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Reference: TRAI CP Framework for Satellite Communication Network Authorisation, and Assignment of Spectrum to Satellite Communication Network Providers
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Subject: Inputs to TRAI Consultation Paper on the Framework for Satellite Communication Network Authorisation, and Assignment of Spectrum to Satellite Communication Network Providers

Dear Sir

This is with reference to TRAI Consultation on the Framework for Satellite Communication Network Authorisation, and Assignment of Spectrum to Satellite Communication Network Providers dated 8th April 2026.

Please find enclosed Ericsson's submission as Annexure-1 on the matter for your consideration.

Regards

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Annexure-1

Ericsson Inputs to TRAI CP on Framework for Satellite Communication Network Authorisation, and Assignment of Spectrum to Satellite Communication Network Providers

Ericsson welcomes TRAI's initiative to consult on the development of a regulatory framework for satellite Direct-to-Device (D2D) services. We support the objective to enable innovation and improve mobile coverage through D2D services, provided that, this is done in a way that ensures robust and effective protection of existing terrestrial IMT networks.

As India evaluates the introduction of satellite D2D services, below policy considerations may be relevant:

- Prioritise using the existing MSS allocation spectrum bands supported by 3GPP for D2D: Using MSS (Mobile Satellite Service) spectrum for D2D leverages internationally harmonized spectrum allocations, established ITU regulatory frameworks, and ongoing alignment with 3GPP NTN standards.
- In case of enabling D2D service via satellite using IMT spectrum:
    1. - Preserving IMT primacy: Terrestrial mobile services should remain the primary users of IMT spectrum.
    2. - Mandatory operator partnership: Satellite D2D services connecting to mobile (cellular) may be permitted only through collaboration with licensed mobile operators.
    3. - Clear interference thresholds: Adoption of defined limits to protect terrestrial networks.
    4. - Compliance verification: Adoption of the verification methodology to verify the compliance of D2D systems with the limits defined for protection of IMT.
    5. - Regulatory parity: Satellite service providers should comply with relevant telecom obligations to maintain a level playing field.
    6. - International coordination: Cross-border interference issues may require alignment with global spectrum management processes. Thus, we recommend to wait for the outcome of WRC27 AI 1.13 when considering D2D in other IMT bands after the new MSS allocation.
    7. - Supplementary service: Satellite D2D, either using MSS spectrum or IMT spectrum should be used as a supplementary service to complement terrestrial network coverage.

In this submission, Ericsson has focused response on a select set of key questions that are most relevant from organization's perspective as follows:

Assignment of Spectrum for the SCN

Q9. Which of the following services should be permitted to be provided by using the SCNs established by the proposed SCN authorised entities:

(a) Fixed Satellite Service (FSS);

(b) Mobile Satellite Service (MSS);

(c) Direct-to-Device (D2D) Service via satellite by using MSS spectrum;

d) **Direct-to-Device (D2D) Service via satellite by using IMT spectrum?**

Kindly provide a detailed response with justification.

Response:

- Ericsson supports enabling D2D service via satellite by using MSS spectrum (L-band and S-band) by the proposed framework for SCN, while guaranteeing that adjacent IMT operation is protected and that no additional restrictions or limitations are implied on existing or future IMT deployments. D2D in MSS spectrum can be implemented within existing ITU allocations without the need for new spectrum allocations or fundamental regulatory changes. Besides, 3GPP has defined NTN bands in

MSS spectrum and standardized NTN solutions in those bands to complement TN coverage. Note the S-band, which has MSS allocation is also part of the Extended IMT FDD band 1920 – 2010 MHz/ 2110 – 2200 MHz (3GPP band 65/n65).

- Regarding D2D in IMT bands, Ericsson acknowledges the potential of the service to complement the terrestrial network coverage. However, this approach introduces technical challenges and concerns about coexistence and interference with respect to terrestrial IMT. Ongoing international studies, including those under WRC-27 Agenda Item 1.13, are examining these issues. Ericsson would suggest that D2D in IMT bands is only considered after WRC-27 once the studies related to WRC-27 AI 1.13 are completed in ITU-R and the provisions needed to fully protect IMT from D2D in IMT bands are defined and harmonized by WRC-27.

Q10. Whether D2D Service via satellite by using IMT spectrum should be permitted at this stage itself, or should this matter be examined after considering the outcome of WRC-2027? Kindly provide a detailed response with justification.

Response: D2D Service via satellite by using IMT spectrum should be examined after WRC-2027 considering the outcome of WRC-27 and the provisions needed to fully protect IMT from D2D in IMT bands are defined and harmonized by then.

Waiting for WRC-27 AI 1.13 outcome will help avoid premature regulatory decisions, ensure protection of terrestrial networks, and having regulations aligned with international frameworks.

Q11. From the perspective of holding spectrum for the feeder link and the user link on SCNs, which of the following combinations should be permitted at the SCNs established by the proposed SCN authorised entities:

Combination No.	Spectrum for the feeder link held by -	Spectrum for the user link held by -
1	SCN authorised entity	SCN authorised entity
2	SCN authorised entity	Partnering entity (service provider)
3	Partnering entity (service provider)	SCN authorised entity
4	Partnering entity (service provider)	Partnering entity (service provider)

Kindly provide a detailed response with justification

Response: D2D service via satellite using IMT spectrum is a supplementary service that complements the terrestrial network coverage. For that reason, MNO (Mobile Network Operator)-SNO (Satellite Network Operator) partnership should be required to provide the service in a band that MNO is the license holder. Thus, the spectrum for the user link shall be held by the MNO (service provider), i.e. option 2 or option 4.

However, for D2D in MSS spectrum, other combinations could also be considered.

Q12. Which of the following types of spectrum should be assigned to the proposed SCN authorised entities:

(a) Spectrum in the frequency bands allocated for FSS

(b) Spectrum in the frequency bands allocated for MSS

c) Any other?

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Kindly provide a detailed response with justification

Response: Ericsson endorses assigning the existing Mobile Satellite Service (MSS) spectrum to the proposed SCN authorised entities to provide D2D and IoT services. We also encourage modernizing the licensing schemes for MSS spectrum which are defined as NTN bands in 3GPP (bands n250-n256). MSS spectrum is already supported by 3GPP for NTN and can be integrated with TN for services, such as D2D/NTN and IoT solutions. Using MSS spectrum for D2D leverages internationally harmonized spectrum allocations, established ITU regulatory frameworks, and ongoing alignment with 3GPP NTN standards. We also recognize that in such existing MSS bands, there are non-3GPP/proprietary technologies that cannot be integrated with TN networks which would limit the ability to leverage the 3GPP device ecosystem.

D2D via Satellite Policy Framework

Q18. In case it is decided to permit D2D service via satellite by using the spectrum in the frequency bands allocated for MSS such as L-band and S-band, whether there is a need to establish a policy and regulatory framework for enabling and regulating such a service? If yes, kindly suggest a broad framework for this purpose and the key terms and conditions to be included under such a framework? Kindly provide a detailed response with justification.

Response: Ericsson advocates for the creation of a robust framework to facilitate D2D services utilizing MSS spectrum (defined as NTN band in 3GPP: bands n250-n256) while ensuring protection of adjacent IMT operation with no additional restrictions or limitations on existing and future IMT deployments.

Regarding MSS S-Band, it is adjacent to 3GPP band n1. The regulatory framework should ensure that MSS service in S-band is in a manner where IMT operation in Band 1 is fully protected. and is subject to no burden from any MSS operation in the S-Band.

In addition, for D2D using MSS spectrum, we encourage TRAI to strictly follow 3GPP NTN frequency arrangements. The 3GPP supported frequency arrangements for MSS L and S band (n250-n256) are listed in the table below. Such D2D service should be enabled to provide complimentary connectivity through existing terrestrial operators. We would like to emphasize that this should not create interference or incompatibility with the frequency arrangements for allowing IMT in the band 1427-1518 MHz range (TRAI consultation). It is also important to consider the ongoing WRC-27 AI 1.12 that studies potential MSS allocation for low data rate (LDR) services in part of this frequency range 1427-1432 MHz.

NR NTN satellite bands		
Band	Frequencies (UL/DL) MHz	Duplex mode
n250	1668 – 1675 / 1518 – 1559	FDD
n251	1626.5 - 1660.5 / 1518 – 1559	FDD
n252	1668 – 1675 / 1518 – 1525	FDD
n253	2000 – 2020 / 2180 – 2200	FDD
n256	1980–2010 / 2170–2200	FDD
n255	1626.5–1660.5 / 1525–1559	FDD
n254	1610–1626.5 / 2483.5–2500	FDD

Q19. In case with a view to enable D2D service via satellite using IMT spectrum, it is decided to permit the proposed SCN authorised entity to utilize IMT spectrum assigned to a service authorised entity ("partnering entity") for the purpose of providing SCNaaS to the partnering entity, -

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(a) whether there is a need to establish a policy and regulatory framework for enabling the SCN authorised entity to enter into an agreement/ arrangement with the partnering entity to utilize IMT spectrum assigned to such partnering entity for the purpose of providing SCNaaS to the partnering entity? If yes, what should be the terms and conditions under such a framework? If no, in what manner such arrangements should be enabled and regulated?

Response: In case of enabling D2D service via satellite using IMT spectrum Ericsson reiterates the importance of sufficiently protecting the terrestrial IMT networks from potential interference from D2D services in IMT bands while enabling D2D only as complimentary to existing Terrestrial coverage by TSPs and also not imposing any additional burden on current and future expansion of IMT deployment in those areas uncovered today. To achieve this, the development of adequate protection levels for all possible IMT BSs and UEs and scenarios, together with transparent coordination processes and enforcement procedures from the very first stages of D2D authorizations are vital.

D2D operation should be limited to use of IMT frequency bands that are licensed to IMT operators and have clear radio regulatory requirements to protect IMT networks at national level as well as across international borders. Note that to complement terrestrial IMT network coverage using DC-MSS-IMT is still subject to intensive discussions and studies under WRC27 study cycle AI 1.13. The results and provisions (e.g. PFD limits) for the protection of terrestrial mobile networks from DC-MSS-IMT are only expected by WRC27. The bands under study in AI 1.13 also include MSS S-band which has also MS allocation and IMT identification.

While Ericsson recognizes TRAI's initiative to facilitate the use of D2D in IMT bands, we would like to highlight the importance of not pre-empting the results of WRC-27 on AI 1.13. In the case where TRAI considers authorizing such operation before WRC-27, we encourage to only consider it under non-interference non-protected basis and define associated regulatory measures to ensure the protection of IMT based on methodologies whose compliance can be validated and enforced to avoid any interference, burden or limitations to the deployment of IMT in India or in neighbouring countries.

Moreover, D2D in IMT bands should be considered as a supplementary service to complete the TN coverage and part of a broader hybrid satellite–terrestrial model. Therefore, D2D in IMT bands should only be enabled by satellite operators working in partnership with licensed MNOs, using spectrum assigned to those MNOs. This approach allows D2D to be implemented as an extension of terrestrial mobile networks, maintaining continuity with existing licensing frameworks and customer relationships.

(b) Which frequency bands identified for IMT should be considered for this purpose? Specifically, whether only FDD-based frequency bands should be considered?

Response: Ericsson believes, at this stage, only FDD-based frequency bands licensed in India should be considered for D2D.

As said, protection of terrestrial IMT from D2D in IMT bands is critical. In order to minimise the risk of interference of D2D to IMT networks, the working assumption is that D2D should follow the same directionality as that of the existing IMT bands for mobile terrestrial services. Based on that, FDD bands allow for a clear distinction of which IMT receivers (i.e. BS or UEs) are most likely to be impacted. In case of having D2D in TDD bands, both IMT UE and IMT BS are at the risk of interference.

In terrestrial TDD systems, synchronisation among different adjacent networks is vital to ensure coexistence. Synchronised TDD duplex mode implies that all transmissions from all networks start at the same reference time and follow the same frame structure.

Due to their nature, TDD bands share the entire available spectrum in the time-domain, requiring accurate time-synchronisation to avoid interference. In D2D, due to the large propagation distance and the long and

variable round-trip delays, time-synchronisation is challenging if not impossible. As such, there is an increased likelihood that D2D emissions arrive delayed, and thus unsynchronised, in adjacent IMT networks (co-channel adjacent area and co-coverage adjacent channel). To ensure an interference free environment in TDD bands, the regulatory limits to protect terrestrial operations might become more stringent, since both BS and UEs would need to be protected from unsynchronised SNO/MNO operations over large territories. Moreover, when cross-border issues are considered, the typical way to resolve the interference is via synchronization, which is much more difficult to achieve in case of D2D satellite systems.

In addition, the 5G NR NTN work in 3GPP so far has been focused only on FDD bands, and any potential upcoming debates on the support of TDD bands in 3GPP needs to address associated technical challenges.

(c) For the frequency bands identified for IMT where D2D is decided to be permitted, whether the National Frequency Allocation Plan (NFAP) should be modified to include MSS on a secondary basis? If yes, kindly furnish your suggestion for the proposed modification(s).

Response: We encourage TRAI to wait for the outcome of WRC27 AI 1.13. In the case where TRAI considers authorizing D2D in IMT bands before WRC-27, we encourage to only consider it under non-interference non-protected basis. The revision of NFAP after WRC-27, would be the appropriate time to reflect the decision of D2D services.

We would also like to emphasize that not all the frequency bands identified for IMT are being studied under WRC-27 AI 1.13, one of the expected outcome of the conference, in addition to the regulatory condition to protect IMT BS/UE is neighbouring countries, is the direction of operation between the DC-MSS-IMT space-station and UE, and whether this new allocation (DC-MSS-IMT) will be secondary to all services or secondary only to IMT (Mobile services). We appreciate and support India's position towards WRC-27 preparations to allocate MSS in secondary basis and limiting its application only to DC-MSS-IMT to complement terrestrial network coverage. The discussions are ongoing, and we recommend TRAI to consider the outcome of WRC-27 for a harmonized allocation in the region and not recommend any national-level allocation for MSS.

(d) To mitigate the issues related to cross-border interference, whether any other condition in addition to Article 4.4 of the ITU-Radio Regulations is required to be made applicable?

Response: In the case where TRAI considers authorizing D2D in IMT bands before WRC-27, we encourage to define associated regulatory measures to ensure the protection of terrestrial IMT based on methodologies whose compliance can be validated and enforced to avoid any interference, burden or limitations to the deployment of IMT in India or in neighbouring countries.

It is also important to consider the frequency arrangements in India and neighbouring countries too. Also, such bilateral arrangement needs to respect and adhere the WRC-27 regulatory outcome, that will be applicable for the DC-MSS-IMT systems globally.

(e) What regulatory framework should be established for ensuring interference-free operation of D2D service via satellite by using IMT spectrum within the country? Specifically, which of the following methods should be followed: The SCNs established by SCN authorised entities should be permitted to be used to provide D2D service via satellite by using IMT spectrum only if a single partnering entity (access service provider) holds the relevant IMT frequency channel in all the 22 LSAs of the country and agrees to permit the usage of its IMT frequency channel by the SCN authorised entity at its SCN for the purpose of providing SCNaaS; or

The SCNs established by SCN authorised entities should be permitted to be used to provide D2D service via satellite by using IMT spectrum if one or more access service providers – together holding the assignment of the relevant IMT frequency channel across all 22 licensed service areas of the country – agree to allow the usage of their IMT frequency channel by the SCN authorised entity at its SCN for the purpose of providing SCNaaS; or

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Any other method? **Kindly provide a detailed response with justification.**

Response: For ensuring interference-free operation of D2D service via satellite by using IMT spectrum within the country, the MNO-SNO partnership to provide D2D in the band that the partner MNO is the license holder should be required. To avoid the need for having separation distances within the country, we recommend TRAI to follow the first method, i.e. the SCNs established by SCN authorised entities should be permitted to be used to provide D2D service via satellite by using IMT spectrum only if a single partnering entity (access service provider) holds the relevant IMT frequency channel in all the 22 LSAs of the country and agrees to permit the usage of its IMT frequency channel by the SCN authorised entity at its SCN for the purpose of providing SCNaaS.

The reason is to avoid the need for having substantial separation distances within the country to ensure protection of terrestrial networks in other LSAs within the country.

Q20. Whether there are any other inputs or suggestions with respect to the delivery of D2D services via satellite through SCNs established by the proposed SCN authorised entities? Kindly provide a detailed response with justification.

Response: Ericsson supports the introduction of Direct-to-Device (D2D) satellite services as a complementary extension to terrestrial mobile networks, enabling ubiquitous coverage and enhancing network resilience where terrestrial operators are today (or in near-future) limited to deploy terrestrial infrastructure. However, D2D should be deployed within a **standards-based, terrestrial-integrated, and spectrum-efficient framework**, ensuring coexistence with IMT networks, compliance with national security requirements, and alignment with global standards. A **hybrid satellite–terrestrial model**, anchored in operator-led architectures, is critical to ensure leveraging the 3GPP economies of scale of mobile devices, service quality, and affordability in the Indian context.

Below are some inputs and suggestions which needs to be considered with respect to delivery of D2D services via satellite through SCN:

1. - Standards-Based, Mobile Network Operator-Led Hybrid Architecture: D2D satellite services should be deployed as an extension of terrestrial mobile networks, rather than as standalone or over-the-top satellite offerings.
2. - Spectrum Policy to Ensure Protection of Terrestrial Networks: D2D services must operate under a controlled and coordinated spectrum-sharing framework, with safeguards to protect terrestrial IMT networks. Necessary regulatory framework to report and resolve interference from the operation of D2D at national and neighbouring administrations.
3. - Licensing and Regulatory Clarity: A clear and unified licensing framework is required for D2D services, avoiding regulatory arbitrage between satellite and terrestrial service providers. Ensure equitable and fair opportunity for all terrestrial operators to provide such complimentary services through D2D.
4. - Device Ecosystem and Interoperability: D2D services should leverage standardized, mass-market devices without requiring proprietary hardware modifications.
5. - Security, Lawful Interception, and Traceability: D2D services must comply fully with India's security and regulatory frameworks, including lawful interception (LI) and data governance requirements that are applicable for terrestrial service operator.
6. - Phased Service Introduction and Use-Case Prioritization: D2D services should initially focus on low-bandwidth, high-impact (e.g. emergency, SoS) use cases with gradual evolution toward enhanced capabilities (see M.2514).
7. Infrastructure Sharing and Cost Efficiency: Policy frameworks should encourage infrastructure sharing and open interfaces to reduce deployment costs.
8. Global Harmonization and Ecosystem Alignment: India should align its D2D regulatory approach with global developments to ensure ecosystem compatibility.