
Non-geostationary satellite systems

Annexes 1-6

ANNEX:

Publication date: 10 December 2021

Contents

Annex

A1. Legal framework	1
A2. Stakeholder comments on issues beyond the scope of the consultation	5
A3. Our starting point for the competition check	9
A4. NGSO network licence	13
A5. NGSO gateway licence	25
A6. Wireless Telegraphy Licence Conditions Booklet OfW 597	32

A1. Legal framework

Ofcom's role and objectives

- A1.1 Ofcom has core legal functions and duties that relate to the control of harmful radio interference. Wireless communication relies on use of the radio spectrum, but if every wireless device could transmit in an uncontrolled way, they would cause harmful interference to others, degrading or preventing communications altogether. Therefore, some form of regulation of spectrum use is beneficial to reduce the likelihood of interference.
- A1.2 There are two levels to the regulation of spectrum use - radio interference that arises internationally and radio interference within the UK. Ofcom is active at both levels.
- A1.3 However, it is the interference emanating from radio equipment and radio systems within the UK and hence the **regulation of radio frequencies under the UK regulatory framework**, which is the focus of this document and our decisions within it. These decisions sit alongside and do not change or replace our international responsibilities.

Regulation of radio interference that arises internationally – the ITU

- A1.4 In order to stop radio signals from one country disrupting signals in another country there is a world-wide international regulatory regime. This is governed by the International Telecommunications Union (ITU) and a body of international treaty rules contained in the ITU's Constitution, Convention and "Radio Regulations". These rules aim to achieve efficient use of the radio frequencies internationally, since radio frequencies are a scarce resource. This is done by establishing an order of precedence as to which radio signals travelling across international borders prevail over other signals if harmful radio interference arises. Interference can potentially arise across international land and sea borders from a large variety of radio systems, including for example television broadcasting and mobile phone networks.
- A1.5 Since satellites in space transmit or broadcast down to multiple countries on earth, the ITU also has a system for registering internationally in its master register the orbital position and radio frequencies used by those satellites. This is essentially a first come first served principle, whereby later registrations must coordinate with prior registrations (known as filings). However, regardless of the date of their filing, all operators need to make every effort to accommodate these coordination discussions, working in good faith to reach coordination agreements.
- A1.6 Within the UK, Ofcom is tasked with making satellite filings to the ITU on behalf of companies wishing to launch satellites. Ofcom makes and manages the process for satellite filings for companies or other organisations registered in the UK, the British Overseas

Territories, the Channel Islands and the Isle of Man.¹ In particular, we are responsible for a number of NGSO satellite filings with the ITU.

- A1.7 Ofcom's role can involve supporting satellite operators with their ITU filings and taking such action as may be necessary to protect UK filings. This can include assisting with coordinating their systems with other operators and administrations and helping to resolve disputes where necessary. Ofcom is also responsible for representing the UK in international forums that deal with spectrum, including at the ITU and European Conference of Postal and Telecommunications Administrations (CEPT). In relation to satellites, we help to develop international rules that support the efficient use of spectrum by satellite networks, including by NGSO systems. For example, we supported new rules for the 'Bringing into Use' of non-geostationary satellites systems that were agreed at the ITU's World Radio Conference of 2019.
- A1.8 Ofcom's legal functions and duties for these activities derive from section 22 of the Communications Act 2003.²

Regulation of radio interference that arises within the UK

- A1.9 There are a broad range of general objectives for Ofcom as set out in the Communications Act 2003 including (in section 3) to further the interests of citizens and consumers, where appropriate by promoting competition and to secure the optimal use of the radio spectrum.
- A1.10 Ofcom is tasked with granting licences to users of radio equipment under the Wireless Telegraphy Act 2006 (the "2006 Act"). Transmission or reception of radio signals is unlawful and a criminal offence under the 2006 Act, unless it is done in accordance with an authorisation contained in a "wireless telegraphy" licence granted by Ofcom or set out in a licence exemption (contained in a statutory instrument) made by Ofcom. These licences and exemptions aim to segment users of the radio spectrum in terms of frequency, geographic location, or time so as to avoid harmful interference.
- A1.11 Key spectrum management objectives and duties are contained in the 2006 Act. Key objectives are to achieve optimal (and efficient) use of the scarce resource of radio spectrum, and to promote competition. There are also specific legislative requirements which relate to granting licences and changing (varying) them.
- A1.12 A key part of the UK framework of rules for spectrum licensing is set out in in section 3 of the 2006 Act. In carrying out our spectrum functions we have a duty under that section to have regard, in particular, to:
- a) the extent to which the spectrum is available for use, or further use, for wireless telegraphy;

¹ Ofcom's satellite filing procedures are set out at https://www.ofcom.org.uk/_data/assets/pdf_file/0022/140926/new-procedures-1.pdf

² The judgment by Mr Justice Goldring in the case of the [Government of Bermuda v Office of Communications & Ors](#) [2008] EWHC 2009 (Admin) (13 August 2008) gives a particularly clear explanation and summary of the legislative background.

- b) the demand for use of that spectrum for wireless telegraphy; and
- c) the demand that is likely to arise in future for such use.

A1.13 We also have a duty to have regard, in particular, to the desirability of promoting:

- a) the efficient management and use of the spectrum 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

A1.14 Section 7 of the Communications Act 2003 (the “**Communications Act**”) provides that where we are proposing to do anything for the purposes of or in connection with the carrying out of our functions, and it appears to us that the proposal is important, we are required to carry out and publish an assessment of the likely impact of implementing the proposal, or a statement setting out our reasons for thinking that it is unnecessary to carry out such an assessment. Where we publish such an assessment, stakeholders must have an opportunity to make representations to us about the proposal to which the assessment relates.

A1.15 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policymaking. As a matter of policy, Ofcom is committed to carrying out impact assessments in relation to the majority of our policy decisions. The analysis presented in our consultation document of 26th July 2021 together with this document as a whole constitutes our impact assessment, as defined in section 7 of the Communications Act.

Equality Impact Assessment

A1.16 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.

A1.17 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.

Annexes 1-6

- A1.18 To help us comply with our duties under the 2010 Act and the 1998 Act, we assessed 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.
- A1.19 We did not consider that our proposals have equality implications under the 2010 Act or the 1998 Act.

A2. Stakeholder comments on issues beyond the scope of the consultation

A2.1 This annex notes issues raised by stakeholders that we consider to be beyond the scope of the proposals we made in the consultation. However, we have summarised and responded to them below, indicating how we plan to address the issues where we have a role to do so.

Electromagnetic fields (EMF)

A2.2 Electrosensitivity UK raised concerns about the radiation emitted by satellite systems, suggesting that our licence updates should include the requirement for appropriate warnings for anyone exposed above the international biological guidelines for long-term and non-thermal health effects. In the UK, Public Health England takes the lead on public health matters associated with radiofrequency electromagnetic fields, and has a statutory duty to provide advice to Government on any health effects that may be caused by exposure to EMF. PHE advise that EMF exposure should comply with ICNIRP³ Guidelines, and we have recently acted to take account of this advice by requiring all spectrum licensees including the NGSO gateway and NGSO network licences discussed in this document comply with the ICNIRP general public limits. This is now reflected in a new condition (condition 7) inserted in the general conditions' booklet (see Annex A6).

Climate change

A2.3 Gary Hunt commented that the suspension of NGSO network and gateway licences should be maintained until the whole question on environmental impact is fully considered. As we set out in our [2021/22 Plan of Work](#), we are continuing our work to analyse the sustainability of our industries. This includes how they affect the environment, and are affected by it, how technologies can help other sectors reduce their carbon footprint, and what actions can be taken to tackle the challenges presented by climate change and the UK's net zero carbon target. We will be considering what role Ofcom could play in addressing sustainability issues within communications sectors as part of this work. Currently, we have no duties relating to the environment, so it is not appropriate to include it in licence conditions at this time.

Protection of GSO systems

A2.4 A number of stakeholders (Arqiva, techUK, Viasat, Hughes Europe and a confidential respondent) raised concerns that we had not addressed the risk of interference from NGSO

³ ICNIRP (the International Commission on non-ionising radiation protection) is a non-profit, non-governmental organisation which aims to protect people and the environment against adverse effects of non-ionizing radiation. Its role is formally recognised by the World Health Organisation (WHO) and International Labour Organisation (ILO).

operators into GSO systems. Their concerns related to the operation of Article 22.2 of the ITU Radio Regulations areas: a) that the protections under Article 22.2 do not reflect the busier interference environment of today; and b) that Article 22.2 does not take account of the aggregate interference that might occur from several large NGSO systems.

- A2.5 Some respondents suggested that modern Ultra High-Throughput satellites would be more sensitive to interference from NGSO systems than the current generation of geostationary satellites, so may require additional protections. Another claimed that the ITU software to calculate interference into GSO systems (based on Recommendation S.1503) can miscalculate actual interference.
- A2.6 We already have conditions in our NGSO licences requiring all operators to comply with Article 22.2 of the ITU Radio Regulations (the full NGSO network and gateway licences can be found in Annexes A4 and A5 respectively). At this time, we do not think that there is a material risk to GSO systems that cannot be addressed by Article 22.2. Nonetheless, we note that the issues raised by stakeholders are currently being discussed at an international level through the work of ITU-R Working Party 4A (WP 4A) and we will continue to engage in these international discussions.

Protection for radio astronomy services

- A2.7 Two respondents (SKAO and the Royal Astronomical Society) raised concerns that NGSO satellites would interfere with radio astronomy services. They asked whether we would include licence conditions to comply with regulatory and technical documents developed in CEPT which protect radio astronomy (e.g. ECC Report 271). We have been active participants in the relevant CEPT technical and regulatory groups where these issues are addressed. Although consideration of additional licence conditions to protect other services was beyond the scope of the current consultation, we will return to this question in the context of our forthcoming space spectrum strategy consultation.
- A2.8 SKAO also queried our future role in monitoring satellites to ensure compliance with regulatory conditions. We believe NGSO mega constellations will need a new approach to interference monitoring and investigation and are continuing to develop our capabilities this area.
- A2.9 In addition, The Royal Astronomical Society flagged that optical astronomy observations would be impacted by NGSO satellite constellations and the consultation did not address this. The optical impacts (i.e. reflections, sky blockages) are outside Ofcom's remit although we note that these issues are currently being discussed in the UN Committee on the Peaceful Uses of Outer Space (UN COPUOS).

Application to other NGSO satellite services (beyond FSS)

- A2.10 Some stakeholders commented that other NGSO satellite services should be subject to the same regulations (i.e. for the mobile satellite service (MSS), earth exploration satellite service (EESS), global navigation satellite service (GNSS), and space research satellite service (SRSS)). To clarify, the proposals introduced in our consultation only relate to

licences which authorise use in bands allocated to the Fixed Satellite Services (FSS). However, we will be consulting on our plans for future licensing updates as part of our space spectrum strategy, and stakeholders are invited to respond to that if there are additional areas they believe we should consider in our future work.

Application to other bands beyond Ka/Ku

A2.11 Various stakeholders suggested that existing and future NGSO terminals operating in any band in which coordination is required in the future (e.g. Q and V bands) should be subject to the same licensing approach. Q and V band are not yet authorised for use under the NGSO network or gateway licences. The question of whether we should consider authorising additional bands for GSO and NGSO use in the future will be considered in our forthcoming Space Spectrum Strategy (see paragraph 7.24). If and when we authorise additional bands for NGSO use, we will consider whether the regime set out in this statement is relevant.

High altitude platforms (HAPs)

A2.12 Avealto commented that HAPs should not be ignored in the licensing process and wanted permission to operate in Ka bands soon. Ofcom continue to monitor the developments in HAPs, but have no plans yet in the UK to develop a licensing product.

14.25-14.5 GHz allocation to FSS

A2.13 SpaceX commented that the 14.25-14.5 GHz spectrum band should be made available for consumer use alongside the existing fixed links. We will be consulting on the future use of the 14.25-14.5 GHz band, including its availability for uplinks from (GSO and NGSO) satellite user terminals, early next year.

Sustainability/safety of space

A2.14 Viasat responded with concerns on the safety of space, including the need to ensure NGSO systems avoid collisions and create additional debris in space. In the UK, the space regulator with responsibility for these issues is the Civil Aviation Authority as outlined in the [Space Industry Act 2018](#).

Access to orbital resources

A2.15 Viasat commented that orbital resources are finite and recommended that Ofcom manages access by incorporating questions on orbits during the application process. These concerns cannot be dealt with through the individual NGSO licences that we authorise in the UK. These issues are currently discussed at an international level through the work of ITU-R Working Party 4A (WP 4A).

Appendix 7 of the Radio Regulations not being applicable to our proposals

A2.16 A confidential respondent commented that it is not clear how Ofcom would continue to protect the gateway earth stations of UK GSO operators since Ofcom does not apply the procedures of Appendix 7 of the Radio Regulations. Appendix 7 is only relevant to sharing between satellite earth stations and fixed services across international borders, and therefore is outside the scope of our new licensing process which is intended to deal with coexistence challenges between NGSO systems operating in the UK.

A3. Our starting point for the competition check

Introduction

- A3.1 We set out our starting point for the competition check for issuing new NGSO licences in section 3. This annex sets out further detail on why we have adopted that starting point.
- A3.2 We have taken account of the following four factors:
- a) first, the extent of the likely risks to competition;
 - b) second, the potential benefits from granting NGSO licence applications;
 - c) third, ensuring that the time and resources devoted to the licensing process are proportionate to the risks and benefits; and
 - d) fourth, that NGSO services are currently in their infancy.
- A3.3 Below we consider these four factors in relation to NGSO gateway licence applications and NGSO network licence applications.

NGSO gateway licence applications

Assessment

- A3.4 We have considered the four factors set out above.

Extent of the competition risks

- A3.5 In terms of the first factor, we consider that the risks to competition may generally be modest, although this depends on the number of licences applied for. As noted in section 3, NGSO gateways might require large separation distances and/or may require other operators to make costly changes to their systems in order to avoid harmful interference.
- a) At present, we do not think there is a significant risk that a scarcity of appealing gateway sites will materially constrain the deployment of NGSO systems in the UK. This is because: (i) not all NGSO systems will technically depend on a gateway in the UK as some can rely on a gateway in nearby countries; (ii) those that do may need only a limited number of UK gateways (4 or 5, say, depending on their system architecture); and (iii) based on the current information that operators have provided to us about their plans for gateways, we believe that sufficient sites will be available.

- b) Scarcity of sites could be (artificially) exacerbated if operators apply for gateway licences that they never actually use for a real system.⁴ However, the incentive to engage in such strategic behaviour is diminished by: (i) the uncertainty about how this market will develop which makes any profits from attempting to foreclose rivals less predictable; and (ii) the requirement for gateway licensees to commence and maintain transmissions within 12 months.⁵ In other words, pursuing such a strategy may be costly with uncertain gains. The ability to engage in such behaviour is also dependent on rival operators not having appealing alternative gateway sites (including potentially in other countries).
- c) However, we are mindful that there is currently a limited number of UK teleports and these are mainly located in the south of the UK.
- d) We are also mindful that operators' plans may change. Technical developments may also affect the design of NGSO systems, including the number of gateways needed, and their ability to coexist with each other.

Benefits from granting licence applications

A3.6 In terms of the second factor, as discussed in section 2, new NGSO systems potentially support Ofcom's strategic priority to get everyone connected. Granting NGSO gateway licence applications can aid the entry of new operators (if they technically need a UK gateway in order to offer services in the UK) and allows existing operators to improve the services they offer. Moreover, by adopting a supportive approach towards granting licences, Ofcom can strengthen the incentives for NGSO operators to swiftly apply for licences and ultimately deploy in the UK.

Time and resources devoted to the licensing process

A3.7 In terms of the third factor, we wish to ensure that the time and resources devoted to the licensing process are proportionate to the risks and benefits. When conducting a competition check, it is important to limit the burden (both on Ofcom and stakeholders) especially where applications are unlikely to be problematic. Moreover, given the likely size of the NGSO sector in the UK, it will generally be appropriate to conduct a less detailed competition analysis than we might for other spectrum licences (such as mobile telephony, for example).⁶

⁴ Operators could also exaggerate the separation distance needed to protect their gateways by seeking unrealistic levels of protection. However, in deciding whether to grant a licence application we would consider whether the separation distances sought by existing operators were reasonable

⁵ This increases the cost of trying to artificially exacerbate any scarcity of gateway sites since, in order to do so for more than 12 months, the operator would need to incur the costs of establishing and operating an unnecessary site.

⁶ As set out in section 2, at the end of 2019 there were only 28,000 satellite broadband connections in the UK. This may change in the future both because of changes in other connectivity products and because NGSO systems can offer improved latency and speed.

Infancy of NGSO services

A3.8 In terms of the fourth factor, we are mindful that NGSO services are in their infancy and there are considerable uncertainties about how they will develop. There are uncertainties over how the design of NGSO systems will evolve, with technology and system architecture changes potentially increasing or decreasing gateway requirements. There are also uncertainties about how the commercial aspects of these services will develop. As a result, the balance between the risks and benefits described above may change in the future.

Conclusion

A3.9 In conclusion:

- a) Our starting point is that we expect that granting a gateway licence application will not raise material competition risks. This starting point reflects the likely balance of the competition risks and the benefits.
- b) We expect this stance will allow us to process most applications briskly while only carrying out a limited, light touch assessment of competition. However, particularly where a third party raises credible, reasoned competition concerns about an application then a more detailed competition check may be warranted.⁷
- c) In the future we may revisit this approach, once the technical and commercial shape of the sector becomes clearer and in the light of our experience of how the new licensing system has been operating.

NGSO network licence applications

Assessment

A3.10 We have considered the four factors set out above.

Extent of the competition risks

A3.11 In terms of the first factor, in principle competition concerns could arise from the constraints that systems operating under a network licence might impose on subsequent entrants due to the technical barriers to coexistence between systems (e.g. due to a lack of flexibility in the design of systems). If there was a limited prospect of the applicant's system and future systems being able to technically coexist, then this could form a barrier to future entry to the market. This would be a particular concern if it results in market power. However, the magnitude of this risk is currently unclear.

⁷ There may be situations where we depart from this position. For example, an application might be for such a large number of gateways and/or the coexistence challenges presented by those gateways might be so clear cut that we have competition concerns even without any third party objections.

Benefits from granting licence applications

A3.12 In terms of the second factor, a network licence is necessary for an operator to deploy user terminals in the UK. As set out in section 2, satellite connections can be used to support a range of consumer and business services. Granting NGSO network licence applications is thus likely to benefit customers and consumers and supports Ofcom's strategic priority to get everyone connected (see above). Since issuing a new network licence allows market entry it also has the potential, if a service is deployed, to promote greater competition (assuming that it can coexist with other authorised systems).

Time and resources devoted to the licensing process and the infancy of NGSO services

A3.13 Our consideration of the third and fourth of factors are the same as for gateway licence applications (see paragraphs A3.7-A3.8 above).

Conclusion

A3.14 In conclusion:

- a) Our starting point is that we expect that granting a network licence application will not raise material competition risks. This starting point reflects the benefits of issuing these licences.
- b) We expect this stance will allow us to briskly process most applications while only carrying out a limited, light touch assessment of competition. However, particularly where a third party raises credible, reasoned competition concerns about an application then a more detailed competition check may be warranted.⁸
- c) In the future we may revisit this approach, once the technical and commercial shape of the sector becomes clearer and in the light of our experience of how the new licensing system has been operating.

⁸ There may be situations where we depart from this position.

A4. NGSO network licence

Wireless Telegraphy Act 2006

Satellite (Earth Station Network)

Sector/class/product	<Product>
Licence number	<Lic_No>
Licensee	<Lic_Name>
Licensee address	<Address>
Trading as	<Tradename>
Licence first issue date	<Issue_Date>
Licence version date	<Date>
Payment interval	<Year>

1. This Licence is issued by the Office of Communications ("Ofcom") on <Date> and replaces any previous authority granted in respect of the service subject to this Licence by Ofcom or by the Secretary of State.
2. This Licence authorises <Lic_Name> ("the Licensee") to establish, install and/or use radio transmitting and/or receiving stations and/or radio apparatus as described in the schedule(s) (hereinafter together called "the Radio Equipment") subject to the terms set out below and subject to the terms of the General Licence Conditions booklet (Version OfW 597).

ISSUED BY OFCOM

Satellite (Earth Station Network) Licence
SCHEDULE 1 TO LICENCE NUMBER <Lic_No>
TERMS, PROVISIONS AND LIMITATIONS COVERED BY THIS LICENCE

This schedule forms part of Licence <Lic_No>, issued to <Lic_Name>, the Licensee on <Issue_Date>, and describes the terms and equipment specifications covered by this Licence.

1. The Licensee may establish and use:

1.1. Permanent, transportable or mobile sending and receiving Network Earth Station(s) ("the Station(s)") for the purpose of providing Wireless Telegraphy links between the Station(s) and Geostationary or Non-Geostationary Satellite(s).

2. Limitations on use

2.1. The Stations(s) operating with Geostationary Satellites shall:

- a) transmit within one or more of the following frequency ranges: 14.0-14.25 GHz, 27.5 - 27.8185 GHz, 28.4545 - 28.8265 GHz, 29.4625 - 30 GHz;
- b) transmit only to the satellite and its associated orbital longitude specified in Schedule 2;

2.2. Land Station(s) operating with Non-Geostationary Satellites shall:

- c) transmit within one or more of the following frequency ranges: 14.0-14.25 GHz, 27.5 - 27.8185 GHz, 28.4545 - 28.8265 GHz, 29.5 - 30 GHz;
- d) transmit only to the satellite network specified in Schedule 2;

2.3. Aeronautical Station(s) operating with Non-Geostationary Satellites shall:

- e) transmit within the frequency range 14.0-14.25 GHz;
- f) transmit only to the satellite network specified in Schedule 2.

2.4. Additionally:

- g) stations(s) that transmit with e.i.r.p. greater than 55 dBW shall operate only with prior consent from Ofcom and registration of the station(s) against the Licence;
- h) station(s) that transmit within the frequency range 14.0 - 14.25 GHz inclusive shall not operate at any location that is less than or equal to 5 km from the two geographical locations specified in Schedule 3 without prior consent from Ofcom and registration of the station(s) against the Licence;
- i) station(s) that transmit with e.i.r.p. greater than 50 dBW and less than 55 dBW (50 dBW < e.i.r.p. < 55 dBW) in the frequency range 14.0 - 14.25 GHz inclusive shall not operate at any location that is greater than 5 km and less than or equal

to 7 km from the two geographical locations specified in Schedule 3 without prior consent from Ofcom and registration of the station(s) against the Licence; and

- j) station(s) shall not operate within the perimeter fence of any of the aerodromes specified in Schedule 4 without prior consent from the Civil Aviation Authority or stated Airport Authority.

3. Apparatus

3.1. The Licensee shall ensure that:

- a) The wireless telegraphy apparatus comprised in the Station(s) ("the Apparatus") is so designed, constructed, maintained and operated, that its use does not cause any undue interference to other users of the spectrum;
- b) The apparatus complies with (and is maintained in accordance with) the relevant performance specification(s) published by the operator(s) of the Geostationary or Non-Geostationary Satellite(s);
- c) The earth stations operating with Non-Geostationary Satellites shall ensure compliance with the equivalent power flux-density limitations specified in Article 22 of the ITU Radio Regulations; and
- d) The apparatus used for transmission complies with the Radio Equipment Directive and the appropriate UK National Interface Requirements.

4. Additional conditions for mobile operation

- a) The Radio Equipment shall be established or installed so that transmissions from the Radio Equipment may only be made when the Radio Equipment's operation is enabled by the crew of the vehicle, aircraft, vessel or train upon which it is mounted, and under the operational control of the Network Control Facility. The Radio Equipment shall provide the crew with a means immediately to terminate transmissions;
- b) Where an aircraft or vessel is registered in the United Kingdom, Channel Islands or the Isle of Man, the Licensee shall ensure that all Radio Equipment on board that aircraft is endorsed by either a separate licence or exemption under the Wireless Telegraphy Act 2006;
- c) Transmissions from the Radio Equipment shall automatically be terminated on loss or significant degradation of the downlink signal from the relevant Satellite;
- d) For operation with Geostationary Satellites, the Radio Equipment shall employ a stabilised platform with the ability to maintain a pointing accuracy +/-0.2 degrees towards the relevant Geostationary Satellite throughout transmissions; and
- e) For operation with Geostationary Satellites, the maximum EIRP at angles greater than or equal to 2.5 degrees from the antenna main beam axis shall not exceed 20 dBW/40 kHz from any individual station.

5. National and international obligations

- a) The relevant satellite data shall have been submitted to ITU in accordance with established ITU procedures; and
- b) All transmissions from the Radio Equipment must be terminated prior to any change of location; unless the apparatus used for transmission is designed for mobile operation and incorporates a stabilised platform or is operating under a specific exemption authorised by Ofcom.

6. Requirements specific to Satellite (Earth Station Network) Licences

- a) The Licensee shall keep a record of the operational characteristics of all terminals in the network, including the locations of fixed installations or, for mobile operation, details of the vehicles, aircraft, vessels or trains on which the terminals are installed and the associated route or defined area of operation, which Ofcom may wish to have access to for enforcement purposes;
- b) The Radio Equipment shall implement independent local control and monitoring functions at the terminal, and be authorised, supervised and administered by a Network Control and Monitoring centre;
- c) The Licensee shall have the facility to disable individual terminal transmission; and
- d) For satellite networks in MESH configuration, the network operator must nominate and notify Ofcom of those earth station(s) located in the UK which have independent centralised control and monitoring functionality and possess the capability to suppress transmissions from any earth station within the network. Earth stations that are capable of dynamic assignment as point-to-multipoint and point-to-point configuration may only be licensed as permanent earth stations.

7. Additional conditions for operation with Non-Geostationary Satellites

7.1. The radio frequencies authorised by this Licence must be used in common with other non-GSO satellite systems authorised under wireless telegraphy licences granted by Ofcom. The names of these licensees shall be notified by Ofcom to the Licensee from time to time, and together with the Licensee are described as the “NGSO Licensees”.

7.2. The Licensee shall cooperate with all NGSO Licensees such that each satellite system (comprising the satellites, earth stations and user terminals) can co-exist and operate within the United Kingdom without causing harmful radio interference to each other, such that network services can be provided to end users.

7.3. In the event that –

- a) one (or more than one) of the NGSO Licensees suffers a material and recurring (or ongoing) degradation of services to its users at a specific region or location in the United Kingdom; and

- b) the degradation of services is resulting from radio transmissions from the earth stations, the satellite or any other part of the satellite system operated by any of the NGSO Licensees, including the Licensee;

Ofcom may by notice instruct the Licensee to cease or change the use of particular equipment or particular radio frequencies which are authorised under a wireless telegraphy licence (including but not limited to radio frequencies authorised under this Licence) and are used by any part of the satellite system.

7.4. Any such cessation or change must be for the purposes of ensuring that such interference is avoided and the degradation of services to users at the particular regions or locations is resolved.

7.5. Following receipt of such notice, for such period of time as may be specified in the notice, the Licensee may only operate in accordance with the terms and conditions of the notice.

8. Interpretation

8.1. In this and subsequent schedule(s):

- a) "Earth Station" means a radio transmitter located on the surface of the earth or mounted on a vehicle, aircraft, vessel or train and intended for communication with one or more satellites;
- b) "Geostationary Satellite" means a satellite in geostationary orbit which remains approximately in a fixed position relative to a position on the surface of the earth;
- c) "Non-Geostationary Satellite" means a satellite that does not remain fixed relative to a position on the surface of the earth; and
- d) "IR" means the United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 8 of the Radio Equipment Directive (Directive 2014/53/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available of radio equipment on the market (known as the Radio Equipment Directive)).

Notes

1. This Licence does not remove any other obligations that the Licensee may have in relation to satellite filings made under the ITU Radio Regulations.
2. This Licence does not affect the requirement, when necessary, to obtain licences or authorisations under other Acts, such as the Broadcasting Act.
3. Some terminal installations require Local Authority Planning Approval. Advice should be sought from the Department for Business, Enterprise and Regulatory Reform and the appropriate Local Authority planning department.
4. The Licensee must apply for a variation of the Licence from Ofcom before making any changes which may contravene the conditions of the Licence.

5. Technical terms used in clause 2 shall have the meanings assigned to them in the ITU Radio Regulations.
6. For Radio Equipment installed on aircraft, licensees are advised that they must comply with Civil Aviation Authority (CAA) airworthiness requirements and regulations.
7. Further information, in respect of airworthiness requirements and certification requirements before installation, can be obtained by contacting the Civil Aviation Authority (CAA):

Civil Aviation Authority

CAA House
45-59 Kingsway
London
WC2B 6TE

Tel: 020 7379 7311

<http://www.caa.co.uk>

SCHEDULE 2

Licence No	<Lic No>	Licence version date	<Date>	Payment interval	<1 Year>
-------------------	----------	-----------------------------	--------	-------------------------	----------

Earth Station Network Name	Emergency Telephone Number (24 hours)
<Network_name>	<Emergency_telephone>

Network Type	Satellite Type	Satellite / Satellite Network Name	Geostationary Orbital Longitude (degrees)
<Network_type>	<Geostationary/Non-Geostationary>	<Sat_name>	<Orbit_long>

Frequency band
14.0 – 14.25 GHz 27.5 – 27.8185 GHz 28.4545 – 28.8265 GHz 29.4625 – 30 GHz (GSO) 29.5 – 30 GHz (NGSO)

Operations are subject to the provision of Article 4.4 of the ITU Radio Regulations (non-interference basis to users of this spectrum) prior to international coordination.

SCHEDULE 3

Restrictions on equipment to be located within 7 km of the following National Grid References apply - see Schedule 1, Sections 2 h) and i) for further details.

SE 20900 56100

SS 20500 12600

SCHEDULE 4

Permission to operate equipment subject to this Licence from any location within the perimeter fence of the aerodromes listed below must be obtained from either the CAA or the Airport Authority.

CAA Contact: 0207 453 6531

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
Aberdeen / Dyce	Aberdeen Airport	AB21 7DU	01224 723714	UK	387997	812609	Duty Tels Officer
Alderney	Alderney Airport	GY9 3AJ	01481 822851	CI	556723	5506468	Senior Air Traffic Controller
Belfast Aldergrove	Belfast International Airport	BT29 4AB	028 9448 4281	NI	315195	380283	Duty Air Traffic Engineer
Belfast City	Belfast City Airport	BT3 9JH	028 9045 4871	NI	337483	376510	ATC Supervisor
Benbecula	Benbecula Aerodrome	HS7 5LA	01870 602051	UK	78483	855733	Senior Air Traffic Controller
Biggin Hill	Biggin Hill Airport	TN16 3BN	01959 574677	UK	541691	161064	ATS Manager
Birmingham	Birmingham International Airport	B26 3QJ	0121 780 0922	UK	417220	284022	Duty Engineering Officer
Blackpool	Blackpool Airport	FY4 2QY	01253 343434	UK	332307	431071	Senior Telecommunications Officer
Bournemouth	Bournemouth International Airport	BH23 6SE	01202 364150	UK	411201	97844	ATS Manager
Bristol	Bristol Airport	BS48 3DY	08701 212747	UK	350055	165098	Air Traffic Engineering Manager
Cambridge	Cambridge Airport	CB5 8RX	01223 293737	UK	548723	258544	Senior Air Traffic Controller
Cardiff	Cardiff International Airport	CF62 3BD	01446 712562	UK	306643	167265	Duty Engineering Officer

Annexes 1-6

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
Carlisle	Carlisle Airport	CA6 4NW	01228 573629	UK	348265	560609	Senior Telecommunications Officer
Coventry	Coventry Airport	CV8 3AZ	02476 308638	UK	435519	274761	Senior Air Traffic Engineer
Cranfield	Cranfield Aerodrome	MK43 0AL	01234 754761	UK	494909	242446	Manager ATS
Dundee	Dundee Airport	DD2 1UH	01382 643242	UK	336868	729382	Senior Air Traffic Controller
Doncaster/Sheffield	Robin Hood Airport	DN9 3RH	01302 624870	UK	46603	39807	ATC Manager
East Midlands	East Midlands Airport	DE74 2SA	01332 852910	UK	445367	326168	Duty Engineering Officer
Edinburgh	Edinburgh Airport	EH12 9DN	0131 317 7638	UK	314389	673842	Duty Air Traffic Engineer
Exeter	Exeter Airport	EX5 2BD	01392 367433	UK	300326	93702	Senior Air Traffic Controller
Farnborough	Farnborough Airport	GU14 6XA	01252 526015	UK	485452	153678	Senior Air Traffic Controller
Filton	Filton Aerodrome	BS99 7AR	0117 969 9094	UK	359103	180229	Senior Air Traffic Controller
Glasgow	NATS, Control Tower	PA3 2SG	0141 840 8029	UK	247869	666993	Manager Engineering
Gloucestershire	Gloucestershire Aerodrome	GL51 6SR	01452 857700	UK	388598	221747	Duty Aerodrome Controller
Guernsey	Guernsey Airport	GY8 0DJ	01481 237766	CI	528960	5476102	Senior Air Traffic Controller
Hawarden	Hawarden Airport	CH4 0DR	01244 522012	UK	334748	364998	Senior Air Traffic Controller
Humberside	Humberside Airport	DN39 6YH	01652 682022	UK	509295	409914	Air Traffic Manager
Inverness	Inverness Airport	IV2 7JB	01667 464293	UK	277380	851836	ATC Inverness

Annexes 1-6

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
Isle of Man	Isle of Man Airport	IM9 2AS	01624 821600	UK	228463	468452	Senior Air Traffic Engineer
Jersey	Jersey Airport	JE1 1BW	01534 492226	CI	558699	5451100	Senior Air Traffic Controller
Kirkwall	Kirkwall Airport	KW15 1TH	01856 886205	UK	348020	1008196	Senior Air Traffic Controller
Land's End / St Just	Land's End Aerodrome	TR19 7RL	01736 788944	UK	137630	28983	Senior Air Traffic Controller
Leeds Bradford	Leeds Bradford International Airport	LS19 7TU	0113 391 3277	UK	422418	441129	Duty Air Traffic Engineer
Liverpool	Liverpool Airport Plc	L24 1YD	0151 288 4300	UK	343507	382196	Senior Air Traffic Controller
London City	London City Airport	E16 2PX	020 7646 0205	UK	542674	180487	Duty Air Traffic Engineer
London Gatwick	London (Gatwick) Airport	RH6 0NP	01293 601060	UK	526676	140318	Duty Air Traffic Engineer
London Luton	London Luton Airport	LU2 9LY	01582 395029	UK	512422	220804	Duty Air Traffic Engineer
London Stansted	London Stansted Airport	CM24 1QW	01279 669316	UK	553916	223081	Duty Air Traffic Engineer
Londonderry /Eglinton	City of Derry Airport	BT47 3PY	028 7181 1099	NI	253681	422039	Senior Air Traffic Engineer
Manchester	Manchester Airport	M90 1QX	0161 499 5025	UK	381796	384132	Duty Air Traffic Engineer
Manchester Woodford	Manchester Woodford	SK7 1QR	0161 439 3383	UK	390174	382355	Senior Air Traffic Controller
Manston	Kent International Airport	CT12 5BP	01843 825063	UK	633140	165662	Senior Air Traffic Controller
Newcastle	Newcastle Airport	NE13 8BZ	0191 214 3244	UK	419802	571483	Senior Air Traffic Controller

Annexes 1-6

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
Northolt	RAF Northolt	HA4 6NG	020 8833 8228	UK	509755	184987	Air Traffic Supervisor
Norwich	Norwich Airport	NR6 6JA	01603 420645	UK	622014	313753	Tels/Engineering
Oxford/ Kidlington	Oxford Airport	OX5 1RA	01865 844272	UK	446949	215594	Senior Air Traffic Controller
Pembrey	Pembrey Airport	SA16 0HZ	01554 891534	UK	240360	204220	Senior Air Traffic Controller
Plymouth	Plymouth City Airport	PL6 8BW	01752 515341	UK	250511	60229	Senior Air Traffic Controller
Prestwick	Glasgow Prestwick International Airport	KA9 2PL	01292 511107	UK	236746	626815	Senior Air Traffic Controller
Redhill	Terminal Building	RH1 5YP	01737 823377	UK	530105	147698	Senior Air Traffic Controller
Scatsta	Scatsta Aerodrome	ZE2 9QP	01806 242791	UK	438844	1172284	Senior Air Traffic Controller
Scilly Isles / St Marys	St Mary's Airport	TR21 0NG	01720 422677	UK	92020	10300	Senior Air Traffic Controller
Shoreham	Shoreham Airport	BN4 5FJ	01273 467377	UK	519999	105406	Senior Air Traffic Controller
Southampton	Southampton Airport	SO18 2NL	023 8062 7113	UK	445278	116962	Duty Air Traffic Engineer
Southend	London Southend Airport	SS2 6YF	01702 608120	UK	586898	189290	Senior Air Traffic Controller
Stornoway	Stornoway Aerodrome	HS2 0BN	01851 707415	UK	145851	933141	Senior Air Traffic Controller
Sumburgh	Sumburgh Airport	ZE3 9JP	01950 460173	UK	439533	1110613	Senior Air Traffic Controller
Swansea	Swansea Aerodrome	SA2 7JU	01792 204063	UK	256904	191635	Senior Air Traffic Controller
Teesside	Teesside International Airport Ltd	DL2 1LU	01325 332811	UK	437041	512801	Senior Air Traffic Controller

Annexes 1-6

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
Warton	British Aerospace	PR4 1AX	01772 852374	UK	341805	427980	Senior Air Traffic Controller
Wick	Wick Aerodrome	KW1 4QP	01955 602215	UK	336317	952799	Senior Air Traffic Controller
Wolverhampton	Wolverhampton Aerodrome	DY7 5DY	01384 221378	UK	382473	291103	Senior Air Traffic Controller
Wycombe Air Park / Booker	Wycombe Air Park	SL7 3DP	01494 529261	UK	482630	190993	Senior Air Traffic Controller
Yeovil / Westland	Yeovil Aerodrome	BA20 2YB	01935 475222	UK	353823	115831	Senior Air Traffic Controller

A5. NGSO gateway licence

Wireless Telegraphy Act 2006

Satellite (Non-Geostationary Earth Station)

Sector/class/product	<Product>
Licence number	<Lic_No>
Licensee	<Lic_Name>
Licensee address	<Address>
Trading as	<Tradename>
Licence first issue date	<Issue_Date>
Licence version date	<Date>
Payment interval	<Year>

1. This Licence is issued by the Office of Communications (“Ofcom”) on <Date> and replaces any previous authority granted in respect of the service subject to this Licence by Ofcom or by the Secretary of State.
2. This Licence authorises <Lic_Name> (“the Licensee”) to establish, install and/or use radio transmitting and/or receiving stations and/or radio apparatus as described in the schedule(s) (hereinafter together called “the Radio Equipment”) subject to the terms set out below and subject to the terms of the General Licence Conditions booklet (Version OfW 597).

ISSUED BY OFCOM

Satellite (Non-Geostationary Earth Station)
SCHEDULE 1 TO LICENCE NUMBER <Lic_No>
TERMS, PROVISIONS AND LIMITATIONS COVERED BY THIS LICENCE

This schedule forms part of Licence <Lic_No>, issued to <Lic_Name>, the Licensee on <Issue_Date>, and describes the terms and equipment specifications covered by this Licence.

1. The Licensee may establish and use:

1.1 A Permanent sending and receiving Earth Station ("the Station") at the location specified in the attached schedule for the purpose of providing Wireless Telegraphy links between the Station and Non-Geostationary Satellite(s).

2. Limitations on use

2.1 The Stations shall use only:

- a) the classes of emission specified in the Emission Code column of the attached schedule;
- b) the frequencies specified in the Transmit Frequency and Receive Frequency columns of the schedule;
- c) a power not exceeding that specified in the Antenna I/P Power column of the schedule;
- d) the antenna type specified in the Antenna Type column of the schedule;
- e) a power density not exceeding that specified in the Spectral Power Density column of the schedule; and
- f) the Station shall be operated only from the location specified on the schedule.

3. Apparatus

3.1 The Licensee shall ensure that:

- a) the wireless telegraphy apparatus comprised in the station(s) ("the Apparatus") is so designed constructed, maintained and operated, that it does not cause any undue interference to other users of the spectrum;
- b) the Apparatus complies with (and is maintained in accordance with) the relevant performance specification(s) published by the operator of the Satellite;
- c) the earth station antenna shall not be employed for transmission at elevation of less than 3 degrees measured from the horizontal plane to the direction of maximum radiation as specified in Article 21.14 of the ITU Radio Regulations;
- d) the earth stations operating with non-geostationary satellites shall ensure compliance with the equivalent power flux-density limitations specified in Article 22 of the ITU Radio Regulations;

- e) the component of effective isotropic radiated power directed towards the horizon and the minimum elevation angle above the horizontal must comply with ITU Radio Regulations and not exceed those limits specified in Articles 21.8 – 21.15 of the ITU Radio Regulations;
- f) in the band 13.75 – 14 GHz, earth stations with an antenna diameter of less than 4.5 m operate in compliance with the pfd limits in ITU Radio Regulations 5.502, that the e.i.r.p. of any emission from an earth station in the fixed satellite service does not exceed 85 dBW and that the e.i.r.p. density of emissions in the band 13.77 – 13.78 GHz complies with ITU Radio Regulations RR 5.503;
- g) use of the band 29.1 – 29.5 GHz shall be in compliance with ITU Radio Regulations 5.535A;
- h) the apparatus used for transmission complies with the Radio Equipment Directive (Directive 2014/53/EU) and all appropriate National Interface Requirements (IR) for Satellite Earth Stations in force within the UK; and
- i) the Antenna Radiation Pattern Envelope meets the minimum performance specified by the operator of the satellite.

3.2 Where appropriate, Ofcom may require that the Licensee provide additional screening at the installation as a condition of the Licence.

4. National and international obligations

- a) the earth station must undergo national coordination and site clearance for operation at the specified location;
- b) the relevant satellite data shall have been submitted to ITU in accordance with established ITU procedures;
- c) all transmissions in the Fixed-Satellite Service must be terminated prior to any change of location; unless operating under a specific exemption authorised by Ofcom;
- d) the Licensee shall comply with any notice given by Ofcom under section 9A of the Wireless Telegraphy Act 2006 requiring the Licensee to cease or suspend the uplinking by means of the licensed apparatus of any service specified in such notice by such date as may be specified.
- e) the Licensee shall provide such information as Ofcom may request by notice in writing for the purpose of determining whether section 9A of the Wireless Telegraphy Act 2006 applies in relation to a service for which the Licensee provides uplink facilities using the licensed apparatus or for any purpose connected with the giving of a notice by Ofcom under section 9A of the Act.

5. Additional conditions

5.1 The radio frequencies authorised by this Licence must be used in common with other non-GSO satellite systems authorised under wireless telegraphy licences granted by

Ofcom. The names of these licensees shall be notified by Ofcom to the Licensee from time to time, and together with the Licensee are described as the “NGSO Licensees”.

5.2 The radio frequencies authorised by this Licence must only be used to communicate with a satellite system which has transmissions authorised under a Satellite (Earth Station Network) wireless telegraphy licence granted by Ofcom.

5.3 In the event that –

- a) one (or more than one) of the NGSO Licensees suffers a material and recurring (or ongoing) degradation of services to its users at a specific region or location in the United Kingdom; and
- b) the degradation of services is resulting from radio transmissions from the earth stations operated by the Licensee;

Ofcom may by notice instruct the Licensee to cease or change the use of particular equipment or particular radio frequencies which are authorised under this Licence.

5.4 Any such cessation or change must be for the purposes of ensuring that such interference is avoided and the degradation of services to users at the particular regions or locations is resolved.

5.5 Following receipt of such notice, for such period of time as may be specified in the notice, the Licensee may only operate in accordance with the terms and conditions of the notice.

5.6 The Licensee must establish, install and use the Radio Equipment to commence regular wireless telegraphy transmissions in accordance with the provisions of this Licence within twelve months of the date that this Licence is issued, and maintain such transmissions thereafter.

6. Interpretation

6.1 In this and subsequent schedule(s):

- a) “earth station” means a radio transmitter located on the surface of the earth and intended for communication with one or more satellites;
- b) “Non-Geostationary Satellite” means a satellite that does not remain fixed relative to a position on the surface of the earth; and
- c) “uplink” and any cognate expression refers to a transmission in the Earth-to-space direction

Notes

1. This Licence does not remove any other obligations that the Licensee may have in relation to satellite filings made under the ITU Radio Regulations.
2. This Licence does not affect the requirement, where necessary, to obtain licences or authorisations under other Acts. Some satellite television or radio broadcasting services also require licences under the Broadcasting Act 1990, and some installations require Local Authority Planning Approval.

3. Advice can be sought from Ofcom using the contact details on page 1 of this Licence and the appropriate Local Authority planning department.
4. The Licensee must apply for a variation of the Licence from Ofcom before making any changes which may contravene the Licence.
5. Technical terms used in clause 2 shall have the meanings assigned to them in the ITU Radio Regulations.

SCHEDULE 2

Licence No	<Lic No>	Licence version date	<Date>	Payment interval	<1 Year>
-------------------	----------	-----------------------------	--------	-------------------------	----------

Licensing Centre Point	<LCP NGR>
-------------------------------	-----------

Earth Station Deployment	Earth Station Name	Earth Station NGR
<ES Deploy No>	<ES Name>	<ES NGR>

			Transmit		Receive		
Antenna Centre Height AGL (m)	Antenna Type	Dish Size (m)	Tx Gain (dBi)	Tx Beamwidth (deg)	Rx Gain (dBi)	Rx Beamwidth (deg)	System Noise temperature (K)
<antenna height AGL>	<antenna type>	<dish size>	<tx gain>	<tx beamwidth>	<rx gain>	<rx beamwidth>	<Syst noise temp>

Satellite Name	ES Azimuth from (deg)	ES Azimuth to (deg)	ES minimum Elevation (deg)	ES maximum Elevation (deg)
<sat name>	<es azimuth from>	<es azimuth to>	<es elevation min>	<es elevation max>

Transmit Frequency	Receive Frequency	Associated Authorised Bandwidth (MHz)	Associated Emissions
<tx-1>		<bandwidth>	<A>
<tx-2>		<bandwidth>	
	<rx-1>	<bandwidth>	<C>

	<rx-2>	<bandwidth>	<D>
--	--------	-------------	-----

Emission reference code	Emission Type	Emission Code	Polarisation	Antenna I/P Power (dBW)	Spectral Power Density (dBW/MHz)
A	<em type>	<em code>	<pol>	<antenna IP power>	<spectral power dens>
B	<em type>	<em code>	<pol>	<antenna IP power>	<spectral power dens>
C	<em type>	<em code>	<pol>	<antenna IP power>	<spectral power dens>
D	<em type>	<em code>	<pol>	<antenna IP power>	<spectral power dens>

A6. Wireless Telegraphy Licence Conditions Booklet OfW 597

Business Radio, Fixed Link, Maritime and Satellite licence classes above 10Watts E.I.R.P. transmit power

Publication date: 18 May 2021

Introduction

Each Wireless Telegraphy licence issued by the Office of Communications ("Ofcom") under section 8 of the Wireless Telegraphy Act 2006 ("the Act") authorises the licensee to establish and use stations or install or use apparatus for wireless telegraphy, subject to the terms, provisions and limitations of that licence.

The terms contained in this General Licence Conditions Booklet (the "Booklet") are incorporated into and form part of the terms, provisions and limitations of each wireless telegraphy licence to which this Booklet applies. (Each such wireless telegraphy licence is referred to as "the Licence".)

This Booklet applies to the following licences:

Business Radio	Maritime	Fixed	Satellite
Business Radio (Area Defined)	Automatic Identification Systems (AIS)	Point to Point Fixed Links	Satellite (Earth Station Network)
Business Radio (GSM-R)	Coastal Station Radio (International)	Scanning Telemetry	Satellite (Earth Station) (Non-Fixed Satellite Service)
Business Radio (Police & Fire)	Coastal Station Radio (International) Area Defined		Satellite (Earth Station) (Non-Geostationary)
Business Radio (Public Safety Radio (Emergency Services))	Coastal Station Radio (Marina)		Satellite (Permanent Earth Station)
Business Radio (Suppliers light)	Coastal Station Radio (Search and Rescue)		Satellite (Transportable Earth Station)
	Coastal Station Radio (UK)		
	Coastal Station Radio (UK) Area Defined		
	Differential Global Position System (DGPS)		
	Maritime Navigational Aids and Radar		
	Maritime Radio (Suppliers and Demonstration)		

General licence conditions

Condition 1 - Licence Term, Variation and Revocation

1. The Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee.
 2. Pursuant to schedule 1 paragraph 8 of the Act Ofcom may not revoke this Licence under schedule 1 paragraph 6 except:
 - a) at the request of, or with the consent of, the Licensee; b) if there has been a breach of any of the conditions of the Licence;
 - c) if, in connection with the transfer or proposed transfer of rights and obligations arising by virtue of the Licence, there has been a breach of any provision of regulations made by Ofcom under the powers conferred by section 30 (1) and (3) of the Act¹;
 - d) in accordance with schedule 1 paragraph 8(5) of the Act;
 - e) 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; or
 - f) for reasons related to the management of the radio spectrum, provided that in such case the power to revoke may only be exercised after five (5) years' notice is given in writing to the Licensee.
3. Where Ofcom exercise their power to revoke or vary the Licence in accordance with schedule 1 paragraph 6 of the Act, the Licensee shall be notified in writing or by a general notice. Any general notices will be posted on the Ofcom website².

Condition 2 – Changes

1. The Licence may not be transferred³.
2. The Licensee must give immediate notice to Ofcom in writing of any change to the Licensee's name and address from that recorded on the Licence

Condition 3 - Licence Fee

1. The Licensee shall pay to Ofcom the relevant sums as provided in section 12 of the Act and the regulations made thereunder:
 - i) on or before the date of issue of the Licence; and

¹ These are regulations on spectrum trading.

² <https://www.ofcom.org.uk/>

³ However, rights and obligations arising by virtue of certain wireless telegraphy licences may be transferred in accordance with regulations made by Ofcom under powers conferred by section 30 of the Act. See Ofcom's website for the latest position on which licences are subject to spectrum trading.

- ii) on or before the payment date shown on the Licence for subsequent payments or such other date or dates as shall be notified in writing to the Licensee, in accordance with those regulations and any relevant terms, provisions and limitations of the Licence.

Condition 4 - Radio Equipment Use

1. The Licensee must ensure that the Radio Equipment relevant to each Licence is constructed, established, installed and used only in accordance with the provisions specified in the individual Licence schedules. Any proposal to amend any detail specified in those schedules must be agreed with Ofcom in advance and implemented only after that Licence has been varied or reissued accordingly.
2. The Licensee must ensure that the Radio Equipment is used only by persons who have been authorised by the Licensee to do so, and that such persons are made aware of, and of the requirement to comply with, the terms of the Licence.
3. The Licensee shall ensure that the establishment, installation, modification or use of the Radio Equipment is carried out in accordance with the provisions set out in condition 7 of this Licence in relation to electromagnetic field (EMF) exposure.

Condition 5 - Access and Inspection

1. The Licensee shall permit any person authorised by Ofcom:
 - i) to have access to the Radio Equipment; and
 - ii) to inspect the Licence and 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 that the Radio Equipment is being used in accordance with the terms of the Licence.

Condition 6 - Modification, Restriction and Closedown

1. 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:
 - i) a breach of the Licence has occurred; and/or
 - ii) the use of the Radio Equipment is causing or contributing to Undue Interference to the authorised use of other radio equipment.
2. Ofcom may require 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 is served on the Licensee or a general notice applicable to holders of a named class of Licence is published.

Condition 7 – Electromagnetic Fields (EMF) Compliance

Sites which are not shared with another licensee

1. The Licensee shall only establish, install, modify or use Relevant Radio Equipment if the total electromagnetic field exposure levels produced by the Licensee's On-Site Radio Equipment do not exceed the basic restrictions⁴ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁵ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

Sites which are shared with another licensee

2. In the case of a shared site where the Shared Site Exemption applies to the Licensee, the Licensee shall comply with paragraph 1 above.
3. In the case of a shared site where the Shared Site Exemption does not apply to the Licensee, the Licensee shall only establish, install, modify or use the Relevant Radio Equipment if:
 - a) the total electromagnetic field exposure levels produced by the Licensee's On-Site Radio Equipment, together with
 - b) the total electromagnetic field exposure levels produced by all other wireless telegraphy stations and wireless telegraphy apparatus operated by another licensee on the same site for which the Licensee can reasonably assume that a Shared Site Exemption does not apply,do not exceed the basic restrictions⁶ in the relevant tables for general public exposure identified in the ICNIRP Guidelines⁷ in any area where a member of the general public is or can be expected to be present when transmissions are taking place.

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 communications.⁸

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

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

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

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

⁸ 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.

Condition 8 - Interpretation

1. In this Booklet and in the Licence:
 - i) 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 of the Act;
 - ii) the expression "Undue Interference" shall have the meaning given by Section 115 of the Act; and
 - iii) "inspect" includes examine and test.
 - iv) "Radio Equipment" means the radio equipment specified in the Licence.
2. In this Booklet:

"dBi" 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.

"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.

"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.

"general public" means any person who is not: (a) the Licensee, owner, operator or installer of the Relevant Radio Equipment; or (b) acting under a contract of employment or otherwise

acting for purposes connected with their trade, business or profession or the performance by them of a public function.⁹

“ICNIRP Guidelines” means the version of the Guidelines published by the International Commission on Non-Ionizing Radiation Protection for limiting exposure to electromagnetic fields which are identified in Ofcom’s “Guidance on EMF Compliance and Enforcement” that is in force at the relevant time.¹⁰

“Licensee’s On-Site Radio Equipment” means the Relevant Radio Equipment and any other wireless telegraphy station(s) and wireless telegraphy apparatus on the same site which transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP.¹¹

“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.

“Shared Site Exemption” means any of the following three situations apply on a shared site in relation to the Licensee’s or another licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus that is authorised to transmit at powers higher than 10 Watts EIRP or 6.1 Watts ERP:

- The first situation is that all of the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus on a shared site do not transmit at a combined total radiated power in any particular direction¹² that is higher than 100 Watts EIRP or 61 Watts ERP.¹³
- The second situation is that the total electromagnetic field exposure levels produced by the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus in any area where a member of the general public is or can be expected to be present when transmissions are taking place is no more than 5% of the basic restrictions or 5% of the

⁹ There is pre-existing health and safety legislation which already requires employers to protect workers from exposure to electromagnetic fields (“EMF”) including the following legislation specifically relating to EMF (as amended from time to time): [The Control of Electromagnetic Fields at Work Regulations 2016](#), [The Control of Electromagnetic Fields at Work Regulations \(Northern Ireland\) 2016](#) and [The Merchant Shipping and Fishing Vessels \(Health and Safety at Work\) \(Electromagnetic Fields\) Regulations 2016](#).

¹⁰ Ofcom’s “Guidance on EMF Compliance and Enforcement” will initially require the Licensee to comply with the ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz), published in: Health Physics 74(4):494-522, dated April 1998 and available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf> (“1998 Guidelines”) or the ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 KHz to 300 GHz), published in: Health Physics 118(5): 483–524; 2020 and available at: <https://www.icnirp.org/cms/upload/publications/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.

¹¹ 10 Watts EIRP is equivalent to 6.1 Watts ERP. In linear units $EIRP (W) = 1.64 \times ERP (W)$; in decibels $EIRP (dB) = ERP (dB) + 2.15$. Ofcom’s “Guidance on EMF Compliance and Enforcement” explains how the Licensee can determine if wireless telegraphy station(s) or wireless telegraphy apparatus “transmits at powers higher than 10 Watts EIRP or 6.1 Watts ERP”.

¹² For the purpose of this situation, the combined total radiated power is a simple sum of the radiated powers (in EIRP or ERP) of all of the licensee’s wireless telegraphy station(s) or wireless telegraphy apparatus on the shared site that transmits signals covering the same or overlapping areas.

¹³ 100 Watts EIRP is equivalent to 61 Watts ERP.

reference levels in the relevant tables for general public exposure identified in the ICNIRP Guidelines.¹⁴

- The third situation is where the licensee’s wireless telegraphy station or wireless telegraphy apparatus has an antenna gain that is equal to or higher than 29 dBi and has a fixed beam.

“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.

“site” means a physical structure, building, vehicle or moving platform.

“wireless telegraphy apparatus” has the meaning given to it in section 117 of the Wireless Telegraphy Act 2006.

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

3. Any schedule to the Licence shall form part of the Licence together with any subsequent schedule which Ofcom may issue as a variation to the Licence.
4. The Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

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