Subject: Response to RSPG consultation "*Draft Opinion on the EU-level policy approach to satellite Direct-to-Device connectivity and related Single Market issues*"

Noordwijk, 28 March 2025

Dear Madam, Sir,

ESA welcomes the Draft Opinion sent out by the RSPG and is grateful for the opportunity to comment of this Draft Opinion.

ESA's responses are following RSPG's considerations in the Sections 1-2-3 and specifically comment on the Opinion of the RSPG in Section 4.

General

Since the 80's, ESA has been a steadfast, cornerstone support for European industry, investing multi-million euros in all four services which the RSPG subdivides (**D2D-IMT**, **D2D-MES**, **D2D-IoT-SRD** and **D2D-IoT-MSS**) as well as offering patents, commercial, regulatory, technical and managerial support:

- With regards to the **D2D-MES** service ESA has a long-standing partnership with MSS operators, staring with the launch of the MARECS[1] satellite in 1980's for Inmarsat. D2D-MES systems for maritime and aeronautical safety communications were developed under various ESA programmes.
- With regards to **D2D-MES** in S-band, ESA initiated even before the MSS Decision 2009/449 the development of essential building blocks for the MSS S-band industrial ecosystem. An ESA-initiated innovative tri-party co-funding scheme between operators Eutelsat/Solaris, industries and ESA supported the development of essential equipment for ground and space, initiated MSS S-band standards at ETSI and piloted applications. ESA initiated developments were always implemented in concert with related FP7/H2020 projects co-financed by the Commission.
- With regards to **D2D-MES** in S-band, ESA has initiated the assessment of additional services beyond communications as part of the Low Earth Orbit - Positioning, Navigation, and Timing (LEO-PNT) initiative, including experiments and service demonstrations in its In Orbit Demonstrator (IOD). Among other innovative positioning technologies, this IOD project aims at demonstrating not later than 2027 a D2D positioning concept as alternative to GNSS in MSS S-band using 3GPP NTN radio technology. This first-of-its-kind demonstrator, involves numerous European space industry players and could be pursued in either institutional or commercial missions, integrating satellite communications and navigation services in the D2D-MES bands.
- Related to **D2D-IoT-SRD**, the first trials for this technology with satellite were performed in 2018 using ESA funded satellite payloads, leading to the creation of new European companies.
- With regards to **D2D-IoT-MSS** many European companies have been supported to deploy new < 1 GHz space systems and develop their user terminals.
- With regards to **D2D-IMT**, the first in-orbit demonstrations are planned, and many technologies have been developed which are now part of non-European D2D-IMT initiatives.

Considering the long track record illustrated above, ESA would like to offer its comments on the Draft Opinion.

[1] ESA - The launch of MARECS B2

Comments to Section 1 "Introduction"

ESA can fully subscribe the considerations made in this section, with the following remarks:

- The RSPG Opinion sets very well the context in which D2D services could develop in the future.
- ESA welcomes that the RSPG mentions the ***strategic*** nature of spectrum: ESA considers access to valuable spectrum for D2D a key enabler for any future D2D system that has some degree of European governance or a European supply chain. Contrarily, the lack of access to suitable D2D spectrum could be a complete showstopper for any European governed D2D service or corresponding European supply chain opportunities.

Comments to Section 2 "Satellite Direct-to-Device connectivity"

Section 2.1 Definitions

ESA agrees with the subdivision as proposed, with the minor observation that the D2D-IoT-MSS service seems to limit itself to < 1 GHz, while later in the Opinion the D2D-IoT-MSS service addresses also WRC-27 AI 1.12 and 1.14 in which bands > 1 GHz are under consideration.

Section 2.2 D2D-IMT services

ESA agrees with the considerations made in this section with the following remarks:

- The statement suggesting that D2D-IMT would not be able to offer an equivalent service is a statement which will likely not hold for future D2D-IMT systems. In the future it will be possible that a mobile handset will receive a signal strength from space which is equivalent to e.g. what a terrestrial LTE base station would generate, as such offering an equivalent user experience.
- As noted by the RSPG, ESA is also of the view that many of the regulatory aspects that need to be solved are not covered by this Opinion. While much will depend on a positive outcome of WRC-27 AI 1.13, this will mainly result in spectrum-related conditions. We recommend therefore that the RSPG already starts to make an inventory (based on e.g. FM44 work, BEREC findings) on the possible non-spectrum regulatory measures that need to be developed.
- In addition, the RSPG might consider that some of the bands which are harmonised Europe-wide (e.g. the GSM-R, or some PPDR bands) could also be covered by a future D2D-IMT authorisation framework. It is acknowledged that these bands are currently not within the WRC-27 AI 1.13 selected bands but could lead to some specific European D2D-IMT solutions to add resilience, provide true uniquity to services in these bands and increase the viability of D2D-IMT in the geopolitical European reality.
- Specifically with regards to D2D-IMT, ESA is of the opinion that the RSPG Draft Opinion does not sufficiently describe the fast pace of developments outside EU. We recommend describing how fast these systems are deployed and regulated in other countries outside Europe – stating a sense of urgency to regulate these services. The very recent OFCOM consultation on pre-WRC-27 rulemaking is an example of this.

Section 2.2 D2D-MES

ESA agrees in general with the considerations made, with the following remarks:

- The use of proprietary technologies is addressed. ESA was one of the main initiators to have satellite networks considered by 3GPP. Initial meetings between EC and ESA discussing this topic were held as early as 2015, contributing to the incorporation of Non-Terrestrial Networks in 3GPP Release 17. While there is a significant installed base of traditional satellite systems based on proprietary air interfaces for the D2D-MES market, ESA recommends analysing the impact of the air interfaces selected by new spectrum applicants on the market and the capability to perform emergency calls.

- ESA suggest that RSPG considers that 3GPP is also working on the definition to use smaller bandwidths (e.g. 3 MHz) for 5G NTN FR. This might allow for more flexibility when authorising multiple operators or even specific verticals.
- Interference and sharing: ESA considers future conditions for authorisation could request operators to be more lenient towards spectrum sharing options. Incumbents are currently not forthcoming to share spectrum with new entrants or only provide spectrum ranges for test purposes on a temporary basis. New technologies and sharing schemes such as the Collective Use of Spectrum (CUS) model and Licensed Shared Access (LSA) model which were already investigated by the RSPG (Report RSPG21-016 FINAL, "*RSPG Report on Spectrum Sharing A forward-looking survey*") are equally applicable to future use cases for D2D-MES.

Section 2.4 D2D-IoT in SRD bands

ESA welcomes the further development of SRD-based technology for satellite communications in the 862-870 MHz band. A few European companies have been pathfinders for using SRD-based technology for satellite communications, often supported and incubated by ESA. In particular, ESA considers that the increased integration of SRD-based satellite IoT and Earth Observation applications will benefit from a stable regulatory environment for SRD technologies for satellite communications[2].

Therefore, ESA fully supports that the EC requests via CEPT that technical conditions are further specified.

We support a registration procedure leading to a list of operators that commit to the rules defined in the ECC DEC which is currently under public consultation.

Section 2.5 D2D-IoT-MSS < 1 GHz

ESA agrees with the considerations with the following comments:

- With regards to interference issues, ESA considers that advanced spectrum monitoring is a pre-requisite before addressing interference issues. We address this aspect further in our comments on Section 4.
- The increased harmonisation at EU level is fully supported: ESA has experienced from first-hand how new space entrants have struggled to deploy D2D-IoT-MSS services in countries where for example ERC/DEC(99)05 or 06 were not implemented.

Comments to Section 3 "Access to national and EU markets"

ESA welcomes the considerations that RSPG brings forward and recognises the strategic nature of market access, common requirements and enforcement.

ESA supports to establish a level playing field by formulating and imposing common requirements. If foreign satellite systems do not adhere to stringent space-related regulations, these systems would benefit from an unfair advantage.

In addition, a collective reaction to non-compliances is considered an effective tool. ESA considers that the earlier mechanisms (e.g. the MSS Enforcement Decision, 2011/667) did not work out in practice.

[2] IoT4EO Workshop #2 (2-December 3, 2024): Overview · Indico at ESA / ESTEC

Comments to Section 4 "The Opinion of the RSPG"

General

With regards to future EU-level policies we would like to note several issues which might be considered in future authorisation discussions.

- All the four services might be deployed according to different models, with different business models and value chains. As an example, some services might be deployed according to a "*neutral host*" model, Alternatively, something like a "*satellite MVNO*" might emerge. ESA recommends analysing the different variations such that a future EU-policy for D2D covers all these variations.
- It shall be foreseen that many new technologies will be developed during the next decades. One could expect that new cognitive approaches, beam hopping, new medium access mechanisms, new interference cancellation methods and other spectrum related innovations will appear in the next years. ESA recommends that any future EU-level policy considers such developments and allows for sufficient flexibility.
- Some of the technologies can offer a service using only the downlink or only the uplink. This could impact any future rulemaking or authorisation regimes. Some European companies have plans for using e.g., the downlink-only for distress messaging, navigation updates or to transmit control information of other networks. Other proponents are interested to deploy transmit-only uplink nodes which solely collect very small messages from deployed sensors, without the need for any downlink. ESA recommends such specific services are considered.

4.1 D2D-IMT

ESA agrees to the two recommendations which are made in this section. The first bullet point however suggests ("…follow up action…") that some action will be taken pre-WRC-27. While ESA agrees that some EC/CEPT procedural mechanisms could be started (e.g. mandates, work items), it is not clear what will be done pre-WRC-27 and without knowing the outcome of AI 1.13.

In addition, ESA has the following suggestions.

- ESA recommends that RSPG supports - in collaboration with other regulatory stakeholders such as CEPT, BEREC and DG CNECT – to draw up a European regulatory roadmap for D2D-IMT that includes all regulatory aspects of D2D, including those outside RSPG and ITU remits. ESA notes that there is unclarity within industry and prospective operators on the expected timelines, following a successful WRC-27 AI 1.13 conclusion.
- Within a European context it might be of interest for the RSPG to support an investigation whether bands which are harmonised in Europe (e.g. PPDR, GSM-R, FRMCS,..) are possible candidates for a D2D satellite component.
- The RSPG to address how future D2D-IMT systems will operate within the roaming regulations within the EEA (European Economic Area) and what would be the impact on their business models.
- The RSPG opinion should address less preferential scenarios in which D2D-IMT service providers provide solely services to specific handsets brands or types, making it less of a public telecommunication service.
- To support the EC's 2030 Digital Decade goal of 5G for all populated areas, ESA recommends analysing the inclusion of NTN D2D-MES in NG-eCall and FRMCS regulations to initiate these market in less dense regions.
- In addition to satellite communications, D2D-IMT technologies may also play a role in next-generation positioning services. ESA notes that 3GPP LTE and NR specifications include a large number of positioning methods, and future D2D-IMT architectures could contribute to alternative positioning capabilities by hybrid terrestrial – satellite positioning in D2D-IMT bands.
- Finally, although possibly not a popular subject, RSPG should consider at least a "what-if" scenario in which European administrations as part of ITU Region 1 decide not to allow D2D-IMT as part of AI 1.13

discussions at WRC-27, either because of technical issues or successful lobbying by opponents. What would this mean for the European citizen, their sovereign connectivity, the desired services which will need to be implemented using MSS-only?

4.2 D2D-MES

ESA agrees with the RSPG recommendations, with several remarks:

- RSPG could consider updating the Opinion to reflect the state of the art, e.g. multiple satellite operators are offering at this moment 3GPP compliant NTN-IoT services, be it initially with U.S. chipsets only.
- While this consultation is not about the upcoming 2 GHz MSS process, we are of the opinion that the new MSS framework shall consider innovation, competition, support for new entrants, flexibility, technical sovereignty and control.
- For such a valuable frequency band the aspects related to enforcement, monitoring and a "use-it-or-lose-it" approach should be considered. The status quo since last 18 years should be avoided. Without doubt, the RSPG is aware that for Europe this band might be the only opportunity to implement D2D.
- Public services (broadcast, warnings, PPDR communications) that would benefit European citizens were originally requested in DEC 626/2008/EC. So far, ESA considers that this objective has only been partly fulfilled. Future public services in the fields of security, automotive and transport could benefit from new systems that are addressing these markets. (At the time of the MSS Decision, an MSS S-band system as a communication solution in European for *pay-as-you-drive* applications was considered one of the most cost-effective solutions).
- The potential of D2D-MES services to support satellite positioning together with satellite communications in MSS bands should be considered. Positioning augmentation using 3GPP NTN radio technology in MSS S-band could open new avenues for resilient PNT from space and be pursued under European governance.
- The EU has invested 10's of millions of Euros in FP7/H2020 R&D projects that were addressing the MSS S-band. These R&D developments by European industry and academia have been capitalised upon only to a limited extent. The RSPG might consider during their deliberations that spectrum which is meant to serve the European citizen is preferably served by capitalising upon European R&D efforts. Spectrum sharing methods between systems in the same frequency bands have been addressed by many EC-funded FP7/H2020 and ESA projects. Only a very limited number of these methods are in practical use nowadays. Encouraging – and possibly rewarding - such methods should be seriously considered to stimulate efficient spectrum use, now that there is an opportunity to propose new rules for the MSS S-band.

4.3 D2D-IoT-SRD

ESA supports the RSPG opinion for this service category. As commented in Section 2, ESA projects as early as in 2018 resulted in creating of companies using this technology for their satellite IoT services.

The RSPG might consider that increased integration of SRD-based satellite IoT and Earth Observation applications will serve EU's COPERNICUS programme and will benefit from a stable regulatory environment for SRD technologies for satellite communications[3].

Therefore, ESA fully supports that the EC requests via CEPT that technical conditions are further specified, and support a registration procedure leading to a list of operators that commit to the rules defined in the ECC DEC which is currently under public consultation.

[3] IoT4EO Workshop #2 (2-December 3, 2024): Overview · Indico at ESA / ESTEC

4.4 D2D-IoT-MSS

With regards to the < 1 GHz bands and any future regulatory measures for AI 1.12 and AI 1.14, we support further harmonisation at EU level and identification of the operators.

We advocate active spectrum management of these bands, including monitoring of the occupancy, and possibilities for new entrants to experiment ("spectrum sandboxes").

As mentioned before, ESA notes that the corresponding Section 2.5 relates to spectrum < 1 GHz while this section also addresses WRC-27 AI 1.12 and 1.14 which consider both bands > 1 GHz. This can possibly be clarified in the future RSPG Opinion.

With regards to WRC-27 AI 1.12 and 1.14, ESA would support fully any follow up actions from the RSPG. It will be important for European industry and service providers how the timeline after WRC-27 will look like with regards to harmonisation and possible EU-level decisions.

Specifically with regards to WRC-17 AI 1.12, ESA recommends that the RSPG Opinion shall take into account the specific *sharing*[4] aspect which is mentioned of the corresponding ITU Resolution 252 (WRC-23). Sharing in any possible dimension (bands, time, duty cycles, spreading methods, at system level, multi-tenant/neutral host scenarios) should be encouraged and also be imposed if market access is enforced. Although the frequency bands are different, an example of multiple D2D-IoT-MSS systems sharing the same frequency bands can be found in ERC DEC 99(06). Another example are the D2D-IoT-SRD systems in ISM bands. All these systems have proven to be able to co-exist.

Section 4.6 Access to National Markets

ESA supports the RSPG recommendations.

ESA notes that the reference in Section 3.1 and 3.2 to "*a long-term vision for Member States electronic communications satellite authorisations with common requirements*" is not recalled in the RSPG's Opinion. ESA considers that establishing long-term vision on satellite authorisation is an important pre-requisite for any party wishing to implement future satellite systems serving Europe. ESA recommends that this action is prioritised.

Section 4.7 Access to EU Market (enforcement)

ESA agrees with the recommendations of RSPG.

We recall that in the corresponding Section 3.3 the use of monitoring concept is brought forward ("*This [monitoring concept] might be extended to provide a basis for mutual assessment or confirmation of an interference or non- compliance situation*."). In addition, in various Sections the wish to address and solve interference, increase sharing and compatibility is expressed. ESA is of the opinion that spectrum monitoring (i.e. *knowing what is going on*) is an elementary pre-requisite for any interference detection, solving, sharing or compatibility issue. It is therefore recommended that RSPG's final opinion emphasizes that studies and pilots for monitoring frameworks shall be started to support all the four services and

We advocate in general a more active spectrum management role by European entities, in line with the strategic value of spectrum and available technologies. Europe should cherish more the finite spectrum resources over European territory.

Section 4.8 RED

ESA has no comments on this section.

[4] "…that allow coexistence of these systems in the same frequency bands…"

Comments to Section 5 "Further considerations"

ESA has no detailed comments on this section.

As a final remark, ESA is highly appreciative of the RSPG initiative. We note however that the number of bodies involved (BEREC, RSPG, various EC Directorates, EU's legislative bodies, ETSI, CEPT and European Member States), their areas of responsibility, combined with the different national rules could make it a challenge to introduce new D2D services in Europe. We long for a body in Europe that takes responsibility to orchestrate the various technical and legal regulatory measures that need to be taken and presents them to European industry in one consolidated framework.

ESA appreciates the opportunity to respond to the RSPG Draft Opinion.

Contact for further correspondence:

Frank.Zeppenfeldt@esa.int

European Space Agency – Connectivity and Secure Communications Directorate
European Space Agency
PO Box 229 – 2200 AG - Noordwijk
The Netherlands
Mob: +31 6 5206 2135