

## RESOLUTION 176 (WRC-19)

**Use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service**

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

*considering*

- a)* that the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) are globally allocated on a primary basis to the fixed-satellite service (FSS);
- b)* that there is an increasing need for mobile communications, including global broadband satellite services, and that some of this need can be met by allowing aeronautical and maritime earth stations in motion (ESIMs) to communicate with FSS space stations operating in the frequency bands 37.5-40.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space);
- c)* that in the FSS, there are geostationary-satellite (GSO) networks operating and/or planned for near-term operation in the frequency bands allocated to the FSS in the frequency range 37.5-51.4 GHz;
- d)* that some administrations have already deployed, and plan to expand their use of, ESIMs with operational and future GSO FSS networks;
- e)* that GSO FSS networks in the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) are required to be coordinated and notified in accordance with the provisions of Articles **9** and **11**;
- f)* that the frequency bands 37.5-39.5 GHz, 40.5-42.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz are also allocated to several other services on a primary basis, the allocated services are used by a variety of different systems in many administrations, and these existing services and their future development should be protected without undue constraints;
- g)* the need to encourage the development and implementation of new technologies in the FSS at frequencies above 30 GHz,

*recognizing*

- a)* that Article **21** contains power flux-density (pfd) limits for GSO FSS;
- b)* that advances in technology, including the use of tracking techniques, allow ESIMs to operate within the characteristics of fixed earth stations of the FSS;
- c)* that WRC-15 adopted No. **5.527A** and Resolution **156 (WRC-15)** related to ESIMs;

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- d)* that ESIMs addressed by this Resolution are not to be used for safety-of-life applications;
- e)* that the frequency bands 40.5-42 GHz (space-to-Earth) in Region 2, 47.5-47.9 GHz (space-to-Earth) in Region 1, 48.2-48.54 GHz (space-to-Earth) in Region 1, 49.44-50.2 GHz (space-to-Earth) in Region 1 and 48.2-50.2 GHz (Earth-to-space) in Region 2 are identified for use by high-density applications in the FSS (No. **5.516B**);
- f)* that the frequency bands 37-40 GHz, 40.5-43.5 GHz are available for high-density applications in the fixed service (No. **5.547**);
- g)* that the pfd in the frequency band 42.5-43.5 GHz produced by any GSO space station in the FSS (space-to-Earth) or the broadcasting-satellite service (BSS) operating in the frequency band 42-42.5 GHz shall not exceed, at the site of any radio astronomy station, the values listed in No. **5.551I**;
- h)* that the allocation of the spectrum for the FSS in the frequency bands 42.5-43.5 GHz and 47.2-50.2 GHz for Earth-to-space transmission is greater than that in the frequency band 37.5-39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites, and administrations are urged to take all practicable steps to reserve the frequency band 47.2-49.2 GHz for feeder links for the BSS operating in the frequency band 40.5-42.5 GHz (No. **5.552**);
- i)* that the allocation to the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz is designated for use by high-altitude platform stations, and the use of the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz is subject to the provisions of Resolution **122 (Rev.WRC-19)** (No. **5.552A**);
- j)* that the use of the frequency bands 47.5-47.9 GHz, 48.2-48.54 GHz and 49.44-50.2 GHz by the FSS (space-to-Earth) is limited to GSO satellites (No. **5.554A**);
- k)* that the pfd in the frequency band 48.94-49.04 GHz produced by any GSO space station in the FSS (space-to-Earth) operating in the frequency bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed  $-151.8$  dB(W/m<sup>2</sup>) in any 500 kHz band at the site of any radio astronomy station (No. **5.555B**);
- l)* that, in the frequency bands 49.7-50.2 GHz, 50.4-50.9 GHz and 51.4-52.6 GHz, Resolution **750 (Rev.WRC-19)** applies, and Nos. **5.338A**, **5.340** and **5.340.1** apply among other provisions of the Radio Regulations;
- m)* that the fixed and mobile services are allocated on a primary basis in the frequency bands 37.5-42.5 GHz and 47.2-50.2 GHz on a global basis;
- n)* that the frequency band 37.5-38 GHz is allocated to the space research service (SRS) (deep space) in the space-to-Earth direction and the frequency band 40.0-40.5 GHz is allocated to the SRS and the Earth exploration-satellite service (EESS) in the Earth-to-space direction on a primary basis;
- o)* that the frequency bands 37.5-40.5 GHz and 38-39.5 GHz are also allocated to the EESS in the space-to-Earth direction on a secondary basis;
- p)* that the frequency band 50.2-50.4 GHz is allocated on a primary basis to the EESS (passive) and SRS (passive), which need to be adequately protected;
- q)* that all allocated services in these frequency bands should be taken into account,

*resolves to invite the ITU Radiocommunication Sector*

1 to study the technical and operational characteristics of aeronautical and maritime ESIMs that plan to operate within GSO FSS allocations in the frequency bands 37.5-39.5 GHz, 40.5-42.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz;

2 to study sharing and compatibility between aeronautical and maritime ESIMs operating with GSO FSS networks in the frequency bands 37.5-39.5 GHz, 40.5-42.5 GHz, 47.2-50.2 GHz\* and 50.4-51.4 GHz\* and current and planned stations of existing services allocated in these frequency bands and, where appropriate, in adjacent frequency bands, in order to ensure protection of, and not impose undue constraints on, those services;

3 to develop, for different types of ESIM, technical conditions and regulatory provisions for their operation, taking into account the results of the studies above,

*invites the 2027 World Radiocommunication Conference*

to consider the results of the above studies and take necessary actions, as appropriate, provided that the results of the studies referred to in *resolves to invite the ITU Radiocommunication Sector* are complete and agreed by the radiocommunication study groups.

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\* For the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz, sharing and compatibility studies for aeronautical ESIM should take into account all necessary steps to protect the terrestrial services to which the frequency band is allocated to.

