece of Radio Equipment. For a multi-sector base station, per cell refers to each one of the individual sectors irrespective of the number of transmit antennas;
i) "**Permitted Channel**" means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;
j) "**Permitted Channel Centre Frequency**" means the frequency assigned by Ofcom that is the midpoint between the upper and lower cutoff frequencies.
k) "**Permitted Channel Frequency Bandwidth**" means the total amount of spectrum assigned to the channel;
l) "**Permitted Frequency Band**" means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency;
m) "**TRP**" means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere, measured during the on part of the transmission;

SCHEDULE 3 TO LICENCE NUMBER: [xxx]

Maximum power of Radio Equipment outside the Permitted Channel

1800 MHz

1. When transmitting, the Licensee must transmit within the limits set out below.

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 (ΔFL*+ 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 ΔFH* dBm / kHz
0.05 to 0.1 MHz	-26 - 153.3 x (ΔFH* - 0.05) dBm / kHz
0.1 to 2.8 MHz	-45 - 10 x (ΔFH* + 0.2) / 3 dBm / kHz
2.8 to 5.8 MHz	-55 dBm / kHz

*Notes ΔFL 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)
ΔFH 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)

2300 MHz

1. When transmitting, the Licensee must transmit within the limits set out below.

Frequency offset from the Permitted Channel edge	Power
-5 to 0 MHz offset from lower Permitted Channel edge 0 to 5 MHz offset from upper Permitted Channel edge ~~2385 to 2390 MHz~~ ~~2400 to 2403 MHz~~	(PMax – 40) dBm / 5 MHz EIRP per antenna
-10 to -5 MHz offset from lower Permitted Channel edge 5 to 10 MHz offset from upper Permitted Channel edge ~~2300 to 2385 MHz~~	(PMax – 43) dBm / 5 MHz EIRP per antenna
< -10 MHz offset from lower Permitted Channel edge > 10 MHz offset from upper Permitted Channel edge	(PMax – 43) dBm / 5 MHz EIRP per antenna

2. In addition, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Channel shall not exceed the following additional requirements:

Frequency	Power
2400-2403 MHz	(PMax – 40) dBm / 5 MHz EIRP per antenna
Above 2403 MHz*	–17 dBm / 5 MHz EIRP**

*The limit defined above 2403 MHz given here takes precedence over the limits defined in paragraph 1

**The maximum mean power relates to the EIRP of a specific piece of Radio Equipment

irrespective of the number of transmit antennas.

1. For licensees with a Permitted Channel within the range 2390-2400 MHz, the licensee's base stations must transmit within the limits of transmission Frame Structure A, except for indoor base stations. If indoor base stations cause undue interference to the licensee in the 2350-2390 MHz band, we reserve the right to require the indoor base stations to transmit within the limits of transmission Frame Structure A.

2. Frame Structure A 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 licensee(s) that hold a Spectrum Access licence in 2350-2390MHz 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.

Frame Structure A

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

3. For licensees with a Permitted Channel within the range 2320-2340 MHz, no such synchronisation requirements apply. If the 2320-2340 MHz licensee causes undue interference to the authorised user in the 2340-2345 MHz band, we reserve the right to require the licensee to transmit using a frame structure which mitigates this interference.

3.8 – 4.2 GHz

1. When transmitting, the Licensee must transmit within the limits set out below.

Frequency	Power
-5 to 0 MHz offset from lower channel edge 0 to 5 MHz offset from upper channel edge	(PMax – 40) dBm / 5 MHz EIRP per antenna
-10 to -5 MHz offset from lower channel edge 5 to 10 MHz offset from upper channel edge	(PMax – 43) dBm / 5 MHz EIRP per antenna
< -10 MHz offset from lower channel edge > 10 MHz offset from upper channel edge	(PMax – 43) dBm / 5 MHz EIRP per antenna

2. In addition, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Channel shall not exceed the following additional band edge requirements:

Frequency	Power
3795 MHz – 3800 MHz 4200 MHz – 4205 MHz	(PMax – 40) dBm / 5 MHz EIRP per antenna

3760 MHz - 3795 MHz 4205 MHz – 4240 MHz	(PMax – 43) dBm / 5 MHz EIRP per antenna
Below 3760 MHz Above 4240 MHz	-2 dBm / 5 MHz EIRP per antenna

26 GHz and 40 GHz

The technical schedules for 26 GHz and 40 GHz are set out in Annex A4 of the Enabling mmWave spectrum for new uses statement published in September 2023.

Interpretation of terms in this schedule

1. In this schedule:
   a. "**dBm**" means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
   b. "**Permitted Channel**" means the frequency assigned by Ofcom that is the upper and lower cut-off frequencies;
   c. "**PMax**" is the maximum mean power for the base station in question, measured as EIRP per carrier and determined irrespective of the number of antennas;
   d. ~~"**TRP**" means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere, measured during the on part of the transmission;~~

Office of Communications (Ofcom)
Wireless Telegraphy Act 2006

SHARED ACCESS MEDIUM POWER LICENCE

Sector/Class/Product:	**615002 - Shared Access (Medium Power) / Shared Access**
Licence number:	
Licensee:	
Company Registration:	
Licensee Address:	
Email:	
Date of Issue:	
Valid From:	
[Licence end date:]	
Payment Interval:	1 Year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence ("the Licence") to [the Licensee's name] to establish, install and use wireless telegraphy stations and/or wireless telegraphy apparatus as described in the schedules to this Licence (together "the Radio Equipment") subject to the terms set out below.

Licence Term

2. This Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee or if it is a Short Term Licence, when it reaches its expiration date.

Licence Revocation

3. Pursuant to schedule 1 paragraph 8 of the Wireless Telegraphy Act 2006 ("the Act"), Ofcom may not revoke this Licence under schedule 1 paragraph 6 of the Act except:
   a) at the request, or with the consent, of the Licensee;
   b) if there has been a breach of any of the terms of this Licence;
   c) in accordance with schedule 1 paragraph 8(5) of the Act;
   d) if it appears to Ofcom to be necessary or expedient to revoke the Licence for the purpose of complying with a direction by the Secretary of State given to Ofcom under section 5 of the Act or section 5 of the Communications Act 2003;
   e) for reasons related to the management of the radio spectrum provided that in such a case the power to revoke may only be exercised after at least one month's notice is given in writing.
4. Ofcom may only revoke this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

Licence variation

5. Ofcom may only vary this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

Requirement to commence and maintain transmission within 6 months

6. The Licensee must establish, install and use the Radio Equipment to commence regular wireless telegraphy transmissions in accordance with the provisions of this Licence within six months of the date that this Licence is issued, and maintain such transmissions thereafter.

Transfer

7. This Licence may not be transferred. The transfer of rights and obligations arising by virtue of this Licence may however be authorised in accordance with regulations made by Ofcom under powers conferred by section 30 of the Act.[74]

Changes to Licensee details

8. The Licensee shall give prior notice to Ofcom in writing of any proposed changes to the Licensee's name, email address and/or address as recorded above paragraph 1 of this Licence.

Fees

9. The Licensee shall pay to Ofcom the relevant fee(s) as provided in section 12 of the Act and the regulations made thereunder on or before the fee payment date shown above, or on or before such dates as are notified in writing to the Licensee.

10. If the Licence is surrendered, revoked or varied, no refund, whether in whole or in part, of any amount which is due under the terms of this Licence, payable in accordance with any regulations made by Ofcom under sections 12 and 13(2) of the Act will be made, except at the absolute discretion of Ofcom.

Radio Equipment Use

11. The Licensee shall ensure that the Radio Equipment is established, installed and used only in accordance with the provisions specified in the schedules to this Licence. Any proposal to amend any detail specified in any of the schedules to this Licence must be agreed with Ofcom in advance and implemented only after this Licence has been varied or reissued accordingly.

12. The Licensee shall ensure that the Radio Equipment is operated in compliance with the terms of this Licence and is used only by persons who have been authorised in writing by the Licensee to do so and that such persons are made aware of, and of the requirement to comply with, the terms of this Licence.

13. The Licensee must ensure that all Radio Equipment is established, installed, modified and used only in accordance with the provisions specified in schedule 4 (EMF Licence Condition) of this Licence.

Access and Inspection

14. The Licensee shall permit any person authorised by Ofcom:

    a) to have access to the Radio Equipment; and

[74] See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

b) to inspect this Licence and to inspect, examine and test the Radio Equipment,

at any and all reasonable times or, when in the opinion of that person an urgent situation exists, at any time, to ensure the Radio Equipment is being used in accordance with the terms of this Licence.

Modification, Restriction and Closedown

15. Any person authorised by Ofcom may require the Radio Equipment or any part thereof, to be modified or restricted in use, or temporarily or permanently closed down immediately if in the opinion of the person authorised by Ofcom:

    a) a breach of this Licence has occurred; and/or
    b) the use of the Radio Equipment is, or may be, causing or contributing to undue interference to the use of other authorised radio equipment.

16. Ofcom may require any of the Radio Equipment to be modified or restricted in use, or temporarily closed down either immediately or on the expiry of such period as may be specified in the event of a national or local state of emergency being declared. Ofcom may only exercise this power after a written notice has been served on the Licensee or a general notice applicable to holders of a named class of licence has been published.

Geographical Boundaries

17. Subject to the requirements of any coordination procedures notified to the Licensee pursuant to the schedules to this Licence, the Licensee is authorised to establish, install and use a base station at the location set out the schedules to this Licence and any terminals connecting to it.

Synchronisation requirement

18. Where synchronisation requirements are set out in Schedule 3 to this Licence, the Licensee must transmit within the transmission limits specified.

19. Where synchronisation requirements have not been specified, in the event that harmful interference arises, the Licensee shall endeavour to discuss and agree with the other licence holder(s) how to coordinate their use. If agreement between licence holders cannot be reached, Ofcom may notify the Licensee to comply with additional technical conditions relating to synchronisation requirements.

20. The Licensee must comply with such technical conditions relating to synchronisation requirement notified to it by Ofcom from time to time.

21. The Licensee accepts that they may need to alter or replace Radio Equipment in order to comply with any synchronisation requirement notified from time to time.

Notification in electronic form

22. The Licensee shall accept notifications and other related documents under this Licence electronically to the designated email address as recorded above paragraph 1 of this Licence. The Licensee must update Ofcom about changes to the designated email address in accordance with paragraph 8.

Interpretation

23. In this Licence:

a) the establishment, installation and use of the Radio Equipment shall be interpreted as establishment and use of wireless telegraphy stations and installation and use of wireless telegraphy apparatus for wireless telegraphy as specified in section 8(1) of the Act;
b) the expression "**interference**" shall have the meaning given by section 115 of the Act;
c) the expressions "**wireless telegraphy station**" and "**wireless telegraphy apparatus**" shall have the meanings given by section 117 of the Act;
d) the schedule(s) form part of this Licence together with any subsequent schedule(s) which Ofcom may issue as a variation to this Licence; and
e) the Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

Issued by Ofcom

SCHEDULE 1 TO LICENCE NUMBER: [xxx]

Schedule Date:	[**xxx**]
Licence category:	Shared Access Medium Power

Description of Radio Equipment

1. References in this schedule(s) to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this schedule(s).

Interface Requirements for the Radio Equipment

2. Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2104 Shared Access Medium power

Special conditions relating to the Radio Equipment

3. This Licence authorises the use of the Radio Equipment within the Permitted Frequency Band and the Licensee warrants that the Radio Equipment is capable of transmitting across the Permitted Frequency Band.

4. However, the Licensee is only authorised to transmit on the Permitted Channel Centre Frequency within the Permitted Frequency Band, as set in Schedule 2 to this Licence or as notified to the Licensee by Ofcom from time to time.

5. The Licensee must comply with any change to the Permitted Channel Centre Frequency notified by Ofcom within the timescale indicated in the notification.

6. During the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

   a) For all fixed/ installed terminals the:

      i) postal address (including post code);
      ii) National Grid Reference (to 1m resolution); and
      iii) Antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

   b) For all mobile and nomadic terminals in the 3.8-4.2 GHz band the postal address (including post code) of where it will be used.

7. The Licensee shall submit to Ofcom in such manner and within such period as specified by Ofcom, such other information in relation to the Radio Equipment, or any wireless telegraphy station or wireless telegraphy apparatus which the Licensee is planning to use, as Ofcom may from time to time request. Such information may include, but is not limited to, information in relation to the radio frequency, transmitted power and date of first use for wireless telegraphy stations or wireless telegraphy apparatus to be established, installed or used within such timeframe and in such areas as Ofcom may reasonably request.

8. The use of the Radio Equipment is not permitted airborne.

9. Paragraph 10 applies where the following conditions are fulfilled:

a. The Permitted Frequency Band for this Licence is 3805 – 4195 MHz; and

b. The Licensee holds another Shared Access Medium Power Licence(s) for which the Permitted Frequency Band is 3805 – 4195 MHz which was issued after 24 July 2024; and

c. That other licence(s) authorises Radio Equipment that is located:

i. in an Urban Area; and

ii. within 500m of the Radio Equipment to which this Licence relates; and

d. The Permitted Channel frequency bandwidths authorised by this Licence, and that other licence(s), taken together, authorise the Licensee to use more than 100MHz of the Permitted Frequency Band.

10. Where this clause applies the Licensee must not establish, install and use the Radio Equipment to which this Licence relates.

Coordination at frequency and geographical boundaries

11. The Licensee shall ensure that the Radio Equipment is operated in compliance with such coordination procedures as may be notified to the Licensee by Ofcom from time to time.

Cooperation between licensees

12. In addition to complying with the specific transmission terms, conditions and limitations set out in this Licence, the Licensee must liaise and co-operate with other holders of licences in the Permitted Frequency Band (if necessary adjusting transmission power and other technical parameters of transmission) in such a way that harmful interference is not caused by one network deployment to that of another Licensee within the band.

Interpretation of terms in this schedule

13. In this schedule:

a) “Fixed or installed” means used or installed at specific fixed points.

b) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with the Radio Equipment Regulations 2017, as amended by the Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019.

c) “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points.

d) “Permitted Channel” means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;

e) “Permitted Channel Centre Frequency” means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies.

f) “Permitted Frequency Band” means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency

d) “Urban Area” means an area which is not:

i) *A 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");*[75]

ii) *Any location in Scotland which falls into categories 3-8 based on the Scottish Government's 8-fold Urban Rural Classification;*[76]

iii) *any location in Northern Ireland which falls into bands E-H of the Northern Ireland Statistics and Research Agency's settlement classification bands; or*[77]

iv) *any location in the UK's territorial seas.*[78]

[75] *Office of National Statistics, "2011 Rural/Urban Classification", https://www.ons.gov.uk/methodology/geography/geographicalproducts/ruralurbanclassifications/2011ruralurbanclassification*

[76] *Scottish Government, "Scottish Government Urban Rural Classification", https://www.gov.scot/Topics/Statistics/About/Methodology/UrbanRuralClassification*

[77] *Northern Ireland Statistics and Research Agency, "Urban-Rural Classification", https://www.nisra.gov.uk/support/geography/urban-rural-classification*

[78] Territorial Sea Act 1987 section 1 and The Territorial Sea (Baselines) Order 2014.

SCHEDULE 2 TO LICENCE NUMBER: [xxx]

Schedule Date:	[**xxx**]
Licence category:	Shared Access Medium Power

1800 MHz

Transmitter(s)	
Base station location	NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor]
Permitted Frequency Band	1871.7 - 1880 MHz
EIRP Tx	
Permitted Channel Centre Frequency Tx	1878.35 MHz
Permitted Channel Centre Frequency Rx	1878.35 MHz
Permitted Channel frequency bandwidth	3.3 MHz
Antenna Type	Antenna Library Reference, Azimuth, Elevation
Antenna Height (Metres)	
Relevant Receiver Parameters	
Receive Antenna Gain used in coordination[79]	X dBi

Maximum power within the Permitted Channel

1. When transmitting, the licensee must transmit within the limits set out below.

Radio Equipment	**Band**	**Maximum Power**	
Base Station	1876.7-1880 MHz	42 dBm / carrier (up to 3 MHz) EIRP per cell	
		Frequency offset from the lower frequency of the band edge	**Maximum Mean EIRP density** per cell
		0 to 0.05 MHz	-33.6 + 153.3 x ΔFL* dBm / kHz
		0.05 to 0.1 MHz	-26 + 60 x (ΔFL*- 0.05) dBm / kHz

[79] This is the value which the Licensee supplied to Ofcom for coordination purposes. For the avoidance of doubt, the Licensee is not bound by this value and may use a higher value at the Licensee's own risk.

Radio Equipment	Band	Maximum Power	
		0.1 to 0.2 MHz	-23 + 230 x (ΔFL*- 0.1) dBm / kHz
		0.2 to 3.2 MHz	42 dBm / carrier
		3.2 to 3.3 MHz	-23 + 230 x (3.3 – ΔFL*) dBm / kHz
		* Note: ΔFL 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)	
Fixed / installed terminal station[a]	1781.7 – 1785 MHz	23 dBm EIRP	
Mobile or nomadic terminal station[a]	1781.7 – 1785 MHz	23 dBm TRP	
[a] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.			

2300 MHz

Transmitter(s)	
Base station location	NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor]
Permitted Frequency Band	2390-2400 MHz
EIRP Tx	
Permitted Channel Centre Frequency	2395 MHz
Permitted Channel frequency bandwidth	10 MHz
Antenna Type	Antenna Library Reference, Azimuth, Elevation
Antenna Height (metres)	
Relevant Receiver Parameters	
Receive Antenna Gain used in coordination[80]	

[80] This is the value which the Licensee supplied to Ofcom for-coordination purposes. For the avoidance of doubt, the Licensee is not bound by this value and may use a higher value at the Licensee's own risk.

Maximum power within the Permitted Channel

2300 MHz shared spectrum

1. When transmitting, the Licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power
Base Station	2390-2400 MHz	42 dBm / carrier (up to 10 MHz) EIRP per cell
Fixed / installed terminal Station[a]	2390-2400 MHz	25 dBm EIRP (includes a 2 dB tolerance)
Mobile or nomadic terminal station[a]	390-2400 MHz	25 dBm TRP (includes a 2 dB tolerance)
[a] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.		

3.8 – 4.2 GHz

Transmitter(s)	
Base station location	NGR [**xxx xxx**]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor]
Permitted Frequency Band	3805 – 4195 MHz
EIRP Tx	
Permitted Channel Centre Frequency	
Permitted Channel frequency bandwidth	
Antenna Type	[Antenna Library Reference, Azimuth, Elevation]
Antenna Height (Metres)	
Relevant Receiver Parameters	
Receive Antenna Gain used in coordination[81]	

[81] This is the value which the Licensee supplied to Ofcom for-coordination purposes. For the avoidance of doubt, the Licensee is not bound by this value and may use a higher value at the Licensee's own risk.

Maximum power within the Permitted Channel

3.8 – 4.2 GHz shared spectrum

1. When transmitting, the Licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power
Base Station	3805 – 4195 MHz	42 dBm / carrier EIRP per cell for carriers ≤ 20 MHz; or 36 dBm / 5 MHz EIRP per cell for carriers > 20 MHz
Fixed / installed terminal station[a]	3805 – 4195 MHz	28 dBm TRP and 35 dBm/5 MHz EIRP (includes a 2 dB tolerance)
Mobile or nomadic terminal station[a]	3805 – 4195 MHz	28 dBm TRP (includes a 2 dB tolerance)
[a] The maximum mean power relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.		

26 GHz and 40 GHz

The technical schedules for 26 GHz and 40 GHz are set out in Annex A4 of the Enabling mmWave spectrum for new uses statement published in September 2023.

All bands

Interpretation of terms in this schedule

2. In this schedule:

   a) "Active antenna systems (AAS)" means a base station and an antenna system where the amplitude and/or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This excludes long-term beam shaping such as fixed electrical down tilt. In AAS base stations the antenna system is integrated as part of the base station system or product.
   b) "dBm" means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
   c) "Fixed or installed" means used or installed at specific fixed points;
   d) "Indoor" or "indoors" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
   e) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points;
   f) "NGR" means National Grid Reference;
   g) "outdoor" or "outdoors" means anywhere that is not indoor;
   h) "per cell" means per specific piece of Radio Equipment. For a multi-sector base station, per cell refers to each one of the individual sectors irrespective of the number of transmit antennas;
   i) "Permitted Channel" means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;

j) “Permitted Channel Centre Frequency” means the frequency assigned by Ofcom that is the midpoint between the upper and lower cutoff frequencies.
k) “Permitted Channel Frequency Bandwidth” means the total amount of spectrum assigned to the channel;
l) “Permitted Frequency Band” means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency;
m) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere, measured during the on part of the transmission.

SCHEDULE 3 TO LICENCE NUMBER: [xxx]

Maximum power of Radio Equipment outside the Permitted Channel

1800 MHz

1. When transmitting, the Licensee must transmit within the limits set out below.

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 (ΔFL*+ 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 ΔFH* dBm / kHz
0.05 to 0.1 MHz	-26 - 153.3 x (ΔFH* - 0.05) dBm / kHz
0.1 to 2.8 MHz	-45 - 10 x (ΔFH* + 0.2) / 3 dBm / kHz
2.8 to 5.8 MHz	-55 dBm / kHz

*Notes ΔFL 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)
ΔFH 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)

2300 MHz

1. When transmitting, the Licensee must transmit within the limits set out below.

Frequency	Power
2385 to 2390 MHz 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 24 dBm < Pmax ≤ 42 dBm Pmax ≤ 24 dBm	 (PMax – 41) dBm / 5 MHz EIRP* –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 antennas.

2. The licensee's base stations must transmit within the limits of transmission Frame Structure A.

3. Frame Structure A 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 licensee(s) that hold a Spectrum Access licence in 2350-2390MHz 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.

Frame Structure A

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

3.8 – 4.2 GHz

1. When transmitting, the Licensee must transmit within the limits set out below.

Frequency	Power
-5 to 0 MHz offset from lower channel edge 0 to 5 MHz offset from upper channel edge	(PMax – 40) dBm / 5 MHz EIRP per antenna
-10 to -5 MHz offset from lower channel edge 5 to 10 MHz offset from upper channel edge	(PMax – 43) dBm / 5 MHz EIRP per antenna
< -10 MHz offset from lower channel edge > 10 MHz offset from upper channel edge	(PMax – 43) dBm / 5 MHz EIRP per antenna

2. In addition, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Channel shall not exceed the following additional band edge requirements:

Frequency	Power
3795 MHz – 3800 MHz 4200 MHz – 4205 MHz	(PMax – 40) dBm / 5 MHz EIRP per antenna
3760 MHz - 3795 MHz 4205 MHz – 4240 MHz	(PMax – 43) dBm / 5 MHz EIRP per antenna
Below 3760 MHz Above 4240 MHz	-2 dBm / 5 MHz EIRP per antenna

26 GHz and 40 GHz

The technical schedules for 26 GHz and 40 GHz are set out in Annex A4 of the Enabling mmWave spectrum for new uses statement published in September 2023.

All bands

Interpretation of terms in this schedule

1. In this schedule:

   a) "dBm" means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);

   b) "Permitted Channel" means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;

   c) "PMax" is the maximum mean power for the base station in question, measured as EIRP per carrier and determined irrespective of the number of antennas.

SCHEDULE 4 – EMF Licence Condition

Schedule Date:	[**xxx**]
Licence category:	Spectrum Access Licence

Sites which are not shared with another licensee

1. The Licensee shall only establish, install, modify or use Relevant Radio Equipment if the total electromagnetic field exposure levels produced by the Licensee's On-Site Radio Equipment do not exceed the basic restrictions[82] in the relevant tables for general public exposure identified in the ICNIRP Guidelines[83] in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Sites which are shared with another licensee

2. In the case of a shared site where the Shared Site Exemption applies to the Licensee, the Licensee shall comply with paragraph 1 above.

3. In the case of a shared site where the Shared Site Exemption does not apply to the Licensee, the Licensee shall only establish, install, modify or use the Relevant Radio Equipment if:

   a) the total electromagnetic field exposure levels produced by the Licensee's On-Site Radio Equipment, together with

   b) the total electromagnetic field exposure levels produced by all other wireless telegraphy stations and wireless telegraphy apparatus operated by another licensee on the same site for which the Licensee can reasonably assume that a Shared Site Exemption does not apply,

   do not exceed the basic restrictions[84] in the relevant tables for general public exposure identified in the ICNIRP Guidelines[85] in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Emergency Situations

4. The obligations in paragraphs 1, 2 and 3 above will not apply if the Relevant Radio Equipment is being used for the purpose of seeking emergency assistance or reporting and responding to an emergency situation (in the vicinity of that situation) including for search and rescue activities and maritime emergency communications[86].

[82] Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.
[83] The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".
[84] Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.
[85] The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".
[86] Further information on emergency situations in set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

Relationship with authorised transmission levels

5. The Licensee shall comply with paragraphs 1, 2 and 3 above notwithstanding the maximum transmission levels authorised in the Licence.

Records

6. The Licensee shall keep, or shall procure that a third party shall keep, and shall make available to Ofcom on request, records (including the type of records identified in Ofcom's "Guidance on EMF Compliance and Enforcement") that demonstrate how it has complied with paragraphs 1, 2 and 3 above when Relevant Radio Equipment is established, installed, modified or used.

Ofcom's "Guidance on EMF Compliance and Enforcement"

7. When evaluating its compliance with paragraphs 1, 2 and 3 above, the Licensee shall take into account Ofcom's "Guidance on EMF Compliance and Enforcement" that is in force at the relevant time.

Interpretation

8. In this schedule:

   a) **"dBi"** means the ratio in dB (decibel) when comparing the gain of the antenna to the gain of an isotropic antenna. An isotropic antenna is a theoretical antenna which radiates power uniformly in all directions;

   b) **"EIRP"** means equivalent isotropically radiated power which is the product of the power supplied to an antenna and the absolute or isotropic antenna gain in a given direction relative to an isotropic antenna;

   c) **"ERP"** means effective radiated power which is the product of the power supplied to an antenna and its gain in a given direction relative to a half-wave dipole;

   d) "**general public**" means any person who is not: (a) the Licensee, owner, operator or installer of the Relevant Radio Equipment; or (b) acting under a contract of employment or otherwise acting for purposes connected with their trade, business or profession or the performance by them of a public function;[87]

   e) **"ICNIRP Guidelines"** means the version of the Guidelines published by the International Commission on Non-Ionizing Radiation Protection for limiting exposure to electromagnetic fields which are identified in Ofcom's "Guidance on EMF Compliance and Enforcement" that is in force at the relevant time.[88]

---

[87] There is pre-existing health and safety legislation which already requires employers to protect workers from exposure to electromagnetic fields ("EMF") including the following legislation specifically relating to EMF (as amended from time to time): The Control of Electromagnetic Fields at Work Regulations 2016, The Control of Electromagnetic Fields at Work Regulations (Northern Ireland) 2016 and The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Electromagnetic Fields) Regulations 2016.

[88] Ofcom's "Guidance on EMF Compliance and Enforcement" will initially require the Licensee to comply with the ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz), published in: Health Physics 74(4):494-522, dated April 1998 and available at: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf ("1998 Guidelines") or the ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 KHz to 300 GHz), published in: Health Physics 118(5): 483–524; 2020 and available at: https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf

f) **"Licensee's On-Site Radio Equipment"** means the Relevant Radio Equipment and any other wireless telegraphy station(s) and wireless telegraphy apparatus on the same site which transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP.[89]

g) **"Relevant Radio Equipment"** means all the Radio Equipment that is authorised by this Licence to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP.

h) **"Shared Site Exemption"** means any of the following three situations apply on a shared site in relation to the Licensee's or another licensee's wireless telegraphy station(s) or wireless telegraphy apparatus that is authorised to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP:

- The first situation is that all of the licensee's wireless telegraphy station(s) or wireless telegraphy apparatus on a shared site do not transmit at a combined total radiated power in any particular direction[90] that is higher than 100 Watts EIRP or 61 Watts ERP;[91]
- The second situation is that the total electromagnetic field exposure levels produced by the licensee's wireless telegraphy station(s) or wireless telegraphy apparatus in any area where a member of the general public is or can be expected to be present when transmissions are taking place is no more than 5% of the basic restrictions or 5% of the reference levels in the relevant tables for general public exposure identified in the ICNIRP Guidelines;[92]
- The third situation is where the licensee's wireless telegraphy station or wireless telegraphy apparatus has an antenna gain that is equal to or higher than 29 dBi and has a fixed beam;

i) **"shared site"** means a site that is shared by the Licensee and at least one other licensee for the purposes of establishing, installing, modifying or using wireless telegraphy stations or wireless telegraphy apparatus;

j) **"site"** means a physical structure, building, vehicle or moving platform;

k) **"wireless telegraphy apparatus"** has the meaning given to it in section 117 of the Wireless Telegraphy Act 2006; and

---

("2020 Guidelines"). However, once work on the relevant standards explaining the methodology for assessing compliance with the 2020 Guidelines has progressed sufficiently, Ofcom will publish a public consultation on updating its "Guidance on EMF Compliance and Enforcement" to explain that going forward Ofcom will be requiring the Licensee to comply with the 2020 Guidelines only. Following this public consultation, Ofcom will publish an updated version of Ofcom's "Guidance on EMF Compliance and Enforcement" on its website. Ofcom will follow the same process for any subsequent versions of the ICNIRP Guidelines.

[89] 10 Watts EIRP is equivalent to 6.1 Watts ERP. In linear units EIRP (W) = 1.64 x ERP (W); in decibels EIRP (dB) = ERP (dB) + 2.15. Ofcom's "Guidance on EMF Compliance and Enforcement" explains how the Licensee can determine if wireless telegraphy station(s) or wireless telegraphy apparatus "transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP".

[90] For the purpose of this situation, the combined total radiated power is a simple sum of the radiated powers (in EIRP or ERP) of all of the licensee's wireless telegraphy station(s) or wireless telegraphy apparatus on the shared site that transmits signals covering the same or overlapping areas.

[91] 100 Watts EIRP is equivalent to 61 Watts ERP.

[92] The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

l) **“wireless telegraphy station”** has the meaning given to it in section 117 of the Wireless Telegraphy Act 2006.