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## RESOLUTION 712 (WRC-23)

**Studies on compatibility between the Earth exploration-satellite service (passive), the radio astronomy service in certain bands above 76 GHz, and active services in adjacent and nearby frequency bands**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

- a)* that WRC-2000 made a number of different allocation changes to the frequency bands above 71 GHz, including primary allocations to the Earth exploration-satellite service (EESS) (passive) subject to No. **5.340**, based on the requirements known at the time of that conference;
- b)* that primary allocations have been made to various active services in frequency bands adjacent to frequency bands above 86 GHz allocated to the EESS (passive) subject to No. **5.340**;
- c)* that primary service allocations have been made, in adjacent or nearby frequency bands, to the radio astronomy service (RAS) and to various space services, such as the fixed-satellite service (FSS), mobile-satellite service (MSS), broadcasting-satellite service (BSS) and radionavigation-satellite service (RNSS), hereinafter referred to as “active satellite services”, in frequency bands above 76 GHz;
- d)* that unwanted emissions from active services have the potential to cause unacceptable interference to the EESS (passive) and the RAS;
- e)* that, in many cases, the frequencies used by EESS (passive) sensors and stations of the RAS are chosen to study natural phenomena producing radio emissions at frequencies fixed by the laws of nature, and therefore shifting frequency to avoid or mitigate interference problems is not possible;
- f)* that the current regulatory provisions and procedures may require review to ensure protection of the EESS (passive) and the RAS from harmful interference produced by active services as listed in Tables 1 and 2 below,

*noting*

- a)* that Resolution **750 (Rev.WRC-19)** deals with compatibility between the EESS (passive) and some active services;
- b)* that Resolution **750 (Rev.WRC-19)** already contains provisions to protect the EESS (passive) in the frequency band 86-92 GHz from emissions of the fixed service in the frequency bands 81-86 GHz and 92-94 GHz and that there is no intention to change these provisions;

- c)* that there is no intention to change the existing allocations or status of allocations in Article 5 for the frequency bands above 86 GHz;
- d)* that interference criteria for EESS (passive) sensors have been developed and are given in Recommendation ITU-R RS.2017;
- e)* that typical technical and operational characteristics of EESS (passive) systems are given in Recommendation ITU-R RS.1861;
- f)* that the allocation to the inter-satellite service in the frequency band 116-119.98 GHz is subject to No. **5.562C**;
- g)* that Resolution **739 (Rev.WRC-19)** applies under No. **5.208B** for the frequency bands listed in the Annex to that Resolution;
- h)* that, according to *resolves* 3 of Resolution **739 (Rev.WRC-19)**, in case the unwanted emissions from the space station or satellite system cannot meet the values given in the Annex to that Resolution, the concerned administrations enter into a consultation process in order to achieve a mutually acceptable solution;
- i)* that Resolution **739 (Rev.WRC-19)** defines thresholds to be met by any geostationary space station (Table 1 of Annex to Resolution **739 (Rev.WRC-19)**) or by any single network of non-geostationary-satellite orbit (non-GSO) space stations (Table 2 of Annex to Resolution **739 (Rev.WRC-19)**) in order to protect radio astronomy stations;
- j)* that Recommendation ITU-R RA.769 provides, in Annex 1, the general consideration and assumptions used in the calculation of interference levels;
- k)* that Recommendation ITU-R RA.769 provides, in Table 1 and Table 2, the threshold levels for interference detrimental to radio astronomy observations in some radio astronomy bands;
- l)* that Recommendation ITU-R RA.1631 provides the typical maximum RAS antenna gains in order to derive the equivalent power flux-density (epfd) resulting from unwanted emission levels produced by a non-GSO system at radio astronomy stations,
- recognizing*
- a)* that Resolution **739 (Rev.WRC-19)** contains no power flux-density (pfd)/epfd threshold for unwanted emission from any geostationary-satellite orbit (GSO)/non-GSO space station in the bands listed in Table 2 to this Resolution;
- b)* that the current values provided in Resolution **739 (Rev.WRC-19)** are derived from Recommendations ITU-R RA.769 and ITU-R RA.1631,

*resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference*

1 compatibility studies between the EESS (passive) and the corresponding active services in adjacent frequency bands as listed in Table 1 below:

TABLE 1

**EESS (passive) frequency bands to be studied and corresponding active services to be included**

<b>EESS (passive) frequency band</b>	<b>Active service frequency band</b>	<b>Active service</b>
86-92 GHz	81-86 GHz	Fixed-satellite service (FSS) (Earth-to-space), mobile service (MS)
	92-94 GHz	MS, radiolocation service (RLS)
114.25-116 GHz	111.8-114.25 GHz	Fixed service (FS), MS
164-167 GHz	158.5-164 GHz	FS, FSS (space-to-Earth), MS, mobile-satellite service (MSS) (space-to-Earth)
	167-174.5 GHz	FS, FSS (space-to-Earth), inter-satellite service (ISS), MS
200-209 GHz	191.8-200 GHz	FS, ISS, MS, MSS, radionavigation service (RNS), radionavigation-satellite service (RNSS)
	209-217 GHz	FS, FSS (Earth-to-space), MS

2 compatibility studies between the RAS and the active satellite services in certain adjacent and nearby frequency bands listed in Table 2 below with a view to setting the relevant threshold levels for unwanted emissions from any GSO and non-GSO space stations and revising and updating Resolution **739 (Rev.WRC-19)** accordingly:

TABLE 2

**RAS frequency bands to be studied and corresponding active services to be included**

<b>Radio astronomy frequency band</b>	<b>Active satellite service frequency band</b>	<b>Active satellite service (space-to-Earth)</b>
76-81 GHz	71-76 GHz	Fixed-satellite service (FSS), mobile-satellite service (MSS), broadcasting-satellite service (BSS)
130-134 GHz	123-130 GHz	FSS, MSS, radionavigation-satellite service (RNSS)
164-167 GHz	167-174.5 GHz	FSS
226-231.5 GHz	232-235 GHz	FSS

*invites administrations*

to participate actively in the studies and provide the technical and operational characteristics of the systems involved by submitting contributions to the ITU Radiocommunication Sector,

*invites the 2027 world radiocommunication conference*

1 to determine, based on the results of studies, any required regulatory measures regarding the protection of the EESS (passive) in the frequency bands listed in Table 1 above from unwanted emissions of active services and update Resolution **750 (Rev.WRC-19)** accordingly;

2 to determine, based on the results of studies, any required regulatory measures regarding the protection of the RAS in the frequency bands listed in Table 2 above and update Resolution **739 (Rev.WRC-19)** accordingly,

*instructs the Secretary-General*

to bring this Resolution to the attention of the international and regional organizations concerned.