March 13th, 2026

Malaysian Communications and Multimedia Commission (MCMC)
Spectrum Planning Assignment Division
MCMC HQ Tower 1,
Jalan Impact, Cyber 6,
63000 Cyberjaya,
Selangor
Malaysia

Subject: *MSSA Submission – Industry Engagement Workshop: Review of Spectrum Landscape (Satellite Services including Direct-to-Device)*

Dear Sir/Madam,

We write regarding MCMC's recent Industry Engagement Workshop: Review of Spectrum Landscape – Guiding Questions for Satellite Services (including Direct-to-Device).

On behalf of the Mobile Satellite Services Association (MSSA), please find enclosed our formal submission responding to certain of the guiding questions issued by the Commission.

Our submission reflects MSSA's perspective on internationally harmonized Mobile-Satellite Service (MSS) allocations and standards-based Direct-to-Device (D2D) integration. We have responded to questions focusing on these areas and have chosen not to address other questions at this time (to streamline our overall response, we have not included those questions below). We trust that our comments will assist MCMC in its ongoing assessment of spectrum policy considerations affecting satellite–terrestrial integration.

MSSA appreciates the opportunity to contribute to this important review of Malaysia's evolving satellite and Non-Terrestrial Network (NTN) framework.

Yours sincerely,

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I. Introduction

MSSA is a non-profit industry association, founded in 2024, that seeks to promote and advance the emerging ecosystem for advanced Non-Terrestrial Network (NTN) services, including direct-to-device (D2D). MSSA supports the efforts of advanced NTN solutions providers, including terrestrial mobile and satellite operators, original equipment manufacturers, infrastructure providers, chip vendors, and others. MSSA is focused on facilitating a global ecosystem utilizing spectrum already allocated and licensed for mobile satellite services (MSS) and well-suited for integration into a broad range of mobile devices. More specifically, MSSA seeks to facilitate global mobile connectivity via satellite through open, standards-based solutions. More information about MSSA is available at www.MSSAssociation.org.

MSSA welcomes MCMC's forward-looking review of Malaysia's spectrum landscape and its consideration of satellite services, including D2D applications. As Malaysia advances its national connectivity ambitions and digital transformation agenda, the integration of terrestrial and non-terrestrial networks will become increasingly important in extending coverage, strengthening resilience, and enabling new service innovation.

Malaysia, as an active participant within ITU Region 3 and the Asia-Pacific Telecommunity (APT), is well-positioned to align its national spectrum framework with internationally harmonized allocations and evolving global standards. A balanced and predictable regulatory environment that supports satellite–terrestrial coexistence and encourages innovation will enhance Malaysia's competitiveness and digital inclusion objectives.

Consistent with its mission, MSSA views satellite-enabled D2D and broader NTN services as complementary extensions of existing mobile connectivity frameworks. These capabilities are designed to enhance—not replace—terrestrial networks by extending coverage into remote and maritime areas, improving disaster resilience, supporting emerging IoT applications, and enabling seamless connectivity across diverse geographic environments.

The following responses are provided in that context and reflect MSSA's perspective on how Malaysia's spectrum framework can support the responsible and efficient development of integrated satellite-terrestrial connectivity.

II. Consultation Questions

S1 – Current Market Conditions and Spectrum Utilisation

MSSA is not responding to questions in this section at this time.

S2 – Market Demand Outlook and Technology Evolution

MSSA is not responding to questions in this section at this time.

S3 – Regulatory Requirements

MSSA is not responding to questions in this section at this time.

S4 – ITU World Radiocommunication Conferences (WRC) Alignment

14. ***Which WRC-23 outcomes are most important for your operations in Malaysia?***

    MSSA is a trade association and not a service provider, and as such is not responding to this question.

15. ***Where do you see gaps in implementing the WRC decision at the national level, and outline the areas where further clarification, action, or alignment may be required?***

    From MSSA's perspective, a significant implementation priority is ensuring that internationally harmonized MSS allocations—particularly those incorporated into 3GPP NTN specifications—are clearly reflected in Malaysia's national allocation and licensing framework. Delays in national alignment can create uncertainty for device manufacturers, satellite operators, and mobile network partners seeking to introduce standardized D2D capabilities.

16. ***How do you expect WRC-27 agenda item 1.13 to affect D2D services in IMT bands?***

    WRC-27 Agenda Item 1.13 is expected to play a central role in defining the international regulatory framework governing satellite-to-device operations within certain IMT frequency bands. The studies currently underway within ITU-R are examining technical sharing conditions, coexistence parameters, and regulatory options to ensure that any such operations can occur without harmful interference to incumbent terrestrial services.

    Given the complexity of coexistence between satellite systems and densely deployed terrestrial IMT networks, MSSA considers the WRC-27 process to be essential in establishing globally harmonized technical conditions.

Premature national implementation ahead of the completion of these studies could introduce regulatory fragmentation and operational uncertainty. A sequenced approach—allowing ITU-R technical work to conclude before large-scale authorization of IMT-based D2D—will promote stability and international consistency.

In the interim, MSS-based D2D models operating within internationally harmonized satellite allocations provide a structured and lower-risk pathway for deployment.

17. ***Are there other WRC-27 agenda items that may have impact on satellite and other NTN services?***

MSSA is not responding to this question at this time.

S5 – D2D and IoT

18. ***What role do you see for D2D services in Malaysia?***

D2D services have the potential to become an important complementary layer within Malaysia's national connectivity framework. Rather than functioning as a substitute for terrestrial networks, D2D capabilities extend connectivity beyond the practical reach of ground-based infrastructure. In Malaysia's geographic context, D2D can enhance service continuity, emergency responsiveness, and digital inclusion.

In addition to coverage extension, D2D supports resilience objectives by providing a fallback communication layer during network outages or disaster events. As 3GPP-standardized NTN capabilities mature, D2D can also facilitate seamless user experiences across terrestrial and satellite domains without requiring specialized user equipment.

19. ***Do you have a preference for provision of D2D in either IMT bands or MSS bands or both?***

MSSA supports a phased and internationally aligned approach. In the near term, MSS-based D2D operating within harmonized MSS allocations offers a structured and lower-risk deployment pathway. These bands are internationally coordinated, incorporated into 3GPP standards, and supported by established interference management mechanisms under the ITU Radio Regulations.

With respect to IMT-band D2D, MSSA recognizes its potential long-term role. However, technical and regulatory coexistence conditions remain under

active study within ITU-R in preparation for WRC-27 Agenda Item 1.13. Authorizing IMT-based D2D deployment prior to the conclusion of these studies could introduce regulatory fragmentation and uncertainty regarding protection criteria for incumbent terrestrial services. A sequenced approach aligned with the outcomes of WRC-27 would promote international harmonization, safeguard coexistence integrity, and provide greater clarity for all stakeholders. Both models may ultimately coexist; however, a near-term focus on MSS-based D2D provides greater implementation clarity and regulatory certainty.

Additional information is available in MSSA's White Paper on Spectrum Management.

20. ***One of the regulatory challenges currently under discussion relates to the allocation of responsibilities between the relevant parties involved in the provision of services (e.g. satellite operators and mobile network operators). What are your views on this issue?***

Allocation of responsibilities should reflect the technical architecture and commercial model adopted. Clear delineation of spectrum rights, interference responsibility, and quality-of-service obligations will be important. Regulatory frameworks should enable flexible commercial partnerships between satellite operators and mobile network operators (MNOs), including roaming-style arrangements or integrated core network models, while maintaining accountability consistent with national licensing requirements.

21. ***What other regulatory challenges do you consider may arise in relation to the provision of direct-to-device (D2D) services in IMT frequency bands?***

Provision of D2D in IMT bands introduces complex coexistence considerations. These include potential aggregate interference into densely deployed terrestrial networks, cross-border coordination implications, and the need for clearly defined protection criteria for incumbent IMT licensees.

Given that IMT spectrum is often licensed on an exclusive, high-value basis, introducing satellite-based operations within those bands requires carefully calibrated technical conditions. The ITU-R study process under WRC-27 is specifically addressing these issues, and national frameworks would benefit from aligning with those outcomes before authorizing widespread deployment.

Without such clarity, uncertainty may arise for both satellite and terrestrial stakeholders.

22. Which bands are most suitable for MSS-based D2D?

MSS allocations in L- and S-bands are currently the most suitable and internationally harmonized bands for D2D deployment, as they are incorporated into 3GPP Release 17 and Release 18 NTN specifications and supported by established coordination frameworks under the ITU Radio Regulations.

Their propagation characteristics also make them well-suited for handheld and low-power device connectivity, enabling integration into mass-market mobile devices without the need for directional antennas or specialized terminals.

Prioritizing these bands would align Malaysia with global device ecosystems and standards-based deployment pathways.

23. Which bands are most suitable for MSS-based IoT in Malaysia?

Low-power, wide-area IoT applications are similarly well supported within harmonized MSS allocations in L- and S-bands. These frequencies offer favorable propagation for energy-efficient devices operating in rural, maritime, and remote environments.

24. In bands where there is interest for both MSS-based D2D and MSS-based IoT, what regulatory measures can MCMC take to enable both services?

Coexistence between MSS-based D2D and IoT services within the same allocation can be facilitated through established satellite coordination mechanisms and appropriate network-level resource management. Because these services operate within the same international MSS framework, interference mitigation is governed by long-standing coordination procedures, power flux-density limits, and system design parameters.

National licensing frameworks may provide flexibility for multi-service use within authorized allocations, provided that operators maintain compliance with technical limits and coordination obligations. Clear authorization language recognizing both D2D and IoT applications within MSS allocations would reduce ambiguity and encourage innovation. Additional information is available in MSSA's White Paper on Spectrum Management.

25. The preferred service arrangement for D2D implementation – directly to consumers (retail) or partnership (via MNO/licensees)?

Partnership-based models between satellite operators and national MNOs are likely to be most effective in ensuring seamless integration and regulatory clarity. Such models allow D2D capability to be incorporated within existing mobile service offerings, preserving numbering frameworks, customer management systems, and regulatory accountability.

While standalone retail satellite offerings may exist in certain contexts, integration with licensed MNO frameworks can simplify spectrum management responsibilities and enhance consumer protection consistency.

26. How does the system mitigate potential interference?

For MSS-based D2D and IoT services, interference mitigation relies on internationally established coordination mechanisms. These include power flux-density limits, coordination triggers, satellite-to-satellite coordination procedures, and technical operating parameters that have been successfully applied for decades across multiple systems.

When satellite and terrestrial systems operate in adjacent bands, mitigation may also involve emission limits, guard-band considerations, antenna performance requirements, and clearly defined protection criteria.

For IMT-based D2D, coexistence conditions remain under study internationally. Alignment with forthcoming ITU-R technical conclusions will be essential to ensure that any authorized operations do not create harmful interference to incumbent terrestrial networks.

Additional information is available in MSSA's White Paper on Spectrum Management and in MSSA's White Paper on MSS Reference Architecture.

S6 – Integration of Mobile with Satellite and Non-Terrestrial Networks

27. What role do you foresee for satellite and NTN integration in Malaysia's future mobile ecosystem?

Satellite and NTN integration is likely to become a structural component of Malaysia's future mobile ecosystem rather than a peripheral capability. As 5G-Advanced evolves and work toward 6G progresses, 3GPP standards increasingly incorporate satellite as an extension of terrestrial networks, enabling unified core architectures, standardized mobility management, and seamless device interoperability.

For Malaysia, this integration can support national connectivity objectives by extending mobile coverage into regions where terrestrial deployment is economically or geographically challenging. In addition to coverage extension, integrated NTN capability enhances network resilience, enabling service continuity during natural disasters, infrastructure outages, or peak demand events.

Importantly, satellite integration should be viewed as complementary to terrestrial IMT deployment. A well-designed regulatory framework can allow both layers to operate cohesively, reinforcing Malaysia's ambition to deliver ubiquitous and reliable connectivity under its digital transformation agenda.

28. With regards to D2D in IMT bands, what spectrum coordination and regulatory challenges should be addressed by MCMC?

D2D operation within IMT bands presents distinct coordination challenges that differ from traditional satellite use in MSS allocations. IMT spectrum is typically assigned on an exclusive basis to terrestrial operators, often under high-density deployment conditions. Introducing satellite-based transmissions into these bands requires careful definition of protection criteria, aggregate interference limits, and clear allocation of regulatory responsibility.

Key challenges include managing uplink and downlink interference into terrestrial base stations, addressing cross-border coordination implications, ensuring alignment with ITU-R studies under WRC-27 Agenda Item 1.13, and preserving investment certainty for incumbent IMT licensees.

Given the complexity of these issues, MSSA considers that national frameworks for IMT-based D2D would benefit from alignment with international study outcomes before large-scale implementation. A sequenced approach reduces regulatory fragmentation and ensures coexistence rules are technically robust and internationally harmonized.

Additional information is available in MSSA's White Paper on MSS Reference Architecture.

29. With regards to D2D in MSS bands, which band(s) should be considered in the next 5-year period and what is the best assignment approach for Malaysia to adopt?

For the next five-year period, internationally harmonized MSS allocations in L- and S-bands are the most appropriate candidates for D2D deployment. These bands are already incorporated into 3GPP NTN standards, benefit from established coordination mechanisms, and support integration into mass-market mobile devices without specialized hardware requirements.

S7 – Earth Stations, ESIM, and Infrastructure

MSSA is not responding to questions in this section at this time.

S8 – International Harmonization and Coordination

MSSA is not responding to questions in this section at this time.

S9 – Pricing, Assignment Models, and Investment

MSSA is not responding to questions in this section at this time.

S10 – Strategic Outlook

MSSA is not responding to questions in this section at this time.

III. Conclusion

MSSA appreciates the opportunity to provide input to MCMC's review of the spectrum landscape and the evolving regulatory framework for satellite services, including D2D and broader NTN capabilities.

As Malaysia advances its digital transformation agenda, the integration of satellite and terrestrial networks presents an opportunity to enhance coverage, resilience, and service innovation in a manner that is consistent with international harmonization and long-term investment certainty. A balanced regulatory approach—prioritizing internationally harmonized MSS allocations, sequencing developments in line with WRC processes, and maintaining predictable licensing frameworks—will support sustainable ecosystem growth.

MSSA remains available to engage further with MCMC and other Malaysian stakeholders in support of standards-based, internationally aligned satellite–terrestrial integration.