RADIO SPECTRUM POLICY GROUP

DRAFT Opinion on the EU-level policy approach to satellite Direct-to-Device connectivity and related Single Market issues

RSPG25-008 FINAL

FASTWEB S.P.A.

Fastweb is a leading electronic communications provider delivering a wide range of services across Italy. It is a subsidiary of Swisscom, a prominent telco operator active in the provision of telecommunications services to residential and business customers in Switzerland.

Since its inception in 1999, Fastweb has been a key player in Italy's competitive fixed telecommunications market. It has established itself as one of the foremost providers of ultra-broadband services for both business and consumer customers. This extensive infrastructure enables Fastweb to deliver high-speed, reliable services at scale.

Fastweb has further expanded its market reach to the wireless communications sector, operating as a Mobile Network Operator (MNO) since 2019. The company is at the forefront of the mobile revolution, developing a cutting-edge 5G network that will support next-generation communication technologies. Additionally, Fastweb is deploying Fixed Wireless Access (FWA) services, leveraging 5G technology to provide faster, more flexible broadband solutions.

Fastweb ranks among Italy's top telecommunications operators. Its strategic focus on innovation, network development, and service quality has enabled it to maintain a leadership position in the sector.

On 15 March 2024, Swisscom has entered into agreements with Vodafone Group Plc in relation to the acquisition of 100% of Vodafone Italia with the aim of merging it with Fastweb, Swisscom's subsidiary in Italy

After obtaining all regulatory approvals, on December 2024, Swisscom has successfully completed the acquisition of Vodafone Italia. Fastweb and Vodafone Italia bring together complementary high-quality mobile and fixed infrastructures, competencies, and capabilities to create a leading converged challenger in Italy: Fastweb + Vodafone.

By combining Fastweb's strengths in fixed connectivity with Vodafone Italia's leading position in mobile services, the combined entity will offer innovative, competitively priced converged services to Italian consumers and businesses.

Fastweb wishes to thank the RSPG for its insightful draft Opinion on the EU-level policy approach to satellite Direct-to-Device connectivity and related Single Market issues.

We acknowledge the potential of D2D services to complement terrestrial mobile networks, particularly in extending coverage to underserved areas. However, we believe that a cautious and measured approach is necessary when considering the integration of D2D services into the European telecommunications landscape.

The following paragraphs present Fastweb key messages on the topics touched within the draft Opinion.

PREFACE

LEO Constellations and D2D Services

The evolution of direct-to-device (D2D) satellite connectivity has garnered significant attention from industry, mobile network operators, governments, and policymakers. This interest is driven by the emergence of Low Earth Orbit (LEO) satellite constellations and the efforts of established satellite operators to integrate into the D2D ecosystem.

LEO satellites, positioned closer to Earth than traditional geostationary satellites, offer reduced latency and enhanced data throughput than the latter (Figure 1). This proximity allows for lower power requirements and increased sensitivity for ground terminals, making LEO constellations particularly suitable for D2D services.

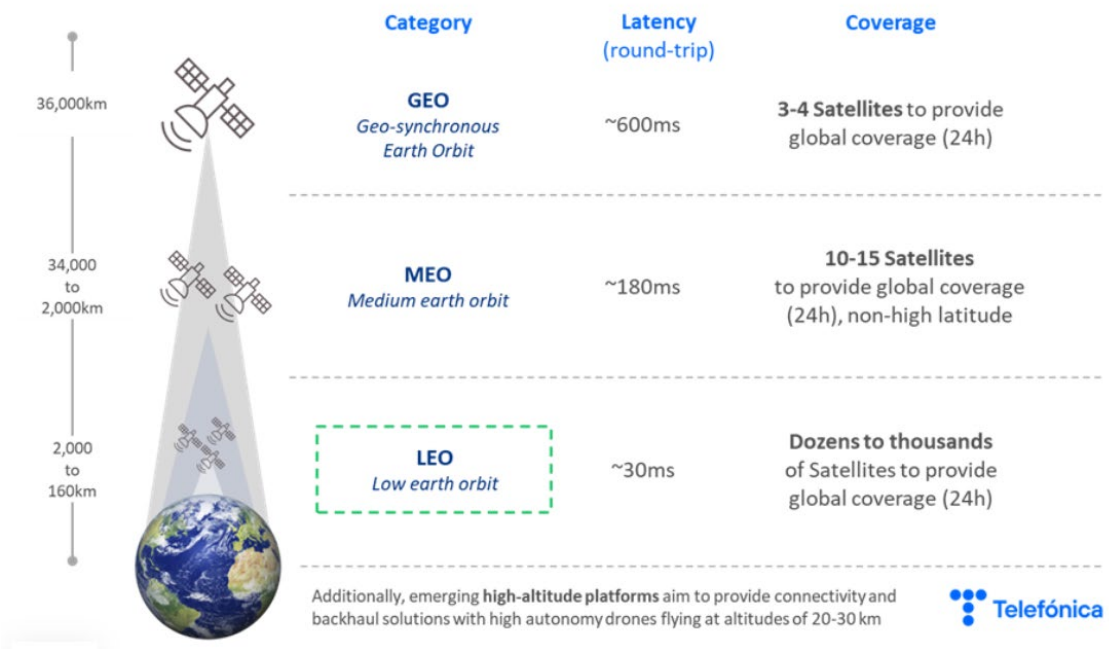

Figure 1: Telefonica - Satellite Connectivity[1]

[1] Source: https://www.telefonica.com/en/communication-room/blog/direct-device-satellite-service-complement-mobile-networks/

However, despite these advancements, the performance and scalability of D2D services currently remain below those of terrestrial mobile networks, positioning them as complementary to terrestrial mobile networks rather than replacements.

Here below, some limitations are listed:

- *Indoor Coverage* - Connecting indoors will generally be difficult leveraging satellite connectivity, due to high building penetration losses.
- *Capacity* - The available capacity is constrained due to the large satellite beam footprints (60 - 100 km) and the limited bandwidth per beam. Moreover, satellite design imposes additional costs and complexity constraints, allowing at the same time only a limited number of simultaneous connections within each large coverage area. This is especially restrictive for high data-rate services. In comparison, terrestrial mobile networks offer vastly superior capacity (Table 1).
- *Performance* - Satellite networks offer lower throughput and higher latency than terrestrial alternatives (Table 1). While suitable for certain use cases, they may not always meet specific performance requirements.

Table 1: LEO vs 4G-5G IMT performance[1]

	LEO	**4G-5G IMT**
Latency (RTT)	20 - 40 ms	1 - 10 ms
Capacity	20-100 Mbps/km^2	100-1000 Mbps/km^2

D2D Services in Europe

Potential use cases

D2D services present compelling use cases, notably in extending coverage to the approximately 4% of the global population residing outside mobile network reach[2]. Nevertheless, this gap shrinks to an average of 1% when considering the percentage of population residing in Europe and not covered by a mobile broadband network[3] (Figure 2).

[2] Source: https://www.gsma.com/newsroom/press-release/new-gsma-report-shows-mobile-internet-connectivity-continues-to-grow-globally-but-barriers-for-3-45-billion-unconnected-people-remain/#:~:text=350%20million%20people%20(4%25%20of,size%20of%20the%20coverage%20gap

[3] Source: https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2025/01/0125-Mobile-Economy-Europe-2025-web.pdf

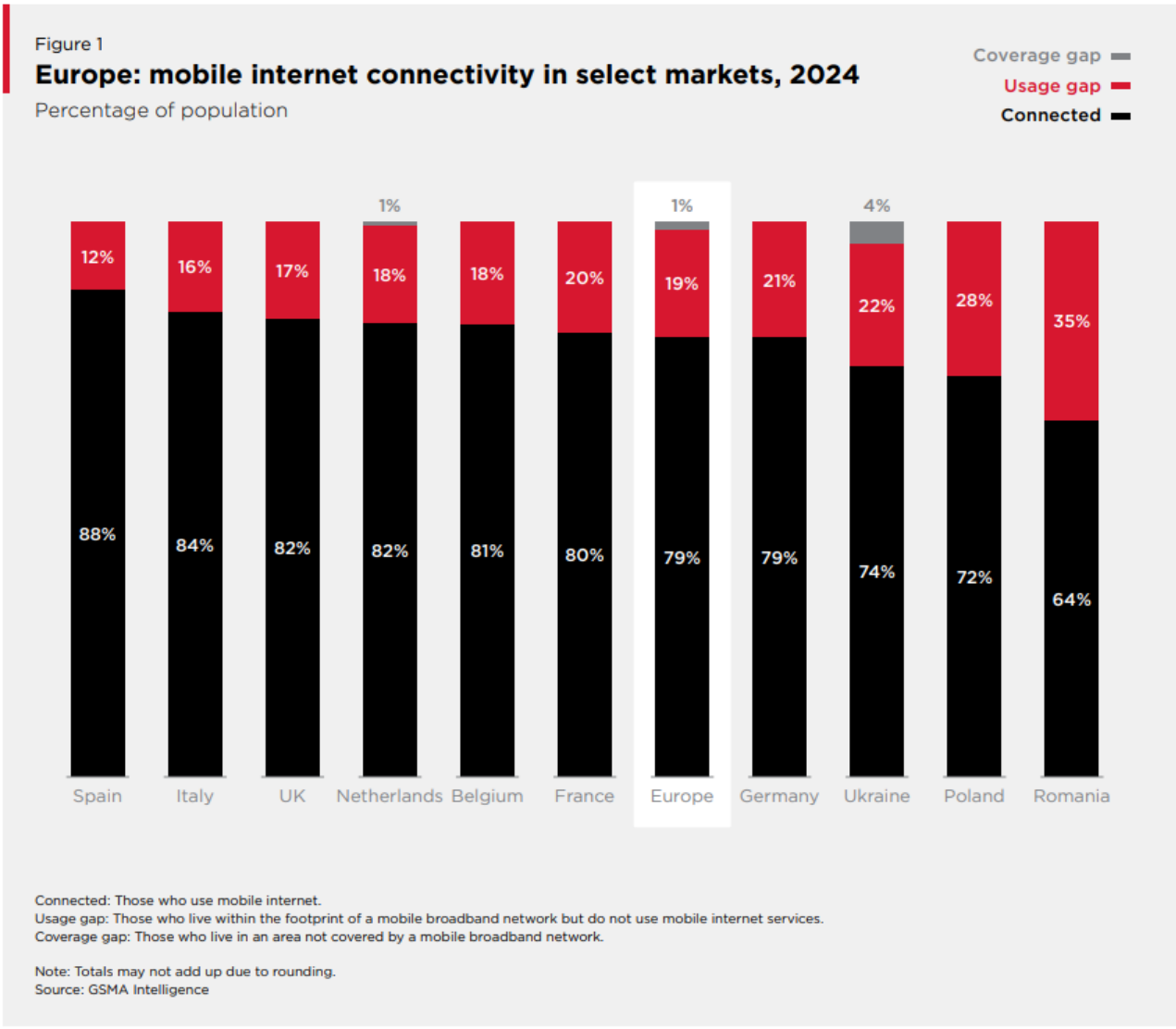

Figure 2: GMSA - Europe's 10 largest markets for mobile internet subscribers

Given that satellite performance cannot match terrestrial mobile networks in terms of latency, speed, and capacity, and considering that terrestrial networks already cover nearly the entire European population, Direct-to-Device services are, at present, regarded as a complementary solution to terrestrial mobile networks.

For instance, D2D services could provide connectivity in areas where terrestrial networks are limited or absent. This includes outdoor environments, rural and remote regions, and maritime zones. In higher-income countries, D2D services could enhance communication for outdoor enthusiasts, support rural communities, and ensure connectivity for maritime activities.

Moreover, MNOs could leverage D2D services to extend their coverage into areas where establishing terrestrial base stations is not economically viable. This approach would enable operators to fulfill possible regulatory obligations and/or to introduce in remote areas new services, such as IoT applications. For example, integrating satellite networks with terrestrial 5G could support innovative IoT use cases like precision agriculture, livestock monitoring, and forest management. These applications could benefit from the wide coverage of satellite communications, ensuring

continuous connectivity for IoT devices in remote locations. Beyond agriculture, D2D services could support various IoT applications, including utility management and automotive services. For utilities, D2D could facilitate remote monitoring of infrastructure, enabling efficient management of resources and rapid response to issues. In the automotive sector, D2D could enhance vehicle connectivity, supporting features like real-time navigation updates, emergency services, and over-the-air software updates, even in areas lacking terrestrial coverage.

Challenges to be evaluated

Despite D2D benefits, the introduction of these services in Europe requires a measured and strategic approach, ensuring that all relevant challenges are thoroughly examined, addressed, and resolved before widespread deployment. As of today, relevant challenges encompass technical topics, as well as regulatory and competitive matters.

Technical complexity

For D2D services to effectively complement terrestrial networks, ensuring seamless integration is crucial.

This includes ensuring that D2D services can integrate smoothly with existing mobile networks to provide uninterrupted connectivity, while avoiding involuntary roaming phenomena. Indeed, one of the critical concerns in D2D deployment is preventing unintended or involuntary roaming between terrestrial and satellite networks. In fact, unlike traditional network selection, where a mobile device connects to the strongest signal within a predefined geographic area, satellite signals can cover vast regions, potentially causing unintended service switching. Without adequate safeguards, users in well-covered terrestrial areas may inadvertently connect to satellite networks, leading to unexpected charges, inefficient network usage, and degraded service experiences. Intelligent network selection mechanisms must be developed to ensure that D2D services are engaged only when terrestrial connectivity is genuinely unavailable.

Moreover, device and network compatibility should be addressed. Current consumer smartphones are designed for terrestrial mobile networks. While some manufacturers have started incorporating support for satellite connectivity, widespread adoption will require standardization of radio interfaces, waveform compatibility, and modifications to chipsets and antennas. Ensuring that devices can switch seamlessly between terrestrial and satellite networks without requiring specialized hardware modifications is a fundamental challenge.

In addition, maintaining a high-quality user experience as devices transition between terrestrial and satellite networks presents significant engineering challenges. These include ensuring that integration grants a seamless handover. Unlike terrestrial networks, where handovers between base stations occur within milliseconds, transitioning between a terrestrial and a satellite connection involves substantial differences in signal propagation, latency, and network architecture. Developing seamless handover mechanisms that minimize service disruption, call drops, or data session interruptions is essential for a smooth user experience.

Finally, interference phenomena should be preemptively addressed. D2D services will operate in frequency bands that overlap or are adjacent to those used by terrestrial MNOs. Without proper safeguards, there is a risk of out-of-band emissions or adjacent-channel interference that could degrade mobile network performance. Frameworks must be established to ensure that satellite operators do not create harmful interference to existing terrestrial services.

Regulatory and Competitive Landscape

The introduction of Direct-to-Device (D2D) services in Europe must be approached with caution to ensure that it does not disrupt the balance of the existing telecommunications ecosystem.

The nature of Satellite Direct-to-Device (D2D) services, which rely on advanced space-based infrastructure and require massive investments, inherently fosters a market structure dominated by a small number of large global players. This creates an oligopolistic environment where a handful of satellite operators (Figure 3) exert significant control over the market.

Main LEO constellation providers that can/could deliver D2D mobile services

Operator	Operative LEO Satellites	Planned LEO Satellites	Services provided as of today	D2D mobile services
SpaceX (Starlink)	~ 7000	~ 30000	Fixed Internet broadband consumer and business	Test and development phase
AST SpaceMobile	1 (BlueWalker 3)	~ 100	None	Test and development phase
Amazon (Kuiper)	0	~ 3230	None	Test phase
Eutelsat (One Web)	~ 650	~ 1000	Fixed Internet broadband business and institutional	Design phase
Rivada Space Networks	0	600	None	Unknown
IRIS² (UE)	0	170 - 300	None	Design phase

Figure 3: Main providers of LEO constellations

Therefore, the entry of new players leveraging satellite-based D2D connectivity has the potential to introduce market distortions if not properly regulated, particularly in relation to MNOs that have made significant investments in terrestrial infrastructure.

MNOs have deployed extensive mobile networks across Europe, investing heavily in spectrum acquisition, infrastructure rollout, and ongoing maintenance to ensure high-quality and reliable mobile services. These investments are subject to stringent regulatory obligations, including coverage commitments, network security and cyber security requirements, service quality standards, as well as resilience and compliance.

The introduction of D2D services should not create an asymmetry, where satellite operators offering mobile-like services are not held to the same standards as traditional MNOs. A failure to align regulatory obligations could lead to an unfair competitive landscape, where satellite-based services can operate under more favorable conditions.

It is therefore paramount to ensure equal treatment between the terrestrial and non-terrestrial connectivity networks and services providers, granting to all the players a fair playing field.

In addition, spectrum allocation, access and management are crucial considerations, particularly for D2D-IMT services, which operate in frequency bands primarily allocated for terrestrial IMT-based services that are harmonized within the EU for electronic communications services (ECS)[4], and for

[4] 700, 800, 900 MHz, 1400 MHz, 1800 MHz, 2 GHz, 2.6 GHz, 3.4-3.8 GHz, 26 GHz and 42 GHz.

D2D-MES services, which are directed to mobile earth stations (MES) within frequency bands specific to satellite operators.

Finally, satellite signals, by their very nature, do not respect national boundaries. This creates significant challenges for regulators, who must coordinate efforts across countries to ensure the efficient and non-interfering use of spectrum, and to facilitate the smooth operation of D2D services. It will be essential to have harmonized international regulations for spectrum usage to avoid interference, particularly near national borders.

D2D Services in other Countries

USA

In the USA, the FCC has developed its own regulations for D2D (Direct-to-Device) through the "Supplementary Coverage from Space" (SCS) framework. The development of D2D regulations in the United States has been facilitated by the country's continental scale (4,500 km) and the limited cross-border interference issues.

The SCS regulation has highlighted two key principles regarding D2D in mobile bands:

1. D2D in IMT bands must have secondary status. D2D services must not cause harmful interference and cannot claim protection from any station operating in compliance with ITU provisions, both in the United States and internationally.
2. D2D service in IMT bands must be provided through the terrestrial license holder. *"SCS services are authorized only if one or more terrestrial licensees lease access to their spectrum rights to a satellite operator."*

Canada

The Canada Innovation, Science and Industry Ministry has published a decision aimed at defining policy, licensing and technical specification for using bands allocated to flexible use and/or commercial mobile services to support the expansion of coverage via satellite (i.e. supplemental mobile coverage by satellite (SMCS)).

The main points of the regulation are the following:

1. The Ministry will introduce MSS as a secondary allocation.
2. Satellite operators must have an agreement with an MNO to provide SMCS.

SMCS coverage will not count towards meeting deployment requirements associated with flexible use licenses.

The regulation applies to a set of sub 6 GHz bands. However, the Ministry intends to issue targeted consultations prior to applying the SMCS framework to other frequency bands used for commercial mobile services.

The Canadian access to unused spectrum in rural and remote areas framework[15] will be protected: SMCS licensees must not cause interference to, and are not protected from, access licensee's operations, as long as the access spectrum license is valid.

[5] It provides non-exclusive, conditional access to underutilized bands.

FASTWEB VISION on the RSPG DRAFT Opinion

D2D-IMT services

According to RSPG, the regulation of D2D IMT services in EU, which operate in frequency bands primarily allocated for terrestrial IMT-based services that are harmonized within the EU for electronic communications services, could be implemented at the national level using different models:

1. a D2D-IMT license integrated into the "terrestrial" Rights of Use of MNOs.
2. a D2D-IMT license granted to the Satellite Operator with an obligation to cooperate with the respective MNO holding the Rights of Use in the same band.
3. a D2D-IMT license granted to the Satellite Operator, limited to certain areas and specific portions of the spectrum not assigned to MNOs.

Fastweb believes the first option to be the most suitable, as it is the more flexible one. This model implies that satellite operators' access to IMT spectrum will be governed by voluntary agreements between MNOs and satellite operators. Such agreements promote flexibility, as they allow both parties to determine the best arrangements that suit their operational needs. Voluntary agreements are encouraged, fostering an environment of cooperation between the mobile and satellite sectors. This flexibility ensures that satellite services do not disrupt terrestrial services, but rather augment them in areas where terrestrial infrastructure might be lacking or limited.

The second option, in which a D2D-IMT license would be granted directly to the satellite operator with an obligation to cooperate with the respective MNO, imposes a form of collaboration that could lead to unintended and imbalanced scenarios. While the principle of cooperation may seem beneficial in theory, in practice, it raises several concerns that must be carefully evaluated.

First and foremost, the exact modalities of cooperation—both technical and commercial—would need to be clearly defined. Without a well-structured framework, there is a risk that cooperation mechanisms may become uncertain, inconsistent, or even contested, potentially leading to inefficiencies in service deployment and quality.

Furthermore, this approach introduces a high degree of variability in the quality of extended coverage services. The level of service that an MNO can offer its customers would no longer be entirely under its control, as it would be directly influenced by the infrastructure capabilities of the satellite operator that acquires the D2D rights for a given frequency band. This could lead to significant disparities in service quality—some MNOs may be able to provide superior extended coverage, while others might be forced to rely on less advanced satellite networks, ultimately impacting end users.

Additionally, there is a risk associated with the allocation of spectrum rights. If no satellite operator decides to acquire the D2D usage rights for a specific band corresponding to a terrestrial MNO’s licensed spectrum, a coverage gap could emerge. In such a scenario, the extended connectivity benefit promised by D2D-IMT would fail to materialize.

These factors highlight the significant regulatory and market challenges associated with this option, making it a less predictable and potentially disruptive choice compared to an approach that ensures MNOs maintain direct oversight of how D2D services are integrated into their networks.

The third option involves granting a D2D-IMT license to the satellite operator, but with limitations on geographical areas and spectrum portions not already used by MNOs. However, this approach presents some significant concerns and challenges.

A key concern is the imminent expiration of many of the rights to use frequency bands currently used by terrestrial IMT networks, which are set to expire in 2029. The prospect of marking some bands

as “unused” and authorization regimes allowing satellite operators to directly acquire usage rights over these bands raises significant concerns. This is particularly true when considering the considerable investments made by Mobile Network Operators to develop and maintain these terrestrial networks, even in remote areas.

Moreover, the technical feasibility of limiting the service to specific geographic areas must be carefully considered. Ensuring that D2D services are effectively limited to areas not covered by terrestrial networks while preventing any overlap could prove challenging: a geographic split which would imply that some areas are served by MNO and others served by satellite direct to device in the same spectrum bands might be considered in large sparsely populated countries (USA, Canada) but not in Europe, where there are small countries, there is dense population, and there is dense mobile coverage by MNOs. Furthermore, it appears to be an unviable solution when taking into account the borders between countries and the (plausible) hypothesis that one country assigns the spectrum for satellite direct to device and the neighboring country does not, resulting in interference with MNOs in the neighboring country.

Since D2D-IMT services will be provided leveraging IMT bands, Fastweb believes the harmonized technical conditions to protect MNO networks from D2D satellite operations are essential to prevent interference scenarios and unintentional roaming.

Fastweb agrees with the RSPG DRAFT Opinion that the European Commission 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. Such mandate should include a follow up action further to WRC 27 in order to update the technical conditions if appropriate.

Nevertheless, please consider that Fastweb believes the allocation or planned assignment of IMT bands to satellite services before WRC-27 to be premature, as it would be more appropriate to await the analysis and outcomes of WRC-27 before making any decision.

D2D-MES services

The RSPG draft opinion highlights that for D2D-MES, a well-established framework already exists, facilitated by the CEPT voluntary harmonization and widely adopted by EU Member States. Currently, a small number of satellite operators—such as Iridium, Globalstar, and Inmarsat—provide global services, including in the European Union, but within a limited set of frequency bands.

Fastweb stresses that D2D-MES should remain confined to traditional satellite mobile applications, such as maritime and industrial use cases, rather than being widely integrated with terrestrial mobile networks. Instead, the integration of satellite and terrestrial mobile networks should be driven by D2D-IMT, with the D2D-IMT license fully integrated into the "terrestrial" Rights of Use of MNOs.

This approach would help:

- Avoid a scenario where satellite connectivity is only accessible on high-end devices, which require additional chipsets and remain too expensive for a significant portion of the population.
- Ensure seamless interoperability between mobile terrestrial and satellite services, preventing fragmentation and ensuring a consistent user experience across networks.

This approach would also help ensure a balanced allocation of spectrum resources, recognizing that D2D-MES services remain complementary to terrestrial mobile networks, particularly in a context where spectrum availability for future 6G IMT services is limited. Given the growing demand for spectrum to support next-generation mobile technologies, it is crucial to prioritize efficient spectrum

management and avoid excessive fragmentation that could hinder the deployment of advanced IMT networks.

However, in the event that additional spectrum bands are allocated to D2D-MES services, their assignment should be structured to ensure sustainable investments and maximize socio-economic benefits. In this context, a "beauty contest" approach—rather than a competitive auction—would be the preferred method for awarding spectrum rights.

A beauty contest would allow to evaluate applicants based on key criteria beyond financial bids, such as:

- Resilience and security requirements, ensuring that satellite communications remain robust against disruptions and cyber threats.
- Service availability, with a focus on guaranteeing continuous and reliable coverage.

By adopting this approach, operators with the technical and operational capacity to deliver reliable, secure, and high-quality satellite services, ensuring that spectrum allocations contribute to long-term sustainability and public interest objectives, rather than being driven solely by short-term financial considerations.

Nevertheless, please consider that Fastweb believes the allocation or planned assignment of bands to satellite services (even D2D-MES) before WRC-27 to be premature, as it would be more appropriate to await the analysis and outcomes of WRC-27 before making any decision.

Furthermore, Fastweb believes that a dedicated authorization and spectrum licensing – to be managed at pan-European level - for Satellite Operators providing D2D-MES services would be paramount. Access to spectrum at a European level would facilitate international coordination and ensure more efficient and harmonized spectrum management across different jurisdictions.

Moreover, it is Fastweb opinion that Satellite Operators providing D2D-MES services should be subject to the different national policies related to Competition, sovereignty, national security, privacy, lawful intercept, etc. This would ensure a level playing field with operators providing D2D-IMT services.

In addition, since some of the current and envisioned future bands allocated to the MES services and included in the 3GPP 5G-NTN standard are adjacent to IMT spectrum, harmonized technical conditions to protect MNO networks from D2D satellite operations need to be updated for each MES allocated band, especially in the case of bands included in the 3GPP NTN standard.

Common Items regarding D2D services

Security

Fastweb agrees with the RSPG draft opinion that Member States should manage interception and national security issues autonomously within the scope of their sovereignty.

Moreover, Fastweb believes that satellite direct-to-device services, when used as an equivalent to IMT services, should adhere to the same security, cybersecurity, resilience, and compliance standards as terrestrial networks. This includes obligations related to lawful interception, emergency communications, and national security requirements. Any deviation from these principles could create regulatory arbitrage and expose European users to lower security standards.

Competition and Access to National and EU Markets

Fastweb agrees with the RSPG draft opinion that the Commission should consider updating the regulatory framework to introduce common requirements in national authorization regimes for satellite service providers, including:

- Application of coordination and notification procedures as outlined in the ITU Radio Regulations (registration in the MIFR), respecting the dates and protection status established by the ITU.
- Compliance with relevant coordination agreements.
- Prohibition of harmful interference to other satellite networks/systems or stations operating under the Radio Regulations.
- Operation on a non-interference and non-protection (NINP) basis when registration has not yet been notified and entered into the MIFR, or when operating under ITU-R RR No. 4.4.
- That the Commission consider updating the regulatory framework to introduce procedures applicable in cases where a Member State identifies a non-compliance with common requirements that cannot be resolved at the national level. These procedures should include reporting, evaluation, and collective response.
- That Member States promote the exchange of best practices regarding national measures adopted.

Moreover, Fastweb urges the RSPG to introduce a principle of equal treatment, ensuring that all satellite-based services (both D2D and broadband) that are functionally equivalent to ECS services using terrestrial spectrum are subject to the same regulatory and operational obligations. This is critical to maintaining a level playing field.

Moreover, it is Fastweb opinion that the RSPG should clarify the specific actions it intends to take, or recommend, regarding harmonization rules, licensing, and authorization frameworks. In particular, it is necessary to assess the potential impact of hyperscalers entering the European D2D and broadband connectivity markets to prevent market distortions and ensure fair competition.

Radio Equipment

Fastweb agrees with the RSPG opinion that compliance with the Radio Equipment Directive (RED) 2014/53/EU is sufficient and that no additional regulatory requirements are needed at this stage.

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