
Arqiva's 28 GHz spectrum access licence

Consultation on proposed variation

CONSULTATION:

Publication date: 15 February 2023

Closing date for responses: 15 March 2023

1. Overview

This document sets out our proposal to grant Arqiva's request to vary its 28 GHz spectrum access licence (0307328).

What we are proposing – in brief

Ofcom is minded to agree to Arqiva's variation request, submitted on 7 February 2023, subject to a four week period in which stakeholders may submit any comments for our consideration. This period closes on 15 March 2023. Subject to consideration of consultation responses, we expect to publish our final decision by 31 March 2023.

This is a simplified high-level summary only. Our provisional decision and reasoning are set out below in full.

2. Background

- 2.1 On 7 February 2023¹, Arqiva submitted a request that we vary its [national 28 GHz spectrum access licence, licence number 0307328](#) (originally awarded in 2008², and subsequently varied on 27 April 2016 and again on 18 May 2021) ('the Licence'). The Licence authorises use of 2x224 MHz (27.8285-28.0525 GHz paired with 28.8365-29.0605 GHz).
- 2.2 The Licence has been used for both fixed wireless access (FWA) services and earth-to-space services connecting gateways used for non-geostationary orbit (NGSO) satellite operators, who primarily provide satellite broadband services. In particular, Arqiva has entered into commercial arrangements with a satellite operator which enable that operator to provide satellite gateway services at three locations using Arqiva's 28 GHz spectrum – Goonhilly, Morn Hill and Chalfont Grove.
- 2.3 Ofcom has a broad discretion under the [Wireless Telegraphy Act 2006](#) (the WTA 2006) to vary spectrum licences (see Annex A1 for more detail on our applicable legal powers).

3. Our consideration of the variation request

Arqiva's request

- 3.1 Arqiva have requested its Licence be amended to reflect the geographical boundaries and limited duration as detailed below, and that the variation be determined ahead of the annual licence fee regulations being put in place for this spectrum in 2023.
- 3.2 Arqiva have requested the following changes to the Licence:

¹ Arqiva initially submitted a licence variation request on 15 November 2022

² [Award of 10 GHz, 28 GHz, 32 GHz and 40 GHz spectrum](#)

- that condition 17 (*Geographical Boundaries*) of the Licence be amended, with three geographic areas replacing the existing national authorisation. The three areas in which Arqiva wish to continue to be authorised to establish, install and use radio equipment (Goonhilly, Morn Hill and Chalfont Grove) are defined by a national grid reference (NGR) point, and include a 2-3 km zone around each site;
- that condition 2 (*Licence Term*) be amended so that the licence for the remaining three areas has a fixed term, ending on 31 July 2026; and
- that references to the fee payment date on the front page and in condition 8 are amended (from 21 February 2023) to reflect the updated relevant timetable and reduced geographical boundaries of the licence.

Arqiva's rationale

- 3.3 Arqiva stated that the basis for its request is spectrum efficiency, as its national spectrum block is currently only lightly used. Arqiva believes its request to reduce the geographical scope (and duration) of its licence to three locations (and thereby returning the unused near-national spectrum, to be reauthorised by Ofcom) is consistent with our duty under the Communications Act 2003 to secure the optimal use of spectrum. It has explained that it would ensure existing NGSO satellite gateway services can continue to be supported, thereby protecting consumers and services using innovative developments including satellite broadband services. It would also allow Ofcom to address any alternative use of the spectrum nationally, and provide time to put in place longer term arrangements for access to spectrum for gateway services.
- 3.4 Arqiva consider its request is wholly aligned with our [2021 spectrum management strategy](#)'s increased focus on *Supporting wireless innovation*, *Licensing to fit local and national services*, and *Promoting spectrum sharing*. Furthermore, Arqiva considers that it supports the objectives in our [2022 space spectrum strategy](#), by enabling space sector growth and more NGSO services in the UK, given that use of this spectrum is related to the satellite industry's wider use of the 27.5-30 GHz Ka band.
- 3.5 Lastly, Arqiva note similarities between this request and other spectrum access 28 GHz licences it holds with geographical restrictions (in the wider 28 GHz band), which were obtained under spectrum trading. These existing location-based licences are used for earth-to-space satellite services for satellite gateways.
- 3.6 Arqiva believe the limited nature of the varied Licence (in terms of geographical areas and time constraints) and its focus on existing services should mean there is no impact on other users.

Our provisional view

- 3.7 Granting Arqiva's request to reduce the scope of its Licence would facilitate efficient use of spectrum, given its current use is localised in only a small part of the UK. We consider that there would be particular benefits of freeing up unused spectrum in the 28 GHz band.

- 3.8 In our 2022 space spectrum strategy, we noted interest from stakeholders in improving access to 28 GHz spectrum for NGSO satellite gateways, and that we would continue to monitor developments in demand and supply of 28 GHz spectrum for the space sector. Without prejudice to any future authorisation of this block of paired spectrum (2x224 MHz between 27.8285 and 29.0605 GHz), the return of unused geographic regions could help to increase spectrum available for satellite services in the Ka band.
- 3.9 We also note that the policy applied to the 28 GHz spectrum licences when the spectrum was allocated would allow Arqiva to achieve a similar outcome to the variation through spectrum trading. Specifically, the Licence was originally awarded on flexible terms: paragraph 3.14 of the award statement³ explained that *“licences will be tradeable and total or partial transfers of the spectrum rights will be possible; partial transfers could be for either geographical or spectrum partitions”*.⁴ While the original policy did not consider the surrender of parts of the band to Ofcom, we have considered the variation request on its merits, and we consider that allowing the variation request in these circumstances would not be inconsistent with our original policy. In particular, Arqiva would retain spectrum rights under the proposed variation that would permit existing satellite gateway services to continue to be provided under the varied Licence.
- 3.10 In light of these considerations, our provisional view is that Arqiva’s variation request is objectively justifiable and we are therefore minded to agree to it.
- 3.11 We consider it unlikely that there will be adverse impact to other users. We are nevertheless publishing this consultation in order to give stakeholders an opportunity to comment on the licence variation.

Proposed licence conditions

- 3.12 A draft of the Licence showing the proposed changes (highlighted) is in Annex A2.

Licence areas

- 3.13 We propose that condition 17 (Geographical Boundaries) be amended so as to read as follows:

This Licence authorises the Licensee to establish, install and use the Radio Equipment only within the circular areas which have:

- a radius of 3km around Goonhilly, Cornwall with NGR SU723214;
- a radius of 2 km around Morn Hill, Hampshire with NGR SU516292; and
- a radius of 2 km around Chalfont Grove, Buckinghamshire with NGR SU983917.

³ [Award of available Spectrum: 10, 28, 32 and 40 GHz Bands](#)

⁴ Regulation 7 of the [Wireless Telegraphy \(Spectrum Trading\) Regulations 2012](#) (as amended) permits the partial transfer of rights and obligations arising under a wireless telegraphy licence (including, subject to certain conditions, parts of frequency channels and geographic areas).

Licence term

3.14 We propose that condition 2 (Licence Term) be amended so as to read as follows:

This Licence shall continue in force until 31 July 2026, unless revoked by Ofcom or surrendered by the Licensee.

Fees

3.15 The varied Licence would still be subject to the payment of annual fees, the level of which are still under consultation and will be determined in due course. For consistency with those proposals, we would calculate fees on the same basis as for other location-based licences in the 28 GHz band.

3.16 Regarding Arqiva's request to amend the payment date in the Licence, we do not consider it necessary. The payment date of 21 February 2023 is conditional upon Ofcom having made regulations under the WTA 2006. As Ofcom has not yet made a final decision on the fees which should apply to this particular spectrum (and no fees regulations have yet been made), the payment is not yet due and will not be due on 21 February 2023. Ofcom will notify all licensees in writing in due course of the payment date.

4. Next steps

4.1 We are inviting comments on our provisional decision, as set out in this consultation, for a period of four weeks. Details for responding are explained in Annex A3, and responses can be sent to 28GHzvariation@ofcom.org.uk. The consultation period closes at 5pm on **15 March 2023**.

4.2 Following this consultation period, we will consider any responses received relating to this variation. Subject to consideration of consultation responses, we expect to publish our final decision by 31 March 2023.

Future authorisation of returned spectrum

4.3 Should the variation take effect as set out in this consultation, the near-national returned spectrum in the 2x224 MHz block (27.8285-28.0525 GHz paired with 28.8365-29.0605 GHz) will become available for reauthorisation.

4.4 We plan to seek stakeholder views on our future authorisation approach within the coming months. We expect to take account of interest from a range of users, including satellite gateways as recognised in the space spectrum strategy.

Question 1:

Do you have any comments on this variation? Please provide evidence for your position.

A1. Legal context

Ofcom's power to vary licences

A1.1 Ofcom has a broad discretion under Schedule 1 paragraph 6 of the WTA 2006 to vary licences, subject to certain limitations. Pursuant to para 6A of the WTA 2006, any variation must be objectively justifiable.

The duties imposed by the Communications Act 2003

A1.2 Section 3 of the [Communications Act 2003](#) (the Communications Act) sets out Ofcom's general duties, including its principal duty:

- a) to further the interests of citizens in relation to communications matters; and
- b) to further the interests of consumers in relevant markets, where appropriate by promoting competition.

A1.3 In carrying out its functions, section 3(2) provides that Ofcom is required, amongst other things, to secure the optimal use for wireless telegraphy of the electro-magnetic spectrum and the availability throughout the UK of a wide range of electronic communication services.

A1.4 Section 3(3) of the Communications Act provides that in performing its duties, Ofcom must in all cases have regard to the principles of transparency, accountability, proportionality and consistency, as well as ensuring that its actions are targeted only at cases in which action is needed.

A1.5 Section 3(4) of the Communications Act requires Ofcom, in performing its duties, to have regard to a number of factors as appropriate, including the desirability of promoting competition, encouraging investment and innovation in relevant markets, encouraging the availability and use of high speed data transfer services throughout the UK, the different interests of persons living in rural and in urban areas and the different needs and interests of everyone who may wish to use the spectrum for wireless telegraphy.

A1.6 Section 4 of the Communications Act requires Ofcom to act in accordance with six requirements when carrying out certain specified functions, including our functions under the WTA 2006. These include a requirement to promote competition in relation to the provision of electronic communications networks and electronic communications services, and to take account of the desirability of carrying out its functions in a manner which, so far as practicable, does not favour one form of electronic communications network, electronic communications service or associated facility, or one means of providing these, over another.

The duties imposed by the WTA 2006

A1.7 Section 3 of the WTA 2006 imposes a number of further duties relating to spectrum management. Amongst other things, in carrying out its spectrum functions Ofcom is

required to have regard to: a) the extent to which spectrum is available for use, or further use, for wireless telegraphy; b) the demand for use of the spectrum for wireless telegraphy; and c) the demand that is likely to arise in future for the use of the spectrum for wireless telegraphy.

- A1.8 Section 3 also requires Ofcom to have regard to the desirability of promoting:
- a) the efficient management and use of the part of the electromagnetic spectrum available for wireless telegraphy;
 - b) the economic and other benefits that may arise from the use of wireless telegraphy;
 - c) the development of innovative services; and
 - d) competition in the provision of electronic communications services.

Impact Assessment

- A1.9 Section 7 of the Communications Act requires us to carry out and publish an assessment of the likely impact of implementing a proposal which would be likely to have a significant impact on businesses or the general public, or when there is a major change in Ofcom's activities. As a matter of policy Ofcom is committed to carrying out and publishing impact assessments in relation to the great majority of our policy decisions, although the form of that assessment will depend on the particular nature of the proposal.
- A1.10 This consultation constitutes our impact assessment for the purpose of section 7 of the Communications Act.

Equality Impact Assessment

- A1.11 Section 149 of the Equality Act 2010 (the "2010 Act") imposes a duty on Ofcom, when carrying out its functions, to have due regard to the need to eliminate discrimination, harassment, victimisation and other prohibited conduct related to the following protected characteristics: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex and sexual orientation. The 2010 Act also requires Ofcom to have due regard to the need to advance equality of opportunity and foster good relations between persons who share specified protected characteristics and persons who do not.
- A1.12 Section 75 of the Northern Ireland Act 1998 (the "1998 Act") also imposes a duty on Ofcom, when carrying out its functions relating to Northern Ireland, to have due regard to the need to promote equality of opportunity and regard to the desirability of promoting good relations across a range of categories outlined in the 1998 Act. Ofcom's Revised Northern Ireland Equality Scheme explains how we comply with our statutory duties under the 1998 Act.
- A1.13 To help us comply with our duties under the 2010 Act and the 1998 Act, we assess the impact of our proposals on persons sharing protected characteristics and in particular whether they may discriminate against such persons or impact on equality of opportunity or good relations. We fulfil these obligations by carrying out an Equality Impact Assessment

(‘EIA’), which examines the impact our policy is likely to have on people, depending on their personal circumstances. EIAs also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers, regardless of their background and identity.

- A1.14 We do not consider the impact of our proposals will have equality implications under the 2010 Act or the 1998 Act.

A2. Draft 28 GHz Spectrum Access Licence

Office of Communications (Ofcom)
Wireless Telegraphy Act 2006



SPECTRUM ACCESS LICENCE 28 GHz

This licence document replaces the version of the licence issued by Ofcom on **18 May 2021** to **Arqiva Limited**.

Licence no. **0307328**
Date of issue: **[date] 2023**
Fee payment date **21 February (annually)**
(from 21 February 2023)

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

Arqiva Limited
(Company Registration number: 2487597)
("the Licensee")
Crawley Court
Winchester
Hampshire
SO21 2QA

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 **31 July 2026, 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 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 Act⁵;
 - (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;
 - (g) 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;
 - (h) 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 Act⁶.

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.

⁵ These are regulations on spectrum trading.

⁶ See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

Fees

8. From 21 February 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 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 any regulation made under those sections of the Act (as the case may be).

Radio Equipment Use

11. The Licensee must 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 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.
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. 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 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 **within the circular areas which have:**
- (a) a radius of 3km around Goonhilly, Cornwall with NGR SU723214;
 - (b) a radius of 2 km around Morn Hill, Hampshire with NGR SU516292; and
 - (c) a radius of 2 km around Chalfont Grove, Buckinghamshire with NGR SU983917.

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: 0307328

Schedule Date: [date] 2023

Licence Category: SPECTRUM ACCESS 28 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:

IR2048 "Spectrum Access 27.8285 to 28.4445 paired with 28.8365 to 29.4525 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 or satellite (Earth to space) 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 9, the Radio Equipment must only transmit on the following frequency bands (the “Permitted Frequency Blocks”):

27.8285 to 28.0525 GHz - 28.8365 to 29.0605 GHz

Maximum Permissible (mean) e.i.r.p. (terrestrial services)

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 (terrestrial services)

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.

Deployment Requirements (satellite services)

9.

- (a) The elevation angle of the main beam of the transmitting earth station shall be higher than 10° above the horizontal;
- (b) the off axis e.i.r.p. density radiated into spectrum immediately adjacent to the licensed frequency block shall be limited to -35 dBW/MHz (off axis refers to angles greater than 7° from the axis of the main beam of transmission) except into the spectrum between; 27.5 GHz to 27.8285 GHz, 28.4445 GHz to 28.8365 GHz and 29.4525 to 29.5 GHz where this limit will not apply and where only spurious emission limits will then apply;
- (c) satellite earth stations shall not have their transmitted occupied band edges closer than 10 MHz from the edge of the frequency blocks as referred to in the table in Paragraph 7 except where that block edge directly abuts spectrum at, 27.8285 GHz and 28.8365 GHz.

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) "e.r.p." means the effective radiated power. This is the power fed to the antenna multiplied by the maximum gain of the antenna with respect to a half-wave dipole;
- (c) "dBm" means the power level in decibels (logarithmic scale) referenced against 1 milli Watt (i.e. a value of 0 dBm is 1 mW);
- (d) "dBW" means the power level in decibels (logarithmic scale) referenced against 1 Watt. (i.e. a value of 0 dBW is 1 W);
- (e) "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;
- (f) "terrestrial" means radio transmission on the ground to other ground based systems, but excludes transmission to or between satellite systems;
- (g) "satellite" means radio transmission which forms of an intended communication between systems on the ground and systems that go beyond, or has been beyond, the major portion of the earth's atmosphere.

SCHEDULE 2 TO LICENCE NUMBER: 0307328

Schedule Date: [date] 2023

Licence Category: SPECTRUM ACCESS 28 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.

SCHEDULE 3 TO LICENCE NUMBER: 0307328

EMF Licence Condition

Schedule Date: [date] 2023

Licence category: Spectrum Access 28 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 restrictions⁷ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁸ 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 restrictions⁹ in the relevant tables for general public exposure identified in the ICNIRP Guidelines¹⁰ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Emergency Situations

4. The obligations in paragraphs 1, 2 and 3 above will not apply if the Relevant Radio Equipment is being used for the purpose of seeking emergency assistance or reporting and responding to an emergency situation (in the vicinity of that situation) including for search and rescue activities and maritime emergency communications¹¹.

⁷ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

⁸ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

⁹ Compliance with the reference levels for general public exposure identified in the ICNIRP Guidelines will ensure compliance with the basic restrictions.

¹⁰ The relevant tables for general public exposure are identified in Ofcom's "Guidance on EMF Compliance and Enforcement".

¹¹ Further information on emergency situations is set out in Ofcom's "Guidance on EMF Compliance and Enforcement".

Relationship with authorised transmission levels

5. The Licensee shall comply with paragraphs 1, 2 and 3 above notwithstanding the maximum transmission levels authorised in the Licence.

Records

6. The Licensee shall keep, or shall procure that a third party shall keep, and shall make available to Ofcom on request, records (including the type of records identified in Ofcom's "Guidance on EMF Compliance and Enforcement") that demonstrate how it has complied with 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;¹²
 - (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.¹³

¹² 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](#).

¹³ 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

- (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.¹⁴
- (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 direction¹⁵ that is higher than 100 Watts EIRP or 61 Watts ERP;¹⁶
 - 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;¹⁷
 - 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;

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.

¹⁴ 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”.

¹⁵ 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.

¹⁶ 100 Watts EIRP is equivalent to 61 Watts ERP.

¹⁷ The relevant tables for general public exposure are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement”.

- (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

A3. Responding to this consultation

How to respond

- A3.1 Ofcom would like to receive views and comments on the issues raised in this consultation, by 5pm on 15 March 2023.
- A3.2 You can download a response form from <https://www.ofcom.org.uk/consultations-and-statements/category-3/consultation-arqivas-28-ghz-spectrum-access-licence>. You can return this by email or post to the address provided in the response form.
- A3.3 If your response is a large file, or has supporting charts, tables or other data, please email it to 28GHzvariation@ofcom.org.uk, as an attachment in Microsoft Word format, together with the [cover sheet](#). This email address is for this consultation only and will not be valid after 31 March 2023.
- A3.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:
- Arqiva 28 GHz variation
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA
- A3.5 We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:
- send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files; or
 - upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A3.6 We will publish a transcript of any audio or video responses we receive (unless your response is confidential)
- A3.7 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt of a response submitted to us by email.
- A3.8 It would be helpful if your response could include direct answers to the question asked. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be. We also welcome joint responses.
- A3.9 If you want to discuss the issues and questions raised in this consultation, please contact us by email to 28GHzvariation@ofcom.org.uk.

Confidentiality

- A3.10 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish responses on [our website](#) at regular intervals during and after the consultation.
- A3.11 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.
- A3.12 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A3.13 To fulfil our pre-disclosure duty, we may share a copy of your response with the relevant government department before we publish it on our website. This is the Department for Business, Energy and Industrial Strategy (BEIS) for postal matters, and the Department for Culture, Media and Sport (DCMS) for all other matters.
- A3.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our [Terms of Use](#).

Next steps

- A3.15 Following our consideration of responses, we plan to publish our final decision by **31 March 2023**. You can [register to receive updates](#) alerting you to new Ofcom publications.

Ofcom's consultation processes

- A3.16 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex A4.
- A3.17 If you have any comments or suggestions on how we manage our consultations, please email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions in a formal consultation.
- A3.18 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:
- Ofcom - Corporation Secretary
Riverside House, 2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A4. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

- A4.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

- A4.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A4.3 We will make the consultation document as short and simple as possible, with an overview of no more than two pages. We will try to make it as easy as possible for people to give us a written response.
- A4.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A4.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A4.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

- A4.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish the responses on our website at regular intervals during and after the consultation period. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A5. Consultation coversheet

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? _____

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom aims to publish responses at regular intervals during and after the consultation period. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)