

SPECTRUM ACCESS LICENCE 32 GHz

This licence document replaces Licence 0307336 issued by the Ofcom on 18 May 2021 to British Telecommunications Plc.

Licence no. **1311752**
Date of issue: **17 April 2023**
Fee payment date **17 April** (annually)

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

British Telecommunications Plc
(Company registration number 1800000)
("the Licensee")
1 Braham Street
London
E1 8EE

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 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 30(3) of the Act¹;
 - (f) for reasons related to the management of the radio spectrum, provided that in such a case this power to revoke may only be exercised after at least five (5) year's notice is given in writing to the Licensee; and
 - (g) 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)(No. 2) Regulations 2007 (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.

Spectrum Leasing

7. The Licensee may:
- (a) confer the benefit of the Licence (which is hereinafter referred to as a "lease") on another person (referred to as the "leaseholder") in respect of any wireless telegraphy station or wireless telegraphy apparatus to which the Licence relates;
 - (b) in his contract with the leaseholder permit the leaseholder to confer the benefit of the Licence (hereinafter referred to as "sub-lease") on any other person ("sub-leaseholder"),

provided that the conditions set out in schedule 2 to this Licence are met.

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.

Fees

8. 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 the fee payment shown above, or on or before such dates as are notified in writing to the Licensee.
9. 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.
10. 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 in accordance with regulation 72 of the Regulations, or any regulation made under those sections of the Act (as the case may be).

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 the schedules to this Licence must be agreed with Ofcom in advance and implemented only after this Licence has been varied or reissued accordingly.
12. The Licensee shall ensure that the Radio Equipment is operated in compliance with the terms of this Licence and is used only by persons who have been authorised in writing by the Licensee to do so and that such persons are made aware of, and of the requirement to comply with, the terms of this Licence.
13. The Licensee must ensure that all Radio Equipment is established, installed, modified and used only in accordance with the provisions specified in schedule 3 (EMF Licence Condition) of this Licence.

Access and Inspection

14. 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

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 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.
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. This Licence authorises the Licensee to establish, install and use the Radio Equipment only in the United Kingdom.

Interpretation

18. 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: 1311752

Schedule Date: **17 April 2023**

Licence Category: **Spectrum Access 32 GHz**

Description of Radio Equipment Licensed

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 use

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

IR2049 "Spectrum Access 32 GHz"

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;
 - b) National Grid Reference (to 100 Metres resolution);
 - c) antenna height (above ground level) and type, bearing east of true north;
 - d) radio frequencies used by the Radio Equipment;
 - (ii) a statement of the number of subscribing customers,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.

Co-ordination at Frequency and Geographical Boundaries

4. The Radio Equipment shall be operated in compliance with such co-ordination procedures as may be necessary and notified to the Licensee by Ofcom.

International Cross-border Coordination

5. 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 Frequency Blocks

6. Subject to the out of block emissions permitted under paragraph 8, the Radio Equipment must only transmit on the following frequency bands (the “Permitted Frequency Blocks”):

32.319 – 32.445 GHz	33.131 – 33.257 GHz
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Maximum permissible (mean) e.i.r.p.

7. The maximum e.i.r.p. power in the Permitted Frequency Blocks is:

Offset from edge of block	Maximum permitted level
In block	55 dBW (in any measured bandwidth)
-14 MHz of block edge	30 dBW/MHz
Block edge when arrived at from in block	11 dBW/MHz

Where - = in block
Linear interpolation between points

Permissible Out of Block Emissions

8. For out of block emissions (i.e. emissions outside the Permitted Frequency Block(s) specified in paragraph 6 at either the upper or lower edge), the maximum mean e.i.r.p. shall not exceed the following:

Offset from edge of block	Maximum permitted level
Block edge when moving out of block	-39 dBW/MHz
+14 MHz of block edge	-52 dBW/MHz

Where + = out of block
Linear interpolation between points

Where an individual radiating antenna has a 3 dB beamwidth of less than 5°, then the values of out of block emissions, shown above, can be increased by 20 dB.

Interpretation of terms in this schedule

9. In this schedule:

- (a) “dBW” means the power level in decibels (logarithmic scale) referenced against 1 watt. (i.e. a value of 0 dBW is 1 W);
- (b) “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);
- (c) “out of block emissions” means radio frequency emissions generated by the Radio Equipment and radiated into the frequency bands adjacent (in terms of frequency) to the licensee’s permitted frequencies of operation.

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SCHEDULE 2 TO LICENCE NUMBER: 1311752

Schedule Date: **17 April 2023**

Licence Category: **Spectrum Access 32 GHz**

Spectrum Leasing

Grant of lease

The Licensee may confer the benefit of the Licence (which is hereinafter referred to as a “lease”) on another person (referred to as the “leaseholder”) in respect of any wireless telegraphy station or wireless telegraphy apparatus to which the Licence relates, provided that the conditions in this schedule are met.

Conditions

The conditions are –

- L1. The Licensee may only confer the benefit of the Licence on one or more than one leaseholder for –
 - (a) any geographical area forming part of the geographical area in which the Licensee is authorised to establish, install or use wireless telegraphy stations or apparatus under this Licence; and
 - (b) for any frequency range forming part of the frequency band which the Licensee is authorised to use.
- L2. The Licensee shall remain responsible for all obligations under the Licence (including without limitation the obligations to pay licence fees in accordance with clause 8 of this Licence).
- L3. If the Licensee –
 - (a) transfers his rights and obligations under the Licence by way of spectrum trade; or
 - (b) receives a notice of revocation from Ofcom revoking this Licence, the lease (and any sub-lease) shall automatically extinguish.
- L4. If Ofcom varies this Licence in such a way that the provisions in condition 1 are no longer satisfied in respect of a lease which has been granted (or any sub-lease made by the leaseholder), that lease (or sub-lease) shall automatically extinguish.

- L5. The Licensee must inform the leaseholder and any sub-leaseholder immediately when this Licence terminates (regardless of the reason for such termination).
- L6. The Licensee must inform the leaseholder (and any sub-leaseholder) that it proposes to apply for a spectrum trade, prior to any such application being made to Ofcom.
- L7. The Licensee must ensure that the use of Radio Equipment by the leaseholder (and any sub-leaseholder) complies with the terms, provisions and limitations of this Licence.
- L8. The Licensee must inform the leaseholder in writing of the following matters in writing before use of the radio equipment commences:
- (a) the terms, provision and limitations of the Licence that governs the establishment, installation and use of the Radio Equipment;
 - (b) that failure to meet the terms, provisions and limitations of this Licence may be a criminal offence;
 - (c) that failure to meet the terms, provisions and limitations of this Licence may also result in close down of the Radio Equipment.
- L9. The Licensee must have a written contract with the leaseholder containing the terms of the lease and must make this available to Ofcom immediately on request.
- L10. The Licensee must maintain records at all times of the persons to whom he has granted a lease and any persons who have been granted a sub-lease under this Licence.
- L11. The Licensee must make these records (and any other relevant information) immediately available to Ofcom on request.
- L12. The Licensee must ensure that one of the terms of the written contract is that both parties are bound by a dispute resolution procedure that provides for the prompt and satisfactory resolution of disputes with or between the holders of leases or any sub-leases under this Licence, including any relating to interference management.
- L13. If Ofcom investigates interference management issues which arise as a result of a complaint to Ofcom, and if both the person which is the subject of any undue interference caused and the source of any undue interference caused are the leaseholder, sub-leaseholders or the Licensee himself, Ofcom will charge the Licensee (and the Licensee shall pay) Ofcom's costs which relate to the investigation.
- L14. The Licensee must ensure that any leaseholder and/or sub-leaseholder is immediately informed of any instructions given by Ofcom under the other terms of this Licence and that the leaseholder and/or sub-leaseholder also complies with those instructions.

Grant of sub-lease

The Licensee may in his contract with the leaseholder permit the leaseholder to confer the benefit of the Licence (hereinafter referred to as “sub-lease”) on any other person (“sub-leaseholder”) provided that the conditions in this schedule are met.

- L15. The Licensee must –
- (a) prohibit the sub-leaseholder from further conferring the benefit of the Licence on any other third party; and
 - (b) ensure that the sub-leaseholder is made aware of that prohibition.
- L16. The Licensee must procure that the terms of any such permission are contained in his contract with his leaseholder.
- L17. The Licensee must procure that the written contract between the leaseholder and the sub-leaseholder containing the terms of the lease is made available to Ofcom immediately on request.
- L18. The Licensee must require in his contract that the leaseholder informs him immediately of any sub-lease which has taken place.
- L19. The sub-lease may only confer the benefit of the Licence on one or more than one such person for –
- (a) any geographical area forming part of the geographical area in which the Licensee is authorised to establish, install or use wireless telegraphy stations or apparatus under this Licence; and
 - (b) for any frequency range forming part of the frequency band which the Licensee is authorised to use.
- L20. The Licensee shall remain responsible for all obligations under the Licence (including without limitation the obligations to pay licence fees in accordance with clause 8 of this Licence).
- L21. The Licensee shall procure that the sub-leaseholder is informed of the following matters in writing before use of the radio equipment commences:
- (a) the terms, provision and limitations of the Licence that governs the establishment, installation and use of the Radio Equipment;
 - (b) that failure to meet the terms, provisions and limitations of this Licence may be a criminal offence;
 - (c) that failure to meet the terms, provisions and limitations of this Licence may also result in close down of the Radio Equipment.

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SCHEDULE 3 TO LICENCE NUMBER: 0307336

EMF Licence Condition

Schedule Date: 17 April 2023

Licence category: Spectrum Access 32 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 restrictions³ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁴ 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 restrictions⁵ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁶ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

³ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁴ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

⁵ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁶ 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 communications⁷.

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.

⁷ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

Interpretation

8. In this schedule:

- (a) “**dB**” 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;⁸
- (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.⁹
- (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.¹⁰

⁸ 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](#).

⁹ 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.

¹⁰ 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 direction¹¹ that is higher than 100 Watts EIRP or 61 Watts ERP;¹²
 - 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;¹³
 - 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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¹¹ 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.

¹² 100 Watts EIRP is equivalent to 61 Watts ERP.

¹³ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.