

Wireless Telegraphy Act 2006

Satellite (Earth Station Network)

Sector/class/product	Satellite Services / Light / 308010
Licence number	1309175/2
Licensee	Mangata Edge Ltd
Licensee address	c/o Johnston Carmichael 227 West George St. Glasgow G2 2ND
Licence first issue date	22/03/2023
Licence version date	06/02/2024
Payment interval	1 year

1. This Licence is issued by the Office of Communications (“Ofcom”) on **06 February 2024** 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 **Mangata Edge Ltd** (“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 OfW597).

ISSUED BY OFCOM

**SATELLITE (EARTH STATION NETWORK) LICENCE
SCHEDULE 1 TO LICENCE NUMBER 1309175/2
TERMS, PROVISIONS AND LIMITATIONS COVERED BY THIS LICENCE**

This schedule forms part of Licence **1309175/2**, issued to **Mangata Edge Ltd**, the Licensee on **06 February 2024**, 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. Geographical extent of the licence

2.1 This licence authorises earth stations:

- a) on land (within the UK, Channel Islands or the Isle of Man);
- b) on offshore energy installations which are within the UK territorial sea and also those which are outside UK territorial seas (and the territorial seas of the Channel Islands and the Isle of Man) but within the UK Continental Shelf (as set out in the Civil Jurisdiction (Offshore Activities) Order 1987; and
- c) on any vessel or aircraft (which is within or above the territory on the UK, channel Islands or the Isle of Man or within or above the territorial seas of the UK, the Channel Islands or the Isle of Man)¹.

3. Limitations on use

3.1 The station(s) operating with geostationary satellites shall:

- a) transmit within one or more of the following frequency ranges: 14.0-14.5 GHz, 27.5-27.8185 GHz, 28.4545-28.8265 GHz, 29.4625-30 GHz;
- b) for aeronautical stations, not transmit within the frequency range 14.47-14.5 GHz;
- c) transmit only to the satellite and its associated orbital longitude specified in Schedule 2;

¹ Stations on an aircraft or vessel which is registered in the United Kingdom, Channel Islands and Isle of Man and which is outside those territories and outside their territorial seas are not authorised under this licence but may be separately authorised under wireless telegraphy licences for that individual vessel or aircraft. Radio equipment on foreign vessels and aircraft which are for the time being within the limits of these places [the UK, the Channel Islands or the Isle of Man] and their territorial seas may be exempt for wireless telegraphy licensing see <https://www.legislation.gov.uk/ukSI/1998/2970/made>

- 3.2 Land station(s) (including stations on vehicles and trains), station(s) on offshore installations and maritime station(s) operating with non-geostationary satellites shall:
- d) transmit within one or more of the following frequency ranges: 14.0-14.5 GHz, 27.5-27.8185 GHz, 28.4545-28.8265 GHz, 29.5-30 GHz;
 - e) transmit only to the satellite network specified in Schedule 2;
- 3.3 Aeronautical station(s) operating with non-geostationary satellites shall:
- f) transmit within the frequency range: 14.0-14.47 GHz;
 - g) transmit only to the satellite network specified in Schedule 2;
- 3.4 Additionally:
- h) station(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;
 - i) station(s) that transmit within the frequency range 14.0 - 14.5 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;
 - j) station(s) that transmit with e.i.r.p. greater than 50 dBW and less than 55 dBW ($50 \text{ dBW} < \text{e.i.r.p.} < 55 \text{ dBW}$) in the frequency range 14.0-14.5 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
 - k) 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.
- 3.5 Protection of radio astronomy and fixed links in the 14.25-14.5 GHz band
- l) To protect radio astronomy, a land or maritime station shall not transmit in the frequency range 14.47-14.5 GHz when located within a 175km radius of either of the national grid references below² :
 - Jodrell Bank - focus point of circle is NGR SJ5739392556;
 - Cambridge - focus point of circle is NGR TL5439992385.
 - m) Licensees shall protect fixed links at 14.25-14.5 GHz in accordance with any Notice issued by Ofcom.
- 3.6 Protection of radio astronomy stations operating in the 10.6-10.7 GHz band
- n) For protection of the following six UK radio astronomy stations:
 - Jodrell Bank - NGR (easting) 379817, (Northing) 370806

² Due to UK terrain, the interference areas are not symmetrical around each of the radio astronomy sites. By offsetting the centre of the interference area (away from the site) we can more closely match the interference area which has the overall result of reducing the size of the protection area.

- Cambridge - NGR (Easting) 539423, (Northing) 254028
- Darnhall - NGR (Easting) 364278, (Northing) 362263
- Defford - NGR (Easting) 390201, (Northing) 244700
- Knockin - NGR (Easting) 332854, (Northing) 321877
- Pickmere - NGR (Easting) 370407, (Northing) 376953

- o) Licensees shall manage interference by limiting unwanted emissions³. For non-geostationary orbit systems this includes the suppression of satellite transmissions in the channel immediately adjacent to 10.7 GHz or taking other measures⁴.

3.7 Protection of geostationary satellites and earth stations communicating with geostationary satellites

- p) Non-geostationary satellites and earth stations communicating with non-geostationary satellite(s) shall ensure compliance with the relevant equivalent power flux-density limitations specified in Article 22 of the ITU Radio Regulations in both the Earth-to-space and space-to-Earth directions.

3.8 Protection of fixed links in the 17.7-19.7 GHz band

- q) For non-geostationary systems, licensees shall ensure compliance with the relevant power flux-density limitations in Article 21 of the Radio Regulations in the space-to-Earth direction.
- r) In any case, NGSO satellites operating in the space-to-Earth direction shall not cause undue (or harmful) interference to fixed links, and compliance with the relevant power flux-density limitations referred to in 3.8.q does not release licensees from this obligation.

4. Apparatus

4.1 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); and

³ As stated in ITU-R Recommendations [RA.1513](https://www.itu.int/rec/R-REC-RA.1513) (<https://www.itu.int/rec/R-REC-RA.1513>), interference from any one network should not cause more than 2% data loss to radio astronomy measurements. Data loss occurs when the thresholds given in ITU-R Recommendation [ITU-R RA.769](https://www.itu.int/rec/R-REC-RA.769) (<https://www.itu.int/rec/R-REC-RA.769>) are exceeded.

⁴ See [ECC Report 271](https://docdb.cept.org/download/3422) (<https://docdb.cept.org/download/3422>).

- c) The apparatus used for transmission complies with the Radio Equipment Directive and UK Interface Requirements 2077.

5. 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 to terminate transmissions immediately;
- 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 or vessel 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.

6. 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.

7. 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.

8. Additional conditions for operation with non-geostationary satellites

- 8.1 The radio frequencies authorised by this Licence must be used in common with other non-geostationary 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”.
- 8.2 The Licensee shall cooperate with all NGSO Licensees, such that each satellite system (comprising the satellites, gateway 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.
- 8.3 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.
- 8.4 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.
- 8.5 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.

9. Interpretation

9.1 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 Communications Act (2003).
- 3. Some terminal installations require local authority planning approval.
- 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 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

Tel: 0330 022 1500

[<http://www.caa.co.uk/>](http://www.caa.co.uk/)

SCHEDULE 2

Licence No	1309175/2	Licence version date	06/02/2024	Payment Interval	1 year
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Earth Station Network Name		Emergency Telephone Number (24 Hours)	
Mangata Networks			
Network Type	Satellite Type	Satellite / Satellite Network Name	Geostationary Orbital Longitude (degrees)
Mixed	Non-Geostationary	Mangata Networks	

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 3 i) and j) 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
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

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
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
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

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
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
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 Mary's	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

Aerodrome name	Address	Postcode	Telephone	UK/CI/NI	Easting	Northing	Aerodrome POC
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	DL2 1LU	01325 332811	UK	437041	512801	Senior Air Traffic Controller
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