
Enabling mmWave spectrum for new uses

Annexes 10-15: draft licences and interface requirements

CONSULTATION AND STATEMENT:

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A10. Draft licences: auction

Office of Communications (Ofcom)

Wireless Telegraphy Act 2006



SPECTRUM ACCESS HIGH DENSITY [26/40] GHz LICENCE

Licence no: [xxx]

Date of issue: [xxx]

Licence end date: [xxx]

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

[xxx]

(Company registration number [xxx])

("the Licensee")

[xxx]

[xxx]

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 from the date of commencement until [DATE] unless revoked by Ofcom or surrendered by the Licensee.

Licence Variation and 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;
 - i) in accordance with schedule 1 paragraph 8(5) of the Act;
 - ii) 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;
 - c) if, in connection with the transfer or proposed transfer of rights and obligations arising by virtue of the Licence, there has been a breach of any provision of regulations made by Ofcom under the powers conferred by section 30 of the Act¹;
 - d) if the Licensee has been found to the reasonable satisfaction of Ofcom to have been involved in any act, or omission of any act, constituting a breach of the Wireless Telegraphy (Licence Award) Regulations 20[xx] (“the **Regulations**”).
4. Ofcom may only revoke or vary this Licence by notification in writing to the Licensee and in accordance with schedule 1, paragraphs 6, 6A and 7 of the Act.

Transfer

5. 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 Act².

Changes to Licensee details

6. The Licensee shall give prior notice to Ofcom in writing of any changes to the Licensee’s name and/or address as recorded in paragraph 1 of this Licence.

Radio Equipment Use

7. 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.
8. 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.

¹ These are regulations on spectrum trading.

² See Ofcom’s website for the latest position on spectrum trading and the types of trade which are permitted.

9. 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.

Access and Inspection

10. 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

11. 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 a term 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.
12. 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

13. 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 the Radio Equipment in the high density area(s) defined in Schedule 2.

Interpretation

14. In this Licence:
 - a) the “Act” means the Wireless Telegraphy Act 2006;
 - b) 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;

- c) the expression “**high density areas**” shall be interpreted as the areas of the UK described in Schedule X to this Licence
- d) the expression “**interference**” shall have the meaning given by section 115 of the Act;
- e) the expressions “**wireless telegraphy station**” and “**wireless telegraphy apparatus**” shall have the meanings given by section 117 of the Act;
- f) 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
- g) the Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

Issued by Ofcom

Office of Communications

SCHEDULE 1 TO LICENCE NUMBER: [xxx]

Schedule Date: [xxx]

Licence category: **Spectrum Access High Density Licence ([26/40] GHz)**

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 this schedule.

Interface Requirements for the Radio Equipment

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

IR 2110: 26 GHz High Density area

IR 2111: 40 GHz High Density area

Special conditions relating to the Radio Equipment

3.
 - a) Subject to paragraph 3(a) of this schedule 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) postal address (including post code);
 - ii) National Grid Reference, to at least 10 metre resolution;
 - iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable);
 - iv) radio frequencies which the Radio Equipment uses; and
 - v) transmitted power expressed in TRP per cell.and the Licensee must produce these records if requested by any person authorised by Ofcom.
 - b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this schedule shall not apply in respect of smart/intelligent low power repeater equipment.
 - c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

- d) 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.
- e) When deploying Active Antenna System (AAS) outdoor base stations, Licensees transmitting in either 24.45-27.5 GHz or 42.5-43.5 GHz, shall ensure that each antenna is normally transmitting only with main beam pointing below the horizon and in addition the antenna shall have mechanical pointing below the horizon except when the base station is only receiving.³

Coordination

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

International cross-border co-ordination

5. The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

Cooperation between Licensees

6. The Licensee must liaise and co-operate with other holders of licences in the [25.1-27.5/40.5-43.5 GHz] 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.

Synchronisation requirement⁴

7. Where synchronisation requirements are set out in Schedule 1 to this Licence, the Licensee must transmit within the transmission limits specified.
8. 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

³ See section 13, from paragraph 13.37 for further information about this licence condition.

⁴ This condition, which reflects the "Synchronisation requirement" condition included in our standard Shared Access licences, would support the implementation of option 2 (as described in paragraphs 13.34-13.35 of Ofcom's Statement and Consultation, *Enabling mmWave spectrum for new uses*), which is currently our preferred option.

reached, Ofcom may notify the Licensee to comply with additional technical conditions relating to synchronisation requirements.

9. The Licensee must comply with such technical conditions relating to synchronisation requirements notified to it by Ofcom from time to time.
10. The Licensee accepts that they may need to alter or replace Radio Equipment in order to comply with any conditions notified from time to time.

Permitted Frequency Blocks

11. Subject to the emissions permitted under paragraph 8 of this schedule, the Radio Equipment may only transmit within the following frequency bands (the “**Permitted Frequency Blocks**”):

25.1-27.5 GHz / 40.5-43.5 GHz

Maximum power within the Permitted Frequency Blocks

12. Subject to any more restrictive limitations imposed by the coordination requirements notified by Ofcom in accordance with paragraphs 4 and 5 of this schedule, the power transmitted in the Permitted Frequency Blocks shall not exceed:

Radio Equipment	Maximum mean power
Base Station	30 dBm/200 MHz TRP
Terminal station	23 dBm TRP

Maximum power outside the Permitted Frequency Blocks

13. For transmissions on the downlink frequencies, the maximum mean TRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks, shall not exceed the least restrictive of the requirements in the following table:

26 GHz

Frequency Range	Maximum mean Power (TRP)
0 to 50 MHz below or above the Permitted Frequency Blocks	12 dBm/50 MHz
Within 24.25-27.5 GHz	4 dBm/50 MHz
Within 23.6-24.0 GHz	-39 dBW/200 MHz (Base station) -35 dBW/200 MHz (Terminal station)

40 GHz

Frequency Range	Maximum mean Power (TRP)
0 to 50 MHz below or above the Permitted Frequency Blocks	12 dBm/50 MHz
Within 40.5-43.5 GHz	4 dBm/50 MHz

Interpretation of terms in this schedule

14. In this schedule:

- a) **“5G NR”** means 5G New Radio and refers to the air interface that has been developed by 3GPP for fifth generation (5G) mobile radio networks. This air interface defines how 5G base stations and user devices both transmit and receive radio signals using spectrum;
- b) **“AAS”** means active antenna system. An AAS is a base station and 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 is not intended to include 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;
- c) **“dBm”** means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
- d) **“Downlink”** means transmissions from a base station to a terminal station
- e) **“Fixed or installed”** means used or installed at specific fixed points;
- f) **“Indoor”** or **“indoors”** means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
- g) **“Indoor Domestic Small Cell”** means a base station with a TRP that is less than or equal to 25 dBm / 200 MHz that is located within a residential property;
- h) **“Indoor Non-domestic Small Cell”** means a base station with a TRP that is less than or equal to 25 dBm / 200 MHz that is located indoors but not within a residential property;
- i) **“IR”** means a United Kingdom Radio Interface Requirement notified 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;
- j) **“lower block edge”** means, in relation to each Permitted Frequency Block, the lowest frequency in that Permitted Frequency Block;
- k) **“mobile or nomadic”** means intended to be used while in motion or during halts at unspecified points;

- l) “**non-AAS**” means a piece of Radio Equipment which is not an AAS;
- m) “**per antenna**” means per radiating unit/component (irrespective of the number of radiating elements that make up that unit/component);
- n) “**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;
- o) “**Permitted Frequency Blocks**” has the meaning given to it in paragraph 7 of this schedule;
- p) “**smart/intelligent low power repeater**” means a repeater which operates with power not exceeding 24 dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:
 - i. The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
 - ii. The repeater operates only on the Licensee’s frequencies and with their valid Public Land Mobile Network Identifier;
 - iii. Must not cause undue interference to other spectrum users; and
 - iv. The repeater only transmits on the uplink timeslot when actively carrying a call (voice, video or data) or signalling from serviced handsets.
- q) “**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;
- r) “**Uplink**” means transmissions from a terminal station to a base station; and
- s) “**upper block edge**” means, in relation to each Permitted Frequency Block, the highest frequency in that Permitted Frequency Block.

SCHEDULE 2 TO LICENCE NUMBER: [xxx]

Schedule Date: [xxx]

Licence category: **Spectrum Access High Density Licence ([26/40] GHz)**

High Density Authorised areas

References in this schedule to “high density areas” indicate the parts of the UK listed in this Schedule, defined by coordinates based on the British National Grid reference system.

There are 68 separate high density areas in the UK:

Aberdeen	Farnborough & Aldershot	Oxford
Ashford	Folkestone & Hythe	Peterborough
Basildon	Gloucester & Cheltenham	Plymouth
Basingstoke	Greater Birmingham	Portsmouth & Gosport
Belfast	Greater Glasgow	Preston
Blackpool	Greater London	Reading
Bournemouth & Poole	Greater Manchester	Redditch
Bracknell	Harrogate	Sheffield City Region
Brighton	Hastings	Shrewsbury
Bristol & Bath	Hull	Southampton
Cambridge	Ipswich	Southend
Cardiff & Newport	Leeds & Bradford Area	Southport
Chelmsford	Leicester	Stafford
Chester	Lincoln	Stansted Airport
Colchester	Liverpool	Stoke-on-Trent
Coventry	Loughborough	Swansea
Crawley	Luton	Swindon
Derby	Medway Towns	Teesside
Doncaster	Milton Keynes	Tyne & Wear
Dover	Newbury	Warrington
Dundee	Northampton	Worcester
Edinburgh	Norwich	York
Exeter	Nottingham	

Shapefiles defining all of these high density areas are available [on our website](#).

Each of these is defined as follows:⁵

Greater London:

“Greater London” refers to the area of the UK enclosed within the following coordinates, and displayed in the map below:

Vertex	Coordinates
0	485000.000393582 182999.996051261
1	485000.000393582 183999.999803164
2	501999.997174274 183999.999803164
3	501999.997174274 188999.998568406
4	507000.000107448 188999.998568406
5	507000.000107448 201999.997357461
6	501999.997174274 201999.997357461
7	501999.997174274 211000.001133179
8	523999.99688814 211000.001133179
9	523999.99688814 201999.997357461
10	541999.995904479 201999.997357461
11	541999.995904479 195000.001085551
12	559000.000930232 195000.001085551
13	559000.000930232 182000.002296496
14	567999.996315871 182000.002296496
15	567999.996315871 169999.997262206
16	549000.003308946 169999.997262206
17	549000.003308946 161000.003483626
18	542999.998140126 161000.003483626
19	542999.998140126 156999.99847315
20	530999.996047546 156999.99847315
21	530999.996047546 147000.000942667
22	522000.000661907 147000.000942667
23	522000.000661907 153000.003459812
24	516999.997728734 153000.003459812
25	516999.997728734 169000.00350744
26	511000.000804974 169000.00350744
27	511000.000804974 158000.002225054
28	504000.001645568 158000.002225054

⁵ For the purpose of this draft licence, we have only included examples of how we will define London, Liverpool and Lincoln.

29	504000.001645568 145999.997190764
30	494000.004024282 145999.997190764
31	494000.004024282 161000.003483626
32	500000.000948042 161000.003483626
33	500000.000948042 175999.999779351
34	485000.000393582 175999.999779351
35	485000.000393582 182999.996051261



Source: Ofcom; base map [@ OpenStreetMap contributors](#)

Liverpool

“Liverpool” refers to the area of the UK enclosed within the following coordinates, and displayed in the map below:

Vertex	Coordinates
0	327000.001698997 395999.995435664
1	327000.001698997 401999.997952809
2	342000.002253457 401999.997952809
3	342000.002253457 395999.995435664
4	346999.996941569 395999.995435664
5	346999.996941569 380999.999139939
6	327000.001698997 380999.999139939
7	327000.001698997 395999.995435664



Source: Ofcom; base map [@ OpenStreetMap contributors](#)

Lincoln

“Lincoln” refers to the area of the UK enclosed within the following coordinates, and displayed in the map below:

Vertex	Coordinates
0	498999.998712395 374999.996622794
1	501000.003183689 374999.996622794
2	501000.003183689 366000.002844215
3	491999.999552989 366000.002844215
4	491999.999552989 374999.996622794
5	498999.998712395 374999.996622794



Source: Ofcom; base map [© OpenStreetMap contributors](#)

SCHEDULE 3 TO LICENCE NUMBER: [xxx]

EMF Licence Condition

Schedule Date: [xxx]

Licence category: **Spectrum Access High Density Licence [(26/40 GHz)]**

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 restrictions⁶ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁷ 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 restrictions⁸ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁹ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

⁶ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁷ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

⁸ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁹ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

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 communications¹⁰.

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) "**dB*i***" 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

¹⁰ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

employment or otherwise acting for purposes connected with their trade, business or profession or the performance by them of a public function;¹¹

- (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.¹²
- (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.¹³
- (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 direction¹⁴ that is higher than 100 Watts EIRP or 61 Watts ERP;¹⁵
 - 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

¹¹ 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](#).

¹² 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> (“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.

¹³ 10 Watts EIRP is equivalent to 6.1 Watts ERP. In linear units $EIRP (W) = 1.64 \times ERP (W)$; 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”.

¹⁴ 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.

¹⁵ 100 Watts EIRP is equivalent to 61 Watts ERP.

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;¹⁶

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

Ofcom

¹⁶ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.

A11. Draft licences: Shared Access

Office of Communications (Ofcom)

Wireless Telegraphy Act 2006



DRAFT 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:	
Payment Interval:	1 Year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence (“the **Licence**”) to [xxx] 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:
 - t) at the request, or with the consent, of the Licensee;
 - u) if there has been a breach of any of the terms of this Licence;
 - v) in accordance with schedule 1 paragraph 8(5) of the Act;
 - w) 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;

- x) 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.¹⁷

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 in 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

¹⁷ See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

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.

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 requirement¹⁸

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 conditions notified from time to time.

Future Dynamic Spectrum Approach

21. On 25 July 2019, Ofcom published a statement called *Enabling wireless innovation through local licensing* containing a spectrum management decision to enable shared access to spectrum supporting mobile technology. In that decision, Ofcom stated that it will assess whether it is appropriate to transition towards a Dynamic Spectrum Approach in order to provide users more access to spectrum by means of automatic database frequency assignment. The Licensee is therefore notified that Ofcom currently intends to vary this Licence in accordance with paragraph 5 from time to time in future, or may re-issue the Licence, to give effect to that decision.

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 in 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

¹⁸ This condition, which reflects the “Synchronisation requirement” condition included in our standard Shared Access licences, would support the implementation of option 2 (as described in paragraphs 13.34-13.35 of Ofcom’s Statement and Consultation, *Enabling mmWave spectrum for new uses*), which is currently our preferred option.

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 Low 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 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:
 - 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

- c) 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.

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 same 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) "Indoor" or "indoors" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed.
 - c) "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.
 - d) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points.
 - e) "outdoor" or "outdoors" means anywhere that is not indoor.
 - f) "Permitted Channel Centre Frequency" means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies.

- g) “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

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]
Permitted Frequency Band	[24.45 – 27.5 GHz] / [40.5 – 43.5 GHz]
TRP Tx	
Permitted Channel Centre Frequency	
Permitted Channel frequency bandwidth	
Antenna Height (Metres)	

Transmitter and antenna restrictions

1. If transmitting in 24.45-25.05 GHz, the Licensee is restricted to deploy only 3 outdoor base stations (a sector antenna equates to a base station).
2. When deploying Active Antenna System (AAS) outdoor base stations, Licensees transmitting in either 24.45-27.5 GHz or 42.5-43.5 GHz, shall ensure that each antenna is normally transmitting only with main beam pointing below the horizon and in addition the antenna shall have mechanical pointing below the horizon except when the base station is only receiving.¹⁹

Maximum power (TRP) / Maximum power within the Permitted Channel

26 GHz & 40 GHz shared spectrum

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

Radio Equipment	Band	Maximum Power
Base Station	26 & 40 GHz	25 dBm/200 MHz TRP
Fixed / installed terminal station	26 & 40 GHz	23 dBm TRP

¹⁹ See paragraph 13.36 of Ofcom’s Statement and Consultation, *Enabling mmWave spectrum for new uses*.

Radio Equipment	Band	Maximum Power
Mobile or nomadic terminal station	26 & 40 GHz	23 dBm TRP

Interpretation of terms in this schedule

4. 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 1milliwatt (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) “Permitted Channel” means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;
- i) “Permitted Channel Centre Frequency” means the frequency assigned by Ofcom that is the midpoint between the upper and lower cutoff frequencies.
- j) “Permitted Channel Frequency Bandwidth” means the total amount of spectrum assigned to the channel;
- k) “Permitted Frequency Band” means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency;
- l) “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

26 GHz shared spectrum

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

Frequency range	Maximum TRP
0 to 50 MHz below or above an assigned Permitted Channel	12 dBm/50 MHz
Within 24.25-27.5 GHz	4 dBm/50 MHz
Within 23.6-24.0 GHz	-39 dBW/200 MHz (Base station) -35 dBW/200 MHz (Terminal station)

or

40 GHz shared spectrum

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

Frequency range	Maximum TRP
0 to 50 MHz below or above an assigned Permitted Channel	12 dBm/50 MHz
Within 40.5-43.5 GHz	4 dBm/50 MHz

Interpretation of terms in this schedule

2. In this schedule:
 - a) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
 - b) “lower channel edge” means, in relation to each Permitted Channel, the lowest frequency in that Permitted Channel;
 - 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) “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;
- f) “upper channel edge” means, in relation to each Permitted Channel, the highest frequency in that Permitted Channel.

Ofcom



DRAFT 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:	
Payment Interval:	1 Year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence ("the **Licence**") to [xxx] 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.²⁰

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 in 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.

²⁰ See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

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
 - 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 requirement²¹

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 conditions notified from time to time.

Future Dynamic Spectrum Approach

22. On 25 July 2019, Ofcom published a statement called *Enabling wireless innovation through local licensing* containing a spectrum management decision to enable shared access to spectrum supporting mobile technology. In that decision, Ofcom stated that it will assess whether it is appropriate to transition towards a Dynamic Spectrum Approach in order to provide users more access to spectrum by means of automatic database frequency assignment. The Licensee is therefore notified that Ofcom currently intends to vary this Licence in accordance with paragraph 5 from time to time in future, or may re-issue the Licence, to give effect to that decision.

Notification in electronic form

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

Interpretation

24. 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

²¹ This condition, which reflects the “Synchronisation requirement” condition included in our standard Shared Access licences, would support the implementation of option 2 (as described in paragraphs 13.34-13.35 of Ofcom’s Statement and Consultation, *Enabling mmWave spectrum for new uses*), which is currently our preferred option.

Enabling mmWave spectrum for new uses

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.

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 same 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) "Indoor" or "indoors" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed.
 - c) "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.
 - d) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points.
 - e) "outdoor" or "outdoors" means anywhere that is not indoor.
 - f) "Permitted Channel Centre Frequency" means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies.
 - g) "Permitted Frequency Band" means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency.

SCHEDULE 2 TO LICENCE NUMBER: [xxx]

Schedule Date: [xxx]

Licence category: Shared Access Medium Power

Transmitter(s)	
Base station location	NGR [xxx xxx]
Station Name/Address	
Deployment location	[Indoor only/Indoor or Outdoor]
Permitted Frequency Band	[24.45 – 27.5 GHz] / [40.5 – 43.5 GHz]
TRP Tx	
Permitted Channel Centre Frequency	
Permitted Channel frequency bandwidth	
Antenna Height	
Antenna Gain	

Transmitter and antenna restrictions

1. When deploying Active Antenna System (AAS) outdoor base stations, Licensees transmitting in either 24.45-27.5 GHz or 42.5-43.5 GHz, shall ensure that each antenna is normally transmitting only with main beam pointing below the horizon and in addition the antenna shall have mechanical pointing below the horizon except when the base station is only receiving.²²

Maximum power (TRP) / Maximum power within the Permitted Channel

26 GHz & 40 GHz shared spectrum

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

²² See paragraph 13.36 of section 13.

Radio Equipment	Band	Maximum Power
Base Station	26 & 40 GHz	30 dBm/200 MHz TRP
Fixed / installed terminal station	26 & 40 GHz	23 dBm TRP
Mobile or nomadic terminal station	26 & 40 GHz	23 dBm TRP

Interpretation of terms in this schedule

3. 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 1milliwatt (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) “Permitted Channel” means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies;
- i) “Permitted Channel Centre Frequency” means the frequency assigned by Ofcom that is the midpoint between the upper and lower cutoff frequencies.
- j) “Permitted Channel Frequency Bandwidth” means the total amount of spectrum assigned to the channel;
- k) “Permitted Frequency Band” means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency;
- l) “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

26 GHz shared spectrum

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

Frequency range	Maximum TRP
0 to 50 MHz below or above an assigned Permitted Channel	12 dBm/50 MHz
Within 24.25-27.5 GHz	4 dBm/50 MHz
Within 23.6-24.0 GHz	-39 dBW/200 MHz (Base station) -35 dBW/200 MHz (Terminal station)

40 GHz shared spectrum

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

Frequency range	Maximum TRP
0 to 50 MHz below or above an assigned Permitted Channel	12 dBm/50 MHz
Within 40.5-43.5 GHz	4 dBm/50 MHz

Interpretation of terms in this schedule

2. In this schedule:
 - a) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
 - b) “lower channel edge” means, in relation to each Permitted Channel, the lowest frequency in that Permitted Channel;
 - c) “Permitted Channel” means the frequency assigned by Ofcom that is the upper and lower cutoff frequencies
 - 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;

- e) “upper channel edge” means, in relation to each Permitted Channel, the highest frequency in that Permitted Channel.

SCHEDULE 4 - EMF Licence Condition

Schedule Date: [xxx]

Licence category: **Spectrum Access Licence (26/40 GHz)**

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 restrictions²³ in the relevant tables for general public exposure identified in the ICNIRP Guidelines²⁴ 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 restrictions²⁵ in the relevant tables for general public exposure identified in the ICNIRP Guidelines²⁶ 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

²³ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

²⁴ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

²⁵ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

²⁶ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

responding to an emergency situation (in the vicinity of that situation) including for search and rescue activities and maritime emergency communications²⁷.

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) "**dB_i**" 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;²⁸

²⁷ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

²⁸ 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](#)

- 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.²⁹
- 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.³⁰
- 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 direction³¹ that is higher than 100 Watts EIRP or 61 Watts ERP;³²
 - 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;³³

[Regulations \(Northern Ireland\) 2016](#) and [The Merchant Shipping and Fishing Vessels \(Health and Safety at Work\) \(Electromagnetic Fields\) Regulations 2016](#).

²⁹ 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> (“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.

³⁰ 10 Watts EIRP is equivalent to 6.1 Watts ERP. In linear units $EIRP (W) = 1.64 \times ERP (W)$; 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”.

³¹ 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.

³² 100 Watts EIRP is equivalent to 61 Watts ERP.

³³ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.

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

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A12. Draft UK Interface Requirement (IR) 2103

A12.1 We have published a [draft version](#) of IR 2103 separately.

A13. Draft UK Interface Requirement (IR) 2104

A13.1 We have published a [draft version](#) of IR 2104 separately.

A14. Draft Interface Requirement (IR) 2110

A14.1 We have published a [draft version](#) of IR 2110 separately.

A15. Draft Interface Requirement (IR) 2111

A15.1 We have published a [draft version](#) of IR 2111 separately.