



PUBLIC NOTICE 2026-2

Consultation on Satellite Spectrum
and Licensing Framework, Including
NGSO Broadband, Direct-to-Device
Services and Satellite Earth Stations

6 JULY 2026

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1. Introduction

Satellite connectivity is becoming an increasingly important component of national communications infrastructure. NGSO satellite systems can support high-speed broadband, resilience during outages, connectivity for remote and maritime areas, emergency communications, and supplementary coverage for mobile networks. At the same time, satellite systems raise important regulatory questions concerning spectrum sharing, harmful interference, international coordination, consumer protection, lawful operation in Anguilla, and the relationship between satellite operators and existing terrestrial licensees.

This consultation document invites stakeholder views on a proposed regulatory framework for the allocation, allotment and assignment of spectrum for satellite services in Anguilla; the establishment of a modular satellite licensing framework; and a draft licence for NGSO satellite providers delivering broadband services to customers using static end-user terminals.

The Commission's objective is to create a clear and forward-looking regime that is based on the following principles: flexible within existing legislative parameters and capable of adapting to new circumstances so that it supports the rapid deployment of satellite connectivity and competition; transparent to stakeholders including sound consultative practices; proportionate to the risks; non-discriminatory among equally placed parties; technologically neutral except where interference avoidance requires technology specific requirements; investment friendly by providing sufficient regulatory certainty; innovation friendly including regulatory innovation by way of self and co-regulation; supportive of public safety; and, one that ensures coexistence with existing terrestrial services and neighbouring jurisdictions.

The Commission seeks evidence-based submissions on the proposed spectrum bands, licensing framework, interference mitigation measures, treatment of direct-to-device D2D and other services, obligations on satellite providers, licence fees and the draft NGSO satellite internet services licence.

Relevant evidence may include such things as technical studies, link-budget analysis, interference modelling, international regulatory comparisons, equipment specifications, consumer-demand evidence, coverage maps, service-level commitments, emergency communications experience, existing spectrum use in Anguilla, and experience from comparable small-island jurisdictions.

The Commission referenced consultations on satellite services in the recent 5G consultation (2026-1). We have decided to combine in this single document a consultation on the provision of internet services by Low Earth Orbit (LEO) satellite providers within the category of Non-Geographic Stationary Orbit (NGSO) satellites along with the wider satellite consultation previously indicated. After this consultation has been completed a consultation on a third mobile and/or fixed wireless access (FWA) operator will commence.

Question 1. Do respondents agree with the Commission's proposed objectives and principles for satellite regulation in Anguilla?

Question 2. Should the Commission prioritise particular satellite use cases? If so, please rank them and provide reasons.

2. Summary of Commission Proposals

The Commission proposes to:

- Establish a modular satellite licensing framework. The proposed framework can work within the existing legislation. Licence documentation would therefore remain structurally consistent with current licences. Future review of the telecommunications legislation and all forms of licence documentation may lead to further changes.
- Permit NGSO broadband using authorised static user terminals¹ in specified shared Ku/Ka bands. This is urgent given emergency use cases.
- Permit Direct-to-Device (D2D)/Supplemental Coverage from Space (SCS)-type services in IMT bands for D2D/IoT/M2M services only through, or with the consent of, the relevant MNO spectrum licensee. This is urgent given emergency use cases.
- Consider 3GPP NTN non-IMT bands for D2D/IoT/M2M subject to public-service and interference obligations. This is a medium term consideration subject to viability and interest.
- Permit gateway and other large earth station type use in selected high-capacity bands subject to technical conditions being met. Timing is subject to demand for backhaul for D2D services under existing MNO licences. Ku and Ka band are the priority. V, E and W bands are forward looking considerations for the medium to long term.
- Apply proportionate fees, type approval, orbital debris and interference-management obligations. Interference prevention requirements would be immediate. Fees would be implemented immediately on licence award for NGSO services to static terminals and would be subsumed within MNO fees for D2D services provided under MNOs' licences and authorisations. Orbital debris requirements should already have been met through the UK's Civil Aviation Authority. Type approval can operate under the existing legislation, but fees might be introduced under changed legislation in the future.

3. The Consultation

Stakeholders, including operators, members of the public, equipment vendors, businesses, public institutions and other relevant organisations are invited to comment on the proposals and supporting questions.

Submissions will be accepted through the following means:

¹ This does not exclude usage on mobile platforms subject to licence conditions.

Email to: **consultations@puc.ai**

Delivery (paper and electronic copy) by hand or by courier to:

Mr. Damien Harrigan
Executive Director
Anguilla Public Utilities Commission
Hansa Building II - Unit 1,
Cosley Drive,
The Valley, Anguilla

Responses must be received by the Commission no later than 3:30 p.m. local time on Friday, 14 August, 2026.

Respondents are requested to provide evidence and reasoning when replying to questions where possible.

4. Advantages of NGSO Satellite Systems

NGSO internet services offer substantial advantages over traditional Geostationary Orbit (GSO) satellite internet services for a small island territory like Anguilla. The primary benefit comes from much lower latency², typically ranging from 20 to 60 milliseconds for LEO services compared to the 600 to 800 ms delays common with GSO systems. This dramatic reduction makes real-time applications like video calls, online gaming, remote work, VoIP, cloud services, and live streaming feel relatively smooth and responsive. By way of comparison, fibre internet services typically have latencies of 10 to 15 ms.³

NGSO services also deliver significantly higher and more consistent data throughput speeds than GSO satellites, with download rates of 50 to 250 Mbps and upload rates of 10 to 30 Mbps being possible.⁴ Capabilities are much more limited on most GSO plans, which typically range from 10 to 50 Mbps and occasionally up to 150 Mbps.⁵

Coverage and reliability are further enhanced by the nature of NGSO constellations, which feature hundreds or thousands of low-orbit satellites passing overhead frequently. That enables near-continuous connectivity. The service typically operates in the Ku band for downlinks to user terminals. Ku band is less susceptible to rain fade than many high-frequency GSO Ka-band offerings, providing better performance, although heavy storms can still affect any satellite system.

Emerging Direct-to-Device (D2D) capability enables ordinary smartphones to connect directly to satellites for messaging, basic data, location sharing, and voice calls, without requiring a dish or other separate antenna. In the Caribbean, such partnerships have already demonstrated value during emergencies, providing SMS, emergency alerts, and limited data access after hurricane Melissa in Jamaica.⁶ For Anguilla, this means improved disaster resilience, better mobile coverage in remote beaches or inland areas and offshore, and the ability to stay connected during outages, all using existing phones rather than specialised equipment.

² The shortest experienced time between click and response.

³ Ookla. (n.d.). Speedtest Global Index. Speedtest by Ookla. Retrieved February 9, 2026, from <https://www.speedtest.net/global-index>

⁴ High Speed Options. (2025, November 25). Satellite internet download & upload speed. <https://www.highspeedoptions.com/resources/insights/satellite-internet-download-upload-speed>

⁵ Ibid.

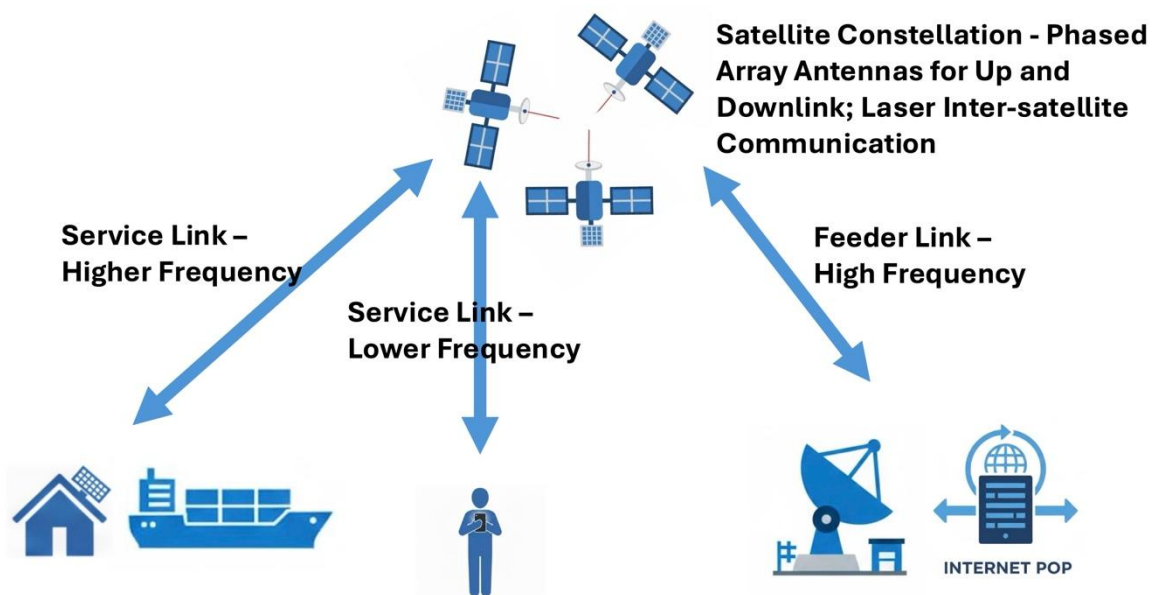
⁶ Liberty Latin America. (2025, October 29). Liberty Latin America working with Starlink Direct to Cell to provide emergency service in aftermath of Hurricane Melissa in Jamaica [Press release]. <https://lla.com/blog/liberty-latin-america-working-starlink-direct-cell-provide-emergency-service-aftermath-hurricane-melissa-jamaica>

5. NGSO System Architecture

NGSO systems, particularly LEO constellations at altitudes of 500-2,000 km, move rapidly relative to the Earth's surface, completing an orbit roughly every 90 minutes. This requires a large number of satellites (hundreds to thousands) working together to ensure continuous coverage, with frequent handovers as satellites pass overhead. Both satellites and end-user terminals employ phased array antennas (flat, electronically steered panels with no moving parts). End-user terminals dynamically track passing satellites. These systems primarily use Ku-band for user service links. Ka-band, E-band (70-86 GHz) and prospectively V-Band (40-75 GHz) are used for feeder/gateway links, enabling much higher throughput and lower latency.⁷ W-band (75-100GHz) is the latest band in which usage has been made possible for feeder/gateway links⁸.

Modern LEO constellations also incorporate optical laser inter-satellite links to route data across the orbiting mesh network, reducing dependence on ground gateways and extending coverage to remote and oceanic regions.

Figure 1: NGSO Satellite Architecture



⁷ Diritto UE. (2025, June 13). On Starlink - National Security. www.dirittoue.info/on-starlink

⁸ Federal Communications Commission. (2026). Authorization and Order: In the Matter of Space Exploration Holdings, LLC Request for Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System (DA 26-36). Space Bureau. <https://docs.fcc.gov/public/attachments/DA-26-36A1.pdf>

6. Connecting User Terminals and other End-User Devices to NGSO Networks

User terminals and end user devices such as smartphones connecting with NGSO satellite networks must comply with ITU standards as contained in the Radio Regulations.

Most modern smartphones can connect to LEO direct-to-cell satellite systems without hardware modifications, provided they support standard LTE bands, have carrier-enabled satellite roaming and run recent iOS/Android versions.⁹

7. Role of the ITU

The ITU's Radiocommunication Bureau (ITU-BR):

- a) is responsible for applying the provisions of the Radio Regulations and agreements between administrations in the same Region;
- b) records and registers frequency assignments and also the orbital characteristics of space networks, and maintains the Master Register; and,
- c) provides advice to the ITU Member States on the rational, efficient, economic and sustainable use without causing harmful interference with respect to the radio-frequency spectrum and satellite orbits and investigates and assists in resolving cases where harmful interference does occur.

8. Role of Ofcom

Ofcom is the UK satellite notifying administration under the ITU procedures for British Overseas Territories (BOTs) such as Anguilla which is not an ITU Member State in its own right. Ofcom consults BoTs for these purposes as relevant. Ofcom may, in consultation with the Anguillan government, also become involved in applications in Anguilla that could result in harmful interference with other jurisdictions. In other respects, Anguilla acts autonomously with respect to satellite service licensing.

9. ITU Frequency Allocation and Coordination

The ITU's roles with respect to the use of frequencies by satellite services are:

- a. Frequency allocations, as referenced in Article 5 of the Radio Regulations;
- b. Coordination (as relevant) or special agreement with other administrations for frequency usage under Article 9 and Article 6 of the Regulations respectively; and
- c. Notification and recording in the Master Register under Article 11 of the Regulations.

⁹ FCC's Supplemental Coverage from Space Report and Order (adopted February 2024, released March 2024): <https://docs.fcc.gov/public/attachments/DOC-400678A1.pdf>.

The main objectives of the Regulations are the following:

- to facilitate equitable access to and rational use of the natural resources of the radio-frequency spectrum and the GSO orbit;
- to ensure the availability and protection from harmful interference of frequencies used for distress and safety purposes;
- to assist in the prevention and resolution of harmful interference between the radio services of different administrations;
- to facilitate the efficient and effective operation of all radiocommunication services; and to provide for, and where necessary regulate, new applications of radiocommunication technology.

Section 4.2 in Article 5 of the Radio Regulations states that:

“Member States undertake that in assigning frequencies to stations which are capable of causing harmful interference to the services rendered by the stations of another country, such assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of these Regulations.”

A station is defined in Article 1.61 as:

“One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.”

Section 4.4 states:

“Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations.”

The Radio Regulations stipulate procedures by which a satellite network's frequency assignments can be registered through its national administration (Ofcom in this case) with the ITU to obtain international recognition. This process informs administrations about the use of frequency assignments and enables them to be considered in frequency planning.

Section 8.1 of the Radio Regulations states that the:

“The international rights and obligations of administrations in respect of their own and other administrations’ frequency assignments shall be derived from the recording of those assignments in the Master International Frequency Register (the Master Register) or from their conformity, where appropriate, with a plan.”

The rights and obligations of administrations concerning orbit and spectrum management, along with the procedures designed to enable radiocommunication in a controlled interference environment, have been established through successive ITU World Radiocommunication Conferences (WRCs).

Two complementary mechanisms have been developed and implemented for the sharing of orbit and spectrum resources:

- Firstly, planned procedures, which guarantee equitable access to orbit/spectrum resources for future use. Spectrum assignments are then pre-registered in the names of specific administrations.
- Secondly, coordination procedures. In this case applications for spectrum assignments are in general, filed on a first-come-first-served basis.

a. Power Limits at the Earth's Surface

Article 21 of the ITU Radio Regulations, entitled “*Terrestrial and space services sharing frequency bands above 1 GHz*”, establishes technical sharing criteria between satellite (space) and terrestrial services. It primarily sets maximum power flux-density (pfd) limits that space stations must respect at the Earth's surface (Section V, with limits varying by frequency band and angle of arrival). These pfd limits are designed to protect terrestrial services such as fixed and mobile from harmful interference caused by satellite downlinks (space-to-Earth). When the pfd from a space station remains below the specified limits, the downlink is generally considered acceptable without requiring additional case-by-case coordination specifically for the protection of terrestrial services (although other coordination obligations may still apply). For satellite uplinks (Earth-to-space), earth station emissions in shared bands must not cause harmful interference to terrestrial services based on both having a PRIMARY allocation in the Radio Regulations. Preventing harmful interference is typically managed through coordination procedures under Article 9 using applicable coordination thresholds.

b. Coordination

The coordination procedure is a required negotiation process between administrations. Its primary objective is to ensure the efficient use of orbit/spectrum resources while maintaining a controlled interference environment that allows satellite networks to operate and meet their actual operational requirements.

The three main steps in the coordination process are:

1. Advance publication information;
2. Request for coordination is sent to the ITU; and
3. Notification.

When applicable, the coordination procedure is used as follows:

- i) GSO networks (in every service and frequency band), as well as to non-GSO networks in certain frequency bands governed by No. 9.11A of the Radio Regulations, both of which are subject to full coordination procedures; and,

- ii) in respect of other non-GSO networks, for which only an advance publication procedure (API) is required.

The general requirements for avoiding interference between NGSO satellite systems and GSO systems is set out in section 22 of the Radio Regulations. Generally, GSO satellites have protection from NGSO satellites. There are specific equivalent power flux-density (EPFD)¹⁰ limits for NGSO satellite downlinks to and from fixed earth station uplinks.

NGSO satellite systems operating in the Fixed-Satellite Service (FSS)¹¹, including those using fixed earth stations and fixed-location user terminals, must comply with the EPFD limits in Article 22 to avoid the need for individual coordination with GSO satellite networks. Specifically, they must ensure that the EPFD_↓ (downlink) and EPFD_↑ (uplink) values remain below the limits specified.

Coordination may still be required under other parts of the regulations. The Table of Frequency Allocations in Article 5 (including its footnotes), Article 9 and the examination findings of the ITU Radiocommunication Bureau (BR), which are published in the BR International Frequency Information Circular (BR IFIC), should be consulted.

Article 22 EPFD limits are principally relevant to specified NGSO FSS and Broadcasting-Satellite Service (BSS) sharing scenarios. D2D services using Mobile Satellite Service (MSS)¹² or terrestrial mobile spectrum raise different coordination and interference issues, which are likely to be addressed primarily through Article 9 coordination, applicable Article 21 limits, national licence conditions, 3GPP NTN standards and any relevant footnotes in the Table of Frequency Allocations.

c. Notification

The notification of a frequency assignment to the ITU Radiocommunication Bureau in accordance with Article 11 of the Radio Regulations constitutes the final regulatory step before the assignment is recorded in the Master International Frequency Register (Master Register).

The main provisions governing the notification of frequency assignments are set out in Article 11 of the Radio Regulations, with certain exceptions applying to specific services or planned assignments.

As provided in sections 11.2 and 11.9 of the Radio Regulations, a frequency assignment

¹⁰ EPFD is defined as the sum of the power flux densities produced at a GSO satellite system receive station on the Earth's surface or in the geostationary orbit, as appropriate, by all the transmit stations within a NGSO satellite system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing in its nominal direction. It takes into account inter alia: transmit power; gain; transmission angles and distances.

¹¹ Note that the reference to fixed in FSS refers to the device or equipment on the Earth and not the satellite itself.

¹² Note that the reference to mobile in MSS refers to the device or equipment on the Earth and not the satellite itself.

to transmitting and/or receiving stations must be notified to the ITU in cases such as the following:

- a. the assignment can cause harmful interference to, or might result in receiving harmful interference from, any station of another administration;
- b. the assignment is intended for international radiocommunications;
- c. the assignment is subject to a world or regional frequency allotment or assignment plan which does not have its own notification procedure;
- d. the assignment is subject to the coordination procedure under Article 9; or
- e. international recognition of the assignment is desired; or
- f. it is a non-conforming assignment (i.e. it does not follow the Table of Frequency Allocations in the Regulations - but in that case it cannot cause interference for others) and if the Member State wishes to have it recorded for information.

In practice, it is safer to assume that all frequency assignments related to space services are subject to notification.

Member States cannot assign to a station any frequency in derogation of either the Table of Frequency Allocations in the ITU's Radio Regulations or other provisions of the Regulations unless particular conditions are met. The station using the frequency assignment must not cause harmful interference to or claim protection from harmful interference caused by a station operating in accordance with the provisions of the ITU Constitution, Convention and Radio Regulations.

d. Satellite Filings

Satellite operators are required to make satellite filings to operate in Anguilla with Ofcom. Documentation can be obtained here:
<https://www.ofcom.org.uk/spectrum/space-and-satellites/satellite-filings>

10. Satellite and Terrestrial Operator Partnerships

Satellite operators and local network operators are forming commercial partnerships whereby the satellite operator provides additional coverage possibilities by means of frequencies assigned to mobile network operators.

As of March 2025, the Global Mobile Suppliers Association (GSA) had identified 143 publicly announced partnerships between operators and satellite vendors across 53 countries and territories. Of these, 79 operators in 54 countries and territories had planned satellite services. 24 operators in 20 countries had launched. See Figure 2.

a. Total Number of Partnerships

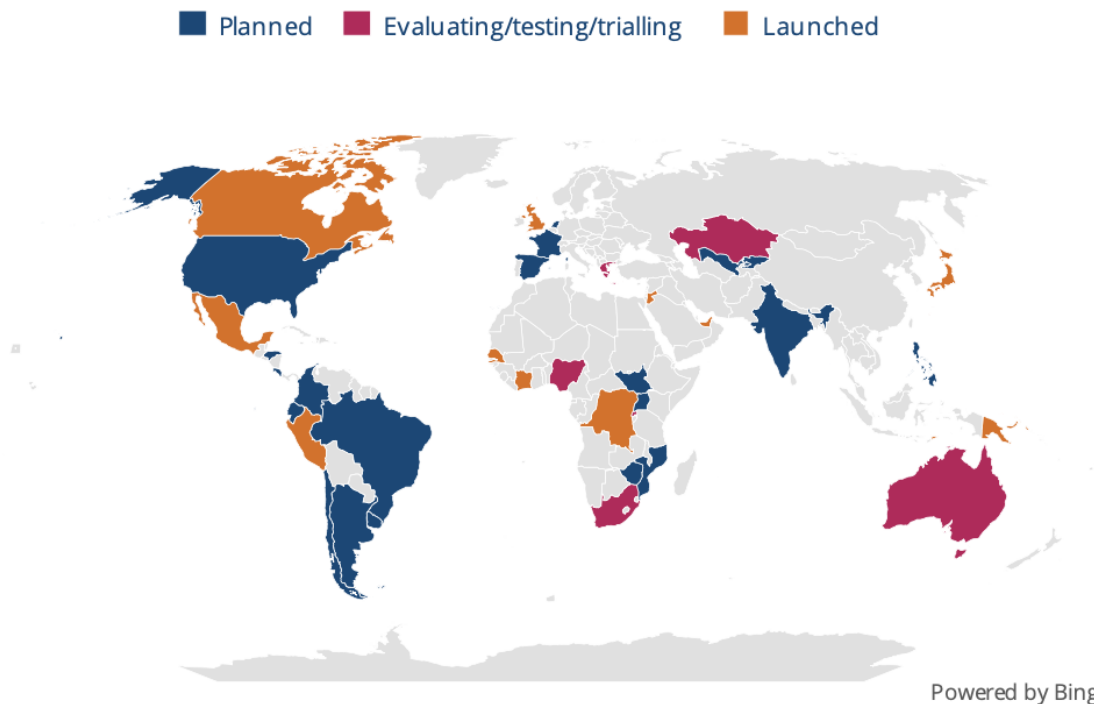


Figure 2: Countries with partnerships for satellite-based rural and enterprise broadband, by status; Source - GSA; March 2025; Non-Terrestrial 5G Networks and Satellite Connectivity

b. Satellite-to-Cellphone Partnerships

As of February 2026, 16 partnerships had launched satellite-to-cellphone services. 25 partnerships were evaluating, testing or trialling the technology, or held licences to do so. A further 53 planned to launch. See Figure 3.

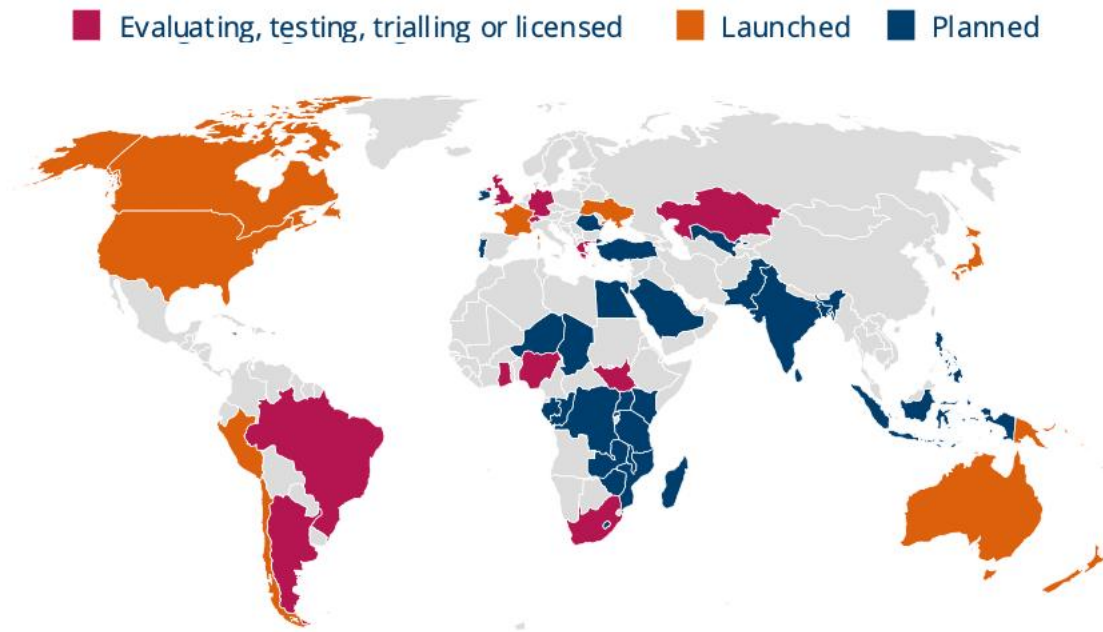


Figure 3: Countries with satellite-to-cellphone partnerships; Source - GSA; February 2026; Non-Terrestrial 5G Networks and Satellite Connectivity

Starlink leads in terms of the number of commercial partnerships undertaken for satellite to cellphone. See Figure 4.

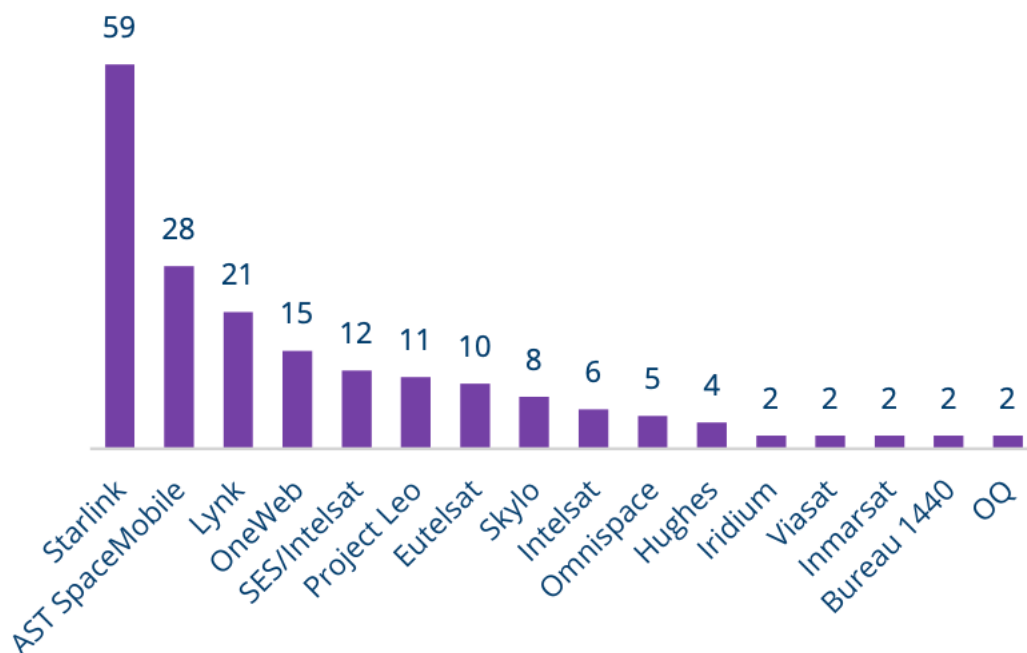


Figure 4: Satellite-to-cellphone partnerships by satellite operator; Source - GSA; February 2026; Non-Terrestrial 5G Networks and Satellite Connectivity

c. IoT and M2M Partnerships

As of March 2025, 4 MNO and satellite operator partnerships had launched an IoT or M2M satellite service. Another nine were planning launches. One partnership was evaluating, testing or trialling. See Figure 5

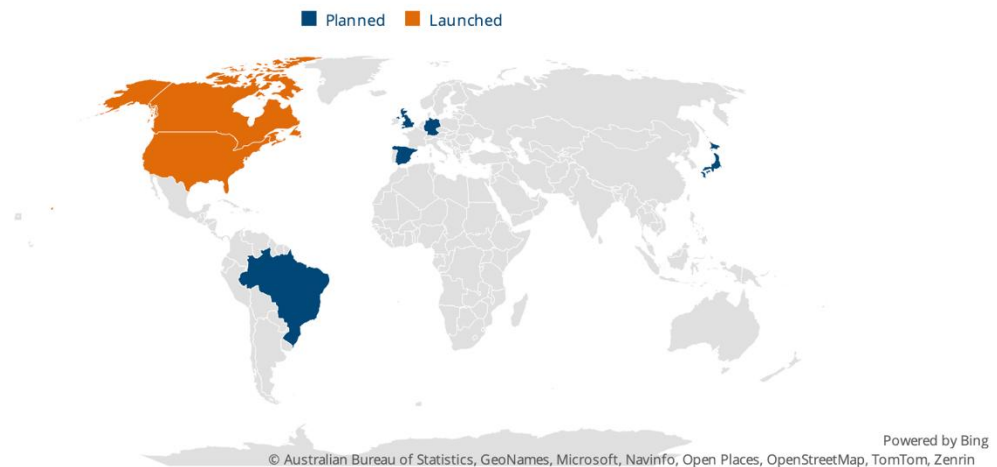


Figure 5: Countries with IoT and M2M satellite-based partnerships; Source - GSA; March 2025; Non-Terrestrial 5G Networks and Satellite Connectivity

Network operators in Anguilla may wish to form similar partnerships with satellite operators. In that light the Commission has proposed in section [17](#) which frequencies belonging to network operators could be used for such purposes.

11. Satellite Spectrum Bands

A wide range of frequencies are used to deliver telecommunications service via satellites as illustrated in Table 1:

Satellite Spectrum Band	Frequency Range	Primary Satellite Use Cases
VHF/UHF (informal low band)	< 1 GHz	Low-data-rate IoT, D2D / Satellite Mobile
L-band	1–2 GHz	Satellite Navigation (GPS/GNSS); D2D / Satellite Mobile (Iridium, Inmarsat, Globalstar, emerging NTN smartphone connectivity)
S-band	2–4 GHz	Weather radar, space operations (e.g., ISS/LEO TT&C); Airplane Connectivity; D2D / Satellite Mobile (emerging for direct-to-smartphone)
C-band	4–8 GHz	Satellite TV & Radio feeds; Maritime Connectivity; Enterprise / Backhaul Connectivity (reliable, low rain fade)
X-band	8–12 GHz	Military / Government (secure comms, radar, reconnaissance)
Ku-band	12–18 GHz	Home Broadband (e.g., end-user links); Enterprise Connectivity; Satellite TV & Radio (DTH); Maritime / Aviation Connectivity
Ka-band	26–40 GHz	High-throughput Home Broadband; Enterprise Connectivity; Backhaul; Maritime / Aviation Connectivity (high capacity, rain fade sensitive)
Q / V / E / W bands	40–110+ GHz	High-capacity Backhaul; Military / Experimental; Emerging NGSO broadband (high attenuation, short range)

Table 1: Sources: 1/ Satellite Spectrum Bands; European Space Agency; 2/ ETSI White Paper No. 9: E-Band and V-Band - Survey on status of worldwide regulation (2015). 3/ Satellite Communications in the V and W Band: Tropospheric Effects (Shelters, 2018). 4/ Ofcom. (2025). Expanding spectrum access for satellite gateways: Consultation on making Q/V band spectrum available.

Higher frequency bands in the Fixed Satellite Service (FSS) bands offer high capacity for broadband, while lower frequency bands in the Mobile-Satellite Service (MSS) provide better propagation for mobile/handheld devices in D2D and the Internet of Things (IoT).

Unlike terrestrial mobile frequency operating bands, satellite frequencies are not typically assigned on a dedicated basis to particular operators. Instead, they are shared and measures are taken to avoid or mitigate interference.

The number of satellite operators using particular bands is illustrated in Table 2. L-band frequencies are most used for voice and data services. Ku and Ka-band are most used for broadband data services. D2D uses S band for relatively modest broadband throughput.

Frequency Band	Number of satellite providers
L-band (1.5 GHz to 1.6 GHz)	4
S-band (2 GHz to 4 GHz)	2
C-band (3.7 GHz to 4.2 GHz)	4
Ku-band (12 GHz to 18 GHz)	8
Ka-band (27 GHz to 40 GHz)	16
Q-band (36 GHz to 46 GHz)	1
V-band (40 GHz to 75 GHz)	2
E-band (60 GHz to 90 GHz)	1
W-band (75 GHz to 110 GHz)	1

Table 2: Device Support for Low Band Frequencies; Source: Non-Terrestrial 5G Networks and Satellite Connectivity; 2025; GSA

12. User Terminals for NGSO Systems in the Fixed Satellite Service (FSS)

NGSO satellite services typically use the Ku or Ka bands to communicate with specialised user terminals in the FSS¹³ provided by the satellite operator.

Phased array user terminals are used typically. They are usually flat, rectangular or square (pizza-box-sized) electronic phased array antennae and consist of hundreds to thousands of small antenna elements in a grid on a flat surface. Those steer beams electronically by adjusting the phase and amplitude of signals to each element rather than mechanically moving the whole unit. That allows such terminals to automatically track fast-moving satellites without any physical motors for beam steering in most modern versions.¹⁴

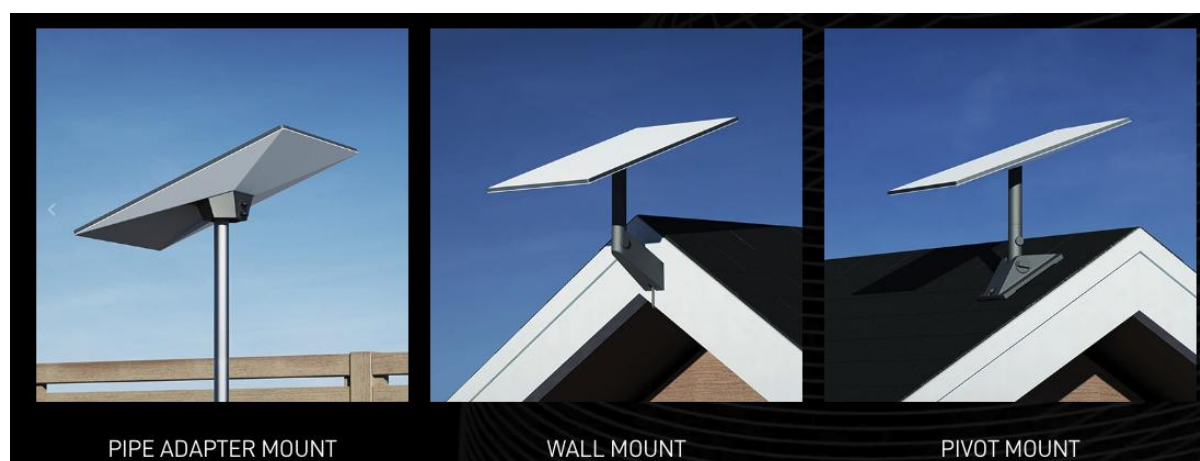


Figure 6: Starlink Standard User Terminals; Source: Starlink.com

¹³ “Fixed” in the term FSS refers to the static nature of the user terminal and does not refer to the satellite movement.

¹⁴ SpaceX. (n.d.). What are the differences between the Starlink Standard and the Starlink Standard Actuated Kits? Starlink Help Center. <https://www.starlink.com/support/article/0dfd853a-c719-74c7-7817-90614c9c82c7>

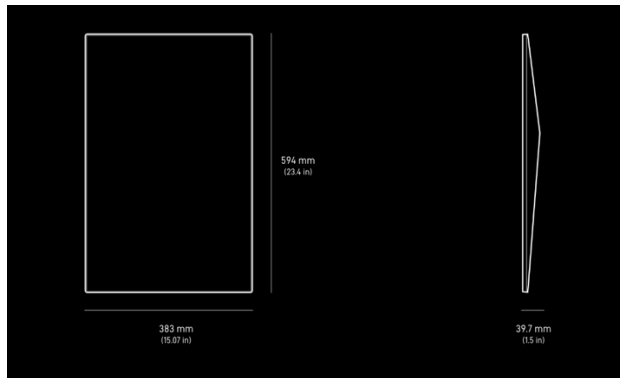


Figure 7: Starlink Standard User Terminal Dimensions; Source: Starlink.com

13. VSATs for GSO Systems in FSS Including ESIMs

Very Small Aperture Terminals (VSATs) are typically associated with parabolic (dish-shaped) antennas and operate using GSO satellites at higher power levels than phased array user terminals. They offer higher gain, better efficiency, and proven reliability in fixed or motion-stabilized setups (e.g., maritime, remote enterprise sites, or government). However, they require mechanical tracking if they are used to follow NGSO satellites. Consequentially, they are a more expensive option.



Figure 8: Intellian v85NX, Ku to Ka-band convertible maritime VSAT antenna system with a 85cm diameter reflector; source: <https://intelliantech.com/en/products/nx-maritime-vsats/v85nx#>

Earth Stations in Motion (ESIMs) can be categorised as VSATs¹⁵ and are designed to operate on moving platforms, such as aircraft, maritime vessels, or land vehicles. ESIMs use advanced stabilised antennas to maintain a continuous, high-speed data link with satellites while travelling.

¹⁵ Formerly VSATs were only associated with static platforms.

14. Gateway Earth Stations/Feeder Links in FSS

Gateway stations act as a *"middleman"*, connecting satellites in space to the Internet on the ground. For GSO satellites, which stay in one fixed spot high above the Earth, a gateway is usually a few giant, unmoving dishes that send and receive huge amounts of data for a whole country. For NGSO systems, the gateway typically consists of several smaller antennas that are constantly tracking fast-moving satellites across the sky and handing off the signal from one satellite to prevent the internet connection dropping. Gateway stations are not required in every jurisdiction, and data may transit between satellites before returning to Earth.

GSO earth stations are generally larger than NGSO earth stations. This is driven primarily by the physics of orbital distance and the resulting signal degradation. While NGSO earth stations operate effectively with antennas of only 1.5 to 3.5 meters due to their proximity to Earth (500 to 2,000 km), GSO satellites orbit at approximately 35,786 km. Because a GSO satellite is much further away, its signal suffers from extreme free-space path loss, requiring GSO teleports to utilise big dishes ranging from 9 to 32 meters to provide a larger aperture for capturing faint radio signals. To overcome this distance, GSO stations also utilize significantly higher transmitter output power.

15. Direct to Device (D2D) Services in MSS and Terrestrial Mobile Bands

D2D services can provide connectivity to mass market mobile devices in areas not covered by terrestrial mobile networks. They can increase coverage, particularly in remote areas, and provide a basic backup service in the event of outages on the terrestrial networks.

D2D technology is primarily enabled by modern smartphones and specialised IoT hardware equipped with chipsets capable of communicating directly with satellite constellations. These devices typically operate within two distinct ITU regulatory frameworks depending on the frequency bands utilized. The first involves the Mobile-Satellite Service (MSS) allocation, such as the L-band or S-band, where devices connect to satellites using spectrum specifically designated for space-based mobile communication.¹⁶ The second approach involves operating within terrestrial mobile (IMT) allocations, typically used for 4G or 5G networks, under a regulatory arrangement where the satellite operator leases spectrum from a terrestrial mobile network operator (MNO). In this scenario, the satellite functions as a *"tower in the sky"*, utilising the terrestrial operator's licenced frequencies to provide coverage in remote areas where ground-based infrastructure is absent.¹⁷ The satellite provider interconnects with the MNO network via the MNO's gateway earth station. This is illustrated in Figure 9.

¹⁶ **3rd Generation Partnership Project (3GPP).** (2022). *Study on Non-Terrestrial Networks (NTN) for User Equipment (UE) supporting direct-to-device communication* (Technical Report TR 38.811).

¹⁷ **Federal Communications Commission.** (2023). *In the Matter of Facilitating Supplemental Coverage from Space* (GN Docket No. 23-65). <https://www.fcc.gov/document/fcc-proposes-framework-facilitating-supplemental-coverage-space-0>

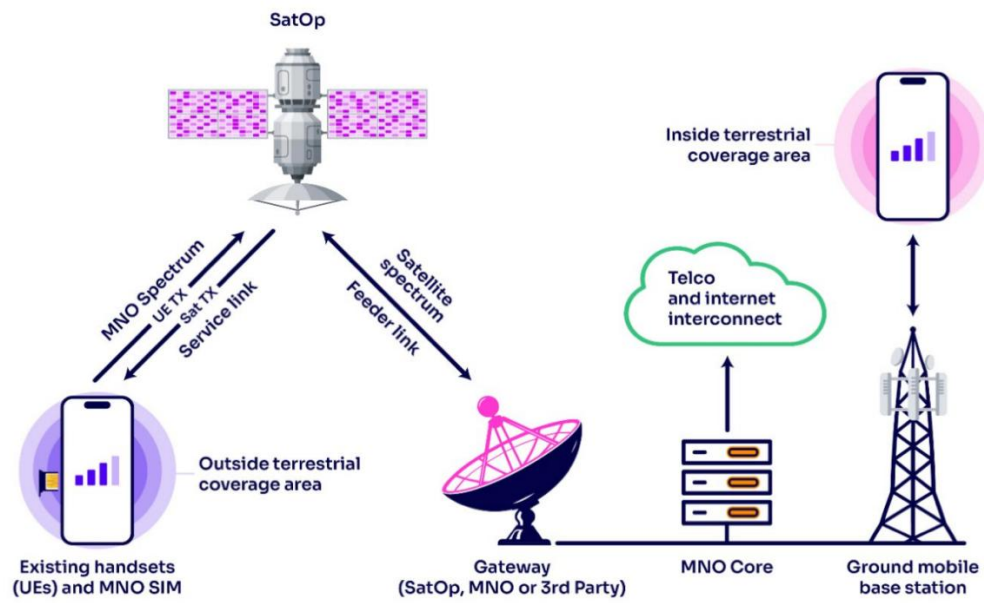


Figure 9: D2D Supplemental Coverage Services for Mobile Networks; source - Ofcom

16. Avoiding and Mitigating Interference by Satellite Systems

To protect mobile networks and terrestrial microwave links from interference by satellite systems, the ITU Radio Regulations set strict power and direction rules for satellite systems.

a. General Protections

First, Power Flux-Density (PFD) limits restrict the strength of the signal hitting the ground from space. This ensures the satellite signal stays at a low enough energy level that it does not interfere with the ground-based equipment used for phone calls or data.

Second, Article 21 limits the power an earth station can send toward the horizon. Because microwave towers transmit signals horizontally, satellite antennas are required to point upward at a minimum angle, usually at least 3 degrees. This keeps the high-power satellite beam from pointing directly at ground-based towers.

Finally, the regulations use frequency allocations to keep different services apart. In areas where frequencies must be shared, operators have to complete a coordination process. This involves calculating potential interference before a station is built. If the math shows that the satellite station will disrupt a mobile network or microwave link, the operator must change the station's location, reduce its power, or add shielding.

b. Additional NGSO Protections

The interference protections for NGSO user terminals involve additional specific rules because these terminals are much smaller, more numerous, and often located in residential areas.

To prevent NGSO user terminals from interfering with terrestrial mobile networks and microwave links, the regulations focus on three specific areas:

EIRP Limits Toward the Horizon

Under Article 21, NGSO user terminals must follow strict masking rules. Since a user terminal must track satellites moving across the sky, it could potentially point its beam toward the horizon where it might hit a mobile base station or a microwave tower. To prevent this, the hardware is programmed with an elevation mask that automatically reduces power or shuts off the transmitter if the antenna is pointed below a certain elevation angle that is determined at the national level. Article 21.14 in the Radio Regulations states that earth station antennas must not transmit at elevation angles of less than 3° measured from the horizontal plane to the direction of maximum radiation.

PFD at the Earth's Surface

For the downlink (satellite to user terminal), the satellite itself must strictly follow PFD limits to ensure that it does not overwhelm terrestrial receivers. User terminal to satellite uplink power is limited. This ensures that even if many terminals are operating in a single location, their combined "*leakage*" does not disrupt terrestrial mobile services.

Specific Coordination for FSS

In many frequency bands terrestrial microwave links have PRIMARY status. Therefore, the NGSO operator is responsible for ensuring that their user terminals do not cause interference. While large gateways are coordinated individually, user terminals are typically governed by class licensing. The regulator sets a maximum allowable power level as necessary that is low enough to guarantee that any terminal, regardless of where a user places it, will not interfere with existing terrestrial infrastructure.

Avoiding Interference by Large Earth Stations Versus User Terminals

The main difference between the treatment of large NGSO earth stations versus user terminals in an NGSO system in terms of avoiding interference is that large earth stations are protected by calculated "*coordination zones*" (a physical distance from other towers), whereas user terminals are protected by hardware-coded limits on power and pointing angles.

c. Avoiding Interference Between GSO and NGSO Systems and Between Different Satellite Providers

As explained previously, but reiterated here, the ITU Radio Regulations establish a clear hierarchy of protection between GSO and NGSO satellite systems operating in shared frequency bands. This protection is primarily implemented through the Equivalent Power Flux-Density (EPFD) limits contained in Article 22. These limits cap the aggregate interference produced by an entire NGSO constellation (including all its space stations and associated earth stations) toward any GSO receiver.

The mechanism is one-way: NGSO systems must not cause unacceptable interference to GSO networks in the Fixed-Satellite Service (FSS) and Broadcasting-Satellite Service (BSS), while NGSO systems generally do not claim protection from GSO networks (Article 22.2).

NGSO systems may be required to coordinate with one another if that is stated in a footnote to the Table of Frequency Allocations in the Radio Regulations.

National regulators typically require operators to coordinate in good faith on shared frequencies. If no agreement is reached, other measures such as spectrum-splitting

may apply (e.g. FCC, 2023)¹⁸. This dedicates specific sub-bands to providers for the duration of an *"inline event"*. Protections for earlier-launched systems (incumbency rights) are generally respected, though these protections can sunset after approximately 10 years under FCC rules to allow for spectral efficiency. Similar approaches exist in the UK, where Ofcom imposes explicit cooperation conditions to prevent mutual signal blocking (Ofcom, 2022)¹⁹.

Technical mitigations are increasingly embedded directly into the hardware:

- **Spatial Separation:** Beamforming and phased arrays on user terminals and satellites enable highly directional beams that focus energy and minimise spillover into the receivers of adjacent systems.
- **Dynamic Avoidance:** Systems can implement *"satellite selection"* and *"handover"* processes, choosing an alternative satellite in the constellation to avoid a direct alignment (inline event) with a competitor.
- **Power and Modulation:** Power control and adaptive modulation dynamically reduce transmission power or shift to more robust signal modes upon detecting interference.

d. ESIMs

ESIMs face stricter requirements than other VSATs because their movement is continuous and unpredictable. They must constantly adjust their transmission parameters as they cross different regulatory zones and physical environments. Any failure in its motion-tracking system could cause its signal beam to accidentally hit a terrestrial tower or another satellite.

To ensure compliance, these terminals are programmed with automatic *"kill switches"* that stop all transmissions if the antenna's pointing error exceeds a fraction of a degree. Additionally, they use GPS-triggered geofencing and internal databases to automatically lower power or shut down when entering protected areas, such as near a radio astronomy site or a specific country's borders.²⁰

e. Interference With Mobile Bands by D2D Services

For the most part there are not yet any agreed measures for avoiding harmful interference between D2D satellite services using terrestrial mobile bands. Therefore, we intend to allow use of D2D satellite services in bands identified for IMT only under the licence and control of an MNO based on a commercial arrangement between the parties. The MNO will then have responsibility for ensuring that there is no harmful interference.

¹⁸ Federal Communications Commission [FCC]. (2023). Updating Rules for Non-Geostationary Orbit Fixed-Satellite Service Constellations (FCC 23-XX).

¹⁹ Ofcom. (2022). Space Spectrum Strategy: Supporting the next generation of satellite services. Office of Communications.

²⁰ Earth Stations in Motion, 47 C.F.R. § 25.228

f. Interference by D2D operating in 3GPP NTN Bands

We anticipate that compliance with 3GPP NTN standards for D2D services would avoid harmful interference by means of the various technical mechanisms stipulated including continual power adjustment, frequency shifting and filtering.^{21, 22} Mere frequency separation may be insufficient because of the “*near-far*” problem (the amount of transmission power from the mobile required to communicate with the satellite) drowning out signals from other mobile subscribers, high out of band signal bleed and blocking (where the relatively high power signal or signals makes the base station “*deaf*”).²³

A satellite service provider should be able to detect whether a phone is compliant with 3GPP NTN standards primarily through a digital handshake and signalling process that occurs the moment the device attempts to attach to the network.²⁴ Therefore, only compliant handsets would be allowed to communicate.

g. Risk Assessment in The Bahamas

The Bahamas carried out a risk assessment when making provision for satellite services and came to the conclusions shown in Table 3.

Table 3: Interference risks between satellite communications and other types of services in the Bahamas, URCA

Service Type	Frequency Range	Band	3GPP Band ID	Assessment of Potential Risk
FWA	10.7–11.7 GHz	Ku-band	Non-3GPP	Limited risk given horizontal nature of fixed wireless links
5G	24.25–27.5 GHz	Ka-band	n258	Limited risk given no plan to release this band for 5G use in The Bahamas.
FWA	24.25–27.5 GHz	Ka-band	n258	Limited risk given horizontal nature of fixed wireless links
Microwave Backhaul	14.0–14.5 GHz (uplink)	Ku-band	Non-3GPP	Limited risk given horizontal nature of fixed wireless links
Microwave Backhaul	18.0–23.0 GHz (adjacent)	Ka-band	Non-3GPP	Limited risk given horizontal nature of fixed wireless links

²¹ 3rd Generation Partnership Project (3GPP). (2022). *User Equipment (UE) radio transmission and reception; Part 3: Range 1 Standalone (NR-NTN)* (Technical Specification TS 38.101-5).

<https://www.3gpp.org/specifications-technologies/releases/release-17>

²² 3rd Generation Partnership Project (3GPP). (2022). *NR; Radio Resource Control (RRC); Protocol specification* (Technical Specification TS 38.331).

²³ 3rd Generation Partnership Project (3GPP). (2022). *User Equipment (UE) radio transmission and reception; Part 3: Range 1 Standalone (NR-NTN)* (Technical Specification TS 38.101-5).

<https://www.3gpp.org/specifications-technologies/releases/release-17>

²⁴ 3rd Generation Partnership Project (3GPP). (2022). *NR; User Equipment (UE) procedures in idle mode and in RRC connected state* (Technical Specification TS 38.304). <https://www.3gpp.org/specifications-technologies/releases/release-17>

Digicel operates microwave in the 10 GHz band and Flow in the 11 GHz band. Similarly to the Bahamas we anticipate that there is limited risk to terrestrial microwave from satellites as a result of inline interference.

Question 3. Do respondents believe that there is any significant risk from interference between the satellite bands proposed and terrestrial services or any other interference. If so, what mitigating measures are necessary beyond what is already stipulated in the Radio Regulations and 3GPP NTN standards?

17. Satellite Frequency Band Proposals

The Commission herewith makes proposals for satellite frequency use for the purpose of high-speed broadband, very high capacity bands for feeder links as well as D2D services for satellite services.

The extent to which the bands can be used for stationary or mobile ground equipment is identified in the Table of Frequency Allocations in Article 5 of the ITU's Radio Regulations.

Stationary ground equipment is used for Fixed Satellite Services (FSS) and mobile equipment is used for Mobile Satellite Services (MSS). As indicated in previous footnotes, FSS and MSS do not refer to the behaviour of the satellites.

a. Band Usage Internationally by Number of Providers

By way of background the number of satellite service providers operating worldwide in each satellite frequency band as of March 2025 were as follows:

Frequency band	Number of satellite providers
L-band (1.5 GHz to 1.6 GHz)	4
S-band (2 GHz to 4 GHz)	2
C-band (3.7 GHz to 4.2 GHz)	4
Ku-band (12 GHz to 18 GHz)	8
Ka-band (27 GHz to 40 GHz)	16
Q-band (36 GHz to 46 GHz)	1
V-band (40 GHz to 75 GHz)	2
E-band (60 GHz to 90 GHz)	1
W-band (75 GHz to 110 GHz)	1

Figure 10: Satellite provider frequency bands in use: Source - GSA; March 2025; Non-Terrestrial 5G Networks and Satellite Connectivity; Note: Q band overlaps with Ka and V band because the term is associated with particular technologies, arguably the term Q-band could be dropped

b. Ku-band and Ka-band for High-Speed Broadband

The most suitable frequency bands for satellite broadband including NGSO constellations are primarily the Ku-band (typically shown as ranging from 12-18 GHz although also considered to reach from 10GHz to 18GHz) and Ka-band (27-40 GHz).

Ku-band is highly suitable for broadband due to its balanced performance characteristics, making it ideal for reliable, widespread coverage in a wide range of environments²⁵. It is particularly good for user links with throughput up to hundreds of Mbps. It has better resilience to rain fade compared to higher bands, which is advantageous in variable weather conditions. Ku-band supports efficient spot beams for frequency reuse in dense NGSO setups, where frequent satellite handovers occur. Ku band is commonly used for both downlinks and uplinks and benefits from a large number of providers (as can be seen in Figure 10), ensuring equipment availability and cost-effectiveness for consumer and enterprise broadband.

Ka-band enables higher capacity. It is suitable for user terminals (alongside some Ku elements) and has a dense spot-beam architecture that maximizes capacity in populated areas. With the highest provider count (16 as shown in Figure 10), Ka-band also supports massive user scaling in mega-constellations²⁶. It excels in urban/rural broadband delivery but requires adaptive techniques (e.g., power control and coding) to mitigate significant rain fade²⁷.

Higher mmWave bands such as V-band (40-75 GHz), E-band (71-76 GHz and 81-86 GHz), and W-band (75-110 GHz) are emerging²⁸. They can be used for enhanced gateway feeder links and future capacity upgrades. mmWave bands face severe atmospheric attenuation (rain fade, oxygen absorption) that limits range and reliability, especially in tropical or rainy climates²⁹. They have immature ecosystems (1-2 providers each)³⁰.

The amount of spectrum required for satellite providers to serve a given number of users depends on several factors:

- Target Per-User Performance.
- Spectral Efficiency - This is heavily influenced by the chosen modulation and coding and environmental factors such as rain fade.
- Beam Architecture: The use of numerous simultaneous spot beams allows for high frequency reuse across different geographic cells, effectively multiplying the capacity available.

²⁵ Orbital Research Ltd., n.d., <https://www.orbitalresearch.net/blogs/blogs/satellite-frequency-bands-what-are-they-used-for>

²⁶ Alqaraghuli, A. J., Abdellatif, H., & Jornet, J. M. (2021). Performance analysis of a dual Terahertz/Ka band communication system for satellite mega-constellations. *2021 IEEE 22nd International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM)*, 316–322

²⁷ Yeo, J. X., Lee, Y. H., & Ong, J. T. (2014). Rain attenuation prediction model for satellite communications in tropical regions. *IEEE Transactions on Antennas and Propagation*, 62(11), 5775–5780. <https://ieeexplore.ieee.org/document/6899607>

²⁸ Federal Communications Commission, n.d., https://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet70/oet70.pdf

²⁹ Csurgai-Horváth, L., Adjei-Frimpong, B., Riva, C., & Luini, L. (2018). Radio wave satellite propagation in Ka/Q band. *Periodica Polytechnica Electrical Engineering and Computer Science*, 62(2), 38–46. <https://pp.bme.hu/eecs/article/view/11065>

³⁰ Federal Communications Commission, n.d., https://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet70/oet70.pdf

- **Duty Cycle and Sharing:** as satellites move across the sky, they require constant handovers and that results in a dynamic sharing of capacity as multiple satellites in a constellation contribute to the total coverage over a specific area.³¹

These factors are under the control of the satellite provider.

The Bahamas listed the frequency ranges illustrated in Table 4 for satellite services:

Service	Primary Spectrum Bands	Frequency Range (MHz/GHz)
Mobile Satellite Service (MSS)	L-Band, S-Band	1–2 GHz, 2–4 GHz
Fixed Satellite Service (FSS)	C-Band, Ku-Band, Ka-Band	4–8 GHz, 12–18 GHz, 26–40 GHz
Earth Stations in Motion (ESIM)	Ku-Band, Ka-Band	12–18 GHz, 26–40 GHz
Internet of Things (IoT/M2M)	VHF, L-Band, S-Band, Ku-Band, Ka-Band	137–174 MHz, 1–2 GHz, 2–4 GHz, 12–18 GHz, 26–40 GHz
Backhaul	C-Band, Ku-Band, Ka-Band, Q-Band, V-Band	4–8 GHz, 12–18 GHz, 26–40 GHz, 33–50 GHz, 40–75 GHz

Table 4: frequency bands listed for satellite usage in The Bahamas; Utilities Regulation and Competition Authority. (2024). Regulatory framework for satellite-based electronic communications services in The Bahamas (Consultation Document ECS 75/2024). <https://www.urcabahamas.bs>

Please note that these are broad allocations and precise details, including frequency gaps, are contained in URCA’s Frequency Allocation Table.

The FCC in the United States identifies Ku and Ka Bands as follows:

Extended Ku-band	10.95	11.20	space-to-Earth
Extended Ku-band	11.45	11.70	space-to-Earth
Conventional Ku-band	11.70	12.20	space-to-Earth
Extended Ku-band	13.75	14.00	Earth-to-space
Conventional Ku-band	14.00	14.50	Earth-to-space
Extended Ka-band	17.30	18.30	space-to-Earth
Conventional Ka-band	18.30	18.80	space-to-Earth
Extended Ka-band	18.80	19.40	space-to-Earth
Extended Ka-band	19.60	19.70	space-to-Earth
Conventional Ka-band	19.70	20.20	space-to-Earth
Extended Ka-band	27.50	28.35	Earth-to-space
Conventional Ka-band	28.35	28.60	Earth-to-space
Extended Ka-band	28.60	29.10	Earth-to-space
Conventional Ka-band	29.25	30.00	Earth-to-space

³¹ Pace, L., Tarchi, D., & Vanelli-Coralli, A. (2024). On the capacity and coverage of Very High Throughput Satellite systems based on NGSO mega-constellations. *IEEE Open Journal of the Communications Society*, 5, 1245–1262

Table 5: Federal Communications Commission. (2026). 47 CFR Part 25: Satellite communications (up to date as of March 27, 2026). Electronic Code of Federal Regulations. <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-B/part-25>

Ku and Ka-Band Proposals

The Commission therefore proposes that the Ku-band and Ka-band frequencies listed in Table 6 should be used for broadband satellite systems. They are broken down in the manner set out in the current ITU Radio Regulations and the usage requirements should be read consistently with the Regulations including any requirements for coordination, power limits and antenna sizes. Minimum elevation angles for user terminals and any form of earth station would be 5 degrees.³²

Ku-band and Ka-band			
Start Frequency (GHz)	End Frequency (GHz)	Bandwidth (GHz)	Direction
10.7	10.95	0.25	space-to-Earth
10.95	11.2	0.25	space-to-Earth
11.2	11.45	0.25	space-to-Earth
11.45	11.7	0.25	space-to-Earth
11.7	12.1	0.4	space-to-Earth
12.1	12.2	0.1	space-to-Earth
12.7	12.75	0.05	Earth-to-space
12.75	13.25	0.5	Earth-to-space
13.75	14	0.25	Earth-to-space
14	14.25	0.25	Earth-to-space
14.25	14.3	0.05	Earth-to-space
14.3	14.4	0.1	Earth-to-space
14.4	14.47	0.07	Earth-to-space
14.47	14.5	0.03	Earth-to-space
14.75	14.8	0.05	Earth-to-space
15.43	15.63	0.2	Earth-to-space
27.5	28.5	1	Earth-to-space
28.5	29.1	0.6	Earth-to-space
29.1	29.5	0.4	Earth-to-space
29.5	29.9	0.4	Earth-to-space
29.9	30	0.1	Earth-to-space
30	31	1	Earth-to-space
37.5	38	0.5	space-to-Earth
38	39.5	1.5	space-to-Earth
39.5	40	0.5	space-to-Earth

Table 6: Ku-band and Ka-band Proposals

³² Federal Communications Commission. (2026). § 25.205, 47 CFR Part 25: Satellite communications (up to date as of March 27, 2026). Electronic Code of Federal Regulations.

Question 4. Do you agree with these Ku-Band and Ka Band proposals? If not, please provide alternative proposals with justifications.

c. Bands for D2D, D2C, IoT, M2M

The three main frequency bands for satellite services delivering Direct-to-Device (D2D) including Direct-to-Cell (D2C) connectivity, as well as Internet of Things (IoT), and Machine-to-Machine (M2M) applications are:

- Low-band / sub-1 GHz (e.g., 600/700/800 MHz): Excellent propagation, better building/terrain penetration, and larger cell sizes from space. This makes them ideal for reaching unmodified smartphones in remote or indoor areas with lower power. Many modern phones already support these bands for terrestrial 4G/5G, so no new hardware is needed.
- L-band (1–2 GHz): Good compromise but slightly worse propagation than sub-1 GHz.
- S-band (2–4 GHz): More capacity potential but requires better link budgets³³ ie it is necessary to consider the need for greater transmitter power or receiver sensitivity.

Lower frequencies have better penetration through obstacles, foliage, and buildings, low atmospheric attenuation, and resilience to rain fade. They are more suitable for reliable, ubiquitous coverage in remote, rural, indoor, or obstructed areas.

The FCC in the USA refers to these frequencies as supplemental coverage from space (SCS) bands. The bands that have been made allocated on a [secondary](#) basis by the FCC are:

- 600 MHz: 614-652 MHz and 663- 698 MHz;
- 700 MHz: 698-769 MHz, 775 MHz- 799 MHz, and 805-806 MHz;
- 800 MHz: 824-849 MHz and 869-894 MHz;
- Broadband PCS: 1850-1915 MHz and 1930-1995 MHz; and
- AWS-H Block: 1915-1920 MHz and 1995-2000 MHz³⁴

SCS is authorised only where a terrestrial licensee leases access to their spectrum rights to a participating satellite operator.³⁵

³³ The link budget calculation assesses whether the received signal will be strong enough above the noise floor for the data to be decoded successfully,

³⁴ Federal Communications Commission. (2024). Single network future: Supplemental coverage from space; Space innovation (Report and Order and Further Notice of Proposed Rulemaking, FCC 24-28). <https://docs.fcc.gov/public/attachments/FCC-24-28A1.pdf>

³⁵ Federal Communications Commission. (2024). Single network future: Supplemental coverage from space; Space innovation (89 Fed. Reg. 34148 (April 30, 2024) (to be codified at 47 C.F.R. pts. 1, 2, 25)). <https://www.federalregister.gov/documents/2024/04/30/2024-06669/single-network-future-supplemental-coverage-from-space-space-innovation>

In addition to other requirements the FCC requires terrestrial providers using SCS to transmit all 911 voice calls and texts to a Public Safety Answering Point (PSAP) using location-based routing or an emergency call centre. Terrestrial providers must also transmit location information and the user's phone number to facilitate dispatch and callback capabilities at the receiving PSAP.

Satellite operators and terrestrial licensees providing SCS must comply with existing satellite and terrestrial rules to avoid harmful interference into radio astronomy and related services.

Parties are left to resolve protections for co-channel operations through private contractual agreements. There are no in-market downlink pfd limits.

The FCC adopted an aggregate out-of-band PFD limit of -120 dBW/m2/MHz for the 600MHz, 700MHz, 800MHz, and PCS 1990-1995 MHz bands. That applies at 1.5 meters above ground level to protect adjacent band operations across the SCS Bands.

3GPP E-UTRA (LTE) and 5G NTN Bands

3GPP has identified multiple spectrum bands for use with non-terrestrial networks in relation to E-UTRA (LTE) and New Radio (5G) networks.

The relevant E-UTRA bands are listed in Table 7.

E-UTRA Operating Band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex Mode
	BS receive	BS transmit	
	UE transmit	UE receive	
	FUL_low – FUL_high	FDL_low – FDL_high	
256	1980 MHz–2010 MHz	2170 MHz–2200 MHz	FDD
255	1626.5 MHz–1660.5 MHz	1525 MHz–1559 MHz	FDD
254	1610 MHz–1626.5 MHz	2483.5 MHz–2500 MHz	FDD
253 (Note 2)	1668 MHz–1675 MHz	1518 MHz–1525 MHz	FDD
252	2000 MHz–2020 MHz	2180 MHz–2200 MHz	FDD
249 (Note 4)	1616 MHz–1626.5 MHz	1616 MHz–1626.5 MHz	TDD
246 (Note 3)	N/A	1467 MHz–1492 MHz	SDO
NOTE 1: Satellite bands are numbered in descending order from 256			
NOTE 2: UE assigned to channels and allocated frequency resources in the lower portion of Band 253 may experience blocking or harmful interference from terrestrial networks in adjacent or nearby frequencies when operating in the proximity with terrestrial base stations.			
NOTE3: Band 246 only applies for LTE-based 5G Broadcast over Geosynchronous Satellite in region 3.			
NOTE 4: Band 249 is defined only for NB-IoT operation.			

Table 7: E-UTRA Satellite Bands (3GPP TS 36.102 V19.2.0 (2025-12)); 3rd Generation Partnership Project; Technical Specification Group Radio Access Network³⁶

³⁶ Most of these bands (other than 256), correspond exactly to some of the New Radio bands. SDO refers to Satellite Digital Operation and defines a mode where the frequency band is dedicated to a digital broadcast or data stream coming down from a satellite.

New Radio (5G) Frequency Range 1 bands are identified in Table 8.

NTN satellite operating band ¹	Uplink (UL) operating band Satellite Access Node receive / UE transmit FUL,low - FUL,high	Downlink (DL) operating band Satellite Access Node transmit / UE receive FDL,low - FDL,high	Duplex mode
n256	1980 MHz -2010 MHz	2170 MHz -2200 MHz	FDD
n255	1626.5 MHz -1660.5 MHz	1525 MHz -1559 MHz	FDD
n254	1610 -1626.5 MHz	2483.5 -2500 MHz	FDD
n253	1668 MHz -1675 MHz	1518 MHz -1525 MHz	FDD
n252	2000 -2020 MHz	2180 -2200 MHz	FDD
n251	1626.5 MHz -1660.5 MHz	1518 MHz -1559 MHz	FDD
n250	1668 MHz -1675 MHz	1518 MHz -1559 MHz	FDD
n248	14000 MHz -14500 MHz	10700 MHz -127502,3 MHz	FDD
n247	13750 MHz -14000 MHz	10700 MHz -127502,3 MHz	FDD
NOTE 1: NTN satellite bands are numbered in descending order from n256.			
NOTE 2: For Region 2, the downlink is limited to 10700 -12700 MHz.			
NOTE 3: For the US, the downlink is limited to 10700 -12200 MHz for Mobile VSAT.			
NOTE 4: Operating band n200 is a reserved value.			

Table 8: FR1-NTN Satellite Bands (3GPP TS 38.101-5 V19.3.0 (2025-12)); 3rd Generation Partnership Project; Technical Specification Group Radio Access Network³⁷

New Radio (5G) Frequency Range 2 bands are identified in Table 9:

Satellite operating band	Uplink (UL) operating band SAN receive / UE transmit FUL,low - FUL,high	Downlink (DL) operating band SAN transmit / UE receive FDL,low - FDL,high	Duplex mode
n512 ¹	27500 MHz -30000 MHz	17300 MHz -20200 MHz	FDD
n511 ²	28350 MHz -30000 MHz	17300 MHz -20200 MHz	FDD
n510 ³	27500 MHz -28350 MHz	17300 MHz -20200 MHz	FDD
n509	14000 MHz -14500 MHz	10700 MHz - 127504,5 MHz	FDD
n508	13750 MHz -14000 MHz	10700 MHz - 127504,5 MHz	FDD
NOTE 1: This band is applicable in the countries subject to or referring to CEPT ECC Decision(05)01 and ECC			
NOTE 2: This band is applicable in the countries subject to or referring to FCC 47 CFR part 25.			
NOTE 3: This band is applicable for Earth Station operations in the USA subject to FCC 47 CFR part 25. FCC rules currently do not include ESIM operations in this band (47 CFR 25.202).			
NOTE 4: For Region 2, the downlink is limited to 10700 - 12700 MHz.			
NOTE 5: For the US, the downlink is limited to 10700 - 12200 MHz for Mobile VSAT.			

Table 9: FR2-NTN Satellite Bands (3GPP TS 38.101-5 V19.3.0 (2025-12)); 3rd Generation Partnership Project; Technical Specification Group Radio Access Network

Proposals for D2D, D2C, IoT, M2M Services in IMT Bands

The Commission proposes that existing terrestrial mobile operators should be permitted to lease use of the mobile spectrum assigned to them for use by satellite operators who wish to offer D2D, D2C, IoT, M2M services, or as the FCC refers to them, SCS services. This is subject to compliance with the ITU Radio Regulations and requirements specific to Anguilla.

Proposals for D2D, D2C, IoT, M2M Services in 3GPP NTN Non-IMT Bands

With respect to bands identified by 3GPP for D2D, D2C, IoT, M2M services that are not currently identified for IMT, and not adjacent to IMT identified bands, the Commission is

prepared to consider making these bands available for use by satellite operators. However, they would be subject to the same requirements as terrestrial mobile operators including the need to provide emergency calling without charge, customer service, quality of service conditions, the need to interconnect, and the need to terminate domestic calls on a cost basis. The Annex 1: Draft NGSO Satellite Internet Services Licence illustrates what would be necessary in terms of wider regulation. That contains the same wider (non-satellite specific) obligations that MNOs face currently. Compliance with the ITU Radio Regulations, 3GPP NTN specifications and national requirements would also be necessary.

d. Very High Capacity Bands

Bands that have been identified for satellite usage above 40 MHz have the potential to deliver very high speed data transfer, typically using large ground-based parabolic satellite stations. Three bands in particular are of interest, V-band, E-band and W-band.

V-band

We propose to allow the bands identified in Table 10 to be used for satellite services subject to compliance with the Radio Regulations.

V-bands			
Start Frequency (GHz)	End Frequency (GHz)	Bandwidth (GHz)	FIXED-SATELLITE PRIMARY
37.5	38	0.5	space-to-Earth
38	39.5	1.5	space-to-Earth
39.5	40	0.5	space-to-Earth
40	40.5	0.5	space-to-Earth
40.5	41	0.5	space-to-Earth
41	42.5	1.5	space-to-Earth
42.5	43.5	1	space-to-Earth
47.2	47.5	0.3	Earth-to-space
47.5	47.9	0.4	Earth-to-space
47.9	48.2	0.3	Earth-to-space
48.2	50.2	2	Earth-to-space
50.4	51.4	1	Earth-to-space
51.4	52.4	1	Earth-to-space

Table 10: V-band Satellite Frequencies

E-band

We are considering permitting the bands identified in Table 11 to be used for satellite services in accordance with the terms set out in the Radio Regulations.

However, that is subject to feedback about their usefulness or otherwise for terrestrial microwave and possibly increased harmful interference risks at such high frequencies if also used for microwave.

Licences would be issued on a temporary basis only for specific identified ground stations until 31 December 2028 when relevant decisions from the World

Radiocommunication Conference 2027 (WRC-27) will be finalised. This is consistent with Ofcom's ruling on the use of these bands in the UK.³⁸

E-Bands			
Start Frequency (GHz)	End Frequency (GHz)	Bandwidth (GHz)	Direction
71	74	3	space-to-Earth
74	76	2	space-to-Earth
81	84	3	Earth-to-space
84	86	2	Earth-to-space

Table 11: E-band Satellite Frequencies

W-band

We also propose to allow the bands identified in Table 12 to be used for satellite services until 31 December 2028, post WRC-27. However, providers would have to cease transmitting in the event that harmful interference was caused to any service identified in the Radio Regulations for these bands on a PRIMARY or secondary basis. Nor could protection be claimed from any other party using the frequencies in accordance with the Regulations. That would enable compliance with Article 4.4 of the Regulations.

W-Bands (Use on a stringent non-interference basis - immediate cessation required if any interference demonstrated)			
Start Frequency (GHz)	End Frequency (GHz)	Bandwidth (GHz)	Direction
92	94	2	Earth-to-space
94.1	95	0.9	Earth-to-space
95	100	5	Earth-to-space
102	105	3	Earth-to-space
105	109.5	4.5	Earth-to-space
109.5	111.8	2.3	Earth-to-space
111.8	114.25	2.45	Earth-to-space

Table 12: W-band Satellite Frequencies

Question 5. Do you agree with the proposed V, E and W band allocations and the terms on which they can be used, or are there other uses to which some of this spectrum should be put such as terrestrial microwave to the exclusion of satellite services? Provide justifications for your answers.

Question 6. Are there existing terrestrial fixed links, mobile networks, broadcasting systems, government systems, aviation/maritime systems or other services in Anguilla that may be affected by use of the proposed satellite bands? Please identify the frequencies, locations, technical characteristics and likely interference mechanisms.

Question 7. Should the Commission require satellite applicants to submit an Anguilla-specific interference assessment before authorisation? If so, what should that assessment include?

³⁸ Ofcom (2025, October 28). Statement: Temporary NGSO gateway access to E band. www.ofcom.org.uk/.../statement-temporary-ngso-gateway-access-to-e-band.pdf

Question 8. Should gateway earth stations (larger stations that aggregate traffic rather than being user specific) be subject to site-specific coordination zones, exclusion zones, registration, public notice, or neighbour-jurisdiction coordination before deployment?

18. Existing Legal and Policy Licensing Framework

Under section 4 of Anguilla's Telecommunications Act anyone who wishes to operate a public telecommunications network or provide a public telecommunications service must obtain a licence from the Commission and apply to the Commission in the manner specified in the Telecommunications Code.

The process for making all decisions regarding spectrum allocation and frequency assignments is set out in The Telecommunications Frequency Management Regulations. Section 2 requires the following factors to be taken into account by the Ministry and the Commission:

- The objects of the Act. The objects include determining applications for licences. In this respect the Commission responds to market interest on an individual basis.
- The likely impacts on existing and future availability and uses of spectrum. In this respect, the Commission has to consider demand versus supply. The Commission seeks to provide confidence to operators about sufficient spectrum availability in the light of market and technological developments.
- The efficient use of spectrum.
- Any regional agreements, standards and arrangements applicable to the allocation and use of spectrum in Anguilla.
- Any applicable international standards, ITU treaties and other agreements.
- The overriding public interest in efficient utilisation of the spectrum for various public and private telecommunications purposes.

The Telecommunications and Frequency Licensing Regulations (2014) provide a technology-neutral framework for licensing public telecommunications networks/services and granting frequency authorisations. The main types are:

- Individual Licences and Frequency Authorisations (Section 8).
- Class Licences (Section 9).
- Special Licences (Section 11).
- Private, closed user group, or value-added services may require either individual or class licences depending on circumstances (Section 10).

The current framework therefore gives the Commission broad discretion to set procedures, exempt low-risk uses, attach conditions, and decide the appropriate licence type for any service.

19. Proposed Satellite Licensing Framework

Satellite licensing frameworks are traditionally split into several and sometimes many individual licence types. This is largely driven by the fact that the spectrum is shared,

internationally coordinated, and used by different types of stations with different interference, mobility, and public-service risks. The focus is often on specific technologies or products. However, that is not technology neutral and leads to uncertainty. For example, references to gateway stations could range from lower to higher power stations. Earth Stations in Motion (ESIMs) could refer to land, sea or air ESIMs. Different potential interference risks exist.

The Commission wishes to adopt an approach to satellite licensing that is in tune with the needs of future regulation by making it adaptable and flexible and to allow for more rapid deployment. Consequently, rather than stipulating a strict list of different licences based on technologies or products we propose to use a modular approach. This can be accommodated under the existing licensing legislation.

a. Licence Modules

At the top level the three main modules would be as shown in Table 13:

Module Number	Module	Explanations
1	Satellite Network / Service Market Access Module	This determines whether a satellite system may serve Anguilla and would include e.g. bands available.
2	Satellite Communications Service Provider Module	This determines whether a company can sell satellite communications services to customers in the country and the type of customer e.g. retail v wholesale
3	Consumer Broadband User Terminals and Devices	This determines whether customer terminals can operate in the country without each customer obtaining an individual licence.

Table 13: Licence Module Types

b. Seven Regulatory Instruments Built from Modules

Seven types of regulatory instruments would be used as shown in Table 14. Those are built from modules. In turn the modules are built from categories. Each of the example categories listed in the table fall under one of the 3 module types.

Regulatory instrument Number	Regulatory instrument	Use	Typical Categories	Comment
1	Individual licence	High-power, site-specific, infrastructure, or public-service-impacting activities	Market access; gateway/teleport/large earth station; significant VSAT; IMT D2D/NTN; major service provider obligations	Can contain multiple schedules addressing different requirement categories.
2	Class licence with registration	Multiple, lower-risk professional deployments where the regulator still wants visibility	Enterprise VSAT; professional land ESIM; satellite IoT platforms; some government/business terminals	Useful where individual licensing would be too heavy but complete exemption would give too little visibility.
3	Blanket authorisation / licence exemption	Mass-market, low-risk, operator-controlled terminals	Consumer broadband terminals; standard phased-array terminals; low-risk IoT devices; receive-only terminals	Would be tied to approved equipment, authorised networks, non-interference obligations, and operator control.
4	Supplemental authorisation	Activities that modify or extend an existing telecom or spectrum licence	Satellite backhaul by MNOs/ISPs; D2D/NTN using IMT spectrum; use of MNO-assigned or IMT-designated spectrum	Particularly important where existing mobile spectrum rights are affected.
5	Temporary authorisation	Service pilots, demonstrations, experiments, emergency temporary deployments	Trials; proof-of-concept services; humanitarian pilots	Would specify duration, reporting, scope, and no expectation of permanent rights.
6	Emergency overlay	Disaster relief, public warning, humanitarian communications, temporary restoration of connectivity	Emergency/disaster relief operations; public-interest D2D/NTN; temporary terminals	Would allow pre-clearance, rapid activation, fee waivers, and temporary import/type approval relief.
7	Equipment/type approval overlay	Ensuring devices conform without licensing each device individually	VSATs; ESIMs; consumer terminals; IoT devices; D2D/NTN-capable devices	Can be incorporated into all relevant licences by condition or using approved-equipment list.

Table 14: New Satellite Framework Regulatory Instruments

c. Modules Built from Licence Categories

For further clarification a more detailed consideration of the licensing categories is shown in Table 15. These categories have distinct requirements and, as stated above, fall into one or more of the three module types. In combination the modules/categories provide the content for the seven regulatory instruments.

No.	Category of licensing requirement	Who / what it applies to	What it covers	How it may be combined in one licence or authorisation	Comments
1	Satellite Network / Service Market Access	Foreign or local satellite network operators; authorised satellite service providers	Geostationary Orbit (GSO) and Non-Geostationary Orbit (NGSO) satellite networks providing service into the territory	May be included as Part 1 of a satellite operator licence; may also be a standalone market-access approval where the operator supplies capacity only	Approves the satellite network/capacity for use in the territory. Covers landing rights, frequency bands, International Telecommunication Union compliance, coordination status, and harmful-interference obligations.

No.	Category of licensing requirement	Who / what it applies to	What it covers	How it may be combined in one licence or authorisation	Comments
2	Satellite Communications Service Provider	Any person selling or supplying public or private satellite communications services to customers in the territory, including satellite Internet Service Providers (ISPs), wholesale providers and retail broadband providers	Retail or wholesale satellite broadband, voice, enterprise connectivity, Internet access, managed connectivity, and other public-facing satellite communications services	May be combined with market access and blanket terminal authorisation where the same satellite operator also sells service directly to users	Regulates the service/customer relationship, not merely the radio equipment. Covers consumer protection, billing, complaints, outage reporting, local contact, security/lawful access obligations where applicable, and service continuity.
3	Large and High Power Earth Stations - Gateway / Teleport / Large Earth Station, including Telemetry, Tracking and Command (TT&C) and Feeder Links	Satellite operators, teleport operators, ISPs, Mobile Network Operators (MNOs), government, wholesale capacity providers, satellite control entities	Major satellite hubs, gateways, teleports, high-capacity fixed earth stations, feeder links, and TT&C facilities	May be a dedicated individual earth-station licence, or a schedule/annex within a broader satellite operator licence	Site-specific review is appropriate because of power levels, coordination, security, resilience, infrastructure impact, and possible international coordination. TT&C and feeder links need not be separate categories.
4	Fixed Very Small Aperture Terminal (VSAT) / Enterprise Earth Station	Businesses, government, resorts, utilities, banks, non-governmental organisations, private networks, ISPs	Fixed VSATs, enterprise terminals, government sites, remote offices, and private networks	May be covered by a class licence plus registration, or by an annex to a service provider's licence for managed enterprise deployments	Useful middle ground: simple registration for ordinary VSATs, individual review for high-power, large antenna, sensitive-site, or coordinated deployments.
5	Consumer Broadband User Terminals / Phased-Array Terminals	Authorised satellite operators or service providers; end users operating under operator control	Residential and small and medium-sized enterprise terminals, flat-panel/phased-array terminals, and self-installed terminals	May be bundled with the public satellite communications service provider authorisation for a direct-to-consumer satellite operator	Keeps access barriers low. The blanket terminal authorisation permits approved devices to operate; it does not by itself authorise the commercial provision of communications services.
6	Earth Stations in Motion (ESIM): Maritime	Ship operators, cruise operators, ferries, fisheries, yacht operators, maritime service providers, satellite operators	Satellite terminals on vessels operating in territorial waters, ports, exclusive economic zone where relevant, and international routes	May be part of an ESIM class licence, a maritime terminal authorisation, or a satellite operator's blanket terminal authorisation	Important for fisheries, tourism, shipping, inter-island transport, and maritime safety. Should clarify treatment of foreign vessels temporarily in territorial waters or ports.
7	Earth Stations in Motion (ESIM): Aeronautical	Airlines, aircraft operators, business aviation, aviation connectivity providers, satellite operators	Satellite terminals on aircraft, including passenger connectivity and operational communications where permitted	May be part of an ESIM class licence or an aviation connectivity approval linked to aircraft and safety approvals	Should align with aviation safety approvals, aircraft equipment certification, international operation of aircraft terminals, and foreign aircraft treatment.

No.	Category of licensing requirement	Who / what it applies to	What it covers	How it may be combined in one licence or authorisation	Comments
8	Earth Stations in Motion (ESIM): Land Mobile	Emergency services, utilities, broadcasters, construction operators, transport operators, satellite providers, government	Vehicle-mounted, portable, transportable, and mobile land terminals	May be included in a professional terminal class licence, emergency service licence, or satellite operator blanket terminal authorisation	Useful for disaster response, remote worksites, public safety, road transport, government operations, and temporary connectivity.
9	Satellite Backhaul for Mobile Network Operators (MNOs), Internet Service Providers (ISPs), and Fixed Wireless Access (FWA) Networks	MNOs, ISPs, FWA operators, community network operators, wholesale network providers	Satellite backhaul for mobile base stations, fixed wireless access, community networks, Wi-Fi hotspots, public networks, and traffic aggregation	May be inserted as conditions or a schedule to an existing MNO/ISP licence rather than a new standalone satellite licence	Supports underserved communities, resilience, disaster recovery, and hybrid terrestrial-satellite networks.
10	Direct-to-Device (D2D) / Non-Terrestrial Network (NTN) Using Mobile-Satellite Service (MSS) Spectrum and Excluding International Mobile Telecommunications (IMT) Spectrum	Satellite operators, authorised satellite service providers, non-MNO providers, and MNOs if they choose to participate	D2D messaging, emergency messaging, relatively low-rate data, satellite Internet of Things (IoT), or handset/device connectivity using satellite or MSS spectrum that is not IMT spectrum	May be included in a satellite operator's market access/service authorisation, with a clear condition excluding all IMT spectrum whether assigned or unassigned	This is the category where non-MNOs may be allowed to provide service, subject to approval. It would expressly exclude spectrum identified, allocated, assigned, licenced, or otherwise designated for IMT/mobile broadband use.
11	Direct-to-Device (D2D) / Non-Terrestrial Network (NTN) Using International Mobile Telecommunications (IMT) Spectrum	MNOs, MNO-satellite partnerships, or another provider authorised by the relevant IMT spectrum holder	Satellite-to-standard-handset services using terrestrial mobile bands or mobile broadband spectrum identified, assigned, licenced, or designated for IMT use	May be an addendum to an MNO licence, a joint approval for an MNO-satellite partnership, or a special supplemental authorisation	Would not be open to non-MNOs without spectrum-holder consent and regulatory approval. Requires protection of terrestrial networks, spectrum-right checks, Subscriber Identity Module (SIM) / embedded Subscriber Identity Module (eSIM) arrangements, roaming treatment, emergency services, consumer protection, and interference coordination.
12	Public-Interest / Emergency Direct-to-Device (D2D) / Non-Terrestrial Network (NTN) Services	Government, emergency agencies, authorised satellite operators, humanitarian providers, MNOs, or approved non-MNO providers	Disaster alerts, emergency messaging, search and rescue, public warning, remote community resilience, humanitarian communications	May be an emergency annex to any relevant operator licence or a pre-approved temporary activation mechanism	Allows flexibility for non-commercial or public-interest use. Use of IMT spectrum should still require regulatory approval and, where applicable, consent of the relevant IMT spectrum holder.

No.	Category of licensing requirement	Who / what it applies to	What it covers	How it may be combined in one licence or authorisation	Comments
13	Low Data Rate Satellite Internet of Things (IoT) / Machine-to-Machine (M2M) / Non-Terrestrial Network (NTN)	Satellite IoT operators, utilities, fisheries, agriculture users, environmental agencies, government, private networks, logistics providers	Asset tracking, vessel monitoring, agriculture sensors, weather stations, environmental monitoring, utility telemetry, low-data-rate NTN devices	May be handled through a low-impact class licence and operator/platform registration rather than individual device licensing	Keeps terminal licensing light, but requires operator/platform identification, approved equipment, and non-interference conditions. If the service uses IMT spectrum, treat it under the IMT D2D/NTN category instead.
14	Receive-Only Earth Stations	Broadcasters, data users, government, weather services, research institutions, businesses, consumers	Receive-only antennas, Television Receive-Only (TVRO) stations, weather/data reception, monitoring stations, and downlink-only terminals	May be covered by exemption or optional registration; does not normally need to be bundled into a service licence unless part of a broader operation	Low risk because the station does not transmit. Optional registration may be useful where the operator wants interference recognition or protection.
15	Experimental / Trial / Demonstration Satellite Authorisation	Satellite operators, equipment vendors, universities, government, MNOs, ISPs, innovators, humanitarian pilots	Trials, demonstrations, technical tests, pilots, temporary deployments, and proof-of-concept services	May be issued as a temporary standalone approval or temporary schedule to an existing licence	Should include duration limits, reporting obligations, non-commercial or limited-commercial conditions, revocation rights, and no expectation of permanent authorisation. Trials using IMT spectrum should require separate approval and, where applicable, consent of the relevant IMT spectrum holder.
16	Emergency / Disaster Relief Satellite Operations	Government, emergency services, humanitarian organisations, approved satellite operators, authorised service providers, MNOs, ISPs	Temporary or priority satellite connectivity during cyclones, floods, volcanic events, earthquakes, submarine cable outages, or other declared emergencies	May be inserted as an emergency annex in individual licences, class licences, and blanket terminal authorisations or be self-standing	Includes expedited approval, notification-based activation, pre-cleared equipment, temporary import relief, fee waivers, priority treatment, and restoration of public communications.
17	Equipment Approval / Terminal Type Approval Overlay	Equipment vendors, satellite operators, service providers, importers, users	Satellite terminals, phased-array antennas, VSATs, ESIM terminals, IoT devices, and D2D/NTN-capable devices	May sit outside the service licence but be referenced in all relevant regulatory instruments; approved equipment lists can be incorporated by condition	Not a service licence, but important. Ensures conformity without requiring individual licensing of every device, especially for mass-market terminals, ESIMs, and D2D/NTN-capable devices.

Table 15: Licencing requirement categories

d. Examples of Licences that could be Issued

By way of example the following licences could be issued based on the seven regulatory instrument framework listed above:

Example 1: Foreign NGSO or GSO Retail Broadband Operator

A foreign satellite operator selling directly to users might need one licence containing:

Individual - Satellite Network / Service Market Access
Individual - Satellite Communications Service Provider
Consumer Broadband User Terminal Blanket Authorisation

Example 2: Gateway Operator

A gateway operator might need:

Individual - Satellite Network / Service Market Access
Individual - Gateway / Teleport / Large Earth Station
Individual - Possibly Telemetry, Tracking and Command / Feeder Link conditions

Example 3: Local Mobile Operator Using D2D

In addition to its existing mobile service/network provider licence and mobile spectrum authorisation a mobile operator might need:

Individual - Direct-to-Device / Non-Terrestrial Network Using IMT spectrum
Supplemental - Satellite Backhaul for Mobile Network Operators - suppl
Emergency / Public-Interest overlay

Note that all licence modules would be included in one document, unless it was subsequently determined that spectrum should be authorised in separate documentation from telecommunications services.

Question 9. Do you agree with this framework for satellite licensing and authorisation? If you have alternative proposals, please provide explanations and justifications.

20. Licence and Frequency Authorisation Applications

Section 5 of the Telecommunications and Frequency Licensing Regulations requires applicants for individual licences and frequency authorisations to provide the information specified by the Commission.

a. General Requirements

For the purposes of obtaining an individual network and service market access licence, and a communications service provider licence, for example, applicants would be required to provide:

- Name, legal status, business address. A legal presence in Anguilla would not be required to make the initial application for a license or frequency authorisation.

An overseas legal presence would suffice. Incorporation in Anguilla would be required to provide services other than by means of leasing spectrum from existing mobile operators. If spectrum was merely leased, then a legal presence would be required to operate under tax legislation;

- Details regarding the type of telecommunications networks and telecommunications services and the frequencies for which the application is being submitted;
- Details of the applicant's directors, partners, management, officials and controlling persons;
- Information about the applicant's background including other licences or frequency authorisations held by the applicant or any of its affiliates;
- A description of the network or networks and services to be supplied;
- The applicant's business plans, including the estimated date upon which it will commence service provision and the coverage it intends to provide;
- Details about subscriber numbers and services provided by the applicant or its affiliates in other jurisdictions;
- Details about the applicant's operational, financial and other experience that demonstrate its ability to successfully launch and run mobile services and/or FWA services in the manner required by the licence conditions;
- Confirmation that the applicant has the intention and ability to comply with all relevant legislation including the Telecommunications Act, the regulations, the Telecommunications Code, licence and frequency authorisation;
- Details of any finding against the applicant, its umbrella company or an affiliate by a regulator, other administrative body or court in any jurisdiction within the last 5 years;
- Details about how harmful interference will be avoided bearing in mind the spectrum bands operated by networks in Anguilla and in neighbouring islands. In this respect applicants are directed to refer to the agreements that the Commission has established with neighbouring islands to the extent relevant.³⁹
- A commitment that the applicant will abide by all internationally recognised standards and in particular the requirements of the ITU's Radio Regulations and associated recommendations and resolutions, and 3GPP NTN standards where applicable, to avoid harmful interference, and that it will coordinate in good faith to avoid or mitigate any harmful interference that does occur. That would include an explanation of what it believes its obligations are in this respect and what measures it will put in place to meet them.
- Information sufficient to determine into which of the categories listed in [Table 15](#) the network and service fall.
- Such other information as the Commission may require in order to carry out its duties under the act.

a. Large and High-Power Earth Stations

More detailed information would be required for gateway earth stations, teleports, feeder-link earth stations and telemetry, tracking and command TT&C facilities

³⁹ <https://pucanguilla.com/agreements>

(summarised as large and high power stations) because they are typically site-specific facilities using larger antennas, higher power levels, more complex radiofrequency equipment and dedicated frequency links, which can create greater interference risks for terrestrial services, other satellite systems and neighbouring jurisdictions.

A gateway earth station connects a satellite network to terrestrial networks such as the internet. A teleport is a larger satellite communications hub that may support multiple satellite links, operators or services. A feeder-link earth station carries high-capacity traffic between satellites and the operator's gateway or core network. A TT&C facility monitors and controls the satellite itself, including receiving satellite status information, tracking its position and sending operational commands. All of these are either individual earth stations (gateways and feeder-links) or include earth stations (teleports have several earth stations; TT&C facilities have one or more earth stations).

Articles 21 and 22 of the Radio Regulations establish general international interference protections applicable to relevant space and earth station operations. The Commission's large and high-power earth station application requirements are not intended to duplicate those provisions, but to address the additional national regulatory issues raised by such facilities. These facilities require individual authorisation and supporting technical information. In contrast, for example, lower-power mass-market user terminals may be dealt with through blanket authorisations where they operate within approved technical limits and under satellite-network control.

The Commission proposes to apply a common baseline information requirement to all applications for such facilities. This reflects the fact that, regardless of frequency band, the Commission must be able to assess the proposed site, frequencies, bandwidths, emissions, antenna characteristics, power levels, satellite network, ITU filing and coordination status, and the measures available to prevent or resolve harmful interference.

However, the Commission recognises that the relevant risks and technical considerations may differ by band. For example, higher-frequency bands may require more detailed assessment of propagation, rain fade, antenna directivity, power density, passive-service protection, coordination with terrestrial fixed links, or temporary and non-interference/non-protection operating conditions. The proposed requirement therefore establishes a consistent core application framework while allowing the Commission to request supplementary band-specific studies, information or operating conditions. That might be justified by the applicable ITU provisions, Anguilla's spectrum use, neighbouring-jurisdiction considerations, the maturity of the relevant international framework, or the specific characteristics of the proposed gateway operation.

Consequently, an applicant for a gateway earth station, teleport, feeder-link earth station or TT&C facility would have to provide such technical, operational, site, satellite-network and coordination information as the Commission reasonably requires to assess compliance with the Act, the Regulations, the Telecommunications Code, the ITU Radio Regulations, applicable satellite filings and to avoid harmful interference.

The information would have to include, at a minimum; the earth station identifier; address; town or city; country; site coordinates; site elevation; equipment manufacturer; associated satellite or satellite constellation; satellite home administration or notifying administration; orbital type and relevant orbital parameters; transmit and receive frequencies; polarisations; bandwidths; frequency ranges of operation; ITU emission designators; maximum EIRP or carrier power; off-axis EIRP limits or masks; minimum elevation angle; antenna manufacturer; model; diameter; gain; azimuth; total input power to antenna; antenna beamwidth; antenna gain; maximum antenna height above ground level; and any other relevant antenna characteristics.

The applicant would also have to provide information on the applicable ITU filing; coordination status; relevant Article 21; Article 22 or other Radio Regulations requirements; emissions and out-of-band emissions; equipment standards; type approval status; network control and monitoring arrangements; interference detection and mitigation measures; and the capability to cease; reduce power; reconfigure; geofence or otherwise modify transmissions if harmful interference occurs or appears likely.

The Commission may require additional band-specific information, studies, measurements or operating conditions where justified by the frequency band, sharing environment, power levels, propagation characteristics, passive-service protection requirements, neighbouring-jurisdiction issues, existing or planned terrestrial services, or the temporary, experimental or developing status of the relevant international regulatory framework.

Question 10. Do you agree with the information requirements for applications for large and high-power earth stations?

21. Immediate Demand for Satellite Licences

The Commission believes that the following types of service are in immediate demand

- Case 1: NGSO satellite public internet access using stationary user terminals (ie User Terminals classed as Fixed Satellite Service (FSS)) using the Ku and Ka bands .
- Case 2: NGSO satellite public voice and lower data rate access using smartphones and other mobile devices ie devices in the Mobile Satellite Service (MSS) using the licence and frequency authorisation of an existing Mobile Network Operator. In other words, satellite operators would provide services to the MNO under a commercial contract.
- Case 3: NGSO satellite public voice and lower data rate access using smartphones and other mobile devices ie devices in MSS bands identified by 3GPP for non-terrestrial networks but outside bands identified for IMT.

Below we have identified the technical conditions for those services. Subsequently we have provided a proposed licence for Case 1. We have also proposed wording to allow MNOs to use NGSO satellite systems to extend MNOs' coverage by way of a change to their existing licenses and frequency authorisations.

22. Licence Conditions

The ITU Radio Regulations and best practice international standards including ITU recommendations and resolutions set out the conditions that are applicable to all satellite services. Providers will be required to abide by those regulations and standards unless otherwise stated.

a. NGSO Satellite and User Terminals Licence

In respect of an NGSO satellite provider delivering services to customers using static user terminals, radio frequency licensing conditions are provided for under the ITU Radio Regulations and in particular under articles 5, 21 and 22.

It would also be necessary for such a provider to comply with the conditions applicable to existing public network and service providers in Anguilla.

In this respect, we have provided a draft licence at Annex 1: Draft NGSO Satellite Internet Services Licence.

Outside the bands specifically designated for mobile satellite use that have been identified also by 3GPP for non-terrestrial networks, the terms of using IMT bands for satellite services are not yet properly defined. WRC-27 is working on Agenda Item 1.13, which seeks to establish formal power limits and technical criteria⁴⁰.

Currently, most IMT bands are not designed to deal with MSS, therefore, where use of them is being permitted for D2D there are extremely stringent requirements to avoid overpassing satellites from blinding ground based mobile networks.

Any such service must operate on a non-interference and non-protection basis under Article 4.4 of the Radio Regulations. In other words, it must not cause harmful interference to, and not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the ITU's Constitution, the Convention and the Radio Regulations.

Power Limits

Ofcom in the U.K. determined that IMT bands as identified by it for D2D services could only be used subject to the following power limits for unwanted emissions into adjacent channels in the mobile downlink (cell tower to phone transmission direction) spectrum.

⁴⁰ www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx

Mobile Band	PFD Limit in mobile downlink spectrum
<i>MHz</i>	<i>dBW / MHz / m²</i>
700, 800, 900	-119
1400	-113
1800, 2100	-111
2600	-108

Table 16: Ofcom. (2025). Statement: Enabling satellite direct-to-device connectivity in mobile spectrum bands.

<https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/consultation-enabling-satellite-direct-to-device-services-in-mobile-spectrum-bands/main-documents/dec2025/statement---enabling-satellite-direct-to-device-connectivity-in-mobile-spectrum-bands.pdf>

In comparison the FCC states that the aggregation of all space station downlink emissions outside a licensee's SCS frequency bands of operation shall not exceed a power flux density of $-120 \text{ dBW/m}^2/\text{MHz}$ at 1.5 meters above ground level and regardless of the satellite elevation angle.⁴¹

The Commission proposes using the same power limits as Ofcom.

Question 11. Do respondents agree that MNOs should be permitted to provide satellite services using spectrum already assigned to them? If not please explain why not with justifications.

Question 12. Do respondents agree that these power limits are appropriate and if not what is the alternative bearing in mind the impact on service quality? Please provide justifications for your answers.

Elevation Angle

A satellite elevation angle is the angle measured upward from the local horizontal plane to the line of sight to the satellite. This is a fundamental "*look angle*" used to determine the visibility of a satellite from any given point on Earth. At 0° elevation the satellite is exactly on the horizon (rising or setting). At 90° elevation the satellite is directly overhead (at the zenith). That is illustrated in Figure 11.

⁴¹ 47 C.F.R. § 25.202(k)(1) (2024).

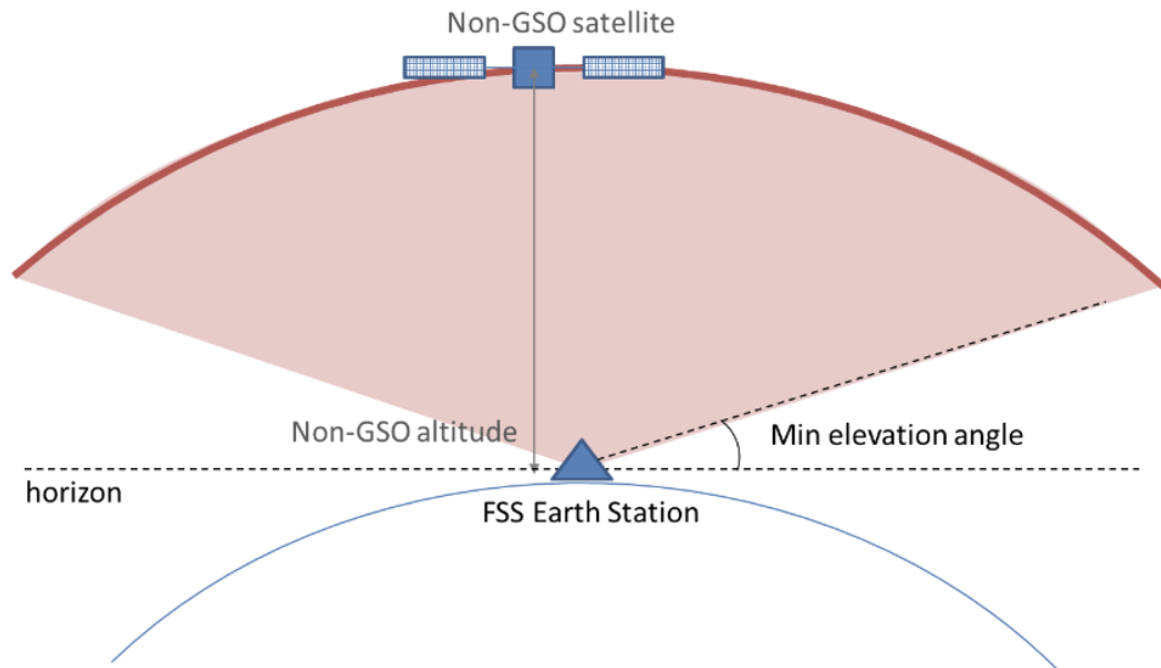


Figure 11: Airbus DS. (2021). Elevation distribution model for NGSO satellites (ECC PT1(21)119). ECC PT1 #68 web meeting, 26–29 April 2021. CEPT.
https://cept.org/documents/ecc-pt1/64068/ecc-pt1-21-119_airbus-ds-elevation-distribution-model-for-ngso-satellite⁴²

A minimum elevation angle is necessary for satellite transmissions in D2D services using mobile terrestrial spectrum in order to prevent harmful interference to mobile base stations. A problem can occur when the angle of the satellite relative to the horizon diminishes. At that point its transmitter begins to point more directly into the mobile base station receivers.

Ofcom undertook work in this area and derived the following results for the maximum level of power (measured as Power Flux Density, or PFD) that a satellite transmission can attain at the Earth's surface before it is likely to cause harmful interference to a terrestrial mobile base station:

⁴² International Telecommunication Union. (2019). Recommendation ITU-R F.1336-5: Reference radiation patterns of omnidirectional, sectoral and other antennas for the fixed and mobile services for use in sharing studies in the frequency range from 400 MHz to about 70 GHz.
https://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.1336-5-201901-1!!PDF-E.pdf

Elevation Angle (θ)	Antenna gain of a rural mobile base station (dBi)	Mobile Uplink Interference Threshold (dBW/MHz/m ²)
0	13	-138
10	2	-127
20	0	-125
30	-2	-123
40	-4	-121
50	-5	-120
60	-7	-118
70	-8	-117
80	-9	-116
90	-10	-115

Table 17: Interference threshold variation with elevation angle for coexistence with a rural terrestrial mobile base station operating at 897.5 MHz. Ofcom. (2025, September 9). Enabling satellite direct to device services in mobile spectrum bands: Statement and further consultation. <https://www.ofcom.org.uk/spectrum/space-and-satellites/consultation-enabling-satellite-direct-to-device-services-in-mobile-spectrum-bands>

Based on this analysis Ofcom concluded that an elevation angle of 10° would be appropriate.

Proposal

The Commission proposes to mandate the same minimum elevation angle of 10°. ⁴³

Question 13. Do respondents agree that a minimum elevation angle of 10° is appropriate and if not what is the alternative bearing in mind the constraints on coverage that would result if the angle were to be made larger. Please provide justifications for your answers.

b. NGSO Satellite D2D Using 3GPP NTN Bands Not Identified for IMT Licence

The requirements for the use of 3GPP NTN bands for D2D type services are included in 3GPP documentation. If usage is permitted in these bands, providers will be responsible for compliance in accordance with 3GPP documentation. They would also

⁴³ Ofcom. (2025). Statement: Enabling satellite direct-to-device connectivity in mobile spectrum bands. <https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/consultation-enabling-satellite-direct-to-device-services-in-mobile-spectrum-bands/main-documents/dec2025/statement---enabling-satellite-direct-to-device-connectivity-in-mobile-spectrum-bands.pdf>

face equivalent wider regulatory requirements to similarly placed competing public terrestrial providers.

Note that these bands are already identified for the Mobile Satellite Service (MSS) in the Radio Regulations and therefore provision is made to prevent harmful interference in articles 21 and 22 in particular and through coordination procedures.

If the use of 3GPP NTN bands outside those identified for IMT were permitted, we would propose using the same power limits as listed in Table 16 and a 10° elevation angle.

Question 14. Should D2D services in shared 3GPP NTN bands outside IMT spectrum be subject to the same interconnection, quality-of-service and other obligations as terrestrial mobile services? If not, which obligations should be change/removed/modified?

Question 15. What emergency calling obligations should apply to D2D services in Anguilla?

c. NGSO Satellites Using E-band

E-band frequencies (71-76 GHz downlink and 81-86 GHz uplink) are currently used on a limited, often temporary or conditional basis by NGSO satellite systems for high-capacity gateway earth station links. However, the Radio Regulations do not specify power limits for such bands currently, they are under investigation by the ITU's World Radiocommunication Conference.

Ofcom

Ofcom has implemented the following conditions for the use of the E-band by gateway stations.

- a) Maximum transmitter power density at the antenna port of the gateway earth station is limited to -20.8 dBW/1MHz.
- b) The Antenna Radiation Pattern Envelope – must meet the minimum performance specified by Recommendation ITU-R S.580; and
- c) Minimum elevation angle of 25 degrees for all gateway beams.
- d) Compliance with all the applicable international regulations and obligations, including ITU Radio Regulation Articles 21 and 22 (including No. 22.2).

Article 22.2 in the Radio Regulations states that NGSO satellite systems must not cause unacceptable interference to and, unless otherwise specified in these Regulations, cannot claim protection from geostationary-satellite networks in the fixed-satellite service and the broadcasting-satellite service operating in accordance with these Regulations.

Ofcom further determined that the PFD at the service of the Earth should not exceed the limit in Table 18.⁴⁴

Reference Bandwidth 1MHz			
Angle of arrival, δ , above the horizontal plane (°)	0-5	May-25	25-90
pfd limit in dB(W/m ²)	-120	$-120 + 0.75(\delta-5)$	-105

Table 18: Power flux density limits for NGSO space stations in 71 to 76 GHz band, Ofcom

Ofcom also added in limits to protect EESS (passive) operations in the adjacent 86-92 GHz band. However, the Commission is not aware of any potential interference problem in that regard in Anguilla. Therefore we have omitted reference to them.

FCC

The FCC has only general requirements that apply to NGSO FSS gateway stations in the E-band under § 25.115(f)⁴⁵ and not E-band specific requirements. The mean power of emissions has to be attenuated below the mean output power of the transmitter as follows:

- In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
- In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
- In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts.
- In any event, when an emission outside of the authorized bandwidth causes harmful interference, the FCC can require greater attenuation.

Proposals

- We propose allowing the use of the E-band using the same restrictions as Ofcom until the end of December 2028 by which time further conclusions will have been drawn as a result of work at the WRC 2027.

⁴⁴ Ofcom (2025, October 28). Statement: Temporary NGSO gateway access to E band <https://www.ofcom.org.uk/.../statement-temporary-ngso-gateway-access-to-e-band.pdf>

⁴⁵ 47 CFR Part 25: Satellite Communications (up to date as of March 27, 2026). eCFR. www.ecfr.gov

Question 16. Do you agree with our proposals for E-band? If not, please provide comments with justifications.

d. NGSO Satellite Services in W-band

W-band is a new frontier for satellite services using a higher frequency than E-band and therefore has higher potential capacity. It is not currently identified for satellite services but the FCC has made it available on a no interference and no protection basis. Consequently, if there is harmful interference for any use identified in the Radio Regulations it would be necessary to cease satellite service provision in the band immediately.

The risk from W-band interference is reduced because free-space path loss (the reduction in signal strength as it travels away from the source and spreads out) is greater and because beams are narrower/more directive and terrestrial usage in W-band is currently much lighter than in E-band.

We propose making it available on a no interference and no protection basis for gateway feeder links subject to interest given higher attenuation in tropical environments.

Question 17. Do you agree with our proposals for W-band? If not, please provide comments with justifications.

23. Right to Modify Power Limits and Elevation Angles

The Commission would reserve the right to make reasonable modifications to power limits and elevation angles with respect to satellite services on 30 days' notice.

24. Local Legal Presence

If satellite operators wish to provide services in Anguilla other than by way of leasing mobile spectrum from terrestrial mobile operators on a commercial basis, they will be required to establish a legal presence on the island by way of incorporation. That is necessary to enable the Commission to undertake enforcement action effectively. If spectrum was merely leased, then a legal presence would be required under tax legislation.

25. General Conditions

All satellite providers providing services in Anguilla would be required to cooperate so that they can coexist and provide services without causing harmful radio interference to each other, or to terrestrial services and service providers in neighbouring islands. Where the satellite service has been provided based on a commercial contract with a MNO and under its telecommunications licence and spectrum authorisation, the MNO would be responsible for ensuring that no harmful interference occurs.

26. Telecommunications Services Licence Fees

We propose the following licence fees:

a. Application Fee

For all of the seven types of regulatory instrument referenced in section 19 the fee will be \$1250.

b. Annual Payments

Under the Telecommunications Ordinance and Frequency Regulations, the Commission is required to act in a non-discriminatory fashion when awarding telecommunications licences and spectrum authorisations.

Consequently, for an NGSO satellite provider that wishes to provide services using shared spectrum it will be required to make annual payments based on the same formula as terrestrial providers.

The administrative costs of running the Commission are wholly funded by the Telecommunications Levy which is set based on the approved budget for the financial year.⁴⁶ The levy is split between all licenced operators based on a ratio determined from their audited revenues from the previous year.

Levy Formula

The levy formula is as follows:

$$\text{EC\$10,000} + (\text{MCA} - (\text{OTC} + (\text{EC\$10,000} \times \text{TNC}))) \times \text{ER/TER}$$

(a) MCA (maximum charge amount) is the sum of the amounts determined under section 48 of the Telecommunications Act (regulatory administrative costs), section 24 of the Public Utilities Commission Act (principles for making calculations) and the Telecommunications Levy and Licence Fees Regulations;

(b) OTC (other telecommunications charge) is the proportion of the Commission's costs for the financial year that-

(i) is attributable to the Commission's telecommunications functions and powers, and
(ii) will be recovered from telecommunications charges other than annual licence fees;

(c) TNC (total number of licensees);

(d) ER (eligible revenue); and

(e) TER (total eligible revenue) is the sum of the eligible revenue for the last annual audited financial statement for all the licensees listed in Schedule 2.

⁴⁶ Note that this is separate from spectrum fees.

Explanation of Equation

Minimum Fee

There is a EC\$10,000 minimum fee. This ensures that even the smallest players contribute a baseline amount to maintaining the regulatory framework.

Calculating the Funding Gap

The part of the calculation inside the large parentheses represents the total remaining amount the regulator needs to collect after other income sources are accounted for:

- MCA: This is the total budget the regulator is legally allowed to collect.
- Minus OTC: this subtracts money already collected from other sources to avoid "double dipping".
- Minus (EC\$10,000 x TNC): This subtracts the sum of all the EC\$10,000 base fees already collected from the licensees.
- Whatever is left after these subtractions is the net administrative cost that must be split among the companies.

The Proportional Variable

ER (Individual Revenue) / TER (Total Market Revenue): This calculates the licensee's share of total revenue and distributes the levy among licensees.

Consequently, if a company earns 40% of the total revenue in the country, it pays 40% of the relevant administrative costs of regulation.

Question 18. Do you agree with this telecommunications licensing fee approach? If not, what are the alternatives given the existing legislative requirements?

27. Spectrum Authorisation Fees

Satellite services are typically provided using shared spectrum. In contrast, public terrestrial mobile services operate using dedicated spectrum.

The Commission does not currently intend to make spectrum identified for IMT available to satellite operators under their own name. They would be required to enter into a commercial arrangement with mobile network operators to whom IMT spectrum has been assigned.

Bands that have been identified by 3GPP for NTN, other than those which fall into IMT bands, would also be available on a shared basis.

Use of shared spectrum bands for satellite usage would be subject to an annual fee of EC\$10,000. That would apply to Ku, Ka, V, E, W bands as well as 3GPP NTN (non-IMT) bands. The charge would be per band and not be bandwidth dependent. However, the E and W bands would be available only until 31st of December 2028, by which time the

results of WRC 2027 will have been announced and decisions about subsequent availability or otherwise could be taken.

There would be no ongoing fees for end user equipment such as user terminals or other devices and equipment communicating with satellites including smartphones. That is contingent on them meeting the requirements of the Radio Regulations and especially Articles, 5, 21 and 22, and abiding by all associated recommendations and resolutions, as well as any reasonable additional technical requirements that might be mandated by the Commission from time to time in order to prevent harmful interference. Compliance with 3GPP NTN requirements would also be necessary where relevant.

The Commission may introduce type approval fees for end user devices, other devices and equipment subject to future legislative changes.

Question 19. Do you agree with this spectrum authorisation fee approach? If not, please provide alternative proposals with justifications.

28. Orbital Debris Licence Requirements

Satellite operators must comply with UK Civil Aviation Authority (CAA) orbital debris rules as a part of securing an ITU satellite filing via Ofcom in order to obtain a licence to use frequencies and to provide telecommunications services in Anguilla.⁴⁷

Satellite providers are required to provide a debris mitigation plan (covering break-up prevention, minimisation of released objects, collision avoidance, and reliable post-mission disposal) to the CAA. The same reports and documentation submitted to UK authorities (e.g., anomalies, collisions, disposal progress) as relevant to Anguilla would have to be submitted to the Anguilla Public Utilities Commission and the Governor's office. Adequate third-party liability insurance and indemnity is also mandatory. Responsibility for orbital debris remains with the CAA and the Governor's office.

29. Type Approval

The Public Utilities Commission (PUC) in Anguilla receives and approves type approval requests from equipment manufacturers on behalf of the Government under section 33 of the Telecommunications Act. While other British Overseas Territories charge fees for this service, there has been none in Anguilla to date for these approvals. The Commission is aware that not all equipment manufacturers have been submitting applications.

The Commission intends to ask the Government to introduce a power to charge for type approval fees in future amendments to the Telecommunications Act.

⁴⁷ See Orbital Operator Licence: www.caa.co.uk/media/kbfgbx0/space-licensing-in-the-uk.pdf

30. Licence Duration and Scope

The NGSO and User Terminal licence and frequency authorisation duration would be 10 years and the geographic scope would be the territory including territorial waters up to any maritime boundaries. Satellite operators must contact the Governor's office for official advice about boundaries.

The same would be true for any individual satellite related licence and any supplement to such a licence unless otherwise stated.

Licences for E and W bands would last only until 31 December 2028 pending the outcome of WRC-27.

Question 20. Please provide any other comments you have on the consultation as a whole including supporting evidence where available and provide justifications.

Annex 1: Draft NGSO Satellite Internet Services Licence and Frequency Authorisation

We have provided a draft licence and frequency authorisation for comment that will enable an NGSO satellite provider to deliver internet services to end users by means of static user terminals. Please see the separate document attached to this consultation in this regard.

The draft licence and authorisation document is a modified version of the existing licence and authorisation that was issued to Cable and Wireless (West Indies) Limited (now “FLOW”) in 2014. The changes that have been made are highlighted for easy reference except that we have entirely deleted Annex E on Price Cap Rules and Annex F on Facilities Build-Out Obligations.

Note that existing legislation suffices to make these changes and that the legal and policy licensing framework set out previously in this consultation can be overlaid onto the existing license format.

The Commission may later and separately consult on the restructuring of licensing and authorisation documents with respect to the provision of satellite services in line with the outcome of this consultation. That would form a part of a wider consultation on restructuring licence and authorisation documents.

Annex 2: Draft Amendment Clause for MNO Licences

The Commission proposes the following supplement to the licences of existing mobile network operators to enable supplementary coverage from space:

1. Scope of Authorisation

Subject to the conditions in this Schedule, the Licensee (MNO) is authorised to permit a qualifying Satellite Operator to use the following frequency bands [the specific bands licensed would be inserted here] solely for the provision of supplementary satellite-to-device (Direct-to-Device – D2D) services within Anguilla’s territory and territorial waters. This authorisation is secondary to the Licensee’s primary terrestrial use and does not confer any independent spectrum rights on the Satellite Operator.

2. Prior Approval Required

No use of the spectrum by the Satellite Operator may commence until the Licensee has obtained the prior written approval of the Commission for the proposed arrangement and the associated contract. The Commission may attach further conditions or reject the proposal if it determines that the arrangement would cause harmful interference or is not in the public interest.

- **Mandatory Contractual Agreement**

The Licensee shall enter into a binding written contract with the Satellite Operator (the “*Satellite Contract*”). The Satellite Contract must:

- a) expressly require the Satellite Operator to comply with all technical and operational conditions of this Frequency Authorisation and all relevant laws including the Telecommunications Act, the Frequency Management Regulations, the Telecommunications Code, and any directions issued by the Commission;
- b) include enforceable obligations on power flux density, emission masks, elevation-angle restrictions, coordination procedures, and non-interference to other authorised users (including neighbouring jurisdictions and existing services);
- c) provide that the Licensee remains primarily responsible and liable to the Commission for all spectrum use under this authorisation;
- d) require the Satellite Operator to cease transmissions immediately upon notice from the Licensee or the Commission; and
- e) provide for automatic termination of the Satellite Operator’s rights if this Schedule is revoked or the Satellite Contract ends.

A copy of the executed Satellite Contract (and any amendments) must be provided to the Commission within 14 days of signing.

3. Technical and Operational Conditions

All satellite transmissions shall comply with:

- ITU Radio Regulations and Anguilla’s Table of Frequency Allocations;
- Any power, out-of-band emission or coordination limits or elevation requirements specified by the Commission;
- Non-interference / non-protection obligations with respect to primary terrestrial services and other users.

- The Licensee must ensure real-time monitoring and the ability promptly and immediately where possible to disable or reduce satellite transmissions in the authorised bands if harmful interference occurs.
4. Reporting and Audit
The Licensee shall provide the Commission with quarterly reports on spectrum usage under this Schedule and must allow the Commission to audit the Satellite Contract and related operations at any time.
 5. Revocation
The Commission may revoke or suspend this Schedule at any time if:
 - the Satellite Contract is terminated or breached;
 - harmful interference is caused; or
 - it is no longer in the public interest.Upon revocation, all satellite use of the spectrum must cease immediately.
 6. The Commission has the right, on 30 days' notice, to require the Authorisation holder to make reasonable modifications to power limits and elevation angles with respect to satellite services in order to avoid harmful interference to other services. This is without prejudice to existing requirements under the ITU Radio Regulations and other obligations on the Authorisation holder.
 7. Fees
The Licensee remains liable for all spectrum fees payable under the Telecommunications Spectrum Fee Regulations. Additional fees may be imposed by the Commission in respect of the shared use if the Commission is required to become involved in interference mitigation and additional spectrum management.

Because it would be supplementary to the main licence the duration of this supplementary schedule would endure until the expiry of the main licence and be subject to the same renewal criteria.

Note that the satellite provider would require an Individual NGSO or GSO Satellite Network Access Licence as relevant under the framework in section 19. That would be a version of the draft licence at Annex 1: Draft NGSO Satellite Internet Services Licence, but pared back to remove the ability to provide services to end users and removing the relevant associated obligations.

Annex 3: List of Consultation Questions

Question 1. Do respondents agree with the Commission's proposed objectives and principles for satellite regulation in Anguilla?

Question 2. Should the Commission prioritise particular satellite use cases? If so, please rank them and provide reasons.

Question 3. Do respondents believe that there is any significant risk from interference between the satellite bands proposed and terrestrial services or any other interference. If so, what mitigating measures are necessary beyond what is already stipulated in the Radio Regulations and 3GPP NTN standards?

Question 4. Do you agree with these Ku-Band and Ka Band proposals? If not, please provide alternative proposals with justifications.

Question 5. Do you agree with the proposed V, E and W band allocations and the terms on which they can be used, or are there other uses to which some of this spectrum should be put such as terrestrial microwave to the exclusion of satellite services? Provide justifications for your answers.

Question 6. Are there existing terrestrial fixed links, mobile networks, broadcasting systems, government systems, aviation/maritime systems or other services in Anguilla that may be affected by use of the proposed satellite bands? Please identify the frequencies, locations, technical characteristics and likely interference mechanisms.

Question 7. Should the Commission require satellite applicants to submit an Anguilla-specific interference assessment before authorisation? If so, what should that assessment include?

Question 8. Should gateway earth stations (larger stations that aggregate traffic rather than being user specific) be subject to site-specific coordination zones, exclusion zones, registration, public notice, or neighbour-jurisdiction coordination before deployment?

Question 9. Do you agree with this framework for satellite licensing and authorisation? If you have alternative proposals, please provide explanations and justifications.

Question 10. Do you agree with the information requirements for applications for large and high-power earth stations?

Question 11. Do respondents agree that MNOs should be permitted to provide satellite services using spectrum already assigned to them? If not please explain why not with justifications.

Question 12. Do respondents agree that these power limits are appropriate and if not what is the alternative bearing in mind the impact on service quality? Please provide justifications for your answers.

Question 13. Do respondents agree that a minimum elevation angle of 10° is appropriate and if not what is the alternative bearing in mind the constraints on coverage that would result if the angle were to be made larger. Please provide justifications for your answers.

Question 14. Should D2D services in shared 3GPP NTN bands outside IMT spectrum be subject to the same interconnection, quality-of-service and other obligations as terrestrial mobile services? If not, which obligations should be change/removed/modified?

Question 15. What emergency calling obligations should apply to D2D services in Anguilla?

Question 16. Do you agree with our proposals for E-band? If not, please provide comments with justifications.

Question 17. Do you agree with our proposals for W-band? If not, please provide comments with justifications.

Question 18. Do you agree with this telecommunications licensing fee approach? If not, what are the alternatives given the existing legislative requirements?

Question 19. Do you agree with this spectrum authorisation fee approach? If not, please provide alternative proposals with justifications.

Question 20. Please provide any other comments you have on the consultation as a whole including supporting evidence where available and provide justifications.

Annex 4: Terms and Acronyms

Band Spectrum Mask

A band spectrum mask (more commonly called a spectral mask, spectrum emission mask, transmission mask, or emission mask) is a regulatory and technical specification that defines the maximum allowable power levels (or power spectral density) that a radio transmitter can emit at different frequencies, relative to the center (carrier) frequency or the assigned channel bandwidth.

Broadcasting-Satellite Service (BSS)

This is a radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. The term “*direct reception*” encompasses both individual reception and community reception.

earth station

A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

- with one or more space stations; or
- with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

eMTC (enhanced Machine-Type Communication)

eMTC also known as LTE-M or LTE Cat-M1, is a 3GPP-standardized LPWA cellular technology that provides higher data rates (up to ~1 Mbps or more), lower latency, full mobility support with seamless handovers, voice capability (VoLTE), and still excellent power efficiency and extended coverage, making it ideal for IoT applications requiring movement, more frequent or larger data, or real-time features such as asset tracking, wearables, or connected vehicles, and it reuses standard LTE frequency bands (typically low- and mid-band ones).

Equivalent Power Flux Density (EPFD)

Equivalent Power Flux Density (EPFD) is designed to protect Geostationary Orbit (GSO) satellite systems from interference caused by Non-Geostationary Orbit (NGSO) constellations (e.g., LEO systems like Starlink). Defined in Article 22 of the ITU Radio Regulations, EPFD calculates the sum of power flux densities produced at a GSO receive earth station (or space station) by all transmit stations in an NGSO system, while accounting for the off-axis discrimination (directivity/gain pattern) of a reference GSO receiving antenna pointed in its nominal direction. The formula effectively "equates" the variable, time-varying interference from multiple moving NGSO satellites (with changing geometry and aggregate effects) to an equivalent steady interference level that a GSO receiver would experience.

fixed station

A station in the fixed service.

Fixed-Satellite Service (FSS)

This is a radiocommunication service “*between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services*” (see No. 1.21 of the Radio Regulations).

Harmful Interference

Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations (CS).

Internet POP

Internet Point of Presence

mobile earth station

An earth station in the mobile-satellite service (MSS) intended to be used while in motion or during halts at unspecified points.

mobile station

A station in the mobile service intended to be used while in motion or during halts at unspecified points.

Mobile-Satellite Service (MSS)

This is a radiocommunication service which is:

- between mobile earth stations and one or more space stations, or between space stations used by this service; or
- between mobile earth stations by means of one or more space stations.
- This service may also include feeder links necessary for its operation.

NB-IoT (Narrowband Internet of Things)

NB-IoT is a low-power wide-area (LPWA) cellular technology standardized by 3GPP that enables massive numbers of low-complexity, battery-powered IoT devices to connect with ultra-low data rates, exceptional deep coverage (including indoors and underground), and extremely long battery life (often 10+ years) for infrequent, small-packet transmissions like smart metering or environmental sensors, operating primarily in sub-1 GHz licenced bands.

orbit

The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity.

Power Flux Density (PFD)

PFD measures the power arriving at a receiving point per unit area per unit bandwidth (typically expressed in dB(W/m²) or dB(W/m²/Hz)). It quantifies the actual power density of emissions from a transmitter (e.g., a satellite downlink) at a specific location on

Earth's surface or in space. PFD limits (defined in Article 21 of the ITU Radio Regulations) are primarily used to protect terrestrial services (e.g., fixed or mobile terrestrial networks) from harmful interference caused by satellite downlinks.

Primary and Secondary Services

Where, in a box of the Table in Section IV of this Article, a band is indicated as allocated to more than one service, either on a worldwide or Regional basis, such services are listed in the following order:

- a) services the names of which are printed in “capitals” (example: FIXED); these are called “primary” services;
- b) services the names of which are printed in “normal characters” (example: Mobile); these are called “secondary” services (see Nos. 5.28 to 5.31).

Stations of a secondary service:

- a) shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
- b) cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;
- c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

satellite link

A radio link between a transmitting earth station and a receiving earth station through one satellite.

satellite network

A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations.

satellite system

A space system using one or more artificial earth satellites.

space station

A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

station

One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.