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Decision on changes to the licence exemption for wireless telegraphy devices and on licensing equipment in 57 to 71 GHz

Making more spectrum available for Wi-Fi, Data Networks and Short-Range Devices, and managing the use of higher power equipment in the 57 to 71 GHz band.

STATEMENT:

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1. Overview

Ofcom is responsible for authorising the use of the radio spectrum to support wireless services used every day, including Wi-Fi. We permit the use of the radio spectrum by granting wireless telegraphy licences under the Wireless Telegraphy Act 2006 (the "WT Act") or by making statutory regulations exempting users of particular equipment from the requirement to hold such a licence.

What we have decided – in brief

On 20 April 2021 we signed new regulations (the Wireless Telegraphy (Exemption) Regulations 2021 (the "Exemption Regulations")) which come into force on 12 May 2021. The Exemption Regulations implement a number of decisions as outlined below. We decided to make the Exemption Regulations following consideration of eight responses to our consultation published on 7 December 2020. The Exemption Regulations revoke and replace the previous exemption regulations.

These are our decisions:

Non-specific Short Range Devices (SRDs) and SRD Data Networks in 870 to 874.4 MHz band: we are making 4.4 MHz of continuous spectrum available by aligning the technical parameters and authorisation regime across the 870 to 874.4 MHz band. These changes will make the band more suitable for applications including smart metering and Machine-to-Machine communications that wish to use wider bandwidth technologies.

Higher power wideband data transmission systems (WBDTS) in the 57 to 71 GHz band: from 20 May 2021, we require new use of these higher power systems to be licensed rather than licence exempt in order to ensure compliance with our electromagnetic fields (EMF) usage conditions. For equipment already deployed under the existing licence-exemption framework we are providing a transition period where operators of the equipment will have until 30 November 2021 to obtain a licence.

Wi-Fi & other Radio Local Area Network (RLAN) Technologies: we are allocating an extra 500 MHz of spectrum from 5925 to 6425 MHz for Wi-Fi and RLAN devices and removing the Dynamic Frequency Selection (DFS) requirements in the 5.8 GHz band (5725 to 5850 MHz). Both these measures will help make more channels available, increase capacity and reduce congestion in existing Wi-Fi bands caused by increasing numbers of connected devices.

European Union Decision on SRDs: we will align the technical conditions for some SRDs with those set out in the European Commission Decision 2019/1345. The Decision harmonised the technical parameters for certain categories of SRD applications across several frequency bands. We believe this change supports an international market for equipment which could help provide more choice and lower costs to UK citizens and consumers.

2. Introduction

2.1 This document confirms that on 20 April 2021 Ofcom made the Wireless Telegraphy (Exemption) Regulations 2021 (the "Exemption Regulations"). The Exemption Regulations come into force on 12 May 2021.

2.2 On 7 December 2020 we published a consultation document entitled "Notice of Ofcom's changes to licence exemption for Wireless Telegraphy Devices and consultation on licensing equipment in 57 to 71 GHz" (the "December document").[1] In this we consulted on two policy proposals and, as required by section 122(4) and (5) of the WT Act, we also included a formal notice of Ofcom's intention to make regulations which would implement both these proposals and other changes already decided. We requested comments on the proposed policy changes and the drafting of the regulations by 29 January 2021.

2.3 The Exemption Regulations revoke the Wireless Telegraphy (Exemption and Amendment) Regulations 2010 (SI 2010/2512) (the "2010 Regulations") and subsequent amendment regulations and replace them with a new set of regulations.

What we set out in the December document

2.4 In our December document the two policy proposals we consulted on, that would require changes to be made to the licence exemption regulations if introduced, were:

- to make available 4.4 MHz of continuous spectrum suitable for Non-specific Short Range Devices (SRDs) and SRD data network equipment, including smart meters and internet of things (IOT) devices, in the 870 to 874.4 MHz; and
- to change the authorisation regime for higher power wideband data transmission systems (WBDTS) in the 57 to 71 GHz band from licence-exemption to a licensing approach.

2.5 The draft regulations included the changes necessary to implement the 870 to 874.4 MHz policy proposal that we were consulting on, if a decision was taken to implement it, as well as changes necessary to implement proposals that had already been agreed. These other changes were to:

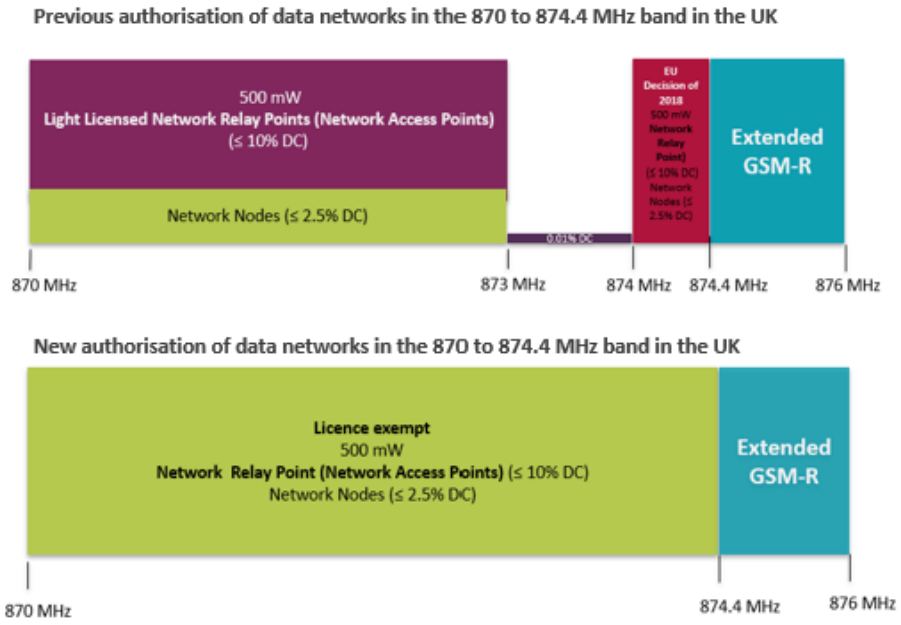
- implement our earlier policy decision to expand the amount of spectrum available for Wi-Fi by making the 5925 to 6425 MHz band available for this use and relax some of the technical parameters in the 5725 to 5850 MHz band relating to Dynamic Frequency Selection (DFS); and
- implement the European Commission Implementing Decision 2019/1345/EU of 2 August 2019 (the "SRD Decision").[2]

[1] https://www.ofcom.org.uk/consultations-and-statements/category-2/licence-exemption-licensing-equipment-changes
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.212.01.0053.01.ENG&toc=OJ:L:2019:212:TOC

Non-specific SRDs and SRD data networks in the 870 to 874.4 MHz band

2.6 We wanted to align the technical parameters and authorisation regime of the 870 to 874.4 MHz band to make it more usable by SRDs. Figure 1 sets out how the equipment in the 870 to 874.4 MHz band was authorised and our proposed changes.

Figure 1: Authorisation of equipment in the 870 to 874.4 MHz band in the UK



2.7 We stated that the use of 870 to 874.4 MHz had already been considered by the Electronic Communications Committee (ECC) through technical sharing studies (see, ECC report 200[3]) and is included in Rec 70-03.[4] After considering the implications of the current authorisation approach, we proposed to harmonise the technical parameters across the band from 870 to 874.4 MHz, to do this we consulted on the following:

a) **870 to 873 MHz** – use of higher duty cycle equipment in this band was authorised under a light licensing regime as a precautionary approach, to allow us to manage any problems arising from high densities of devices interfering with each other. As these problems have not arisen due to updates in the equipment standards, we believed the licence requirement was no longer necessary. We therefore proposed to make the use of devices operating up to a duty cycle of 10% licence-exempt.

b) **873 to 874 MHz** – to align the technical parameters with the use in 870 to 873 MHz and 874 to 874.4 MHz we proposed to increase the permitted duty cycle limit from 0.01% to up to 10% and for other network devices from 0.01% up to 2.5% on a licence-exempt basis.

[3] ECC Report 200 https://docdb.cept.org/document/307
[4] ERC Recommendation 70-03 https://docdb.cept.org/download/25c41779-cd6e/Rec7003e.pdf

c) **874 to 874.4 MHz** – we suggested no changes were needed to the technical parameters for this equipment.

2.8 Our aim was to make available 4.4 MHz of continuous spectrum for SRDs on a licence-exempt basis. Previously, only 0.4 MHz was available with an additional 3 MHz accessible only by obtaining a licence from Ofcom.

2.9 Given the availability of equipment made available through aligning with REC 70-03, we believed that we should introduce these changes. This we argued would create additional and wider bandwidth channels to support growth and innovation in the smart metering, IOT and M2M sectors.

2.10 We proposed to update IR 2030 to include the new technical requirements and included the parameters in Annex 6 of the document.

Higher power wideband data transmission systems (WBDTS) in the 57 to 71 GHz band

2.11 Currently there are two sets of conditions for WBDTS equipment operating in the 57 to 71 GHz band on a licence exempt basis. A low power (40 dBm Effective Isotropic Radiated Power (e.i.r.p.)) provision and a higher power (55 dBm e.i.r.p.) provision restricted to fixed outdoor use only. We proposed to change how we authorise higher power WBDTS equipment from being licence-exempt to requiring a licence.

2.12 We stated that we were in the process of implementing proposals to put in place a requirement for holders of certain WT Act licences[5] to comply with the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines on limiting exposure to electromagnetic fields (EMF) (the "ICNIRP Guidelines").[6] As the transmit power for higher power WBDTS equipment was above the 10 Watt e.i.r.p. threshold then the provisions relating to the ICNIRP Guidelines should apply to this equipment.

2.13 We considered what would be the most appropriate mechanism to put in place that would ensure compliance with the ICNIRP general public limits and, after assessing the options, proposed moving from a licence-exempt authorisation regime to one which would require a licence. We stated that a licensing approach would clearly set out the obligations with which the licensee is required to comply and that they would be responsible for compliance with the ICNIRP Guidelines.

2.14 We proposed to include higher power WBDTS equipment into our existing Spectrum Access Extremely High Frequency (EHF) licence. The Spectrum Access EHF licence:

- allows the deployment of unlimited numbers of devices throughout the UK;
- does not grant exclusive access and all use is on a non-interference basis with no protection from other licensed users of the frequency bands;
- has a fee of £75 chargeable every 5 years;

[5] Licence types that permit power level for transmission above 10 Watts e.i.r.p.
[6] https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf

- has a one-year notice period for Ofcom to revoke the licence for spectrum management reasons;
- does not permit airborne use;
- requires licensees to maintain a record of all their deployments[7] and provide information to Ofcom when formally requested; and
- includes Ofcom's standard terms and conditions covering the grounds for revocation, inspection and shutdown.

2.15 To make this change, we advised that we need to revoke Regulation 5 of the Exemption Regulations that covered this equipment. This we said would not be done straight way as wanted to provide a six-month transition period during which the exemption would remain in place alongside the new Spectrum Access EHF licence. This was to allow time for existing users operating under the licence exemption regime to apply for and obtain a licence. We advised that the necessary changes to the regulations would be in place for the 1 September 2021.

5 and 6 GHz Wi-Fi

2.16 On 24 July 2020 we published our statement "Improving spectrum access for Wi-Fi"[8] in which we decided to make the lower 6 GHz band (5925 to 6425 MHz) available for Wi-Fi and other RLAN devices on a licence-exempt basis, enabling indoor and very low power outdoor use. This we advised would provide an additional 500 MHz of spectrum available and would make more channels available, increase capacity and reduce congestion in existing bands caused by large numbers of devices.

2.17 In addition, we also decided to remove DFS requirements for indoor use (up to 200mW) from the 5.8 GHz band (5725 to 5850 MHz). DFS requires a router to scan for radars and to switch channel if suspected radar transmissions are detected. DFS can therefore represent a constraint for equipment manufacturers regarding quality of service and throughput as well as being the cause of connection delays for users. We decided to amend the requirements on this band on the basis that the risk of undue interference from indoor Wi-Fi use is extremely low. The removal of DFS will increase its use for indoor wireless applications and help reduce congestion in other bands.

2.18 To implement this change, we indicated that Regulation 4 of the draft Exemption Regulations would need to be updated. The new Wi-Fi technical provisions would be put in IR 2030 and a copy of the changes were included in Annex 6.

EU SRD Decision

2.19 Ofcom works closely with other European countries via European Conference of Postal and Telecommunications Administrations (CEPT) to develop harmonised conditions for equipment. This technical work forms the basis for many of the European Commission's harmonisation decisions, including the SRD Decision.

[7] The provision relating to the antenna angle of elevation will not apply to equipment in the 57 to 71 GHz band.
[8] https://www.ofcom.org.uk/__data/assets/pdf_file/0036/198927/6ghz-statement.pdf

2.20 The SRD Decision updated some of the harmonised technical conditions that apply currently to SRDs in various frequency bands and introduces harmonised technical conditions for some new categories of SRDs. Minor editorial changes and updates to some entries also form part of the SRD Decision. Table 1 sets out the new medical and safety related applications, non-safety related intelligent transport systems (ITS) and Transport and Traffic Telematics devices that implementing the SRD Decision would introduce.

Table 1 – Harmonised SRD uses to be implemented because of the SRD Decision [9]

EU Band no	Frequency band	Category of short-range device	Remarks
85	442.2 to 450.0 kHz	Non-specific short-range devices	The band is only for the use of personal detection and collision devices with a magnetic field strength of 7 dBµA/m at 10 m per channel. Channel spacing for this use should be ≥ 150 Hz. Typical uses in the band will be personal detection, personal safety alarms and collision avoidance systems.
86	430 to 440 MHZ	Ultra-low power wireless medical capsule endoscopy (ULP-WMCE)	The band is only for the use of ULP-WMCE applications operating at -50dBm/100kHz ERP but not exceeding a total power of -40dBm/10MHz (measured outside of the patient's body). Typical use in the band will be: • medical imaging capsules which acquire high resolution optical internal images of human digestive tract for non-invasive diagnosis and treatment of gastrointestinal diseases; and • wearable patient data recorders which receive and store the imaging data transmitted by the capsule camera.
87	862 to 863 MHz	Non-specific short-range devices	The band is for the use of non-specific short-range devices with 25mW ERP and maximum duty cycle of 0.1% and a maximum bandwidth of 350 kHz. Typical uses in the band will be home automation, metering, industrial and non-specific IoT/M2M applications.
62	5795 to 5815 MHz	Transport and Traffic Telematics devices	2W e.i.r.p. This set of usage conditions applies only to road tolling applications and smart tachograph, weight and dimension applications.

[9] Extracted from the published decision https://circabc.europa.eu/sd/a/e3ea717a-87cf-4810-929d-35b9b9a2c543/RSCOM19-6rev1_SRD_draft_seventh_update.pdf

88 & 89	5855 to 5865 MHz 5865 to 5875 MHz		33dBm e.i.r.p., 23dBm/MHz density and a Transmit Power Control (TPC) range of 30dB. This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems. Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to the essential requirements of Directive 2014/53/EU shall be used.[10]
75	57 to 71 GHz	Wideband data transmission systems	40dBm e.i.r.p. and 23dBm/MHz e.i.r.p. density. Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to the essential requirements of Directive 2014/53/EU shall be used.
77	63.72 to 65.88 GHz	Transport and Traffic Telematics devices	40dBm e.i.r.p. This set of usage conditions is only available to vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle systems. TTT devices placed on the market before the 1 January 2020 are 'grandfathered', i.e. they are continuously permitted to be used in line with the provisions set out in EC Decision 2017/1483/EU band no 77 (63 to 64 GHz).
79a	76 to 77 GHz	Transport and Traffic Telematics devices	55dBm peak e.i.r.p. with 50dBm mean e.i.r.p. or 23.5dBm mean e.i.r.p. for pulse radars. This set of usage conditions is only available to ground-based vehicle and infrastructure systems. Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to the essential requirements of Directive 2014/53/EU shall be used.

2.21 In order to support an international market for equipment by enabling economies of scale which should lead to lower equipment prices for UK consumers, we sought to align our current technical conditions with the SRD Decision.

2.22 We believed that implementing the changes to align with the SRD Decision would deliver positive benefits to UK citizens and consumers. These included enhancing the freedom of movement of SRDs, by continuing the common approach to spectrum access conditions for SRDs and potentially lowers the costs of SRDs for UK consumers and business.

[10] Note with the withdrawal of the UK from the European Union IR 2030 will include

2.23 We argued that if the spectrum access conditions were not harmonised for SRDs, increased production costs and the risks of harmful interference with other radio applications and services due to unauthorised use are more likely to occur. Citizens and consumers would not be able to benefit from the new opportunities that these devices could provide as a result of advances in technology. If the UK did not participate in this approach, it might be argued that UK businesses and consumers would be disadvantaged in not having access to these innovative technologies.

2.24 To implement this change, we advised that Regulation 4 of the draft Exemption Regulations would again need to be updated. The new SRD technical provisions would be put in IR 2030.

3. Responses

3.1 We received eight comments to the December document. This section sets out the comments that we received to both the consultation proposals and statutory notice and our response to them.

> **Question 1** – Do you agree with Ofcom's proposal to update the authorisation approach and technical criteria for SRD data networks in the 870 to 874.4 MHz band? If not, please provide your reasoning.

Comments received

3.2 We received five responses to this question, which were all supportive. Nokia, Wi-Sum Alliance and Dunel Europa all supported the proposals but did not provide any additional comments. Itron noted that the proposed changes would increase the spectrum availability by almost 50% and would assure future operations but it was not the full 6 MHz of spectrum the industry requested from the CEPT.

3.3 The Wi-Fi Alliance also supported the proposals but also requested that we consider frequency allocation below 1 GHz that would support channel sizes of around 2 MHz but with no duty cycle restrictions.

Ofcom response

3.4 In relation to Itron's comment, the UK currently allows access across all 6 MHz of spectrum from 870 to 876 MHz. However, due to 874.4 to 876 MHz being earmarked for future use by the railway industry to upgrade their GSM-R communications networks, we are not able to allow higher power use in this part of this band.

3.5 Regarding the request for larger bandwidth spectrum be made available in the sub 1 GHz band, this has yet to be studied by CEPT. Our proposals were focused on the 870 to 874.4 MHz band only but we will keep in mind the requests for larger bandwidth channels when work is proposed at CEPT.

> **Question 2** – Do you agree with Ofcom's proposals to authorise higher power use of 57 to 71 GHz by wideband data transmission systems via a light licensing regime? If not, please provide your reasoning.

Comments received

3.6 We received four responses to this question, the majority of which were supportive of our proposal to change the authorisation approach for higher power WBDTS in the 57 to 71 GHz band by moving from a licence exemption regime to a licensing regime.

3.7 Harrison Ainsworth was supportive of a move to a licensing approach but raised concerns over the health effects of using of this band in any scenario. In his response he provided links to two websites as well as a copy of a study on the potential biological effects of 60 GHz waves on human cells. He also believed that the current licence exemption should be removed immediately.

3.8 In a joint submission, Cambium, Facebook and Fibairo supported the proposed authorisation change noting that full compliance with government and international guidelines should be a prerequisite for any deployment. They also wanted Ofcom to make clear that the proposed licensing approach was not due to concerns that the equipment would cause harmful interference. Overall they believed that a licensing approach would be reasonable but made comments on a couple of the proposed licence conditions.

3.9 The first issue of concern was the one year notice period that Ofcom could invoke to remove users from the band for spectrum management reasons. This, they argued, may not provide sufficient regulatory certainty to enable significant investment in the band and may not support mass-market access to the band. A second point raised was that it was not clear to them if a licensee had to comply with either schedule 1 or 2 of the licence, or both. They stated that neither schedule contained the proposed EMF provisions and schedule 2 did not require written records to be maintained. They suggested that the 57 to 71 GHz band should be authorised under a separate licence and not included with other applications in the Spectrum Access EHF licence. Finally, they suggested that a licensing regime should be implemented as quickly as possible as equipment is already available.

3.10 Nokia also agreed with the proposed licensing regime. Separately, Nokia suggested that higher power use of the 66 to 71 GHz band for 5G should be further considered. They stated that this should be taken up at CEPT to look at 5G aspects and its use in this band. They went on to say that the availability of higher power (for a limited set of scenarios) and very wide spectrum bandwidths would allow the use of the band by a more diverse set of uses and applications such as AR/VR, remote healthcare, self-driving vehicles and UHD/4K video. They encouraged Ofcom to consider the possibility of reviewing and updating as necessary the regulatory framework for the upper 66 to 71 GHz frequency range.

3.11 The Wi-Fi Alliance were supportive of the objective of ensuring compliance with the relevant limits in the ICNIRP guidelines for the protection of the general public from EMF. However, they were not in favour of the proposed licensing approach. They noted that any non-compliance with the ICNIRP general public limits is likely to be caused primarily by installers/users who are not aware of their obligation to protect the general public from exposure to EMF. They suggested this problem could be addressed by requiring equipment labeling that would clearly stipulate the EMF requirements and operator's responsibility to comply with them. They stated that a licensing regime would do little to inform equipment installers and operators of their responsibilities to ensure compliance with the ICNIRP general public limits. Moreover, a licensing regime would impose unnecessary procedural burdens in terms of costs and delays.

Ofcom response

3.12 In response to the concerns regarding EMF raised by Harrison Ainsworth, we do not see a need to prevent the use of the 57 to 71 GHz by radio equipment. We recently decided to formally incorporate the relevant limits in the ICNIRP Guidelines for the protection of the general public from EMF exposure (the "ICNIRP general public limits") following a public consultation process into our spectrum licences.[11] We received a significant number of comments in response to our proposals in relation to health concerns which we addressed during that consultation process.[12] Whilst we have seen no evidence that spectrum users are operating radio equipment in breach of the ICNIRP general public limits, moving to a licensing regime will impose a clear requirement on licensees to ensure services operate in a way which does not adversely affect peoples' safety. It will also put Ofcom in a position where we could take appropriate enforcement action in the event the ICNIRP general public limits are breached.

3.13 The alternative approach of labelling equipment suggested by the Wi-Fi Alliance is already a legal requirement on equipment manufacturers. Manufacturers, importers and distributors are currently required to ensure that radio equipment is accompanied by clear, understandable, instructions and safety information.[13] Similar points to the Wi-Fi Alliance were made by a number of stakeholders in response to our consultation on requiring spectrum users to comply with the ICNIRP general public limits and we addressed these points in our EMF Statement.[14]

3.14 Whilst labelling of radio equipment is an important legal requirement and manufacturers should already be aware of the ICNIRP general public limits and be taking EMF exposure into account when conducting their business, we do not agree that EMF risks can be appropriately addressed by only imposing obligations on manufacturers. Notwithstanding these existing obligations on manufacturers, the responses to our recent public consultations have demonstrated that some spectrum users may not be fully aware of the ICNIRP general public limits and/or may not be taking full account of EMF exposure when installing or modifying radio equipment.

3.15 Regardless of the steps a manufacturer takes to mitigate EMF risks, it is the user or, in the case of networked devices, the operator of the equipment that is ultimately in control of how the equipment operates and any EMF levels that are produced by the equipment on an ongoing basis. For this reason, it is the user/operator of the equipment that is responsible for obtaining a licence and is in a position to comply with its terms and conditions.

[11] See our Statement on "Measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)" dated 5 October 2020 ("EMF Statement") and "Update on implementation of measures to require compliance with international guidelines for limiting exposure to electromagnetic fields (EMF)" dated 1 March 2021 ("EMF Update").
[12] See section 3 of both our EMF Statement and our EMF Update.
[13] Radio Equipment Regulations 2017, Regulations 13, 24 and 31
[14] https://www.ofcom.org.uk/__data/assets/pdf_file/0014/204053/emf-statement.pdf sections 4.14 to 4.29, 4.32 to 4.36 and 4.49 to 4.58

3.16 We agree with the Wi-Fi Alliance that non-compliance is likely to be caused primarily by installers who are not aware of their obligation to protect the general public from exposure to EMF. However, we continue to believe that the most appropriate and proportionate way of addressing these risks is to ensure users/operators of equipment in the 57 to 71 MHZ band are required under the terms of their licence to ensure compliance with the ICNIRP general public limits.

3.17 It may still be appropriate for licensees to use manufacturer's instructions on EMF compliance to ensure compliance with the ICNIRP general public limits. In such cases, the installer will need to ensure equipment is installed in accordance with the manufacturer's instructions or their own expertise and knowledge relating to EMF compliance and the operator will subsequently need to ensure they follow the manufacturer's or installer's instructions on EMF compliance when operating the equipment.[15]

3.18 We recognised the Wi-Fi Alliance's concern over the regulatory burden a licensing regime may cause in our December document.[16] We noted for example, that licensees would need to hold a licence prior to installing and using the equipment. However, we do not believe that this would impose unnecessary procedural burdens in terms of costs and delays. The cost of the licence is £75 for a five year period which equates to an annual cost of £15. The application process for a licence can take up to 42 days to complete (normal turn around is significantly less than this) but licensees are free to apply for this at any time. Once in possession of a licence, a licensee is able to deploy as many devices as they wish across the country without needing to approach Ofcom again.

3.19 In response to the concerns raised by Cambium, Facebook and Fibairo, as set out in the Notice, our proposed change in licensing approach was to ensure spectrum users fully take into account the ICNIRP general public limits when operating equipment and to put Ofcom in a position where it could take appropriate enforcement action in the event the limits are breached.[17] We explained that with a licensing approach we would be able to clearly set out the EMF related obligations placed on the licensee and that this would be a more appropriate mechanism to ensure compliance rather than through a licence exemption regime. We also stated that as there is a low risk of interference between users, we did not believe that granting individual rights of use to a location or area is necessary or desirable. We still maintain this view.

3.20 We also acknowledge the concern that the Spectrum Access EHF licence grants powers to Ofcom to revoke the licence for spectrum management reasons by providing one year's notice. It is important to note that this is the minimum period that we would be required to give in order revoke licences on spectrum management grounds. We may for example seek to rely on this provision if the expected rollout of 57 to 71 GHz equipment fails to materialise in the coming years. However, as the use of this equipment has been harmonised across Europe to provide high data services and equipment is being produced

[15] Further guidance on how spectrum users can comply with the ICNIRP general public limits is set out in our Guidance on EMF Compliance and Enforcement
[16] See section 4 of the consultation
[17] See section 4 of the consultation

to meet a demand from stakeholders, we do not currently believe it will be necessary for us to enact this provision in the short to medium term. Further, any proposal to revoke a licence must be proportionate and objectively justified which may mean a longer notice period is more appropriate in the circumstances. Taking all these points into account, we do not believe that the power to revoke the licence on spectrum management grounds will create a barrier to long term investment in this band.

3.21 Turning to the comments made about the licence, the format of the licence is the same as most other licences issued by Ofcom. As stated in paragraph 1 of the licence, licensees need to comply with the terms and conditions of the licence and any attached schedules. Therefore, licensees would need to comply with both schedules 1 and 2 of the licence. Regarding the request for the equipment not to be included in the Spectrum Access EHF licence but a separate one, we received no evidence to show the benefits of such a proposal. Given it is the same licensing mechanism and all but one of the Spectrum Access EHF licence conditions equally applies to 57 to 71 GHz equipment we can see no benefit of making such a change.

3.22 Finally, on the missing EMF licence condition in the draft licence. In paragraph 4.15 of our December consultation document, we pointed out that a copy of the EMF condition could be found in Annex A2 of our EMF Statement published in October 2020. Our decision on the final wording of the EMF condition had yet to be published as it is part of a separate consultation process and therefore, we were not able to include it in a copy of the draft licence.

3.23 On 1 March 2021, we published a general notice that contained a version of the EMF condition.[18] We gave notice to licensees that we were to implement the EMF condition into a majority of the WT Act licences that we issue. We are currently in the process of varying these licences in accordance with the statutory consultation process under Schedule 1 of the WT Act. Licensees have been able to make representations regarding the proposed changes. The final version of the EMF condition has yet to be published as we are still considering the representations received. In Annex 2 we have included a copy of the Shared Access EHF licence. In it we have included the current draft EHF condition which we will update when our final decision has been made.

3.24 We agree with Nokia's comments that further analysis concerning the use of the 66 to 71 GHz band by 5G services was needed at a European level. We have been involved in the analysis being carried out by CEPT in response to an EU Mandate. This work has now been completed and there are no changes recommended to the power levels currently in ERC Recommendation 70-03.[19] The results of this work are published in ECC Report 78.[20]

[18] See Annex A1 of our EMF Update.
[19] ERC Recommendation 70-03
[20] ECC Report 78

Question 3 – Do you agree that the Proposed Regulations would correctly implement the policy decision made earlier this year on extending Wi-Fi to the 6 GHz band, the SRD Decision and, if agreed, the changes to SRD Data Networks in the 870 to 874.4 MHz band?

Comments received

3.25 We received six responses, all in support of the draft regulations.

3.26 Itron made a comment concerning the drafting of the technical provisions in IR 2030 for equipment operating in the 870 to 874.4 MHz band. They noted that these should be classified as Network Meter Reading, Sensor and Actuators and not Non-specific SRDs as we had set out in the document. They asked whether this was a transposing issue.

3.27 Facebook highlighted that the draft IR 2030 for 6 GHz Wi-Fi proposes a single power spectral density for all applications. They stated that this does not align with Decision (20)01[21] of the ECC (the "ECC Decision") which identified different technical limits for Very Low Power (VLP) and Low Power Indoor (LPI) devices. The ECC Decision includes some channel hopping requirements for narrowband systems in the 5925 to 6425 MHz which was not included in Ofcom's proposals. They advised that coexistence is expected to be guaranteed through the ECC Decision and associated ETSI standard. They went on to say that it was important to secure adoption of appropriate coexistence rules between different Wireless Access Systems (WAS).

3.28 Nokia requested that we further evaluate the possibility of allowing higher power outdoor use (a maximum EIRP of up to 4W under the control of an Automated Frequency Coordination (AFC) system) in the 5925 to 6425 MHz band. They pointed to the work carried out by the Federal Communications Commission (FCC) to allow this in the United States of America (USA). The Wi-Fi Alliance also asked Ofcom to consider allowing outdoor Wi-Fi deployments on frequency coordinated basis, while ensuring protection of the incumbent operations in the 5925 to 6425 MHz band.

3.29 Nokia also welcomed the decision to continue to review the use of the upper 6 GHz band. They advised that the potential identification of the 6425 to 7125 band in Region 1 at WRC-23 for the use of 5G /IMT technologies would fulfil a wide range of 5G use case including mobile broadband, continuous city-wide coverage and industry 4.0. The Wi-Fi Alliance also encouraged Ofcom to consider the future use of 6425 to 7125 band but for expanded Wi-Fi access. They advised that the UK should follow similar regulatory efforts in Brazil, Canada, Chile, Mexico, South Korea, USA and other countries in making it available for Wi-Fi. Facebook in their response stated that allowing Wi-Fi 6E and 7 in the 5925 to 7125 MHz band will be a key enabler to connectivity improvement in UK.

[21] https://docdb.cept.org/download/50365191-a99d/ECC%20Decision%20(20)01.pdf

Ofcom response

3.30 For 870 to 874.4 MHz equipment, we took the decision to not restrict the type of equipment that can be used to only tracking, tracing and data acquisition applications. As permitted, we decided to be more liberal than the technical conditions as set out in CEPT Rec 70-03 and allow any type of non-specific SRD or data network to be used. We believe that, where possible, the provisions in our authorisation should remove any unnecessary technology restrictions which we saw this to be.

3.31 We note Facebook's comments that the technical limits set out in draft IR 2030 did not contain the channel hopping requirements for narrowband VLP devices set out in the ECC Decision. However, equipment that complies with parameters set out in the ECC Decision would also meet the more liberal UK requirements. IR 2030 sets out the transmit powers and other radio criteria however, there are other technical parameters that equipment must meet and these are usually set out in the relevant associated ETSI or UK standards. Therefore we expect that issues of appropriate coexistence rules between different WAS technologies to be dealt with through this route. We would expect that any new relevant ETSI standards (e.g. EN 303 687) would also be added to this list and hence any relevant additional technical requirements apply in addition to the ones set out in IR 2030.

3.32 The use of higher power 4W AFC equipment has yet to be studied within the UK or CEPT. Our analysis of demand indicated that most RLAN use cases (current and future) can be addressed by low power indoor or VLP specifications which does not require a database to enable sharing between incumbent users and RLAN devices. We consider that the technical specifications that we have decided to impose will enable the implementation of a simple regulatory solution, without the need for a more complex interference management approach. We continue to monitor demand for higher power RLAN use cases and may consider authorising this use in the future in bands where there are no significant restrictions.

3.33 We note comments from stakeholders regarding the upper 6 GHz band (6425 to 7125 MHz) and recognise that some countries outside Europe have made it available for licence-exempt RLAN devices. Additionally, this band will be discussed at WRC-23 under Agenda Item 1.2 which is considering bands for IMT identification. We are engaging in international work examining this, as well as monitoring information provided by stakeholders and developments in other countries.

4. Making the Exemption Regulations

4.1 This section outlines the legal framework Ofcom operates under and confirms the policy decisions that we have made in relation to the two consultation proposals and our decision to make the Exemption Regulations.

The legislative framework

4.2 Ofcom is responsible for authorising use of the radio spectrum. We permit the use of the radio spectrum by granting wireless telegraphy licences under the WT Act or by making statutory regulations exempting users of particular equipment from the requirement to hold such a licence. 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.

4.3 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 WT Act. Amongst our functions are the making available of frequencies for use for particular purposes and the granting of rights of use of spectrum through wireless telegraphy licences and licence-exemptions.

4.4 Our principal duties under the 2003 Act, when carrying out our functions and exercising our powers, are to further the interests of citizens and consumers, 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.

4.5 We must also have regard to: (i) the desirability of promoting competition in relevant markets; (ii) the desirability of encouraging investment and innovation in relevant markets; (iii) 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; and (iv) 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.

4.6 Additionally, in carrying out our spectrum functions we have a duty under section 3 of the WT Act to have regard in particular to: (i) the extent to which the spectrum is available for use, or further use, for wireless telegraphy; (ii) the demand for use of that spectrum for wireless telegraphy; and (iii) the demand that is likely to arise in future for such use.

4.7 We also have a duty to have regard to the desirability of promoting: (i) the efficient management and use of the spectrum for wireless telegraphy; (ii) the economic and other benefits that may arise from the use of wireless telegraphy; (iii) the development of innovative services; and (iv) competition in the provision of electronic communications services.

4.8 Under section 8(1) of the WT Act, it is unlawful to establish or use a wireless telegraphy station or install or use wireless telegraphy apparatus except under and in accordance with a wireless telegraphy licence granted under the WT Act.

4.9 Under sections 8(3) – 8(3B) of the WT Act, Ofcom may make regulations exempting from the licensing requirements under section 8(1), the establishment, installation or use of wireless telegraphy stations or wireless telegraphy apparatus of such classes or description as may be specified in the regulations, either absolutely or subject to such terms, provisions and limitations as may be specified.

4.10 Section 8(4) of the WT Act sets out the criteria we need to consider when making regulations to exempt equipment, these are if the installation or use is not likely to:

- involve undue interference with wireless telegraphy;
- have an adverse effect on technical quality of service;
- lead to inefficient use of the part of the electromagnetic spectrum available for wireless telegraphy;
- inhibit the development of effective arrangements for the sharing of frequencies;
- endanger safety of life;
- prejudice the promotion of social, regional or territorial cohesion; or
- prejudice the promotion of cultural and linguistic diversity and media pluralism.

4.11 In accordance with the requirements of section 8(3B) of the WT Act, the terms, provisions and limitations specified in the regulations must be:

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

4.12 We make exemption regulations by means of a statutory instrument. Before making any such regulations, we are required by section 122(4) of the WT Act to give statutory notice of our proposal to do so. Under section 122(5), such notice must state that we propose to make the regulations in question, set out their general effects, specify an address from which a copy of the proposed regulations or order may be obtained, and specify a time period of at least one month during which any representations with respect to the proposal must be made to us.

Our policy decisions relating to 870 to 874.4 MHz and 57 to 71 GHz equipment

4.13 In our view, our decisions set out below are:

- **objectively justified** in that they address the risks of undue interference that might otherwise arise from the use of the equipment;

- **not unduly discriminatory** against particular persons or against a particular description of persons in that they would apply to all users of relevant equipment;
- **proportionate** to what they are intended to achieve, in that they would be necessary to ensure that use of the relevant equipment would not be likely to have relevant adverse effects; and
- **transparent** in relation to what they are intended to achieve, in that they are described and explained in this document.

Non-specific SRDs and SRD Data Networks in the 870 to 874.4 MHz band

4.14 Given the support for the proposals in our consultation, we decided to go ahead and make available 4.4 MHz of continuous bandwidth for Non-specific SRDs and SRD Data Networks. Standardising the technical provisions and authorisation regime for equipment across the 870 to 874.4 MHz band we believe would make the spectrum more attractive and usable. This change could support delivery of new services with significant benefits to citizens and consumers across a range of sectors, including smart cities, agriculture, energy, transport and healthcare.

4.15 If we had chosen to maintain the current authorisation regime, this risked an inefficient use of the radio spectrum. Some manufactures have advised that it is not cost effective for them to notch out the 873 to 874 MHz band in order to utilise the 874 to 874.4 MHz band. Therefore, they would continue to only produce equipment that works in 870 to 873 MHz leaving 1.4 MHz of spectrum not being utilised.

Licensing of higher power WBDTS in 57 to 71 GHz

4.16 We have decided to proceed with our proposal to move from a licence-exemption approach to one that requires a licence for 57 to 71 GHz higher power WBDTS equipment. As we discussed paragraphs 4.11 to 4.21 of our December document and in Section 2 of this document, we believe that this is the most appropriate way to ensure that the safeguards to protect the general public from exposure to EMF will be complied with.

4.17 Going forward, the use of higher power WBDTS equipment will only be permitted if the operator holds a Spectrum Access EHF licence. We expect to begin issuing licences in this band from 20 May 2021. The technical conditions are now included in IR 2106.[22] A copy of the licence terms and conditions can be found in Annex 2.

4.18 The licence would also allow the more liberal technical parameters set out in the EU SRD Decision than what is currently permitted under the existing UK exemption. The higher power regulation set out in the SRD Decision (EU Band 75b) slightly differs from what is already licence-exempt in the UK via IR 2078. Although the maximum e.i.r.p. of 55dBm and antenna gain ≥ 30dBi is the same, the difference is the removal of the 10 dBm maximum transmitter power delivered to the antenna. This difference has the effect of allowing a higher e.i.r.p. coupled with a fixed antenna gain and therefore gives more flexibility for the

[22] IR 2106 can be found on https://www.ofcom.org.uk/spectrum/information

new generation of lower gain phased array element antennas. We believe that there would be benefits in aligning our technical conditions with those set out in the SRD Decision.

4.19 In our consultation we advised that operators of existing equipment have until 1 September 2021 to apply for a licence. We have decided to extend this until 30 November 2021 to allow for a longer transition period. We will include a note of this decision in IR 2078[23] to make users aware of the upcoming changes. We will remove the licence-exemption of this equipment from the regulations later this year.

Making the Exemption Regulations

4.20 After reviewing the comments on the draft legislation, we decided to proceed and make the Exemption Regulations as proposed in our statutory notice. On 20 April 2021 we made the Exemption Regulations which will enter force on 12 May 2021. A copy of the regulations can be found online.[24]

4.21 Regulation 3 of the Exemption Regulations revokes and replaces the following Statutory Instruments:

- Wireless Telegraphy (Exemption and Amendment) Regulations 2010 (2010/2512);
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2011 (2011/3035);
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2013 (2013/1253);
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2014 (2014/1484);
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2017 (2017/746);
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2018 (2018/263);
- Wireless Telegraphy (Exemption and Amendment) (Amendment)(No.2) Regulations 2018 (2018/1140); and
- Wireless Telegraphy (Exemption and Amendment) (Amendment) Regulations 2020 (2020/549).

4.22 Regulation 4 of the Exemption Regulations (regulation 5 of the previous 2010 Regulations) sets out the conditions that licence-exempt SRDs must adhere to. This is done by referencing UK Interface Requirement 2030 (IR 2030)[25] that contains all of the transmission parameters for the various types of SRDs.

4.23 To implement the changes discussed in this document, IR2030 was amended to incorporate the following:

[23] IR 2078 Fixed Wireless Systems in the frequency band 57.1 to 70.875 GHz
[24] https://www.legislation.gov.uk/
[25] IR 2030 can be access from https://www.ofcom.org.uk/spectrum/information

- alignment of the technical parameters for Non-specific SRDs and SRD Data Networks in the 870 to 874.4 MHz band;
- use of the 6 GHz band (5925 to 6425 MHz) for Wi-Fi and other RLAN devices and the removal of DFS for indoor Wi-Fi in 5725 to 5850 MHz; and
- harmonisation of technical parameters to implement the SRD Decision.

4.24 The updated version of IR 2030 has been implemented into Regulation 4 by replacing the reference to the old document to the published April 2021 version.

4.25 Regulation 5 covers Fixed Wireless systems in 57.1 to 70.875 GHz. As discussed in this document, this provision will be removed later this year as the authorisation of these devices would transition from licence-exemption to requiring a Spectrum Access EHF licence.

4.26 Aside from the amendments listed above, all the remaining licence-exemption provisions set out in the Exemption Regulations remain the same as they were in the 2010 Regulations, as amended by subsequent regulations. This means that high density fixed satellite service systems (Regulation 6 of the Exemption Regulations), personal locator beacons (Regulation 7 of the Exemption Regulations), earth stations on mobile platforms (Regulation 8 of the Exemption Regulations) and citizen band radio equipment (Regulation 9 of the Exemption Regulations) will continue to be licence-exempt as before.

4.27 For the reasons set out above, we consider these changes to be consistent with our statutory duties, including the requirements set out in section 8(4) of the WT Act.

Changes to IR 2030 introduced by BREXIT

4.28 Although the UK left the European Union (EU) on 31 January 2020, under the terms of the Withdrawal Agreement, the UK remained under an obligation to implement EU Directives into domestic law until the transposition deadline of 21 December 2020. As a result of the transposition period ending, we have had to make some minor amendments to IR 2030. This was to remove references to European Union legislation and replace it with the relevant UK legislation.

4.29 In a number of areas, IR 2030 referenced equipment having to conform to the essential requirements of Directive 2014/53. This is a reference to the EU's Radio Equipment Directive (RED),[26] that set out rules for placing equipment on the European market. We have now replaced references to the RED with the Radio Equipment Regulations 2017[27] which now applies for placing equipment on the UK market. In addition, we also made some editorial amendments to remove the EU band number reference. None of these changes affect the technical parameters of the equipment.

[26] EU Radio Equipment Directive
[27] Radio Equipment Regulations 2017

A1. Respondents

Cambium, Facebook & Fibairo

Dunel Europa

Facebook

Harrison Ainsworth

Itron

Nokia

Wi-Fi Alliance

Wi-Sun Alliance

A2. Spectrum Access EHF licence

Wireless Telegraphy Act 2006

Spectrum Access: EHF

Sector/Class/Product:	xxxxxx – Spectrum Access: EHF
Licence number:	
Licensee:	
Company registration:	
Licensee address:	
Email:	
Date of issue:	xx xxxx 202x
Valid from:	xx xxxx 202x
Payment interval:	5 year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence ("the Licence") to [LICENSEE] 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.

Licence Revocation and Variation

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 year's notice is given in writing.

4. Ofcom may only revoke or vary this Licence in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

5. Where Ofcom exercise their power to revoke or vary the Licence in accordance with schedule 1 paragraph 6 of the Act, the Licensee shall be notified in writing or by a general notice. Any general notices will be posted on the Ofcom website.

Transfer

6. 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[28].

Changes to Licensee details

7. 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 in this Licence.

Fees

8. 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.

9. 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

10. 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.

11. 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.

12. [The Licensee must ensure that all Radio Equipment is established, installed, modified and used only in accordance with the provisions specified in schedule 3 (EMF Licence Condition) of this Licence.- *NB this provision is subject to Ofcom making a final decision in response to any representations received as part of the licence variation process currently underway*]

Access and Inspection

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

    (a) to have access to the Radio Equipment; and

[28] 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

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 Schedule 1 to this Licence, the Licensee is authorised to establish, install and use the Radio Equipment in the United Kingdom, United Kingdom territorial sea (measured in accordance with section 1 of the Territorial Sea Act 1987), the Channel Islands and the Isle of Man.

Interpretation

17. 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.

Spectrum Access: EHF

SCHEDULE 1 TO LICENCE: xxxxxx

Description of Radio Equipment

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

Interface Requirements for the Radio Equipment

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

   IR 2106 Spectrum Access EHF

Special conditions relating to the Radio Equipment

3. Radio Equipment is not permitted to be used airborne.

4. 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:

   I. The postal address (including postcode) and National Grid Reference (to 1m resolution) of the Radio Equipment or, in case of mobile use, of the centre of any 5km radius within which the Radio Equipment is used.
   II. For equipment deployed outdoors in the 116-122 GHz, 174.8-182 GHz and 185-190 GHz bands the Antenna main beam elevation angle measured in degrees above horizontal.

5. 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.

Coordination at frequency and geographical boundaries

6. 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.

Spectrum Access: EHF
SCHEDULE 2

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

1. This Licence is issued on the basis that interference is not caused by the Radio Equipment to other authorised spectrum users and that the Radio Equipment will not be protected from interference caused by other authorised spectrum users.

2. When operating, the Licensee must transmit and receive within the limits set out below.

Permitted Frequency Band	**Maximum power levels**	**Additional parameters**	**Other usage restrictions**
57 – 71 GHz	55 dBm e.i.r.p., 38 dBm/MHz e.i.r.p. density and a transmit antenna gain ≥ 30 dBi Or 55 dBm e.i.r.p., maximum transmit power of 10 dBm and a minimum antenna gain of 30 dBi	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards must be used.	This set of usage conditions is only available to fixed outdoor installations. No deployments operating within 59 – 63.9 GHz are permitted within 6 km of the following locations: • Site 1: 57° 21' 3.6",-07° 23' 36.6" • Site 2: 51° 37' 16.8",-04° 58' 21" • Site 3: 52° 38' 1.8", -00° 36' 22.8"

Interpretation of terms in this schedule

- In this schedule:

a) “dBi” means the ratio between the gain of an antenna system relative to the gain of an isotropic radiator in decibels.

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

c) “e.i.r.p.” 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;

d) “Indoor” means inside premises which: (i) have a ceiling or a roof; and (ii) except for any doors, windows or passageways, are wholly enclosed; and

e) “Outdoor use” means any device operating in an environment which does not meet the definition of “indoor”.

[SCHEDULE 3]

EMF Licence Condition

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[29] in the relevant tables for general public exposure identified in the ICNIRP Guidelines[30] 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[31] in the relevant tables for general public exposure identified in the ICNIRP Guidelines[32] 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[33].

[29] Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.
[30] The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".
[31] Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.
[32] The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".
[33] 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 the basic restrictions in the relevant tables for general public exposure identified in the ICNIRP Guidelines 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;[34]
   (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.[35]

[34] 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: 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.

[35] 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

(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 is authorised by another licence held by the Licensee to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP.[36]

(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.[37]

(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[38] that is higher than 100 Watts EIRP or 61 Watts ERP;[39]
- 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;[40]
- 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

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available at: https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf ("2020 Guidelines"). However, once work on the relevant standards explaining the methodology for assessing compliance with the 2020 Guidelines has progressed sufficiently, Ofcom will consult 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 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.

[36] 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.

[37] 10 Watts EIRP is equivalent to 6.1 Watts ERP.

[38] 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.

[39] 100 Watts EIRP is equivalent to 61 Watts ERP.

[40] 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.

[Ofcom]