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India (Republic of)

PROPOSAL FOR PRELIMINARY VIEWS ON WRC-27 AGENDA ITEM 1.2

*1.2 to consider possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes, in accordance with Resolution **129 (WRC-23)**;*

Resolution 129 (WRC-23) – Studies on possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes.

Background:

The agenda focuses on possible revisions of sharing conditions in the 13.75-14 GHz band to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes.
ITU studies under this agenda item includes conducting sharing and compatibility studies between fixed-satellite service (FSS) earth stations and services addressed in footnotes RR Nos. **5.502** and **5.503**.
The 13.75-14 GHz band is already allocated to FSS on a primary basis and shared with the radiolocation service (RLS) and space research service (SRS) on a primary basis.

The ITU Radio Regulations (RR) Nos. **5.502** and **5.503** (introduced in WARC-92 and last reviewed back in WRC-03) place limitations on the minimum size of the satellite earth station antennas and on the maximum power flux density transmitted by a satellite terminal towards the sea, to protect the RLS and SRS:

"**5.502**: In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

- −115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;
- −115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced 3m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

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For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW.

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

- in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:
  - i) 4.7D + 28 dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;
  - ii) 49.2 + 20 log(D/4.5) dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;
  - iii) 66.2 dB(W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;
  - iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;
- the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions. (WRC-03)"

According to Resolution **129** (**WRC-23**), the studies under WRC-27 agenda item 1.2 should consider possible changes to the FSS technical and operational limits as well as regulatory measures in the band 13.75-14 GHz while ensuring the protection of the RLS in RR No. **5.502** and SRS in RR No. **5.503**.

Annex 1 of the Recommendation ITU-R M.1644 "Technical and operational characteristics, and criteria for protecting the mission of radars in the radiolocation and radionavigation service operating in the frequency band 13.75-14 GHz" provides some characteristics of radiolocation and radionavigation radars and criteria for their protection. It is important to note that some RLS characteristics that are needed to perform the studies are still missing, namely the airborne radar characteristics in Rec. ITU-R M.1644 and the lack of associated percentage of time linked to the RLS protection criteria I/N =-6dB. A liaison statement from WP4A was sent to WP5B (5B/208) seeking the missing information.

Future studies to consider the aggregate interference from GSO FSS uplinks and non-GSO FSS uplinks (both MEO and LEO) are ongoing at WP4A level.

India's Preliminary Views:

India supports ongoing ITU-R studies under this agenda item as it would lead to the efficient use of the 13.75-14 GHz band, alleviate congestion in the existing uplink Ku-band spectrum and balance the amount of available uplink and downlink spectrum resources for FSS in the Ku band.