

SPECTRUM ACCESS 1452 – 1472 MHz LICENCE

This licence document replaces the version of the Licence issued by Ofcom on 08 October 2015 to Vodafone Limited.

Licence no. **1053632**

Date of issue: **18 May 2021**

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

Vodafone Limited
(Company registration number 01471587)
("the Licensee")
Vodafone House
The Connection
Newbury
Berkshire
RG14 2FN

to establish, install and use wireless telegraphy stations and/or wireless telegraphy apparatus as described in schedule 1 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 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 of, 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 purposes 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) 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(1) and section 30(3) of the Act¹;
 - (f) for reasons related to the management of the radio spectrum, provided that in such case this power to revoke may only be exercised after at least five (5) year's notice is given in writing to the Licensee.
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.

Fees

7. From 16 May 2023, the Licensee shall each year pay to Ofcom the relevant fee(s) as provided for in section 12 of the Act and the regulations made thereunder on or before such dates as are notified in writing to the Licensee.
8. The Licensee shall also pay interest to Ofcom on any amount which is due under the terms of this Licence or provided for in any regulations made by Ofcom under sections 12 and 13(2) of the Act, from the date such amount falls due until the date of payment, calculated with reference to the Bank of England base rate from time to time. In accordance with section 15 of the Act any such amount and any such interest is recoverable by Ofcom.
9. If the Licence is surrendered or revoked, no refund, whether in whole or in part of any amount which is due under the terms of this Licence or provided for in any regulations made by Ofcom under sections 12 and 13(2) of the Act will be made, except at the absolute discretion of Ofcom.

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.

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 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 2 (EMF Licence Condition) of this Licence.

Access and Inspection

13. The Licensee shall permit a 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 a term of the Licence has occurred; and/or
 - (b) the use of the Radio Equipment is causing or contributing to 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. This Licence authorises the Licensee to establish, install and use the Radio Equipment only in the United Kingdom.

Interpretation

17. In this Licence:

- (a) the establishment, installation and use of the Radio Equipment shall be interpreted as establishment and use of stations and installation and use of 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 apparatus" and "wireless telegraphy station" shall have the meanings given by section 117 of the Act.
- (d) the schedules to this Licence 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

Office of Communications

SCHEDULE 1 TO LICENCE NUMBER: **1053632**

Schedule Date: **18 May 2021**

Licence Category: **Spectrum Access Licence (1452 – 1472 MHz)**

Description of Radio Equipment Licensed

1. The Radio Equipment means any radio transmitting Base station that transmits in accordance with the requirements of paragraphs 7, 8 and 9 of this schedule.

Interface Requirements for the Radio Equipment use

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

IR 2068³ for Spectrum Access in the Band 1452 – 1492 MHz

Special Conditions relating to the Operation of the Radio Equipment

3.
 - (a) During the period that this Licence remains in force and, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of:
 - (i) The following details relating to the Radio Equipment:
 - a) postal address; and
 - b) radio frequencies used by the Radio Equipment;
 - (ii) the operational details of all transmitting stations including:
 - (a) the National Grid Reference to a one (1) metre resolution of each transmitting site;
 - (b) the date on which each transmitting station is brought into operation;
 - (c) the height above ground level of each transmitting antenna to an accuracy of 1 metre;
 - (d) the azimuth of each transmitting antenna on each site;
 - (e) the horizontal and vertical profile of each transmitting antenna on each site (without taking into account any down-tilt);
 - (f) the down-tilt (physical and electrical) of each transmitting antenna;
 - (g) ITU Class of Emission of the radiated signal;

³ Available from the Ofcom website at <http://www.ofcom.org.uk>

- (h) the operational e.i.r.p. per MHz over the Permitted Frequencies for each transmitting antenna; and
- (i) the out of band emission profile in e.i.r.p. per MHz to a maximum of 25 MHz either side of the Permitted Frequencies for each transmitting antenna.

and the Licensee must produce these records if requested by a person authorised by Ofcom.

- (b) The Licensee shall inform Ofcom of the address of the premises at which this Licence and the information detailed at sub-paragraph 3(a) above shall be kept.
- (c) The Licensee must submit to Ofcom copies of the records detailed in sub-paragraph 3 (a) above at such intervals as Ofcom shall notify to the Licensee.
- (d) The Licensee must also submit to Ofcom in such manner and at such times, all information relating to the establishment, installation or use of the Radio Equipment, whether stored in hard copy or electronic form, as reasonably requested for the purposes of verifying compliance with this Licence or for statistical purposes.
- (e) The Licensee must ensure that the Radio Equipment is established and installed only for terrestrial use.

Avoidance of Undue Interference

4.

- (a) The Licensee must ensure that the establishment, installation and use of Radio Equipment will allow Notified Licensed Links (to the extent that such Notified Licensed Links are operated in accordance with such guidance as Ofcom may issue from time to time) to be operated without undue interference.
- (b) In complying with its obligations under sub-paragraph 4(a), the Licensee must:
 - (i) in respect of an Existing Licensed Link, pay to the licensee of such Existing Licensed Link all costs which may be reasonably incurred by that licensee to mitigate the risk of undue interference with such Existing Licensed Link from Radio Equipment established by the Licensee; and
 - (ii) in respect of a New Licensed Link, take appropriate measures to avoid the risk of undue interference with such New Licensed Link from Radio Equipment established by the Licensee.
- (c) The Licensee shall not be responsible for the payment of:
 - (i) any operation, repair, maintenance or other recurring costs associated with an Existing Licensed Link; and
 - (ii) any costs incurred in respect of a New Licensed Link to mitigate the risk of undue interference from Radio Equipment established by the Licensee.
- (d) Ofcom shall supply the Licensee with such information in relation to Wireless Telegraphy Licences relating to a frequency within the band 1492 – 1517 MHz as Ofcom may consider appropriate for the purposes of enabling the Licensee to fulfil its obligations under sub-paragraph 4(a).

Co-ordination at frequency and geographical boundaries and compliance with other procedures relating to interference

5. 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. The Licensee shall also ensure that it complies with any other procedures relating to the mitigation of interference as may be notified to the Licensee by Ofcom from time to time.

Cross-border coordination

6. The Licensee must ensure that the Radio Equipment is operated in compliance with such cross-border coordination and sharing procedures as may be notified to the Licensee by Ofcom.

Permitted Frequencies

7. Subject to the out of band emissions permitted under Paragraph 9, the Radio Equipment must only transmit on the following frequencies (the “Permitted Frequencies”):

1452 – 1472 MHz

Maximum permissible (mean) e.i.r.p. within the Permitted Frequencies

8. The power transmitted in any direction in the Permitted Frequencies by the Radio Equipment shall not exceed 68 dBm/5MHz e.i.r.p in respect of any given radio transmitting station.

Maximum power outside the Permitted Frequencies

9. The e.i.r.p. emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequencies shall not exceed:

Frequency range	Maximum mean e.i.r.p.	Measurement bandwidth
1427 – 1449 MHz	-20 dBm	1 MHz
1449 – 1452 MHz	14 dBm	3 MHz
1492 – 1495 MHz	14 dBm	3 MHz
1495 – 1498.5 MHz	-20 dBm	1 MHz
1498.5 – 1518 MHz	-62.5 dBm	1 MHz

Interpretation of terms in this schedule

10. In this schedule:
- (a) "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);
- (b) “dBm” means the power level in decibels (logarithmic scale) referenced against 1 milliWatt (i.e. a value of 0 dBm is 1mW);

- (c) “out of band emissions” means radio frequency emissions generated by the Radio Equipment and radiated into the frequency(s) adjacent (in terms of frequency) to the Licensee’s Permitted Frequency(s);
- (d) “Base station” means a radio transmitter not intended to be used while in motion to provide a communications service, typically used in mobile or broadcasting radio systems;
- (e) “Existing Licensed Link” means each of an Existing Link and an Existing Traded Link;
- (f) “Existing Link” means a Notified Licensed Link operating in accordance with a Wireless Telegraphy Licence granted before 29 May 2015 which has not been varied on or after 29 May 2015 other than in respect of the details of the holder of the licence or to add a new condition relating to electromagnetic fields compliance;
- (g) “Existing Traded Link” means a Notified Licensed Link which:
 - (i) was operated in accordance with a Wireless Telegraphy Licence granted before 29 May 2015; but
 - (ii) is subsequently operated in accordance with a Wireless Telegraphy Licence granted on or after 29 May 2015 following a transfer of such licence;
- (h) "ITU" means the International Telecommunication Union, and "Class of Emission" shall have the meaning as defined in the ITU Radio Regulations Appendix 1;
- (i) “New Licensed Link” means each of a New Link and a Varied Link;
- (j) “New Link” means a Notified Licensed Link which is not an Existing Traded Link operating in accordance with a Wireless Telegraphy Licence granted on or after 29 May 2015;
- (k) “Notified Licensed Links” means Radio Equipment operating in accordance with a Wireless Telegraphy Licence which is notified to the Licensee by Ofcom in accordance with paragraph 4(c);
- (l) “Varied Link” means a Notified Licensed Link operating in accordance with a Wireless Telegraphy Licence granted before 29 May 2015 and varied on or after 29 May 2015 in respect of any matters other than the details of the holder of the licence or to add a new condition relating to electromagnetic fields compliance;
- (m) “Wireless Telegraphy Licence” means a licence granted by Ofcom under the Wireless Telegraphy Act 2006 relating to a frequency within the band 1492 – 1517 MHz.

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SCHEDULE 2 TO LICENCE NUMBER: **1053632**

EMF Licence Condition

Schedule Date: **18 May 2021**

Licence category: **Spectrum Access 1452-1472 MHz**

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 restrictions⁴ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁵ 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 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.

⁴ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁵ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

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".

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 communications⁸.

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.

⁸ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

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;⁹
- (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.¹⁰
- (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.¹¹

⁹ 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](#).

¹⁰ 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/ICNIRPPrfgdl2020.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.

¹¹ 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.”

- (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 direction¹² that is higher than 100 Watts EIRP or 61 Watts ERP;¹³
 - 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;¹⁴
 - 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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¹² 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.

¹³ 100 Watts EIRP is equivalent to 61 Watts ERP.

¹⁴ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.