Appendix I: Decisions on Recommendations (DORs) Matrix from the First of Two Rounds of Public Consultation on the *Spectrum Plan for the Accommodation of Non-Terrestrial Networks*

The following summarises the comments and recommendations received from the first of two rounds of public consultation on the *Spectrum Plan for the Accommodation of Non-Terrestrial Networks* (the Plan), which took place from 1st to 29th October 2024 and was extended for a further two weeks. The decisions made by the Telecommunications Authority of Trinidad and Tobago (the Authority) have been incorporated in the approved version (ver. 0.2) of the Plan, where applicable. The Authority wishes to thank the following stakeholders for all comments and recommendations received:

1. Sateliot
2. Space X
3. Skylo Technology
4. Mobile Satellite Services Association (MSSA)
5. Global System for Mobile Association (GSMA)
6. Global Satellite Operators Association (GSOA)
7. Telecommunications Services of Trinidad and Tobago (TSTT) Limited
8. Digicel (Trinidad & Tobago) Limited (Digicel)

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
1	Sateliot	General	Sateliot appreciates the opportunity to participate in this public consultation on the Spectrum Plan for the Accommodation of Non-Terrestrial Networks. As a leading innovator in satellite-based Internet of Things (IoT) solutions, we are deeply committed to contributing with our expertise and insights to ensuring strong IoT connectivity to all Trinidadians. Sateliot thanks TATT for the opportunity to participate in this important consultation. We truly appreciate the direction the Authority is taking towards adapting and enhancing its satellite regulatory framework, while accommodating evolving technologies and services. Sateliot remain available to support TATT in finalising this framework and are eager to resume the process of providing our services in Trinidad and Tobago. We look forward to collaborating further and contributing to the growth and development of the telecommunications landscape in Trinidad and Tobago.		The Authority acknowledges the appreciation expressed by Sateliot for the opportunity to comment on the *Spectrum Plan for the Accommodation of Non-Terrestrial Networks* (the Plan) during this first round of public consultation.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
2	Sateliot	2.3 National Considerations	Sateliot's services, based on the 3GPP NB-IoT NTN standard, use narrowband technology that requires minimal spectrum to deliver nationwide coverage. For instance, 1 MHz would suffice for Sateliot to operate in full capacity giving local mobile network operators a competitive edge. Sateliot operates within the S-Band, specifically in the following radio frequencies: -1980 – 2010 MHz Uplink - 2170 – 2200 MHz Downlink We acknowledge that portions of the bands are already in use within Trinidad and Tobago with current availability at: -1995 – 2010 MHz is available - 2180 – 2200 MHz is available These available portions of the S-Band can be utilized not only by low-data-rate (LDR) operators but also by operators providing traditional MSS services that occupy more bandwidth to service proprietary solutions. The risk is that regulators might allocate the entire spectrum within these bands solely to broadband operators. This restricts market entry for new operators coming with new technologies and reduces competition, options and benefits for end-users.	To address this, Sateliot supports TATT's proposed allocations in the 2Ghz band and appreciates the inclusion of a 10 MHz (2 x 5 MHz) spectrum cap per operator as a licensing condition. This measure promotes diversity by allowing multiple operators to provide services within these bands, fostering competition and preventing monopolisation. Furthermore, Sateliot recommends TATT consider reserving a dedicated portion of this spectrum specifically for IOT services provided by satellite operators. This would safeguard smaller IoT operators from being overshadowed by larger players and ensure their ability to compete in the market. Specifically, we propose that TATT reserves a 5 MHz block within the specified bands exclusively for NB-IoT satellite operators, enabling them to deploy IoT services across Trinidad and Tobago. Given that each operator typically requires no more than 1 MHz to deliver IoT services, this approach could allow up to five different operators to enter the market, ultimately driving down costs for end-users. This approach not only ensures nationwide IoT service availability but also strengthens the competitive landscape, fostering innovation and driving down prices. Some countries have already recognized the strategic importance of this technology. For example, in the Kingdom of Saudi Arabia, the Communications, Space	The Authority acknowledges Sateliot's support for the proposed frequency assignment plan and the inclusion of a 10 MHz (2 x 5 MHz) spectrum cap per operator, as outlined in section 4.1 of the Plan. Sateliot is advised that the Authority does not propose to reserve spectrum for a particular service type or application such as NB-IoT as this may lead to inefficient use of spectrum due to remaining unassigned. The Authority further advises that narrowband Internet of Things (NB-IoT) satellite operators interested in deploying IoT over non-terrestrial networks (NTNs) across Trinidad and Tobago can apply for spectrum in keeping with the Plan, and safeguards are provided by the spectrum caps established. The proposed assignment plan can accommodate multiple satellite operators interested in deploying NB-IoT services over NTNs across Trinidad and Tobago. While the Authority will not reserve spectrum for a particular service type or application such as NB-IoT, it welcomes the information provided on the approaches adopted by other administrations.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				& Technology Commission (CST) has reserved a 5 MHz block within the specified frequencies to prioritise the deployment of NB-IoT technologies. Similarly, the Australian Communications and Media Authority (ACMA) has allocated 5 MHz exclusively for satellite IoT. This position illustrates a growing recognition of the importance of a dedicated spectrum for NB-IoT services, underscoring the potential benefits of such an approach in fostering a robust and competitive IoT ecosystem. Since NB-IoT operators require minimal spectrum, a single 5 MHz block can support up to five different operators providing this service maximizing the efficient use of the spectrum.	
3	Sateliot	2.3 National Considerations	The primary motivating factor for the use of satellite connected terminals is the ability to have ubiquitous coverage, especially in remote and border regions of a country. It is of significant benefit to all parties where bilateral and multilateral agreements are established between bordering countries for roaming devices. IoT devices are especially susceptible to cross borders as they operate in shipping, aeronautical and logistics operations. These devices will in standard lawful use likely regularly cross into and out of Trinidad and Tobago's territorial waters. Ensuring that end-users may freely enter and exit Trinidad and Tobago for temporary roaming with these devices ensures users confidence, wider adoption and a healthy growing satellite IoT market. Additionally, in the current WRC-27 study cycle, Agenda Item 1.5 is indeed considering regulatory measures to limit unauthorised operations (and terminals) of NGSO systems in the FSS and MSS in accordance with Resolution 14 (WRC-23) – this is of particular importance for cross border agreements as posed by TATT, provided most unauthorised devices do travel across borders. Sateliot is following this item closely and will collaborate with TATT where required.		The Authority acknowledges Sateliot's comment on satellite terminals' reachability vis-à-vis providing coverage in remote and border regions of the country and shall ensure the establishment of bilateral and multilateral agreements between bordering countries for roaming devices. The Authority shall follow the development of WRC-27, Agenda Item 1.5, regulatory measures to limit unauthorised operations (and terminals) of non-geostationary satellite orbit (NGSO) systems in the fixed-satellite service (FSS) and mobile satellite service (MSS) bands, in accordance with Resolution 14 (WRC-23).
4	Sateliot	4.2 Licensing Process and Conditions (Rule 7)	New business models that envision TN and NTN operators submitting applications together (section 4.2, rule 7): The satellite industry is evolving with unprecedented collaboration between terrestrial network providers and non-	While we appreciate TATT's recognition of the importance of agreements between NTNs and local terrestrial network providers, as outlined in section 4.2 of the Licensing Process and Conditions, specifically	The Authority agrees with the suggestion to allow NTN satellite operators to apply for spectrum licences prior to the establishment of agreements with local terrestrial network operators. However, if

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			terrestrial network providers. This collaboration has resulted in new services and increased benefits to consumers over the world. One such example is the collaboration to facilitate direct-to-device connectivity, another is the joint effort to provide 3GPP 5G NB-IoT NTN connectivity to customers of terrestrial network providers. Sateliot's business model is built on establishing standard roaming agreements with MNOs, a strategy that delivers dual benefits. For end-users, it ensures seamless connectivity through their trusted local provider. Meanwhile, MNOs gain a broader footprint without direct investment in satellite infrastructure, retaining their customer base while extending service areas.	rule number 7, we suggest that such agreements should be a condition for commencing commercial services, rather than a prerequisite for applying for a licence. This approach would allow satellite operators like Sateliot to secure necessary licences first, facilitating smoother market entry, and then focus on establishing agreements as required to start providing services. This adjustment would support more efficient deployment of services, benefiting both operators and consumers. Additionally, from a spectrum efficiency standpoint, it is more logical for the satellite operator to be the licence holder, with the spectrum allocated to the NTN provider rather than tied to individual agreements with terrestrial operators. This way, the spectrum can be shared across multiple terrestrial network providers without requiring a new application every time a new roaming agreement is signed. By attributing the spectrum directly to the NTN provider, multiple non-exclusive roaming agreements can be established, allowing for greater flexibility and reducing administrative burdens. This approach not only maximizes the efficient use of spectrum but also accelerates service deployment, fostering a more dynamic and competitive market. If adjusting the prerequisite is not possible, we propose implementing a stipulated period, such as 2 to 3 years, within which the required agreement must be finalized. During this time, the spectrum applied for by the NTN would be reserved exclusively for them, preventing other operators from requesting the same spectrum while the application process and agreement finalization are ongoing.	a licence is issued before an agreement with a terrestrial network operator is established, the Authority will be limited in its ability to ensure this condition is satisfied. As such, section 4.2, rule 1 has been amended to include "An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator" and rule 7 has been amended and now reads: "An established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the issuance of a licence in the 2 GHz Band." NTN operators can apply for a concession and licence prior to establishing such an agreement. Such agreement will not be necessary for the grant of the concession. The Authority agrees that NTN operators shall be the licensee in the 2 GHz band. As such, Sateliot is referred to section 4.2, rules 1 (now revised) and 2 which state: 1. Since the spectrum is to be used for the operations of a public telecommunications network, a Type 1 concession will be a prerequisite for the assignment of spectrum. An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator. 2. The licensing of spectrum in the 2 GHz band for NTNs shall be for the operations of public international telecommunications networks. Sateliot is informed that a new application is not required every time a new agreement is signed with a local terrestrial network operator. NTN operators shall notify the Authority of any new agreement signed with a local mobile network operator

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			(Rule 8) **Local infrastructure waiver, provided operators can showcase appropriate system architecture (section 4.2, rule 8)** A positive aspect of the current draft plan, specifically in Section 4.2, rule 8, is that in Trinidad and Tobago, there is only a requirement for a foreign company to be registered rather than a full establishment and creation of a local entity. This registration provision facilitates market entry without necessitating the opening of a company in the country, reducing entry barriers for smaller operators, especially those exploring new or uncertain markets. Establishing entities and infrastructure in new regions can pose significant challenges for smaller operators and may hinder their expansion into new countries. By allowing operators to enter without substantial infrastructure investments, Trinidad and Tobago can position itself as an attractive market for innovative satellite services, enhancing competition and broadening service options for consumers. In cases where a foreign satellite operator adopts a wholesale business model in collaboration with a local mobile network operator (MNO), this partnership ensures that business activity, revenue generation, and economic benefits remain in the country. Under Sateliot's model, the local MNO retains the end customer relationship, with the satellite operator serving solely as a capacity provider and roaming partner. This allows the MNO to own the SIM card and IMSI, maintaining control over customer relationships and billing. The satellite operator provides satellite connectivity while the MNO remains the primary service provider, thereby extending its coverage without requiring significant infrastructure investment from the NTN		(MNO). As such, section 4.2 rule 7 has been updated for clarity. Section 4.2, rule 1 has been amended to include "An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator" and rule 7 has been amended and now reads: "An established agreement between the NTN operator and a local terrestrial network operator will be a prerequisite for the issuance of a licence in the 2 GHz band." The Authority advises that "start of service requirements" are included in the rollout obligations of all authorised concession. As such, an expected timeline for the commencement of operations shall be defined for all authorised NTN operators. The Authority acknowledges that foreign companies that intend to operate in Trinidad and Tobago are required to be registered. This registration provision facilitates market entry, particularly where services are not provided directly to end users. The Authority welcomes the introduction of innovative satellite services to Trinidad and Tobago. The information shared on the wholesale business model of Sateliot is also welcome and shall be taken into consideration in the development of a framework for the authorisation of satellite services.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			provider.		
5	Space X	General	SpaceX and its local subsidiary, Starlink Trinidad & Tobago, thank TATT for this opportunity to comment on the crucial issue of assigning spectrum for enabling Space-based Communication Services. NTNs operating in the 2 GHz spectrum are essential to bridging broadband connectivity gaps, bringing services to emergency response and global IoT networks and providing broadband internet access and connected devices in isolated regions. This spectrum will be important to NTNs to provide broad, reliable coverage, particularly in areas where terrestrial networks cannot reach, underscores their crucial role in advancing communication infrastructure and supporting a wide array of applications. This versatility, coupled with potential global harmonization, highlights the 2 GHz band's critical role in expanding the reach of modern communication systems worldwide. SpaceX welcomes the opportunity to contribute to TATT's vision for spectrum planning to accommodate NTNs. We are eager to further engage with the Telecommunications Authority of Trinidad & Tobago to discuss our feedback and support the development of a robust regulatory framework for the future of NTNs in the 2 GHz band. SpaceX is a privately held company based in the United States that is revolutionizing space technologies, with the goal of making humanity a multi-planetary species. As the world's leading provider of launch services – and the only provider with an orbital class reusable rocket – SpaceX has unique experience with both spacecraft and on-orbit operations and has now deployed a high-speed, low latency satellite broadband network in Low Earth Orbit (LEO), Starlink. Since 2002, SpaceX has maintained unwavering commitment to – as well as demonstrated the value and potential of – a vibrant, open, and global space economy. Additionally, through Starlink, SpaceX		The Authority acknowledges Space X's appreciation for the opportunity to comment in the first round of public consultation on the Plan. The Authority thanks Space X for the background information shared on its operations and its support for the development of a robust regulatory framework for NTNs in the 2 GHz band.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			has helped redefine global expectations of what satellite internet can achieve. As a result, Starlink is currently connecting more than 4 million people with high-speed internet across 110+ countries, territories, and many other markets, spanning all 7 continents and oceans and skies.		
6	Space X	2.1 The Global Environment	**Potential NTN Use Cases in the 2 GHz Band** SpaceX commends TATT for its initiative to explore and make the 2 GHz band available for Non-Terrestrial Network (NTN) operations in Trinidad & Tobago, specifically spectrum in the 1995–2025 MHz and 2180–2200 MHz ranges. Market growth and ecosystem development often follow when opportunities are fully recognized by users. However, when spectrum availability is essential for deploying new services, regulation plays a critical role, acting either as a barrier or an enabler. The 2 GHz band holds significant importance for NTNs, which will be integral in bringing about the next generation of connectivity. The band's ability to provide wide-area coverage with moderate capacity makes it suitable for a range of transformative applications. NTNs such as SpaceX's LEO Starlink constellation can utilize the 2 GHz band to extend connectivity to areas where terrestrial networks either cannot reach or are prohibitively expensive to deploy. However, Mobile Satellite Services (MSS) can provide advanced services beyond IoT and low-data-rate emergency messaging. As such, so SpaceX encourages the TATT to broaden its initial focus. SpaceX believes that the true potential of NTNs remains largely untapped and will emerge in the coming years. A flexible framework for regulating the critical spectrum which will be used for NTNs will support investment and innovation. Several key use cases stand to benefit from allocating the 2 GHz spectrum to NTNs: • Broadband Internet for Remote and Rural Areas: NTNs operating in the 2 GHz band can deliver high-speed broadband to		The Authority acknowledges Space X's commending the initiative to explore and make the 2 GHz band available for NTNs in Trinidad and Tobago. The Authority agrees in principle with Space X's comment on the attributes of the 2 GHz band and its suitability for new and emerging NTN applications. The Authority advises that the scope of the Plan does not address the allocation and licensing of spectrum bands for terrestrial networks, including public mobile networks, fixed wireless access and private mobile networks, nor the provision of domestic services directly to consumers or using spectrum bands for public mobile telecommunications services using direct-to-device (D2D) communication. Use cases not addressed by this Plan shall be addressed in a framework for the authorisation of satellite services. The Authority has been flexible in its management and regulation of the spectrum used for NTNs. The frequency

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			underserved or remote regions where terrestrial infrastructure is scarce or too expensive. LEO satellites, for instance, can utilize this spectrum to provide broadband internet to rural communities, mountainous areas, and islands. This will help bridge the digital divide by extending essential services such as e-learning and telemedicine to areas lacking fiber-optic networks or cellular towers. • Disaster Recovery and Emergency Response: Following natural disasters like earthquakes, floods, or hurricanes, terrestrial communication infrastructure often sustains heavy damage, leaving affected areas disconnected. LEO satellites operating in the 2 GHz band can provide immediate, critical communication channels for emergency response teams, temporarily replacing damaged networks and facilitating disaster response coordination. Additionally, they can serve as reliable backup systems for first responders, maintaining communication even in geographically challenging environments where terrestrial networks may fail. • Maritime and Aviation Connectivity: NTNs can deliver reliable voice and data services to ships, vessels, and offshore platforms using the 2 GHz spectrum. This ensures that crew members remain connected to operational systems and personal communication networks, even when far from coastal areas. Airlines can also leverage NTNs to provide in-flight Wi-Fi services, enabling passengers to access real-time communication and internet during long-haul flights over oceans or remote areas without terrestrial network coverage. • Internet of Things (IoT) and Machine-to-Machine (M2M) Communications: The 2 GHz spectrum is particularly suited for deploying IoT and M2M networks in rural, agricultural, and remote areas, where it can support critical operations such as remote infrastructure monitoring. In industries like oil and gas, the latter so vital to Trinidad & Tobago's economy, NTNs can connect isolated pipelines, rigs, and power stations, enabling real-time data transfer and operational management.		assignment plan is based on 3GPP's band n256 and the MSS 2 GHz band plan of the Federal Communications Commission (FCC). Both plans accommodate the Frequency-division duplexing (FDD) mode of operations but with different duplex spacings. 3GPP's n256 has a duplex spacing of 190 MHz, while the FCC's band plan can accommodate a duplex spacing of 165–195 MHz. The Authority welcomes the information shared on the many use cases of NTNs operating in the 2 GHz band.
7	Space X	4.2 Licensing Process and Conditions	Licensing Process and Conditions (Rule 1)		

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			According to the public consultation proposal, TATT is suggesting specific regulations for licensing Non-Terrestrial Networks (NTNs) in the 2 GHz band. SpaceX welcomes the opportunity to provide feedback on these conditions and aims to contribute to TATT's vision of deploying NTNs in Trinidad & Tobago. Item 1 – Type 1 Concession It is our understanding that TATT's intention is to establish a minimum licensing requirement which could be met by either a Type 1 or Type 2 concession. These concession types are identified below: • **Type 1 Concession** allows a concessionaire to own or operate a public telecommunications network without offering public telecommunications or broadcasting services. • **Type 2 Concession** allows a concessionaire to both own/operate a telecommunications network and provide public telecommunications services over that network. Given the distinctions between the two types of concessions, SpaceX seeks clarification that it is TATT's intention to establish a **Type 1 concession as the minimum requirement** for NTN licensing in the 2 GHz band. Item 6 – Spectrum cap of 10 MHz (2 x 5 MHz) SpaceX strongly suggests that a **spectrum cap** not be implemented until satellite operators have demonstrated a clear demand for S-band spectrum. Prematurely introducing a spectrum cap could discourage potential NTN providers from entering the market, resulting in underutilized and inefficient use of spectrum. Should there be significant interest from multiple NTN operators in the 2 GHz band, only then would it be advisable to introduce spectrum caps in its licensing framework. SpaceX believes that recent innovations in LEO satellite constellation capabilities can offer significantly improved services over traditional MSS offerings and that an **ex-ante spectrum cap** could restrict operational flexibility, stifling innovation and interest in NTN development within the 2 GHz band. Rather than implementing this cap, SpaceX suggests TATT reserve the option to apply a cap		Space X is advised that a Type 1 concession is a requirement for the assignment of spectrum to NTN operators interested in extending the coverage of a local MNO without offering service directly to the end users/mobile subscribers. The Authority clarifies that Type 2 concessions will not be granted at this time to NTN operators in the 2 GHz band. The Authority acknowledges Space X's comments and suggestions on rule #6 – spectrum cap of 10 MHz (2 x 5 MHz). The Authority advises that the spectrum cap is necessary to promote an open market on a level playing field in this band.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			if circumstances warrant but believes a 2x5 MHz limit will unnecessarily limit the potential of services to the detriment of the citizens of Trinidad and Tobago. Item 7 – Established agreement between NTN operator and local terrestrial network NTN use cases can be implemented either in collaboration with local terrestrial network operators or independently. From SpaceX's perspective, advances in satellite technology are enabling NTNs to deliver direct-to-consumer services without necessarily having to deploy terrestrial customer-facing infrastructure. This approach can significantly accelerate the delivery of connectivity services to underserved and remote areas by leveraging the satellite networks' capabilities, without the need for a terrestrial partner. Recent innovations in NTN technology now allow standard smartphones to communicate directly with satellites without requiring specialized hardware. Several companies are developing satellite networks that enable direct communication between satellites and consumer smartphones. This means that users in remote areas can send text messages, make calls, or access limited internet services through satellite connections, even when they are outside the range of traditional cellular networks. SpaceX expects NTNs to provide both direct-to-phone connectivity and service to dedicated MSS receivers soon. Additionally, NTNs can very effectively offer ubiquitous IoT connectivity, which is especially useful for industries that rely on global communication for devices such as sensors and trackers. Satellites can provide seamless connectivity to IoT devices, allowing, for instance, a remote farming operation to deploy sensors for soil moisture or crop conditions monitoring, with data sent directly via satellite. Such a farm, which would previously have been entirely disconnected, could be fully integrated into the digital ecosystem using satellite solutions.		The Authority notes the comments that NTN use cases can be implemented either in collaboration with local terrestrial network operators or independently. Satellites communicating directly with standard smartphones without specialised hardware would operate within existing spectrum bands for mobile services, which is beyond the scope of this plan. At this time, the Authority intends to accommodate the use of the 2GHz band for NTN use cases, on the premise that it will be used to extend the coverage of existing local MNOs via a Type 1 concession and an established agreement between the NTN operators and the MNOs. The established agreement between an NTN operator and a local terrestrial network operator is a prerequisite for the issuance of a licence in the 2 GHz band.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			If NTN operators in Trinidad & Tobago obtain spectrum licenses through competitive processes, partnerships with terrestrial operators should not be mandatory for spectrum allocation. This flexibility is crucial to enable NTN providers to deliver innovative, high-coverage services independently, thus maximizing connectivity potential and meeting the country's broader telecommunications goals.		
8	Space X	4.3 Technical operating Conditions and Specifications	Technical operating Conditions and Specifications Section 4.3 provides a table with the maximum technical operating specifications for NTNs in the 2 GHz band. SpaceX invites the TATT to reconsider the third row in Table 5 on the "out-of-band emission limits." This constraint holds no specific meaning without providing two additional critical pieces of information: the frequency offset(s) at which this limit applies, and the reference bandwidth. For example, ITU-R SM.329-12 specifies the unwanted emissions in the spurious domain for MSS as -13 dBm in a 4kHz reference bandwidth for Space services. While SpaceX is not explicitly opposed to the values (if correctly represented) which have been identified in this table, setting these limits and others is typically not straightforward and requires adequate study. Thus, SpaceX is against setting technical constraints at this stage. Doing so prematurely could disincentivize some NTN operators from participating in spectrum auctions or administrative licensing hearings, if they find that meeting these constraints would be difficult. SpaceX instead proposes that the specifications and operational limits be set after the TATT has reviewed all potentially interested stakeholders and their propositions for service, including the relevant technical characteristics of their systems. NTNs operating in the 2 GHz spectrum are essential to bridging broadband connectivity gaps, bringing services to emergency response and global IoT networks and providing broadband internet access and connected devices in isolated regions. This spectrum will be important to NTNs to provide broad, reliable coverage, particularly in areas where terrestrial networks cannot reach, underscores their crucial role in advancing communication		Space X is informed that technical limits are standard for all spectrum plans. As raised by other contributors to this consultation, technical limits are necessary to ensure other services do not experience harmful interference. The Authority acknowledges the concerns of SpaceX regarding the technical limits and is committed to working with stakeholders in defining or amending these limits, in keeping with the outcomes of relevant studies for existing or emerging technologies. The Authority advises that the out-of-band limit proposed was adopted from ITU-R SM.329-13 and 3GPP TS 38.101.5, V18.8.0, and confirms that the unwanted emissions will apply to a 4 kHz reference bandwidth for mobile and fixed stations, in keeping ITU-R SM.329 for all space services. Space X is welcome to share any information, in addition to the Authority's referenced ITU-R documents, that can support an adjustment of these technical limits. The Authority shall continue to review these limits, in keeping with the outcomes of all relevant ITU studies and in consultation with stakeholders.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			infrastructure and supporting a wide array of applications. This versatility, coupled with potential global harmonization, highlights the 2 GHz band's critical role in expanding the reach of modern communication systems worldwide.		
9	Skylo Technology	General	Skylo supports the Telecommunications Authority of Trinidad and Tobago's Spectrum Plan for the Accommodation of Non-Terrestrial Networks to enable Non-Terrestrial Network (NTN) services in Trinidad and Tobago. By making frequencies available in the 2 GHz band (2005-2020/2185-2200 MHz), TATT is creating an environment where satellite operators can extend critical connectivity to underserved areas, support innovative machine-to-machine (M2M) applications, and enhance the overall resilience of Trinidad and Tobago's telecommunications infrastructure. Skylo encourages TATT to move forward with the proposed plan and create a clear regulatory framework that encourages the deployment of NTNs. Skylo is a 'direct-to-device' (D2D) NTN service provider that powers end-to-end satellite service for phones, wearables and Internet of Things (IoT) devices using geostationary mobile-satellite service (MSS) satellites and dedicated MSS L-band and S-band spectrum. Skylo has sent more than 10 million messages on our NTN service offering and we have nearly 100 patent filings worldwide focused on optimizing satellite links to cellular devices across constellation types. Because Skylo's D2D service is live across four continents, with more than 50 million square kilometers of coverage, Skylo has had a unique opportunity to assess the regulatory framework for D2D services in a wide range of countries, most of which apply the same regulatory framework for D2D using MSS spectrum as for existing mobile-satellite services. The 'user terminal' is simply a standard smartphone or IoT device, as the case may be, allowing existing regulations for MSS to perfectly cover the scope of D2D.		The Authority acknowledges Skylo Technology's support for the spectrum plan to accommodate NTN services in Trinidad and Tobago. The Authority welcomes the information shared on the operations of Skylo Technology and its use of the S-band and L-band for the provision of NTN services.
10	Skylo Technology	2.1 The Global Environment	Skylo strongly agrees with Section 2.1 The Global Environment of the TATT's Consultative Document, which states that the 5G IoT ecosystem 'would enable satellite operators to provide affordable satellite communication that inherently performs better compared		The Authority acknowledges Skylo Technology's agreement with section 2.1 of the Plan and welcomes the additional information.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			to the bulky and expensive terminals used in non-3GPP legacy mobile satellite service (MSS) systems. NTNs enable service providers to operate in otherwise untapped markets and offer premium services beyond the capabilities of traditional terrestrial networks. NTNs satisfy the increasing demand for data and ubiquitous coverage, transmitting and receiving more information through satellite networks for meaningful and universal communications.' One of the most important benefits for people and businesses in Trinidad and Tobago is that D2D networks like Skylo's make satellite connectivity affordable, reliable, ubiquitous, and – most importantly – that it works from the same device that consumers have today. Because Skylo uses standardized cellular modems to connect to satellites, these services benefit from much larger economies of scale and therefore can be deployed into many more devices because of the lower cost compared to traditional satellite phones that are more limited in scale and therefore more costly. Additionally, by building to 3GPP standards, Skylo is fully interoperable with the terrestrial mobile ecosystem, allowing satellite and terrestrial mobile services to operate no differently than standard roaming today. Given the geography of Trinidad and Tobago, and the importance of connectivity for the maritime and oil and gas sectors, extending the connectivity of the terrestrial network with D2D NTN services is a crucial enhancement for consumers and businesses across Trinidad and Tobago and the vicinity. By providing reliable connectivity in areas where terrestrial networks fall short or are not economically viable, such as mountains, islands or maritime where terrestrial networks are not economically viable, D2D services can significantly improve emergency and disaster response. D2D services also support IoT applications across industries like logistics, agriculture, fishing, shipping, energy and environmental monitoring, and enabling data-driven decision-making and operational improvements. These are all critically important sectors of Trinidad and Tobago's vibrant economy, therefore Skylo encourages the TATT to allow for the efficient deployment of a widespread proliferation of new devices.		The Authority agrees, in principle, with Skylo Technology's comment on the affordability, reliability and ubiquitousness of satellite services. The advancement of satellite technology has significantly improved emergency and disaster response in Trinidad and Tobago, particularly in areas where terrestrial networks fall short or are not economically viable, such as mountains or maritime. The Authority shall continue to support the efficient deployment of new devices in keeping with its authorization regime.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			Skylo has seen an exponential increase in the take-up of its service and the interest in deploying Skylo's connectivity has skyrocketed with the recent introduction of Skylo in all Google Pixel 9 smartphones. (https://www.skylo.tech/newsroom/skylo-connectivity-enables-new-satellite-sos-feature-on-google-pixel-9-series), and recent partnership announcement with Verizon (https://www.verizon.com/about/news/verizon-skylo-launch-direct-device-messaging-customers). Given these recent developments and the market opportunity for D2D services in Trinidad and Tobago, Skylo encourages TATT to continue with the consultative process that it has begun to ensure that D2D NTN services in Trinidad and Tobago can be deployed in the S-band, as well as the L-band, as quickly as possible.		The Authority acknowledges Skylo's support for the consultation process for the deployment of NTN services in the S-band and its comments for the inclusion of the L-band for NTN services in Trinidad and Tobago. Skylo is informed that D2D services directly to consumers or within bands for public mobile telecommunications services is outside the scope of this Plan and shall be considered in a framework for the authorisation of satellite services.
11	Skylo Technology	2.3 National Consideration	The approach laid out in TATT's Consultative Document in Section 2.3 on National Considerations suggests that TATT will continue to adopt a light-touch regulatory framework (e.g., all user terminals have been class-licensed) and Skylo would encourage such an approach as it would allow all capable cellular devices to take advantage of D2D/NTN. Taking a regulatory approach for 3GPP standardized D2D NTN devices that is consistent with how terrestrial-only cellular devices are licensed today will encourage the deployment of advanced NTN networks and devices. These 3GPP standardized NTN devices will quickly become ubiquitous and will be in the same hand-held devices used for terrestrial cellular communications, therefore Skylo would recommend that no additional regulatory fees be imposed solely because these devices can provide both terrestrial cellular and satellite access. The public policy benefits of access to coverage anywhere for emergency, location-based, and messaging service when outside the coverage of terrestrial networks far outweigh any possible monetary benefit to the government from fees on satellite connectivity.		The Authority agrees in principle with Skylo's comment as it relates to the authorisation of user terminals, i.e., user terminals for terrestrial mobile networks are class-licensed, in keeping with the Authority's *Schedule B - Schedule of Devices Eligible for Use under a Class Licence*. Additionally, Skylo is informed that regulatory fees for the use of spectrum are in keeping with the Telecommunications (Fees) Regulations, 2006.
12	Skylo Technology	4.1 Frequency Assignment Plan	Given the rather challenging context in Trinidad and Tobago for the 2 GHz band, Skylo supports the 2 GHz assignment plan outlined in Table 4 in the Consultative Document because it		The Authority acknowledges Skylo's support for the frequency assignment plan outlined in Table 4,

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			accommodates both 3GPP's band n256 and the FCC's MSS 2 GHz band plan. Skylo can already operate NTN under both band plans even though they have different duplex spacing.		which accommodates both 3GPP's band n256 and the FCC's MSS 2 GHz band plan.
13	Skylo Technology	4.2 Licensing Process and Conditions	In Section 4.2 Licensing Process and Conditions of the Consultative Document, TATT mentions that an 'established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the assignment of spectrum in the 2 GHz Band.' While many of Skylo's D2D NTN applications are provided in partnership with local terrestrial network operators, there are some use cases for smartphones and wearables that can operate without a terrestrial operator. For example, in the U.S. market, all Pixel 9 smartphones include Skylo's D2D NTN so consumers can connect to emergency services via satellite to get help and share their location with their contacts regardless of the terrestrial network operator, therefore it is not clear how such a use case would be treated under the framework proposed by TATT. In Section 4.2, TATT also states that there will be a 2 x 5 MHz spectrum cap (10 MHz) but there is no rationale for the 10 MHz cap. Skylo would encourage TATT to provide additional rationale on the 2 x 5 MHz cap.		As spectrum may be used to extend the coverage of local MNOs, the Authority advises that an established agreement between an NTN operator and a local terrestrial network operator is a prerequisite for the issuance of a licence, and it has agreed to allow NTN satellite operators to apply for spectrum licences prior to establishing an agreement with local MNOs. As such, section 4.2, rule 1 has been amended to include "An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator" and rule 7 has been amended and now reads: "An established agreement between the NTN operator and a local terrestrial network operator will be a prerequisite for the issuance of a licence in the 2 GHz band." The expected timeline for the commencement of operations shall be defined for authorised NTN operators. The Authority advises that the spectrum cap is based on promoting an open market to this spectrum band on a level playing field. Sections 3, item 6 and 4.2, item 6 have been revised accordingly.
14	MSSA	General	MSSA welcomes the opportunity to provide comments to The Telecommunications Authority of Trinidad and Tobago (TATT/the Authority) regarding its Consultative Document on the Spectrum Plan for the Accommodation of Non-Terrestrial Networks as outlined in the chart that follows. As reflected in the specific comments and recommendations offered below, MSSA is generally supportive of the Authority's efforts to facilitate the introduction of NTN and D2D services in Trinidad and Tobago. That said, MSSA is concerned with certain aspects of the proposed framework, which may inadvertently limit the flexibility with which those services can be offered or erect unnecessary		The Authority acknowledges MSSA's appreciation for the opportunity to comment in the first round of public consultation on the Plan and notes its concerns. The Authority welcomes further discussion with MSSA on the subject.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			barriers to market entry. We would welcome the opportunity to further engage with the Authority—including by meeting with the TATT to further discuss our proposals		
15	MSSA	1.1 Background	The Consultative Document defines "NTN" as "wireless communication systems that operate above the Earth's surface, involving high-altitude platform stations (HAPS), unmanned aerial vehicles (UAVs2) such as balloons, drones, etc. and satellites in geostationary Earth orbit (GEO), medium Earth orbit (MEO) and low Earth orbit (LEO), or a combination of these elements." No source for this definition is provided.	MSSA notes that the term "NTN" has been defined in different ways in different contexts (and sometimes in a manner that intentionally focuses on certain technologies to the detriment of others). MSSA recommends that TATT state the source of the NTN definition used in the Consultative Document and clarify that the definition does not favor any specific technology. While MSSA supports 3GPP – based specifications, some interested operators may currently be using alternative solutions. As long as the technologies can operate in the specified band plan, there should not be a specific technology mandate.	MSSA is advised that the sources of information extracted are properly referenced in the Plan. In section 1.1 – Background, the Authority provides a general description of NTNs and not a definition. For clarity, a definition for NTN has been added to the definition section of the Plan. MSSA is further advised that the Authority has adopted a technology-neutral approach in its regulations, which reduces barriers to entry and promotes competition in the market. Spectrum plans and frameworks are developed to accommodate new and emerging technologies without favouring a specific technology. The Authority confirms that there are no specific technology mandates.
			The Consultative Document assumes, without foundation, that "LEO satellites provide the foundation for many NTN use cases." The Consultative Document also incorrectly assumes that LEO satellites "offer the advantage of lower latency than MEO or GEO satellites due to the shorter distance to Earth, that can support real-time NTN applications."	It is premature to assume that LEO use cases are the primary focus for NTN. Current NTN D2D services in the market include GEO, LEO, and even hybrid solutions that combine both. MSSA notes, in particular, that operators successfully use a wide variety of satellite technologies (*e.g.*, GEO, MEO, and LEO) to support wireless communication links, including direct satellite-to-mobile handset connections. These connections have been used to serve mobile users for decades. Indeed, "NTN" use cases involving MSS spectrum are merely an extension of the well-established MSS concept. As a result, this type of NTN can be provided today without the need for additional national or international regulatory measures.	The Authority agrees and has amended the paragraph in section 1.1 to read: "Currently, many NTN applications use GEO, MEO and LEO satellites." The information provided highlights a fundamental difference between GEO and LEO satellites. MSSA is advised to share any information that can support an amendment to the content of section 1.1. The Authority welcomes the information shared on the wide use of GEO, MEO and LEO to support wireless communication links.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				MSSA advises the Authority to adopt an orbit-neutral approach to NTN, acknowledging that LEO, MEO, and GEO systems can all be employed.	MSSA is informed that the Authority is orbital neutral and is not promoting any specific orbital positions for wireless communication links. As such, the following sentence in the background has been updated for clarity and now reads, "Currently, many NTN applications use GEO, MEO and LEO satellites."
16	MSSA	1.4 Scope	This Consultative Document incorporates a proposed frequency assignment plan for the 2 GHz band and specifies how licenses would be awarded to concessionaires under that plan. The Consultative Document explicitly notes that the plan does *not* address the allocation and licensing of bands for terrestrial networks—including (among other things) "domestic mobile services using direct-to-device techniques."	MSSA generally supports TATT's efforts to license the 2 GHz band to concessionaires and recognizes that the plan does not address spectrum allocation and licensing for terrestrial networks. However, MSSA requests clarification regarding the purported exclusion of "domestic mobile services using direct-to-device techniques." In MSSA's view, "direct-to-device" ("D2D") techniques should not be viewed as monolithic in nature. To the contrary, two very different approaches to D2D are being contemplated—with very different implications. Specifically: -The first approach to D2D uses already allocated and licensed mobile satellite service (MSS) spectrum for D2D and is feasible within the existing regulatory framework that enables today's MSS services. -The second approach to D2D relies on satellite operators transmitting in spectrum allocated to terrestrial services (IMT) and licensed to mobile operators, and will require significant changes to existing regulatory frameworks to allow for different uses of spectrum than existing allocations support, and careful management to avoid interference into existing uses. As suggested by the description of MSS D2D above, satellite connectivity has been provided directly to	MSSA is directed to section 4.2, rule 7 which states: "An established agreement between the NTN operator and a local terrestrial network operator will be a prerequisite for the issuance of a licence in the 2 GHz band." Thus, NTN operators can provide D2D services to mobile subscribers of an MNO with whom they have an established agreement. The Authority acknowledges MSSA's comments as they relate to the two approaches to D2D services, i.e., the use of allocated and licensed MSS spectrum and the use of spectrum allocated to terrestrial services and licensed to mobile operators. The Authority clarifies that the authorisation of MSS D2D services directly to consumers both

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				"devices" in MSS spectrum bands, including in the mobile context, for decades. Emerging D2D services are simply an application of the long-existing MSS concept in which terrestrial and satellite bands can be accessed using a single device. To the extent that the reference to "domestic mobile services using direct-to-device techniques" is meant to refer to the IMT D2D approach discussed above, MSSA agrees that the stated exclusion is appropriate. However, it would make little sense to extend that exclusion to the MSS D2D approach, which is consistent with other MSS applications. We respectfully ask that TATT clarify the intended scope of the exclusion in the next consultation round.	within MSS spectrum and in IMT bands is beyond the scope of this plan. The provision of services using D2D communication directly to consumers or within bands for public mobile telecommunications services may be considered in a framework for the authorisation of satellite services. To clarify, the scope of this Plan has been revised to read: "This Plan accommodates the operation of NTNs using allocated spectrum to extend the coverage of domestic terrestrial network operators for the provision of public telecommunications services. This Plan does not address the allocation and licensing of spectrum bands for terrestrial networks, including public mobile networks, fixed wireless access and private mobile networks. The provision of direct-to-device communication directly to consumers or using spectrum bands for public domestic mobile services is also not addressed."
17	MSSA	2.1 The Global Environment	The Consultative Document specifically describes 3GPP Release 17 and Release 18 and suggests that these standards will provide a basis for future NTN deployments.	MSSA supports the 3GPP ecosystem for NTN but believes regulators should avoid mandating specific technology standards. Concessionaires should have the flexibility to choose the technology that best aligns with their business model and serves the interests of consumers.	MSSA is advised that the Authority has adopted a technology-neutral approach in its regulations, to reduce barriers to entry and promote competition in the market. Spectrum plans and frameworks are developed to accommodate new and emerging technologies without favouring a specific technology. Standards are also necessary to inform spectrum plans and duplex spacings.
18	MSSA	2.2 NTN Frequency Bands	The Consultative Document incorporates, in Table 1, specific bands defined by 3GPP for communication by NTNs with user equipment. However, the stated spectrum ranges do not distinguish between uplink and downlink frequencies, and consequently inadvertently imply that certain band segments are included that should be excluded. The Consultative Document notes that 3GPP band n256 spans 1980-2010 MHz paired with 2170-2200 MHz, providing a 190 MHz duplex. This band is optimized for the globally harmonized frequency band, primarily used in Region 1 due to the absence of	MSSA advises that the Authority adheres to the specific frequency bands outlined by 3GPP in document 3GPP 38.101-5, NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite Access Radio Frequency (RF) and Performance Requirements. This would help to ensure consistency with 3GPP standards documents and avoid unnecessary confusion. MSSA suggests below that TATT opt to use band n252 currently under consideration in 3GPP for Region 2, 2000-2020 MHz paired with 2180-2200 MHz.	The Authority agrees and has updated section 2.2, Table 1, in keeping with *3GPP TS 38.101.5, V18.8.0 – Technical Specification Group Radio Access Network; NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements, (Release 18), 2024.* MSSA is advised that bands under consideration by 3GPP will only be considered by the Authority following the completion of 3GPP's studies and other relevant ITU studies and is based on market

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			PCS operators. TATT is proposing a 2 GHz band plan with a hybrid 180 MHz / 190 MHz duplex separation, covering 2005-2020 MHz paired with 2185-2200 MHz.		interest and spectrum availability in Trinidad and Tobago.
19	MSSA	2.3 National Considerations	The Consultative Document outlines the existing uses of the 2 GHz band in Trinidad and Tobago and the availability for NTNs to operate on a non-interference basis noting that 1995-2020 MHz is unassigned and available for NTNs for MSS and that 2180 – 2200 MHz is unassigned and available for NTNs for MSS. TATT states, "With the increasing deployment of NTNs on a non-exclusive basis, and the advancement of additional services in the 2 GHz band, additional spectrum planning and coordination are required at the national level, to ensure interference-free access to spectrum in the MSS bands by NTN operators."	Due to the growing demand for D2D services and the available spectrum in Trinidad and Tobago, MSSA recommends allocating 2 x 20 MHz for NTNs dedicated to MSS, rather than the initially suggested 2 x 15 MHz. This adjustment will enable TATT to leverage the 3GPP n252 frequency band and support a wider range of band channelization options. While NTNs can sometimes function on a non-exclusive basis, it is preferable for them to have exclusive, dedicated spectrum to ensure high-quality, interference-free MSS services, including IoT and D2D applications.	MSSA is advised that the Authority may consider band n252 following the completion of 3GPP's studies and other relevant ITU studies. The Authority may update its Plan to accommodate new bands based on market interest and spectrum availability in Trinidad and Tobago. However, the Plan accommodates systems that may not support a 180 MHz duplex separation, thereby promoting an open market while providing adequate separation from existing public mobile telecommunications service (PMTS). The Authority will assign spectrum exclusively for NTNs at the national level to ensure interference-free services.
20	MSSA	3 Frequency Planning Principles	The Consultative Document provides that "All plans shall have a reference channel bandwidth that serves as the minimum assignable channel bandwidth. Frequency channels that require larger bandwidths can be achieved by concatenating multiple non-contiguous frequency channels of the reference channel bandwidth, which would equate to contiguous spectrum. All assignments to an operator shall be contiguous as far as possible."	Given the requirements for NR NTN with 5 MHz channel bandwidths, MSSA has concerns regarding the proposed minimum assignable channel bandwidth of 1 MHz. Concatenating multiple non-contiguous frequency channels may not result in contiguous spectrum, or it might not be feasible at all. MSSA agrees that all spectrum assignments should be as contiguous as possible.	The frequency assignment plan caters to operators that require smaller and larger bandwidths. 3GPP's NB-IoT NTN standard uses narrowband technology that requires minimal spectrum to deliver nationwide coverage. A minimum spectrum cap of 2 MHz (2x1 MHz) is sufficient for satellites that require smaller bandwidths to operate at full capacity. This safeguards smaller IoT operators and supports a competitive market. Frequency planning principle 2 (section 3 of the Plan) has been revised to read as follows: "All frequency assignment plans shall have a reference channel bandwidth that serves as the minimum assignable channel bandwidth. Frequency channels that require larger bandwidths can be achieved by concatenating multiple contiguous frequency channels of the reference channel bandwidths, which would equate to contiguous spectrum. All assignments to an operator shall be contiguous as far as possible".

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				MSSA also advises against assigning all blocks in 1 MHz channels, as operators aiming to deploy systems with greater bandwidth would require at least 2 x 10 MHz of spectrum for NR NTN. The ideal allocation would be 2 x 15 MHz to support a reuse pattern of 3 x 5 MHz. We would welcome the opportunity to engage in a technical discussion with the Authority to further explore the specifics of the band plan.	The 1 MHz channel assignment plan supports a competitive market and is based on research conducted by the Authority and supported by contributions to this first round of consultation. A minimum spectrum cap of 2 MHz (2x1 MHz) is sufficient for satellites that require smaller bandwidths to operate at full capacity, and safeguards smaller IoT operators.
21	MSSA	4.1 Frequency Assignment Plan	The Consultative Document notes that the frequency plan presented therein is a mix of 3GPP band n256 and the FCC's MSS 2 GHz band plan with both accommodating FDD but with different duplex spacings. Channels 1 to 5 are based on n256 and channels 6 to 15 are based on the FCC's band plan. The Authority is of the view that the adoption of a channel assignment plan based on 3GPP's band n256 and the FCC's MSS 2 GHz band accommodates a wider range of NTN systems that support duplex spacings from both band plans.	We appreciate that TATT attempted to take a flexible approach to duplex separation, to accommodate a mix of the two band plans. However, as noted earlier, 3GPP is currently specifying the 2000-2020 MHz band paired with the 2180-2200 MHz band as band n252. Based on the spectrum availability in Trinidad and Tobago, this appears to be a solution that aligns with 3GPP standards and Region 2 band planning.	The Authority may consider band n252 following the completion of 3GPP's studies and other relevant ITU studies. The Authority may update the Plan to accommodate new bands based on market interest and spectrum availability in Trinidad and Tobago.
22	MSSA	4.2 Licensing Process and Conditions	The licensing rules specified in the Consultative Document provide that: "A point-to-multipoint spectrum licence shall be granted by the Authority in order for spectrum in the 2 GHz band to be assigned. The minimum assignment shall be 2 MHz (i.e., 2 x 1 MHz)."	MSSA recommends making 2 x 5 MHz block sizes available and would be pleased to have a technical discussion with the Authority to further discuss the specifics of the band plan.	The minimum assignment plan of 2 MHz (i.e. 2 X 1 MHz) is based on the Authority's research in developing this Plan and supports a competitive market. A minimum spectrum cap of 2 MHz is sufficient for satellites that require smaller bandwidths to operate at full capacity, and safeguards smaller IoT operators.
			The licensing rules specified in the Consultative Document provide that "The assignment of spectrum shall be via first come first served or a competitive licensing process, based on demand for this spectrum, as determined by the Authority."	MSSA advocates for administrative licensing processes (such as first come first served) for satellite spectrum rather than a competitive licensing process. This approach enables licensees to optimize their resources for providing high-quality services.	MSSA is advised that the selection of a spectrum authorisation method is guided by the Authority's *Authorisation Framework for the Telecommunications and Broadcasting Sectors of Trinidad and Tobago*, which specifies the conditions for "first come, first served" and competitive assessments.
			The licensing rules specified in the Consultative Document provide that: "The allocated spectrum in the 2 GHz band shall be licensed in accordance with the frequency assignment plan (as seen in Table 4)."	See MSSA's response above. We recommend aligning with the upcoming 3GPP band n252 and making 2 x 20 MHz of spectrum available for NTN MSS in 2000-2020 MHz paired with 2180-2200 MHz.	The Authority may consider band n252 following the completion of 3GPP's studies and other relevant ITU studies. The Authority may update the Plan to

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			The licensing rules specified in the Consultative Document provide that: "The spectrum cap for the 2 GHz band shall be 10 MHz (i.e. 2 x 5 MHz)."	MSSA respectfully disagrees with the proposed spectrum cap for the 2 GHz band. For operators planning to deploy an NR NTN system, 2 x 5 MHz is insufficient to support a robust system with adequate bandwidth and quality of service. A minimum of 2 x 10 MHz, or preferably 2 x 15 MHz, is necessary. Therefore, MSSA recommends against setting spectrum caps on this band.	accommodate new bands, based on market interest and spectrum availability in Trinidad and Tobago. The Authority advises that the spectrum cap of 10 MHz (i.e., 2 x 5 MHz) supports an open competitive market on a level playing field. The spectrum cap may be adjusted if more spectrum is made available, based on market interest and spectrum availability in Trinidad and Tobago.
			The licensing rules specified in the Consultative Document provide that: "An established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the assignment of spectrum in the 2 GHz Band."	MSSA respectfully disagrees with the requirement for an agreement between the NTN operator and a local terrestrial operator as a prerequisite for spectrum assignment in the 2 GHz band. Such a requirement would allow MNOs to influence the ability of NTN operators to enter the market, which could be anti-competitive. NTN operators may choose to provide stand-alone IoT services or partner with one or more MNOs for D2D services. The proposed agreement requirement would limit the ability of an NTN operator to partner with multiple MNOs. Additionally, a mandatory agreement with an MNO is unnecessary, as there are no concerns about using mobile network operator frequency bands.	As spectrum shall be used to extend the coverage of local MNOs, the Authority has agreed to allow NTN satellite operators to apply for spectrum licences prior to establishing an agreement with local MNOs. As such, section 4.2, rule 1 has been amended to include "An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator" and rule 7 has been amended and now reads: "An established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the issuance of a licence in the 2 GHz band." An expected timeline for the commencement of operations shall be defined for all authorised NTN operators.
23	MSSA	4.3 Technical Operations and Specifications	The Consultative Document asserts that the specifications presented therein were developed in accordance with the ITU-R M.1184-3, ITU-R SM.1541 and Code of Federal Regulations, Title 47, Part 25 (i.e., FCC Rules).	MSSA notes that the specifications in the Consultative Document are less stringent than relevant 3GPP standards. For instance, the nominal user equivalent isotropic radiated power (EIRP) for the user terminal is listed as 10.9 dBW, derived from ITU-R M.1184-3, which aligns with one GSO system mentioned in that recommendation. This translates to over 10 watts, which exceeds the power needed to support 3GPP NTN.	The Authority acknowledges that the power limit exceeds the power needed to support 3GPP NTN. The EIRP limit in Table 5 was derived from the ITU-R M.1184-3 for addressing other NTN user terminal applications using GSO.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				In contrast, power classes defined in 3GPP, as found in Table 6.2.1-1 of 3GPP TS 38.101-5	
24	GSMA	General	The GSMA thanks the TATT for the opportunity to comment on the Spectrum Plan for the Accommodation of Non-Terrestrial Networks. The GSMA sees this area as important for the present and future of mobile services. The GSMA commends the TATT towards its goals of ensuring the valuable resource that is spectrum is used in the most beneficial way. The GSMA would like to elaborate further on the evolving NTN space in terms of direct-to-device (D2D) connectivity and its role on regulations in the future, as this impacts the present and future of IMT services. The GSMA wants to thank again the TATT for the opportunity to contribute to this consultation process. We remain available for any questions and any meetings required to further explain our submissions on the matter. Direct connectivity between satellite networks and mobile handsets has been seen as a potential coverage solution since the 1990s. However, direct-to-device solutions are still at an early stage. Today, technical developments have seen the significant barrier of handset scale largely removed. A cycle of activity on D2D has seen 3GPP standards development, new spectrum coexistence discussions and service launches from some vendors on top of significant investments from mobile operators in the space sector. The Mbyte costs of satellite capacity have also reduced within time. Questions remain on the role that D2D will play in advancing global connectivity. This is a coverage technology that can potentially be applied to the 4% of the global population which does not live within a mobile footprint – it does not appear to solve the usage gap. It may also provide IoT solutions requiring a non-population footprint and enhanced reliability, but satellite connectivity still comes at a premium cost over terrestrial. Current D2D offerings are low bandwidth and offer limited messaging and		The Authority acknowledges GSMA's appreciation for the opportunity to contribute to the first of two rounds of public consultation on the Plan. The Authority thanks GSMA for the background information shared on D2D and welcomes the opportunity to have further discussion on a robust regulatory framework for NTN in the 2 GHz band.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			emergency services when outside the areas served by the MNO although this is expected to improve to some extent.		
25	GSMA	General	Regulatory and Technical Issues The advances in technology are welcomed by many in the mobile industry. However, several technical, regulatory and spectrum issues must be considered in the development of D2D. WRC-27 will look at certain technical conditions required for D2D with Agenda Item 1.13. These will include looking at how satellites can use the spectrum identified for IMT in bands from 700 MHz to 2700 MHz and connect directly with the handsets to complement the coverage of MNOs. At a national level, licensing mechanisms and new regulatory frameworks governing the use of the IMT bands for MSS NTN services will need to be developed which ensures that MNO's services are protected from interference. The suitability of many aspects of mobile, satellite and spectrum regulation needs to be tested against D2D technologies. A clear definition of potential interference scenarios will be required both at the ITU, including the work of WRC-27, and subsequently in national regulatory frameworks. For D2D using bands identified for IMT, it should be considered: • The coexistence and commercial agreement between an MNO and the satellite service provider which it uses to provide D2D satellite connectivity within the MNO licensed area to fill any coverage gaps. • The coexistence of an MNO operating in a neighbouring location to an MNO having a commercial agreement with a satellite D2D provider. Beyond the co-existence measures to be developed at the ITU, the roles of the D2D service will need to be defined in national frameworks. Its possibility ability to disrupt MNO's services will need to be understood and the measures to resolve interference to them will also need to be laid out by the national authorities.		The Authority shall follow the development of WRC-27, Agenda Item 1.13, to consider studies on possible new allocations to MSS for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment, to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23), to inform regulatory frameworks and new licensing mechanisms governing the use of IMT bands for MSS NTN. The Authority agrees in principle with GSMA's comment on the need for co-existence measures to be developed, at the ITU level, for D2D use of IMT bands. As such, the Authority shall follow the development of WRC-27, Agenda Item 1.13, to consider studies on possible new allocations to MSS for direct connectivity between space stations and IMT user equipment, to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23). The Authority notes GSMA's concerns on possible interference by D2D operating in IMT bands and the

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			This needs to be understood by regulators and competition issues raised by this include the need for a level regulatory playing field. Satellite services are typically licensed with lighter regulatory and financial burden on the service provider, so 'same service, same rules' rights will require scrutiny. The role that D2D can play in enhancing connectivity can only be fully exploited if the regulatory frameworks give market players confidence that all rights are protected. The GSMA and our members are keen to see D2D develop as a robust means of providing services to customers and not a distorted playing field or technical risk.		need for a robust regulatory framework. GSMA is informed that the Authority is committed to establishing a level playing when developing and amending its licensing framework that governs the use of IMT bands for MSS NTN services.
26	GSOA	General	GSOA welcomes the opportunity to provide comments to TATT regarding its Consultative Document on the Spectrum Plan for the Accommodation of Non-Terrestrial Networks, as outlined in the table that follows.		The Authority thanks GSOA for its comments and contribution to the first of two rounds of public consultation on the Plan.
27	GSOA	1.1 Background	NTN is defined in the consultation as wireless communication systems that operate above the Earth's surface, involving high-altitude platform stations (HAPS), unmanned aerial vehicles (UAVs2) such as balloons, drones, etc. and satellites in geostationary Earth orbit (GEO), medium Earth orbit (MEO) and low Earth orbit (LEO), or a combination of these elements. TATT states that, 'LEO satellites provide the foundation for many NTN use cases and offers the advantage of lower latency than MEO or GEO satellites due to the shorter distance to Earth, that can support real-time NTN applications.'	GSOA suggests that TATT clarify the source of the NTN definition and ensure it is not biased towards any particular technology. While GSOA supports specifications based on 3GPP standards, some operators may currently be using alternative solutions. As long as the technologies can function within the designated band plan, no specific technology should be mandated. GSOA respectfully notes that operators (GEO, MEO and LEO) have used satellite communication links—including links directly connecting satellites to mobile handsets—to serve mobile users for decades. NTN use cases that use MSS spectrum are simply an application	GSOA is advised that the sources of information are properly referenced in the Plan. In section 1.1 – Background, the Authority provides a general description of NTNs and not a definition. For clarity, a definition for NTN has been added to the definition section of the Plan. GSOA is further advised that the Authority has adopted a technology-neutral approach in its regulations, which reduces barriers to entry and promotes competition in the market. Spectrum plans and frameworks are developed to accommodate new and emerging technologies without favouring a specific technology. The Authority confirms that there are no specific technology mandates. The Authority welcomes the information shared on the wide use of GEO, MEO and LEO to support wireless communication links.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				of the long-existing MSS concept. This means that this type of NTN can be offered today without additional national or international regulatory action. Also, it is premature to assume that LEO use cases are primary for NTN. Some current NTN D2D services in the market are GEO, some are LEO, and some may be a mix of the two. Satellite operators are taking advantage of innovative multi-orbit/hybrid topologies. These topologies leverage the distinctive benefits of both GEO and LEO to respond to customer needs and broader market forces. Moreover, the inter-satellite link concept between GEO and LEO is emerging as a new paradigm, with various work streams at the ITU level focusing on the development of this concept. GSOA recommends that TATT take an orbit-neutral view towards NTN, recognizing that LEO, MEO and GEO may all be utilized.	The Authority agrees and has amended the opening sentence in the third paragraph in section 1.1 which now reads: "Currently, many NTN applications use GEO, MEO and LEO satellites." GSOA is informed that the Authority is orbital neutral and is not promoting any specific orbital positions for wireless communication links.
28	GSOA	1.4 Scope	This Plan specifies the frequency assignment plan within the 2 GHz band and how they will be licensed to concessionaires. This Plan accommodates the operation of NTNs for the provision of public telecommunications services. This Plan does not address the allocation and licensing of spectrum bands for terrestrial networks, including public mobile networks, fixed wireless access and private mobile networks, nor the provision of domestic mobile services using direct-to-device techniques.	GSOA supports licensing the 2 GHz band to concessionaires and notes that this Plan currently under public consultation does not address the allocation and licensing of spectrum bands for terrestrial networks. Nonetheless, GSOA would like to bring to TATT's attention, that other D2D variant is also being considered, which relies on the use of terrestrial IMT spectrum. We would like to direct TATT to a document produced by GSOA presenting a comparative analysis on the two D2D variants. Footnote: https://gsoasatellite.com/reports_and_studies/the-future-of-satellite-connectivity-various-approaches-to-direct-to-device-services/	The Authority agrees in principle with GSOA's comments as they relate to the two approaches to D2D services, i.e., the use of allocated and licensed MSS spectrum, and the use of spectrum allocated to terrestrial services and licensed to mobile operators. GSOA is informed that the authorisation of services directly to consumers that use D2D communication is beyond the scope of this spectrum plan. The Authority welcomes any information that can be used in the development of a framework for satellite services.
29	GSOA	2.1 The Global Environment	TATT description of 3GPP Release 17	In this regard, GSOA would like to bring to the attention of TATT the recent meeting of ITU Working Party 4B in Geneva, which approved a Recommendation identifying the satellite radio interface technologies of	The Authority welcomes the information shared on the ITU-R Recommendation *ITU-R M. [IMT 2020-SAT.SPECS] - Detailed specifications of the*

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				International Mobile Telecommunications-2020 (IMT-2020) which refer to 3GPP 5G, Release 17 and beyond – NR NTN and IoT NTN. Footnote: Preliminary draft new Recommendation ITU-R M.[IMT 2020-SAT.SPECS] - Detailed specifications of the satellite radio interfaces of International Mobile Telecommunications-2020 (IMT-2020), 10-21-24, https://www.itu.int/md/R23-WP4B-241016-TD-0015/en	*satellite radio interfaces of International Mobile Telecommunications-2020 (IMT-2020)*, 10-21-24.
30	GSOA	2.2 NTN Frequency Bands	TATT includes 3GPP NTN frequency bands in Table 1	GSOA recommends that TATT use the exact frequency bands specified by 3GPP in document 3GPP 38.101-5, NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements, As TATT notes in section 4.1, 3GPP band n256 is 1980-2010 MHz paired with 2170-2200 MHz. This has a 190 MHz duplex and is tailored to the globally harmonized frequency band mostly utilized in Region 1 due to the lack of PCS operators. TATT is proposing a 2 GHz band plan with a 180 MHz duplex separation 2005-2020 MHz paired with 2185-2200 MHz. This band is under consideration currently in 3GPP as band n252 for Region 2.	GSOA is advised that the Authority proposes a flexible, hybrid approach for duplex separation, to accommodate a mix of 3GPP's band n256 and the FCC's MSS 2 GHz band plan, based on the availability of spectrum for NTNs and its consideration of guard band to protect existing terrestrial networks against potential interference. The adoption of a channel assignment plan based on 3GPP's band n256 and the FCC's MSS 2 GHz band plan accommodates a wider range of NTN systems that support duplex spacing of both band plans. The Authority may consider band n252 following the completion of 3GPP's studies and other relevant ITU studies. The Authority shall update the Plan to accommodate new bands based on market interest and spectrum availability in Trinidad and Tobago.
31	GSOA	2.3 National Considerations	TATT outlines the existing uses of the 2 GHz band in Trinidad and Tobago and the availability for NTNs to operate on a non-interference basis noting that 1995-2020 MHz is unassigned and available for NTNs for MSS and that 2180 – 2200 MHz is unassigned and available for NTNs for MSS. TATT states, 'With the increasing deployment of NTNs on a non-exclusive basis, and the advancement of additional services in the 2 GHz band, additional spectrum planning and coordination are	GSOA recommends that 2 x 20 MHz be assigned for NTNs for MSS and would be pleased to discuss with TATT options for the band planning. While in some cases NTNs can operate on a non-exclusive basis, it is preferred that NTNs have exclusive dedicated spectrum to provide high-quality interference-free MSS services including IoT and D2D.	GSOA is advised that the Authority intends to accommodate multiple satellite operators interested in deploying NB-IoT services using NTNs across Trinidad and Tobago. The Authority will assign spectrum blocks exclusively for authorised NTNs at the national level to ensure interference-free services.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			required at the national level, to ensure interference-free access to spectrum in the MSS bands by NTN operators.'		
32	GSOA	3 Frequency Planning Principles	2. All plans shall have a reference channel bandwidth that serves as the minimum assignable channel bandwidth. Frequency channels that require larger bandwidths can be achieved by concatenating multiple non-contiguous frequency channels of the reference channel bandwidth, which would equate to contiguous spectrum. All assignments to an operator shall be contiguous as far as possible.	Given the requirements of NR NTN for 5 MHz channel bandwidths, GSOA has concerns with a minimum assignable channel bandwidth of 1 MHz because a single operator might not gain access to the required channels to concatenate multiple channels in order to build a standard NR NTN channel. GSOA agrees that all assignments should be as contiguous as possible.	The frequency planning principles are based on research conducted by the Authority and cater to satellite operators that use both large and small bandwidths. 3GPP NB-IoT NTN standard uses narrowband technology that requires minimal spectrum to deliver nationwide coverage. A minimum spectrum cap of 2 MHz (2x1 MHz) is sufficient for satellites that use smaller bandwidths to operate at full capacity. This safeguards operators who require smaller bandwidths, and supports a competitive market. The Authority shall ensure contiguous spectrum for all satellite operators requiring a 5 MHz channel.
33	GSOA	4.1 Frequency Assignment Plan	TATT notes that its frequency plan is a mix of 3GPP band n256 and the FCC's MSS 2 GHz band plan with both accommodating FDD but with different duplex spacings. Channels 1 to 5 are based on n256 and channels 6 to 15 are based on the FCC's band plan. TATT is of the view that the adoption of a channel assignment plan based on 3GPP's band n256 and the FCC's MSS 2 GHz band accommodates a wider range of NTN systems that support duplex spacings from both band plans.	GSOA appreciates that TATT is thinking flexibly with respect to the duplex separation to accommodate a mix of the two band plans. 3GPP is in the process of specifying the 2000-2020 MHz band paired with the 2180-2200 MHz band as band n252 which, based on the availability of spectrum in Trinidad and Tobago, appears to be a solution that would align with the standards body and Region 2 band planning Additionally, GSOA cautions against assigning all blocks in 1 MHz channels because operators wishing to deploy systems with greater bandwidth benefit from a minimum of 2 x 5 MHz of spectrum for NR NTN. A possible arrangement in order to accommodate, both narrowband and NR NTN, would be to reserve 2x5MHz, either at the low or high portion of the band, with individual 1+1 MHz channels, and the rest of the band as 5+5 MHz channels, for a reuse pattern of 5 MHz. We would be pleased to have a technical discussion with TATT to further discuss the specifics of the band plan.	GSOA is advised that the Authority may consider band n252 following the completion of 3GPP's studies and other relevant ITU studies. The Plan may be updated to accommodate new bands based on market interest and spectrum availability in Trinidad and Tobago. However, adopting band 252 may limit the availability of NTN operators who do not support a 180 MHz duplex separation. The frequency assignment plan is based on the Authority's research prior to the drafting of the Plan and caters to both large and small satellite operators. A minimum spectrum cap of 2 MHz (2x1 MHz) is sufficient for satellites that use smaller bandwidths to operate at full capacity. This safeguards operators who require smaller bandwidths and supports a competitive market. The Authority shall ensure contiguous spectrum for all satellite operators requiring a 5 MHz channel. The Authority welcomes a technical discussion with GSOA on this matter.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
34	GSOA	4.2 Licensing Process and Conditions	The rules for licensing are as follows: 1. A point-to-multipoint spectrum licence shall be granted by the Authority in order for spectrum in the 2 GHz band to be assigned. The minimum assignment shall be 2 MHz (i.e., 2 x 1 MHz). 2. The assignment of spectrum shall be via first come first served or a competitive licensing process, based on demand for this spectrum, as determined by the Authority. 3. The allocated spectrum in the 2 GHz band shall be licensed in accordance with the frequency assignment plan (as seen in Table 4. The spectrum cap for the 2 GHz band shall be 10 MHz (i.e. 2 x 5 MHz). 5. An established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the assignment of spectrum in the 2 GHz Band.	1. For the reasons expressed previously, GSOA recommends that minimum block sizes of 2 x 5 MHz be made available. 2. GSOA recommends administrative licensing processes for satellite spectrum. This allows licensees to maximize the resources committed to providing high-quality service. 3. GSOA recommends aligning with the upcoming 3GPP band n252 and making 2 x 20 MHz of spectrum available for NTN MSS in 2000-2020 MHz paired with 2180-2200 MHz. 4. GSOA disagrees with the proposed spectrum cap for the 2 MHz band. For operators wishing to deploy an NR NTN system, 2 x 5 MHz is insufficient to deploy a robust system with adequate bandwidth and quality of service. A minimum of 2 x 10 MHz or 2 x 15 MHz is preferred. Therefore, GSOA recommends against setting spectrum caps on this band. 5. GSOA disagrees with the requirement to have an agreement between the NTN operator and a local terrestrial operator as a prerequisite for the assignment of spectrum in the 2 GHz band. An operator agreement requirement empowers MNOs to affect the ability of NTN operators to enter the market and might give rise to an anti-competitive situation. NTN operators may choose to provide stand-alone IoT services, or they may choose to partner with one or more MNOs to offer D2D services. The proposed agreement with an MNO would	Based on the Authority's research, a minimum spectrum assignment block of 2 MHz (2x1 MHz) is sufficient for satellites that use smaller bandwidths to operate at full capacity. This safeguards smaller IoT operators and supports a competitive market. The Authority shall ensure contiguous spectrum for all satellite operators who require a 5 MHz channel. The relevant authorisation method is outlined in the Authority's *Authorisation Framework for the Telecommunications and Broadcasting Sectors of Trinidad and Tobago*, which specifies the conditions for the "first come first served" and competitive assessment. The Plan may be updated to accommodate new bands such as band n252, based on market interest and the completion of 3GPP's studies and other relevant ITU studies. The Authority advises that the spectrum cap of 10 MHz (2x5 MHz) is based on the Authority's research and supports a competitive market. The spectrum cap shall be adjusted as more spectrum is made available based on market interest and the completion of relevant 3GPP and ITU studies. As spectrum shall be used to extend the coverage of local MNOs, the Authority has agreed to allow NTN satellite operators to apply for spectrum licences prior to establishing agreements with local MNOs. As such, section 4.2, rule 1 has been amended to include "An NTN operator may apply for a concession with a preliminary letter of intent from a local terrestrial network operator" and rule 7 has been amended to read: "An established agreement between the NTN operator and a local terrestrial

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				limit the capacity of an NTN operator to make agreements with more than one MNO. Additionally, a mandatory agreement with an MNO is not necessary because there are no issues related to using mobile network operator frequency bands, as it is required in other D2D schemes where spectrum not allocated to MSS is proposed to be used.	network operator will be a prerequisite for the issuance of a concession and licence in the 2 GHz band."
35	TSTT	General	Telecommunications Services of Trinidad and Tobago Limited ("TSTT") appreciates that the Telecommunications Authority of Trinidad and Tobago ("the Authority") has given operators the opportunity to comment on these matters. It should be noted that TSTT's comments on this document do not preclude TSTT from making further comments in the future.		The Authority acknowledges TSTT's appreciation for the opportunity to comment in the first of two rounds of public consultation on the Plan and notes its position on future comments.
36	TSTT	2.2 NTN Frequency Bands	The current plan acknowledges the minimal risk of interference between NTNs and terrestrial systems. However, it lacks detailed guidance on practical interference management for operators and vendors. Given the expanding deployment of both NTNs and terrestrial mobile networks, there is a pressing need for robust standards and coordination protocols to effectively address potential interference risks.	TSTT recommends that the Authority establish a detailed operational framework and coordination mechanisms to manage potential interference between NTN and terrestrial systems. Operators should provide recommendations or guidelines on device specifications and interference thresholds to ensure that NTN-enabled devices can coexist with existing terrestrial networks without degrading performance.	TSTT is advised that there is sufficient separation (guard band) between NTNs operating in the 2 GHz band (2005–2020/2185–2200) and terrestrial systems operating in the 1900 MHz band (1850–1915/1930–1995 MHz); as such, the potential for interference is negligible. The treatments of harmful interference are addressed, in keeping with the Authority's established guidelines/ process, as posted on its website: https://tatt.org.tt/complaints/interference-complaints/. In addition, the technical specifications defined under section 4.3 provide for operating thresholds to mitigate harmful interference.
37	TSTT	2.3 National Considerations	TSTT notes the Authority's statement that it "*will complete monitoring exercises by December 2025 to verify that spectrum in the 1995 – 2025 MHz and 2180 – 2200 MHz bands are free from harmful interference before assigning spectrum in these bands.*" TSTT suggests that, once testing is completed, if it becomes necessary to alter the frequency spectrum due to interference, local operators should be given first preference.	TSTT recommends that, once testing is completed, if it becomes necessary to adjust the frequency spectrum due to interference, local operators should be given priority.	The Authority advises that, in the development of the Plan, measures have been taken to protect and safeguard existing operational systems from harmful interference and disruptions caused by new technologies or devices operating in the same or adjacent frequency bands. This is typically achieved through spectrum management principles like dedicated channels, power limitations, and sophisticated detection systems to identify and mitigate interference when new users share the

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
					spectrum. Licensed systems are protected from new and emerging technologies.
38	TSTT	4 Frequency Assignment for Non-Terrestrial Networks in the 2 GHz Band	TSTT notes the proposed allocation of the 2 GHz S-band (2005-2020 MHz/2185-2200 MHz) for Non-Terrestrial Networks ("NTNs"). TSTT recommends that once the spectrum has been assigned, it should not be re-assigned for any other purpose.	The Authority should ensure spectrum sovereignty, meaning committing spectrum for specific technology uses, such as either IMT (International Mobile Telecommunications) or MSS (Mobile Satellite Service). This approach would better serve the digital economy based on availability.	TSTT is reminded of section 18(1)(*i*)(ii) of the Telecommunications Act, Chap. 47:31 (the Act), which states: "Subject to the provisions of this Act, the Authority may exercise such functions and powers as are imposed on it by this Act and in particular – plan, supervise, regulate and manage the use of the radio frequency spectrum, including — the allocation, assignment and reallocation or reassignment of frequency bands where necessary." TSTT is further advised that the Authority has adopted a technology-neutral approach in its regulatory frameworks, which ensures minimal barriers to entry and promotes competition in the telecommunications market. This approach allows for flexibility and innovation, as service providers have options as it relates to the technology used to deliver their services, in keeping with regulatory requirements.
39	TSTT	4.2 Licensing Process and Conditions	TSTT notes the Authority's statement that "*an established agreement between the NTN operator and a local terrestrial network operator is a prerequisite for the assignment of spectrum in the 2 GHz Band.*" While this requirement presents a significant opportunity for collaboration between NTN operators and local terrestrial network operators, it also raises important considerations regarding data security.	The Authority should establish a data protection framework to set protocols for the control of user subscription and authentication information, with a strong emphasis on local data protection and supervision. The framework should also ensure compliance with standard roaming architecture. For example, the Authority should ensure: The establishment of a local gateway to handle customer data, where the protocols for local data protection and supervision can be implemented.	The Authority notes TSTT's comments and advises that a data protection framework would fall beyond the scope of a spectrum plan. However, the protocols identified by TSTT would already need to be in place for existing roaming arrangements with international mobile networks and can therefore be extended to any such arrangements with satellite operators.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
				Additionally, Satellite Operators should be encouraged to cooperate with local operators in a collaborative, symbiotic relationship rather than as competitors.	As spectrum shall be used to extend the coverage of local MNOs, the Authority agrees and supports the cooperation of satellite operators and MNOs.
40	TSTT	4.3 Technical Operating Conditions and Specifications	The units used in Table 5 should be consistent with those in other spectrum frameworks. Alternatively, the units used in this document should be listed alongside them for clarity.	The Authority should include the constraint/maximum values along with the units used in previous spectrum frameworks.	The Authority agrees and has updated the power limit in Table 5, in keeping with the ITU-R M.1184-3 and 3GPP TS 38.101-5 standards, to address other NTN user terminal applications using GSO. The maximum UE power permitted reads 10.9 dBW. The Authority has restated the units in the Plan as dBW.
41	Digicel	General	Digicel (Trinidad & Tobago) Limited ("Digicel") wishes to thank the Authority for the opportunity to provide its feedback on this consultation document. Please note that the views expressed herein are not exhaustive. Failure to address any issue in this response does not in any way indicate acceptance, agreement or relinquishing of Digicel's rights.		The Authority acknowledges Digicel's appreciation for the opportunity to comment in the first of two rounds of public consultation on the Plan and notes its position in relation to its rights.
42	Digicel	1.7 Review Cycle	Digicel notes and acknowledges the Authority's position as set out under the review cycle for the spectrum plan for non-terrestrial networks: "*This Plan will be reviewed every four years to meet changing needs, taking into account technological advancements and regional allocations, but it may be reviewed at any time, at the discretion of the Authority, or based on proposals for immediate modification submitted by stakeholders or members of the public*"	Digicel is in agreement with the Authority's position and looks forward to a collaborative approach to addressing any potential concerns that may arise.	The Authority notes Digicel's agreement with section 1.7 Review Cycle and welcomes its suggestion for a collaborative approach to addressing any potential concerns that may arise.
43	Digicel	2.2 NTN Frequency Bands	There does not appear to be any clarity in the consultation document in terms of the coverage border defined between NTNs and existing terrestrial networks.	Digicel requests that the Authority provide clarification on how the coverage border will be defined between NTNs and existing terrestrial networks.	As spectrum shall be used to extend the coverage of local MNOs, Digicel is informed that the coverage border would be in keeping with the coverage obligation of the local MNO. There is no need to define coverage borders, as coverage overlap can occur with the local MNOs since they operate on different spectrum bands, while there will be additional areas within the territory where NTNs provide coverage.

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			We have not seen the proposed guard band between NTN frequency and terrestrial frequency bands. We would like to understand how the Authority will verify that spectrum in the 1995 – 2025 MHz and 2180 – 2200 MHz bands, are free from harmful interference before assigning spectrum in these bands.	The Authority is asked to provide the proposed guard band between NTN frequency and terrestrial network frequency bands. Digicel recommends 10Mhz guard band between the NTNs and terrestrial network frequency. The Authority is asked to provide clarification on how it will verify that spectrum in the 1995 – 2025 MHz and 2180 – 2200 MHz bands are free from harmful interference before assigning spectrum in these bands.	Currently, there is a 10 MHz separation between PMTS in the 1900 MHz band and NTN in the 2 GHz band, and a 5 MHz separation between PMTS in the 2200 MHz and NTNs in that range (2180–2185 MHz). Based on the results of 3GPP, ITU and other relevant studies, the size of this guard band may change. Digicel is reminded that the Authority always ensures that incumbent services are protected when allocating spectrum to accommodate new and emerging technologies. With improvements in technology, the coexistence of different services does not require a large guard band. Digicel is reminded of the last paragraph in section 2.3, which states: "The Authority will complete monitoring exercises by December 2025 to verify that spectrum in the 1995–2025 MHz and 2180–2200 MHz bands are free from harmful interference before assigning spectrum in these bands."
44	Digicel	2.3 National Considerations	Digicel notes and acknowledges the Authority's commitment to completing its spectrum monitoring exercises by December 2025. Hence, in accordance with Section 4.2 titled Licencing Process and Conditions, line items 1 and 2, it is prudent to assume that no licences for the provision of telecommunications services using non-terrestrial spectrum in the 2 GHz band will be issued by Authority subject to the completion of the Authority's spectrum monitoring exercise.	Digicel seeks clarification from the Authority on its supposed implementation of licencing conditions considering that spectrum monitoring exercises are currently being undertaken or would be completed in the near future (i.e., December 2025).	Digicel is advised that the Authority will complete its due diligence before assigning or licensing spectrum to interested applicants. In addition to completing the consultation on this Plan, monitoring exercises will be completed and frequency coordination established, where necessary, to address any potential harmful interference due to cross-border concerns.
45	Digicel	4.2 Licensing Process and Conditions	Digicel notes the Authority's position which for all intents and purposes articulates that the potential assignment of non-terrestrial spectrum to a potential market entrant is conditioned on the establishment of an agreement with a terrestrial network operator. In other words, an operator (i.e., potential and existing) will need to have a valid licence and an established agreement with a local terrestrial network operator in order to be assigned 2 GHz spectrum.	Digicel seeks further clarification on the Authority's application of Line Item 7 and 8. Do these conditions apply to potential and existing operators, especially in light of Section 18 (3) (b) of the Telecommunications Act? Terrestrial and non-terrestrial network operators must be treated the same in a similarly situated market. Further, pursuant to Section 41(1) of the Telecommunications Act, the Authority has	The Authority advises that rules 7 and 8 in section 4.2 apply only to NTN operators in the 2 GHz band, which has a primary allocation for Mobile Satellite Service (MSS) regionally, as per the title of section 4 and as specified in rule 7. Digicel is informed the spectrum licensed for Starlink's use is in different bands (Ku, Ka), is available on a non-exclusive basis, is licensed for fixed services, is allocated on a primary basis for

Item	Stakeholder	Section	Comments	Recommendations	TATT's Decision
			The aforementioned raises the question as to how another satellite telecommunications service provider (i.e., Starlink) will operate in the domestic telecommunications space of Trinidad and Tobago. They have a valid concession to provision telecommunication services, but do they have non-terrestrial spectrum assigned to them by the Authority? If yes, did they comply with Line item 7 of the Licence Process and Conditions? If no, what remedy would the Authority apply to ensure non-discrimination and equity in the application of regulatory obligations to operators in compliance with Section 18 (3) (b) and Section 41 (1) of the Telecommunications Act? Digicel notes and acknowledges the Authority's directive as set out in Line item 8.	the duty to regulate spectrum usage in order to promote economic and orderly utilization of frequencies.	FSS regionally, and does not fall within the band specified, to which rules 7 and 8 apply. Therefore, NTNs in the 2 GHz are not similarly situated and the provisions of this Plan do not apply to network operators and service providers such as Starlink, as currently authorised.