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## RESOLUTION 178 (WRC-19)

**Studies of technical and operational issues and regulatory provisions for non-geostationary fixed-satellite service satellite system feeder links in the frequency bands 71-76 GHz (space-to-Earth and proposed new Earth-to-space) and 81-86 GHz (Earth-to-space)**

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

*considering*

- a) that satellite systems are increasingly being used to deliver broadband services and are part of the solutions to enable broadband access;
- b) that next-generation fixed-satellite service (FSS) technologies are required to deliver multi-terabit speeds to support demanding real-time applications, which can be delivered by large-constellation non-geostationary-satellite (non-GSO) FSS systems;
- c) that the particular characteristics of such high-capacity feeder links for large-constellation non-GSO FSS systems involve highly directional antennas on both the satellites and the earth stations and, as such, may be conducive to frequency-sharing arrangements including, but not limited to, consideration of reverse-band operation in certain situations, and consideration of whether No. 22.2 can be replaced by another sharing mechanism between geostationary-satellite (GSO) and non-GSO systems in some or all of the frequency bands 71-76 GHz and 81-86 GHz;
- d) that GSO networks are operating or planned to operate in these frequency bands and that some administrations are considering deploying high-density fixed-service links in these frequency bands;
- e) that studies are required in order to ascertain the feasibility of, and conditions for, non-GSO FSS satellite system feeder links sharing the frequency bands 71-76 GHz (space-to-Earth) and 81-86 GHz (Earth-to-space) with GSO links and with other non-GSO FSS satellite systems;
- f) that studies are required to ascertain the feasibility of, and conditions for, a possible new allocation to the FSS (Earth-to-space), for reverse-band feeder links for non-GSO FSS satellite systems in the frequency band 71-76 GHz;
- g) that the frequency bands 71-76 GHz and 81-86 GHz are allocated to various services,

*considering further*

- a) that Recommendations ITU-R S.1323, ITU-R S.1325, ITU-R S.1328, ITU-R S.1526 and ITU-R S.1529 provide information on non-GSO and GSO FSS system characteristics, operational requirements and protection criteria that may be used in sharing studies;

b) that Recommendation ITU-R F.2006 provides information on radio-frequency channel and block arrangements for fixed wireless systems operating in the frequency bands 71-76 GHz and 81-86 GHz;

c) that Recommendation ITU-R M.2057 provides information on system characteristics of automotive radars operating in the frequency band 76-81 GHz for intelligent transport system applications;

d) that the ITU Radiocommunication Sector (ITU-R) expert group is currently developing FSS characteristics in the frequency bands 71-76 GHz and 81-86 GHz to provide additional system characteristics of planned high millimetre-wave FSS networks and systems,

*noting*

a) that filing information for GSO and non-GSO FSS satellite networks in the frequency bands 71-76 GHz (space-to-Earth) and 81-86 GHz (Earth-to-space) has recently been communicated to the Radiocommunication Bureau;

b) that the frequency band 71-76 GHz is also allocated to the fixed and mobile services on a primary basis and is extensively used for applications in the fixed service;

c) that the frequency band 74-76 GHz is also allocated to the broadcasting service and the broadcasting-satellite service (BSS) on a primary basis, as well as the space research service (SRS) in the space-to-Earth direction on a secondary basis;

d) that, in the frequency band 74-76 GHz, the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the FSS in accordance with No. **5.561**;

e) that the frequency band 81-86 GHz is also allocated to the fixed and mobile services and the radio astronomy service (RAS) on a primary basis, as well as the SRS in the space-to-Earth direction on a secondary basis;

f) that Resolution **750 (Rev.WRC-19)** applies in the frequency band 81-86 GHz in accordance with No. **5.338A**;

g) that the frequency band 81-84 GHz is also allocated to the mobile-satellite service (MSS) in the Earth-to-space direction on a primary basis;

h) that the frequency band 81-81.5 GHz is also allocated to the amateur and amateur-satellite services on a secondary basis;

i) that the frequency band 76-81 GHz is also allocated to the radiolocation service on a primary basis,

*recognizing*

a) that No. **21.16** does not contain power flux-density limits applicable to FSS satellites to protect fixed and mobile services with allocations in the frequency band 71-76 GHz;

b) that the frequency band 86-92 GHz is allocated on a primary basis to the Earth exploration-satellite service (EESS) (passive), the RAS and the SRS (passive), which must be protected, and in accordance with No. **5.340** all emissions are prohibited in the frequency band;

c) that No. **5.149** indicates that radio astronomy observations are carried out in the frequency band 76-86 GHz and that mitigation measures may have to be defined in this regard,

*resolves to invite the ITU Radiocommunication Sector*

to conduct, and complete in time for WRC-27:

- 1 studies considering additional spectrum needs for the development of non-GSO FSS satellite systems in the frequency bands 71-76 GHz and 81-86 GHz, the technical conditions for their use, and the possibility of optimizing the use of these frequency bands with a view to increasing spectrum efficiency;
- 2 studies of technical and operational issues for the operation of feeder links for non-GSO FSS satellite systems in the frequency bands 71-76 GHz (space-to-Earth and the feasibility of a possible new allocation for reverse-band feeder operation in the Earth-to-space direction) and 81-86 GHz (Earth-to-space), as well as consideration of regulatory provisions in some or all of these frequency bands for non-GSO systems coordinating and sharing with both GSO and other non-GSO systems in the FSS, MSS and BSS, and their specific earth stations, taking into account the future growth of these uses and the need to ensure their protection;
- 3 sharing and compatibility studies between non-GSO FSS satellite system feeder links in the frequency bands 71-76 GHz (space-to-Earth and a possible new allocation for non-GSO FSS in the Earth-to-space direction) and 81-86 GHz (Earth-to-space) and other existing co-primary services, including the fixed and mobile services, in those frequency bands and in adjacent frequency bands, taking into account the need to ensure the protection of these services;
- 4 studies of possible necessary provisions of the Radio Regulations to ensure protection of the EESS (passive) and SRS (passive) in the frequency band 86-92 GHz from non-GSO FSS transmissions, including study of aggregate FSS interference;
- 5 studies towards ensuring protection of the RAS operating in the frequency bands 76-86 GHz and 86-92 GHz from non-GSO FSS transmissions, taking into account *recognizing b)* above, including study of aggregate FSS interference effects from networks and systems operating or planned to operate in the frequency bands described in *resolves to invite the ITU Radiocommunication Sector 2* above,

*invites the 2027 World Radiocommunication Conference*

to consider the results of the above studies and take appropriate action,

*invites administrations*

to participate in the studies by submitting contributions to ITU-R.