

PUBLIC WIRELESS NETWORK LICENCE

This Licence document replaces the version of the Licence issued by the Office of Communications (Ofcom) on 23 March 2015 to Vodafone Limited.

Licence no. **0249664**
Date of issue: **14 December 2016**
Fee payment date: **31 October** (annually)

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

Vodafone Limited
("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 the Schedules to this Licence (together "the Radio Equipment") subject to the terms set out below.

Licence Term

2. This Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee.

Licence Variation and Revocation

3. Pursuant to Schedule 1 paragraph 8 of the Wireless Telegraphy Act 2006 ("the Act"), Ofcom may not revoke or vary 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 or vary 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) 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 30(3) of the Act¹;

¹ These are regulations on spectrum trading.

- (f) 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 five years' notice is given in writing.
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 Act.²

Changes to Licensee details

6. The Licensee must give prior notice to Ofcom in writing of any change in the details of the name and/or address recorded in paragraph 1 of this licence.

Fees

7. The Licensee shall each year 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 shall be notified in writing to the Licensee.

Radio Equipment Use

8. The Licensee shall ensure that the Radio Equipment is established, installed and used only in accordance with the provisions specified in Schedule 1 of this Licence. Any proposal to amend any detail specified in Schedule 1 of this Licence must be agreed with Ofcom in advance and implemented only after this Licence has been varied or reissued accordingly.
9. The Licensee must 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

10. 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.

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

Modification, Restriction and Closedown

11. A 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 causing or contributing to undue interference to the use of other authorised radio equipment.
12. Ofcom may require the Radio Equipment to be modified or restricted in use, or temporarily or permanently 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 exercise this power by a written notice served on the Licensee or by a general notice applicable to holders of this class of Licence.

Geographical Boundaries

13. Subject to the requirements of any coordination procedures notified to the Licensee pursuant to paragraphs 5 and 6 of Schedule 1 to this Licence, the Licensee is authorised to establish, install and use the Radio Equipment in the United Kingdom. For the avoidance of doubt, the United Kingdom includes the United Kingdom's territorial sea (measured in accordance with section 1 of the Territorial Sea Act 1987) and does not include the Channel Islands or the Isle of Man.

Interpretation

14. In this Licence:
- (a) the establishment, installation and use of the Radio Equipment shall be interpreted as establishment and use of wireless telegraphy stations and installation and use of wireless telegraphy apparatus for wireless telegraphy as specified in section 8(1) of the Act;
 - (b) the expression "interference" shall have the meaning given by section 115 of the Act;
 - (c) the expressions "wireless telegraphy station" and "wireless telegraphy apparatus" shall have the meanings given by section 117 of the Act;
 - (d) the schedule forms 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: **0249664**

Licence Category: **Public Wireless Network**

This schedule forms part of licence no **0249664**, issued to **Vodafone Limited**, the Licensee on **14 December 2016**, and describes the Radio Equipment covered by the Licence and the purpose for which the Radio Equipment may be used.

Description of Radio Equipment Licensed

1. In this Licence, the Radio Equipment means the base transceiver stations or repeater stations forming part of the Network (as defined in paragraph 2 below).

Purpose of the Radio Equipment

2. The Radio Equipment shall form part of a radio telecommunications network ("the Network"), in which User Stations which meet the appropriate technical performance requirements as set out in the relevant Wireless Telegraphy (Exemption) Regulations made by Ofcom communicate by radio with the Radio Equipment to provide a telecommunications service.

Interface Requirements for the Radio Equipment

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

IR 2014 – Public Wireless Networks; and/or
IR 2019 – Third Generation Mobile; and/or
IR 2087 – 900 / 1800 MHz LTE and WiMAX;

or for equipment placed on the market before 8 April 2000, is required to be type approved in accordance with a recognised technical performance standard relating to the service licensed.

Special Conditions relating to the Operation of the Radio Equipment

4. (a) Subject to paragraph 4(b) 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 100 metre resolution;
 - iii) antenna height (above ground level) and type, and boresight east of true north (if applicable); and
 - iv) radio frequencies which the Radio Equipment uses;

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

- (b) The conditions relating to the keeping of records contained in sub-paragraphs 4(a)i), 4(a)ii) and 4(a)iii), shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment;
- (c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph (a) above at such intervals as Ofcom shall notify to the Licensee.

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 and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

International Cross-Border Coordination

- 6. 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.

Coverage Obligation

- 7. The Licensee shall by no later than 31 December 2017 provide and thereafter maintain an electronic communications network that is capable of providing mobile voice telecommunications services to an area covering at least 90% of the geographic landmass of the United Kingdom at at least one of the minimum signal strengths set out in Table 1 of this condition. For the avoidance of doubt the Licensee shall be permitted to meet the obligation set out in this condition using any frequencies and technologies available to the Licensee.

Table 1

Technology and Band	Minimum Signal Threshold
GSM 900	-93 dBm
GSM 1800	-93 dBm
UMTS 2100	-103 dBm
LTE 800	-115 dBm

Assessment of compliance with Coverage Obligation

- 8. Ofcom will assess the Licensee's compliance with the Coverage Obligation by reference to the document "*Voice Coverage Obligation Notice of Compliance Methodology*" published by Ofcom.

Permitted Frequency Blocks

9. The Radio Equipment may only transmit on downlink frequencies within the following frequency bands (the Permitted Frequency Blocks):

Downlink frequencies	Uplink frequencies
925.1 – 930.1 MHz	880.1 – 885.1 MHz
935.1 – 939.7 MHz	890.1 – 894.7 MHz
947.3 – 955.1 MHz	902.3 – 910.1 MHz
1810.9 – 1816.7 MHz	1715.9 – 1721.7 MHz

Radio Frequency Carrier Spacing

10. In the absence of bilateral or multilateral agreements which have been notified to Ofcom specifying alternative arrangements between the licensee and the licensee(s) of neighbouring networks the licensee must ensure that in respect of the frequencies set out at paragraph 6 of this schedule:

- the centre frequency of any of their GSM carriers is 100 kHz or more inside any edge of their permitted frequency blocks; and
- the centre frequency of any of their UMTS carriers is 2.7 MHz or more inside any edge of their permitted frequency blocks where a neighbouring licensee has deployed a GSM carrier or carriers (including GSM-R) in the immediately adjacent spectrum; and
- the centre frequency of any of their UMTS carriers is 2.5 MHz or more inside any other edge of their permitted frequency blocks;
- the channel edge of any of their LTE carriers is 200 kHz or more inside any edge of their permitted frequency blocks where a neighbouring licensee has deployed a GSM carrier or carriers (including GSM-R) in the immediately adjacent spectrum; and
- the channel edge of any of their LTE carriers does not extend beyond their permitted frequency blocks;
- the channel edge of any of their WiMAX carriers is 200 kHz or more inside any edge of their permitted frequency blocks where a neighbouring licensee has deployed a GSM carrier or carriers (including GSM-R) in the immediately adjacent spectrum; and
- the channel edge of any of their WiMAX carriers does not extend beyond their permitted frequency blocks.

ITU Class of Emission

11. For GSM: 271KG7W
For UMTS: 5M00D7W
For 1.4 MHz LTE: 1M40D7W
For 3 MHz LTE: 3M00D7W
For 5 MHz LTE: 5M00D7W
For 10 MHz LTE: 10M0D7W
For 15 MHz LTE: 15M0D7W
For 20 MHz LTE: 20M0D7W
For 5 MHz WiMAX: 5M00D7W
For 10 MHz WiMAX: 10M0D7W

Maximum Permissible Downlink Transmit Power

12. The power transmitted (in e.i.r.p.) in any direction on the downlink frequencies of the Permitted Frequency Blocks by the Radio Equipment shall not exceed:

Technology	900 MHz spectrum	1800 MHz spectrum
for GSM	62 dBm per carrier	62 dBm per carrier
for UMTS	65 dBm per carrier	65 dBm per carrier
for LTE	65 dBm per 5 MHz	65 dBm per 5 MHz
for WiMAX	65 dBm per 5 MHz	65 dBm per 5 MHz

Interpretation

13. In this Schedule:
- (a) “900 MHz spectrum” means frequencies in the range 880 MHz to 915 MHz paired with 925 MHz to 960 MHz;
 - (b) “1800 MHz spectrum” means frequencies in the range 1710 MHz to 1781.7 MHz paired with 1805 MHz to 1876.7 MHz;
 - (c) “dBm” means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
 - (d) “e.i.r.p.” means the effective 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);
 - (e) “A femtocell” means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 24 dBm e.i.r.p. per carrier which may be established by customers of the Network but which is or will be used only by and under the control of the Network, following the establishment of a telecommunications link between the femtocell and the Network;
 - (f) “GSM system” means an electronic communications network that complies with GSM standards, as published by ETSI, in particular EN 301 502 and EN 301 511 and “GSM” means pertaining to such a network or its Radio Equipment;

- (g) “GSM-R” means the variant of GSM for railways as specified in IR 2064;
- (h) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity;
- (i) "ITU" means the International Telecommunication Union, and "Class of Emission" shall have the meaning as defined in the ITU Radio Regulations Appendix 1;
- (j) “LTE system” means an electronic communications network that complies with the LTE standards as published by ETSI, in particular EN 301 908-1, EN 301 908-13, EN 301 908-14, EN 301 908-15 and EN 301 908-11 and “LTE” means pertaining to such a network or its Radio Equipment;
- (k) “Permitted Frequency Blocks” has the same meaning given to it in paragraph 6 of this Schedule;
- (l) "User Station" means any vehicle mounted or hands portable mobile station designed for mobile use and/ or any station designed or adapted to be established and used from static locations which meet the appropriate technical performance requirements as set out in the Wireless Telegraphy (Exemption) Regulations and either complies with the appropriate Interface Regulation listed in paragraph 3, or for equipment placed on the market before 8 April 2000, is type approved in accordance with a recognised technical standard relating to the service licensed;
- (m) A “smart/intelligent low power repeater” means a repeater which operates with power not exceeding 24 dBm e.i.r.p. per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:
- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
 - The repeater operates only on the Licensee’s frequencies and with their valid Public Land Mobile Network Identifier;
 - Must not cause undue interference to other spectrum users; and
 - The repeater only transmits on the Licensee’s Base Receive frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets;
- (n) “UMTS system” means an electronic communications network that complies with the UMTS standards as published by ETSI, in particular EN 301 908-2, EN 301 908-3 and EN 301 908-11 and “UMTS” means pertaining to such a network or its Radio Equipment; and
- (o) “WiMAX system” means an electronic communications network that complies with the WiMAX standards as published by ETSI, in particular EN 301 908-1, EN 301 908-21 and EN 301 908-22 and “WiMAX” means pertaining to such a network or its Radio Equipment.