Telecommunications Authority of Trinidad and Tobago

CONSULTATION COMMENT SUBMISSION FORM

Name of Document: Consultative Document on the Spectrum Plan for the Accommodation of Non-Terrestrial Networks (First of Two Rounds) (Version 0.1)

1. **Respondent Category:**

   [ ] (a) Regional regulatory or governmental agencies

   [ ] (b) Existing service and/or facility providers and affiliates

   [ ] (c) Potential service and/or facility providers and affiliates

   [X] (d) Service provider associations/clubs/groups

   [ ] (e) Consumers/consumer groups

   [ ] (f) General public

2. **Interest:**

   (Provide details of any relationship with or interest in any of the above respondent categories.)

The Mobile Satellite Services Association (MSSA) is a non-profit industry association, founded in 2024, that seeks to promote and advance the emerging mobile satellite service (MSS) direct-to-device (D2D) ecosystem and supports the efforts of D2D solutions providers, including terrestrial mobile and satellite operators, OEMs, infrastructure providers, chip vendors, and others. MSSA's vision is to integrate terrestrial and 3GPP standards-based non-terrestrial networks (NTN) to deliver scalable, sustainable and affordable connectivity to any device, anytime, anywhere. Its members are steering this important new initiative together, to bring significant scale and choice to promote and advance the emerging D2D and IoT ecosystems. MSSA is working to ensure mobile satellite services L- and S-band[1] operators play a central role in facilitating the future of a robust and competitive D2D services market. Through the

[1] L and S band allocations are as follows:

- 1518-1525 MHz (space-to-Earth) paired with 1668-1675 MHz (Earth-to-space)
- 1525-1559 MHz (space-to-Earth) paired with 1626.5-1660.5 MHz (Earth-to-space)
- 1610-1626.5 MHz (Earth-to-space and space-to-Earth) paired with 2483.5-2500 MHz (space-to-Earth)
- 1980-2010 MHz (Earth-to-space -- 1980-2025 MHz in Region 2) paired with 2170-2200 MHz (space-to-Earth – 2160-2200 in Region 2)

coordinated deployment of technical standards and enhancement of regulatory frameworks, MSSA is driving new initiatives to foster support for MSS-based services leveraging the 3GPP mobile standards.

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 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.

3. Contact Information:

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4. Section-Specific Comments:

Document Section	Comments	Recommendations
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.
	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.

		MSSA advises the Authority to adopt an orbit-neutral approach to NTN, acknowledging that LEO, MEO, and GEO systems can all be employed.
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 "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.
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.
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.	MSSA advises that the Authority adhere 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. More information can be found at: https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3982.

	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 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.	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.
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.
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.

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. 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.
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 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.
	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 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 MHz 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.
	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.
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. In contrast, power classes defined in 3GPP, as found in Table 6.2.1-1 of 3GPP TS 38.101-5

		V18.7.0 (2024-09), specify a UE power class of 23 dBm (not dBW) with a tolerance of +2 dB. These are conducted powers, as 3GPP does not require antenna gain or EIRP for the 2 GHz band.

2. Confidentiality

The information and comments stated above can be published by the Authority for consultation purposes.

[X] Agree

[ ] Do not agree because:

□ All comments submitted are confidential.

□ Some of the comments submitted are confidential. (In the information submitted in section 4 above, please indicate what information should be considered as confidential by the Authority.)

□ Name of respondent/organisation is confidential.

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

[ ] Yes

[ ] No

3. Declaration

I confirm that the comments and recommendations submitted under this cover sheet is a formal consultation response that the Authority can publish, exclusive of those comments marked confidential.

Signature: 

Position of signatory: Executive Director, MSSA

(This is only applicable for stakeholder categories a to e.)