VIA ELECTRONIC MAIL

March 28, 2025

Radio Spectrum Policy Group
Via email: cnect-RSPG@ec.europa.eu

Re: Radio Spectrum Policy Group DRAFT Opinion on the EU-level policy approach to satellite Direct-to-Device connectivity and related Single Market issues

Dear RSPG Chairperson and Members:

By this letter, the Mobile Satellite Services Association ("MSSA") respectfully submits its comments on the Radio Spectrum Policy Group's *Draft Opinion* regarding the EU-level policy approach to satellite Direct-to-Device (D2D) connectivity and related Single Market issues. As explained below, MSSA believes that the European Union's *existing* regulatory framework is *already* capable of realizing the substantial benefits that D2D-MES services can deliver.[1] However, these benefits will only be fully realized if the EU ensures that this framework continues to: (i) embody the principles of service and technology neutrality; (ii) provide regulatory certainty; and (iii) facilitate the competition and innovation necessary to ensure that all states benefit from high-quality D2D services that can be offered using mobile-satellite service (MSS) spectrum.

MSSA is a non-profit industry association that seeks to promote and advance the emerging D2D ecosystem and support the efforts of D2D solutions providers—including terrestrial mobile and satellite operators, OEMs, infrastructure, chip vendors, and others.[2] MSSA is focused on facilitating a global ecosystem utilizing spectrum already allocated and licensed for MSS (and well-suited for integration into a broad range of mobile devices). Given the critical role that emerging D2D services will play in expanding connectivity and enabling competition across multiple large and diverse segments, MSSA and its members have closely monitored the RSPG's ongoing activities to enable D2D,

[1] D2D-MES services are defined in Section 2.1 of the *Draft Opinion* as services provided directly to mobile earth stations (MES) in frequency bands specific to satellite operators.

[2] Additional information on the MSSA and its diverse membership of L and S-band MSS operators, infrastructure providers, chip vendors and others can be found at https://www.mss-association.org/ and https://www.mss-association.org/members.

including the 2 GHz MSS frequency band opinion, efforts ongoing in CEPT, and preparations for WRC-27. We limit our comments in this consultation to D2D-MES and D2D-IMT services as defined in Section 2.1 of the *Draft Opinion*.

D2D-MES services

MSS operators—including but not limited to MSSA members—are already utilizing existing MSS-allocated spectrum in the L and S-bands to provide D2D-MES services. The ability of operators to provide comprehensive coverage is facilitated by their access to globally harmonised MSS spectrum, which can be used in accordance with the ITU's longstanding MSS framework (defined in the ITU Radio Regulations and Recommendations) which effectively manages potential interference risks and enable the effective use of these bands (including for D2D). At the same time, the D2D-MES approach minimises interference risk in the first instance by avoiding any need to repurpose spectrum for satellite communications, or operate on a co-frequency basis with terrestrial networks (as is the case where IMT spectrum is utilized).

The fact that operators can provide D2D-MES services within *existing* MSS frameworks and frequency allocations has provided certainty and stability that has allowed them to attract capital investment and justify the substantial expenditures necessary to deploy D2D-MES services. As a result, the industry is progressing with the incorporation of these bands into mobile phones and existing operators can innovate and further enhance their MSS services to include D2D and other over services like purely IOT.

Notably, D2D-MES is already possible in most jurisdictions without requiring administrations to adopt new regulations. EU Member States have existing national regulations that enable the use of MSS terminals throughout their territory, using the following L-band and S-band ITU 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)
- 1610-1626.5 MHz (Earth-to-space and space-to-Earth) paired with 2483.5-2500 MHz (space-to-Earth)
- 1980-2010 MHz (Earth-to-space) paired with 2170-2200 MHz (space-to-Earth)

Many operators and equipment manufacturers are embracing 3GPP Non-Terrestrial Networks (NTN) standards Release for emerging D2D handsets such as the Google Pixel and Samsung Galaxy. Regarding equipment standards D2D-MES, 3GPP Release 17

enhances features in the 5G Core Architecture to support NTNs[3] for several use cases, including coverage extension, IoT, disaster communication, global roaming, and broadcasting.

3GPP Release 18 identifies three specific MSS frequency band ranges under 6 GHz (recognised across all ITU Regions) for NTN, following the duplex mode defined by the ITU table of frequency allocations:

NTN satellite bands in FR1-NTN[4]

NTN satellite operating band	Uplink (UL) operating band Satellite Access Node receive / UE transmit FUL,low – FUL,high	Downlink (DL) operating band Satellite Access Node transmit / UE receive FDL,low – FDL,high	Duplex mode
n256	1980 MHz – 2010 MHz	2170 MHz – 2200 MHz	FDD
n255	1626.5 MHz – 1660.5 MHz	1525 MHz – 1559 MHz	FDD
n254	1610 – 1626.5 MHz	2483.5 – 2500 MHz	FDD
NOTE: NTN satellite bands are numbered in descending order from n256.			

A recently published report, Spectrum for Emerging Direct-to-Device Satellite Operators[5], concludes that MSS bands offer significant advantages for nationwide—and potentially global deployment of D2D services. These advantages stem from established global regulations and market access grants already secured by several existing operators. Additionally, millions of MSS users rely on these services, many for critical safety-of-life applications that must be protected. The most effective way to ensure this protection is through commercial agreements between D2D providers and existing MSS operators—a model that has already proven viable through multiple real-world examples.

MSSA agrees with the RSPG recommendation in section 4.2 of the *Draft Opinion* that there is no need to engage at the EU level currently regarding the implementation of proprietary technologies in terminal equipment. The principle of technology neutrality is functioning well within existing EU regulations including the Radio Equipment Directive, CEPT, and ETSI standards. D2D services have, until recently, been limited to D2D-MES offerings operating in bands already allocated globally to the MSS by the ITU on a primary basis. These services support various terminal types, including satellite

[3] Non-terrestrial network (NTN) refers to a Radio Access Network (RAN), which provides non-terrestrial access with 5G New Radio (NR), 4G NB-IoT or 4G eMTC radio interfaces to user equipment by means of an NTN payload embarked on an airborne or space-borne NTN vehicle and an NTN gateway (see 3GPP TS 38.300). The underlying technology, maturity, deployment model, and commercial timelines of a given NTN will vary.
[4] See: 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
[5] https://www.satnow.com/news/details/2797-spectrum-challenges-for-emerging-direct-to-device-satellite-services

service for iPhones, Android phones, and other devices with more capabilities, including broadband connectivity, which are being developed.[6]

MSSA does not agree with recommendation 4.2 of the *Draft Opinion* that improvement in receiver blocking in MES terminals operating in the L-band are needed in order to reduce constraints on mobile SDL operating in the ECS harmonised band. ECC Report 299[7] and ECC Report 263[8] offer alterative proportionate solutions.

D2D-IMT Services

In contrast to D2D-MES services, D2D-IMT services are offered in bands used for the provision of terrestrial IMT-based services. IMT D2D services require satellite operators to operate in spectrum already licensed and used by mobile network operators to serve their customers. As discussed in the *Draft Opinion*, this approach introduces additional technical complexities and operational risks, which at a minimum require further study and regulatory action prior to implementation.

For example, D2D-IMT operations require significant changes to regulatory frameworks to allow for different uses of spectrum that existing allocations do not support. Furthermore, this approach introduces new interference and coexistence issues concerning existing terrestrial mobile spectrum users that require careful study and management. Before national authorizations are issued to facilitate D2D operations in the spectrum allocated and licensed to the terrestrial mobile service, technical studies must be conducted and recommendations developed to potentially address unresolved issues; including out-of-band emissions, cross-border interference and satellite-to-satellite interference.

D2D-IMT also involves regulatory challenges associated with authorizing satellite use of partially harmonised international spectrum allocated for terrestrial services without a satellite allocation. In most cases, the proposed spectrum will already be authorised to one or more MNOs in the country. As such, domestic regulations and existing authorisations may need significant modifications to allow D2D. Re-certification of legacy handset devices for this new use may also be recommended. The DRAFT opinion points out important service provision related questions around D2D-IMT including the risk of unintentional roaming resulting in unexpected costs to consumers and emergency calling and numbering issues.

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[6] See: https://www.zdnet.com/article/google-pixel-9-is-first-android-phone-to-get-satellite-sos-messaging/

[7] See ECC Report 299, "Measures to address potential blocking of MES operating in bands adjacent to 1518 MHz (including 1525-1559 MHz) at sea ports and airports," March 2019.

[8] *See* ECC Report 263, "Adjacent band compatibility studies between IMT operating in band 1492-1518 MHz and the MSS operating in 1518-1525 MHz," March 2017.

The RSPG notes it will address relevant WRC-27 issues when developing its Opinion on WRC-27. Some preliminary ITU-R Working Parties analysis[9] shows that significant separation distance or exclusion zones are required to ensure that interference from such D2D-IMT operations into terrestrial mobile networks or along international borders can be effectively managed. In technical studies conducted by one MSSA member, it was observed that spectrum sharing between D2D operators and terrestrial operators can negatively impact satellite network operator services especially in the uplink. Even with the presence of exclusion or buffer zones, the aggregate interference due to the uplink transmission of the user equipment (mobile devices) managed by the mobile network operators could create significant loss in uplink signal to interference plus noise ratio (SINR) at the satellite. Since, for D2D, uplink is the weakest link, additional interference in the shared spectrum can make D2D potentially infeasible. The technical and regulatory challenges associated with D2D-IMT remain significant and require careful consideration and management to ensure the viability and effectiveness of this technology.

It has been suggested that D2D-IMT could operate based on ITU RR Article No. 4.4[10]. However, as noted by the Radio Regulations Board (RRB) in its report to WRC-23[11], 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 Article No. 4.4. In some cases, these NGSO systems are proposing to offer commercial services on large constellations without an 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.

Additionally, Administrations contemplating potential invocation of ITU RR Article 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 to existing services.
- This showing may be difficult or impossible, as ITU RR 4.4 for new satellite systems will greatly increase the risk of interference with other systems and services.
- Any operations must immediately cease if there is interference, even if providing commercial services to consumers—raising significant questions about the quality, reliability, and sustainability of D2D-IMT services.

[9] 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.
[10] *See* Article 4.4 of the ITU Radio Regulations, 2024 Edition https://www.itu.int/pub/R-REG-RR
[11] *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.

- Before D2D-IMT services can operate, measures must be taken to protect other space and terrestrial services, both at the national and cross-border levels.

In sum, technical, operational, and regulatory matters related to the non-standard D2D-IMT approach must be further studied. While MSSA supports the RSPG's intent in its section 4.1 recommendation that the EC issue a mandate to CEPT under the Spectrum Decision to develop harmonised technical conditions for D2D-IMT satellite operations in ECS harmonised bands, addressing, as appropriate, protection of ECS networks and other radio services from D2D satellite operations, MSSA advocates first conducting the studies under WRC-27 to determine the optimum route for D2D-IMT spectrum to benefit from the international work and develop harmonised solutions.

Conclusion

Several factors have led to the growing demand for D2D services. Significant portions of the world rely on satellite connectivity, as they have many underserved areas or have little ground-based infrastructure providing coverage. Advances in satellite technology and satellite service standardization, such as the 3GPP NTN standards, have driven momentum for D2D. This technology can help provide critical connectivity for underserved populations, delivering important social and economic development gains. It can also expand connectivity across multiple large and diverse segments, including industrial, government, agriculture, automotive, and others.

Satellite D2D technology presents promising opportunities and challenges for EU-level policy and related Single Market issues. The D2D-MES approach generally requires no additional action from national regulators. This approach leverages standardised protocols and frameworks, capitalizing on 3GPP Release 17 and 18 NTN specifications, to provide seamless connectivity across terrestrial and satellite networks within existing regulatory frameworks. Conversely, D2D-IMT presents significant technical and regulatory hurdles, which require further study within the ITU and in the EU.

Respectfully submitted,

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