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## RESOLUTION 173 (WRC-19)

**Use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service**

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

*considering*

- a)* that the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) are globally allocated on a co-primary basis to the fixed-satellite service (FSS), and that there are a number of non-geostationary-satellite systems (non-GSO) operating or planned to operate in these frequency bands;
- b)* that the fixed and mobile services are allocated on a primary basis in the frequency bands 17.7-17.8 GHz, 18.1-19.7 GHz and 27.5-29.5 GHz on a global basis\* and the fixed service is also allocated on a primary basis in the frequency band 17.8-18.1 GHz on a global basis;
- c)* that the frequency band 28.5-30 GHz (Earth-to-space) is allocated to the Earth exploration-satellite service (EESS) on a secondary basis, and no additional constraints should be imposed on the EESS;
- d)* that the frequency band 29.95-30 GHz may be used for space-to-space links in the EESS on a secondary basis, and no additional constraints should be imposed on the EESS;
- e)* that there are existing and planned non-GSO satellite constellations in the frequency bands 17.7-20.2 GHz (space-to-Earth) and 27.5-30 GHz (Earth-to-space) and that these constellations are designed to serve the growing need for access to broadband connectivity, regardless of location;
- f)* that existing regulatory and technical procedures apply in the segments of the frequency bands listed in *considering a)* between geostationary-satellite (GSO) FSS networks and non-GSO FSS systems;
- g)* that the frequency bands listed in *considering a)* are also allocated to several other services on a primary basis, that those services are used by a variety of different systems in many administrations and that these existing services and their future development should be protected without undue constraints;
- h)* that, in accordance with the relevant provisions of Articles 9 and 11, non-GSO FSS networks intending to operate in the frequency bands detailed in *considering a)* should be coordinated and notified;

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\* *Note by the Secretariat:* The band 17.7-17.8 GHz is allocated to the mobile service on a secondary basis in Region 2.

*i)* that there is a need for mobile-satellite communications, including global satellite broadband, and that part of this need can be met by allowing earth stations in motion (ESIMs) to communicate with FSS space stations operating in the frequency bands detailed in *considering a)*;

*j)* that a consistent approach to the deployment of these ESIMs will support important and growing global communication requirements and provide adequate protection to other services in the frequency bands;

*k)* that, currently, there is no specific regulatory procedure for the coordination of ESIMs relative to terrestrial stations for these services,

*considering further*

*a)* that there is no methodology on how to protect GSO FSS space stations from ESIMs communicating with non-GSO FSS systems;

*b)* that there is no information on the coordination agreements reached among administrations between GSO FSS satellite networks and non-GSO FSS systems in those frequency bands where No. **5.523A** applies;

*c)* that there is no established and agreed interference management procedure to address the potential interference arising from the use of ESIMs communicating with non-GSO FSS systems referred to in this Resolution, and the responsibility of the entities involved in this operation is not defined;

*d)* that ESIMs communicating with non-GSO FSS systems should be operated within the envelope of the characteristics and envelope of coordination of specific and/or typical earth stations of the non-GSO FSS systems initially published and included in the International Frequency Information Circular (BR IFIC);

*e)* that there is no established methodology to calculate the equivalent power flux-density (epfd) from the use of multiple non-GSO FSS systems in the frequency bands detailed in *considering a)*,

*noting*

*a)* that Resolution **156 (WRC-15)** addresses the use of ESIMs communicating with GSO space stations in the FSS in the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz;

*b)* that Resolution **158 (WRC-15)** calls for studies for the use of ESIMs communicating with GSO space stations in the FSS in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz;

*c)* that this conference has adopted Resolution **169 (WRC-19)**, which contains the technical, operational and regulatory provisions for ESIMs communicating with GSO FSS networks in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz, under the conditions contained in that Resolution,

*recognizing*

*a)* that technical and operational requirements for ESIMs, which prior to WRC-15 were referred to as earth stations on mobile platforms (“ESOMPs”) operating with non-GSO FSS systems in the frequency bands detailed in *considering a)* above have been discussed in the ITU Radiocommunication Sector (ITU-R) and are reflected in the Report ITU-R S.2261;

- b) that Article **21** determines power flux-density (pfd) limits applicable to non-GSO FSS systems to protect fixed and mobile land stations;
- c) that Article **22** contains epfd limits for non-GSO FSS systems in the frequency bands 17.8-18.6 GHz, 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 GHz (Earth-to-space) and 17.8-18.4 GHz (inter-satellite);
- d) that the use of the frequency band 19.3-19.6 GHz (Earth-to-space) by the FSS is limited to GSO systems and feeder links to non-GSO systems in the mobile-satellite service (MSS), in accordance with No. **5.523D**;
- e) that the use of the frequency band 29.1-29.5 GHz (Earth-to-space) by the FSS is limited to GSO systems and feeder links to non-GSO systems in the MSS, in accordance with No. **5.535A**;
- f) that WRC-15 adopted No. **5.527A** and Resolution **156 (WRC-15)** related to ESIMs that communicate with GSO satellites;
- g) that advances in technology, including the use of tracing techniques, allow ESIMs to operate according to the characteristics of typical FSS earth stations;
- h) that *these earth stations are not be used or relied upon for safety-of-life applications*;
- i) that the frequency band 18.6-18.8 GHz is allocated to the EESS (passive) and space research service (SRS) (passive),

*recognizing further*

- a) that segments of the frequency band 17.7-18.1 GHz are used by feeder links for the broadcasting-satellite service (BSS), subject to Appendix **30A** (No. **5.516**);
- b) that the frequency bands 18.3-19.3 GHz (Region 2), 19.7-20.2 GHz (all regions), 27.5-27.82 GHz (Region 1), 28.35-28.45 GHz (Region 2), 28.45-28.94 GHz (all regions), 28.94-29.1 GHz (Regions 2 and 3), 29.25-29.46 GHz (Region 2) and 29.465-30.0 GHz (all regions) have been identified for use in high-density applications in the FSS (No. **5.516B**);
- c) that the use of the frequency band 18.1-18.4 GHz by the FSS (Earth-to-space) is limited to feeder links of GSO BSS systems (No. **5.520**);
- d) that the use of the frequency bands 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.5-30.0 GHz by non-GSO FSS systems is subject to the applicable provisions of Nos. **5.484A**, **22.5C** and **22.5I**;
- e) that the use of the frequency bands 18.8-19.3 GHz and 28.6-29.1 GHz by GSO and non-GSO FSS networks is subject to the applicable provisions of No. **9.11A**, while No. **22.2** does not apply (No. **5.523A**);
- f) that the use of the frequency band 19.3-19.7 GHz by GSO FSS systems and feeder links of non-GSO MSS systems is subject to the applicable provisions of No. **9.11A**, but not to the provisions of No. **22.2**; in addition, the use of this frequency band by other non-GSO FSS systems or for the cases indicated in Nos. **5.523C** and **5.523E** is not subject to the provisions of No. **9.11A**, and shall continue to be subject to the procedures of Article **9** (except No. **9.11A**) and Article **11**, and to the provisions of No. **22.2** (No. **5.523D**);

g) that the frequency bands 27.5-29.1 GHz and 29.5-30.0 GHz may be used by the FSS (Earth-to-space) to provide feeder links in the BSS (No. **5.539**);

h) that all allocated services in the frequency bands referred to in *considering a) to e)* should be taken into account when conducting sharing and compatibility studies;

i) that the notifying administrations of those non-GSO FSS systems with which ESIMs in the frequency bands detailed in *considering a)* above are intended to operate should submit a commitment to ITU to undertake to immediately eliminate unacceptable interference or reduce it to an acceptable level should such interference be caused to terrestrial services;

j) that Resolution 2 (**Rev.WRC-03**) resolves that “the registration with the Radiocommunication Bureau of frequency assignments for space radiocommunication services and their use do not provide any permanent priority for any individual country or groups of countries and do not create an obstacle to the establishment of space systems by other countries”,

*resolves to invite the ITU Radiocommunication Sector*

1 to study the technical and operational characteristics and user requirements of the different types of ESIMs that plan to operate within non-GSO FSS systems in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space), or parts thereof;

2 to study sharing and compatibility between ESIMs operating with non-GSO FSS systems and current and planned stations of primary services allocated in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space), or parts thereof, to ensure protection of, and not impose additional constraints on, GSO systems and other services, including terrestrial services, in those frequency bands and in adjacent frequency bands, including passive services;

3 to develop the technical and regulatory provisions for the operation of aeronautical and maritime ESIMs with non-GSO FSS systems, taking into account the results of studies under *resolves to invite the ITU Radiocommunication Sector 1 and 2*;

4 to ensure that the technical and operational measures and the possible regulatory changes established in accordance with this Resolution shall not affect the relevant provisions related to the protection of GSO networks from non-GSO FSS systems;

5 to ensure that the results of ITU-R studies are agreed by Member States by consensus;

6 to complete the studies in time for WRC-23,

*invites the 2023 World Radiocommunication Conference*

to review the results of these studies and take appropriate action.