February 14, 2025

Consultation on Convergence of Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN) Services in Tanzania

Response of the Mobile Satellite Services Associations

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 support the efforts of D2D solutions providers, including terrestrial mobile and satellite operators, original equipment manufacturers, infrastructure providers, chip vendors, and others.[1] 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 that L- and S-band MSS operators play a central role in facilitating the future of a robust and competitive D2D services market. Through the coordinated development of technical standards and enhancement of regulatory frameworks, MSSA is driving new initiatives to foster support for MSS-based services leveraging 3GPP mobile standards.

MSSA is pleased to provide, in the table below, targeted responses to the Consultation on the Convergence of Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN) in Tanzania. MSSA is confident that the insights provided will support the Tanzania Communications Regulatory Authority (TCRA) in developing a robust regulatory framework that maximizes the benefits of both TNs and NTNs.

B. NTN and TN Integration/Convergence and their Relevance		
Q3a	How do you view the convergence of satellite services with terrestrial mobile networks?	Innovations in mobile device technology and globally harmonized standards are driving the convergence of satellite services and terrestrial mobile networks. These innovations are allowing satellites to communicate directly with conventional terrestrial mobile handsets and other end-user devices, including those in moving vehicles. D2D technology presents

[1] For more information on MSSA see: https://www.mss-association.org/about-mssa/.

		exciting opportunities to complement services provided by mobile network operators, close the digital divide, and provide ubiquitous coverage, particularly in regions like Africa. D2D technology is expected to fulfil the following use cases: • Complementing existing mobile network operator infrastructure and connect underserved or unserved parts of urban and suburban areas, as well as mountainous, maritime, aeronautical, isolated, and rural areas, and • Facilitating short-term, urgent requirements such as disaster response. Two approaches to D2D service are being considered: • MSS D2D uses MSS spectrum for D2D and is feasible within the existing International Telecommunication Union (ITU) allocations and national licensing frameworks that enable today's MSS services – particularly those using the L-band and S-band MSS allocations. This approach leverages 3GPP standards to integrate satellite capability into mass-market mobile devices, supporting the global 5G ecosystem. • IMT D2D relies on satellite operators transmitting and receiving in spectrum allocated and licensed to the terrestrial mobile service. The operation of MSS in such spectrum is inconsistent with existing national and international spectrum frameworks and hence creates regulatory, technical, and operational challenges.
Q4a	In your view, do you think that MSS	From a spectrum perspective, the MSS D2D approach can deliver future broadband services

	operator, using MSS spectrum allocated in the table of frequency allocation, can be able to provide Mobile Broadband services to end users independent of terrestrial IMT network i.e. without integration with existing MNOs?	using globally harmonized spectrum allocations, independent of the terrestrial IMT network, i.e. in separate spectrum. This approach minimizes interference risk by utilizing existing MSS-allocated spectrum in accordance with long-standing regulations (e.g., ITU Radio Regulations and Recommendations) to manage potential interference issues. MSS D2D is already possible in most jurisdictions without the need for administrations to adopt new regulations. Most African administrations have existing national regulations to enable the use of MSS terminals throughout their territory, using the following L-band and S-band allocations: • 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) • 1610-1613.8 MHz, (Earth-to-space), 1613.8-1626.5 MHz (Earth-to-space and space-to-Earth) and 2483.5-2500 MHz (space-to-Earth) • 1980-2010 MHz (Earth-to-space) paired with 2170-2200 MHz (space-to-Earth). Notably, the L and S band have also been standardized in 3GPP as bands n256, n255 and n254 to facilitate interoperability of equipment.[2] That said, MSSA expects that MSS D2D systems will be operated collaboratively with MNOs.
C. Use of Terrestrial-based IMT spectrum by NTNs		

[2] NTN Satellite Bands in 3GPP FR1-NTN. 3GPP 38.101-5, NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements, https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3982

Q5a **&** **Q5b**	Considering a country like Tanzania, which shares borders with multiple countries using the same spectrum for IMT, how can sharing of assigned Terrestrial IMT be implemented/structured between MNOs and NTN to avoid: Co-channel interferences with neighbouring countries' MNOs? Adjacent channel interference within Tanzanian territory?	Various co-channel and adjacent channel interference scenarios are currently being studied under WRC-27 AI 1.13. Pending this ongoing work, it would be premature for MSSA to offer detailed comment on how to configure/structure the shared use of assigned terrestrial IMT spectrum. Nevertheless, it is worth noting that the use of IMT spectrum for D2D is likely to pose significant technical challenges. For example, preliminary analysis[3] shows that a significant separation distance would be required to ensure that interference from IMT D2D operations into terrestrial mobile networks could be managed.
Q6a	Do you foresee any challenges to the proposal in Q5	As mentioned in previous comments, the use of non-standardised spectrum by IMT D2D systems presents a range of technical, operational and regulatory challenges that should be resolved before these services are authorised in domestic markets.
Q6b	What measures could be taken to mitigate such challenges?	Specific technical, regulatory and operational measures should be established based on the outcome of relevant sharing and compatibility studies under WRC-27 AI 1.13.
Q7a	For the MSS spectrum which is contained in the ITU table of frequency allocation and which is accessed through the	Yes, it is preferable for them to have exclusive, dedicated MSS spectrum available to ensure high-quality, interference-free MSS services, including IoT and D2D applications.

[3] For example, see "Exploring Interference Issues in the Case of n25 Band Implementation for 5G/LTE Direct to-Device NTN Services", Pastukh, A.; Tikhvinskiy, V.; Devyatkin, E., https://www.mdpi.com/1424-8220/24/4/1297.

	international coordination process contained in Article 9 and Article 11 of RR, do you think it necessary for administration/country to exclusive assign them for use in their own jurisdiction?	
	If yes in Q7 (a) What should be the modality to be use by administration for such assignment.	MSSA advocates for administrative licensing processes for satellite spectrum rather than a competitive licensing process. This approach enables licensees to optimize their resources for providing high-quality services.
D. Regulatory Framework		
Q.9	What do you think is important to be included in national regulatory framework to adequately support the integration of NTNs and terrestrial networks?	To adequately support the integration of NTNs and TNs, the national regulatory framework should consider the following key elements: **Regulatory Certainty on MSS D2D**: National regulatory frameworks could be strengthened by explicitly defining MSS D2D services as an application of the long-established MSS concept. This clarification will reinforce the understanding that MSS D2D services are encompassed within the current MSS national licensing framework. **Provisions to Mitigate Interference from IMT D2D Systems**: As mentioned in response to Question 5, IMT D2D poses a significant risk of harmful interference to MSS and terrestrial networks. A range of interference mitigation measures such as: guard bands, exclusions zones, out-of-band emission limits and transmit power limits could be included in the national regulatory frameworks. The TCRA is encouraged to wait for the conclusion of WRC-27 AI 1.13 before establishing the

		aforementioned mitigation measures and authorizing IMT D2D services in Tanzania.
	What specific regulatory adjustments would you recommend to facilitate efficient spectrum management and sharing between terrestrial IMT and NTNs?	As mentioned in previous responses, the specific regulatory adjustments should be based on the outcomes of WRC-27 AI 1.13.
E. Additional Comments		
Q.10	What other suggestions or comments regarding spectrum management and the convergence of terrestrial and non-terrestrial networks would you recommend?	It has been suggested that IMT D2D could operate based on ITU RR No. 4.4, which states: "Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations." As noted by the Radio Regulations Board (RRB) in its report to WRC-23[4], the use of ITU RR Article No. 4.4 for satellite networks should be approached with caution due to the increasing number of NGSO systems planning to use a frequency band under RR No. 4.4. In some cases, these NGSO systems are proposing to offer commercial services without an

[4] See WRC-23/Document 50-E "Report by the Radio Regulations Board to WRC-23 on Resolution 80 (Rev.WRC-07)." https://www.itu.int/md/R23-WRC23-C-0050/en.

		appropriate allocation in the Radio Regulations. This leads to a potentially high risk of satellite-to-satellite interference in some of the proposed frequency bands. Administrations contemplating potential invocation of ITU RR 4.4 must consider the following (among other things): • Under ITU Rule of Procedure 1.6, Administrations attempting to invoke ITU RR 4.4 must show that the intended use will not cause harmful interference. • This showing may be difficult or impossible, as the use of ITU RR 4.4 for new satellite systems will place other systems and services at a high risk of interference. • Any operations must immediately cease if there is interference, even if providing commercial services to consumers—raising significant questions about the quality and reliability of IMT D2D services. • Measures would be needed required to protect other space and terrestrial services, both at national and cross-border levels, before IMT D2D services are allowed to operate.