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India (Republic of)

PROPOSAL FOR PRELIMINARY VIEWS ON WRC-27 AGENDA ITEM 1.1

Agenda Item -1.1: - to consider the technical and operational conditions for the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with space stations in the fixed-satellite service and develop regulatory measures, as appropriate, to facilitate the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with geostationary space stations and non-geostationary space stations in the fixed-satellite service, in accordance with Resolution **176 (Rev.WRC-23)**;

Resolution **176 (Rev.WRC-23) -** invites the ITU-R to study sharing and compatibility between A ESIMs and M-ESIMs communicating with space stations in the FSS in the frequency band 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space), or parts thereof, and the stations of primary services allocated in these frequency bands and in adjacent frequency bands, including passive services in adjacent and near-adjacent frequency bands, in order to ensure protection of, and not impose undue constraints on, those services.

Background:

The agenda focuses on the technical and operational conditions for the use of the V band (47.2-50.2 GHz and 50.4-51.4 GHz) for aeronautical and maritime earth stations in motion (ESIMs) communicating with geostationary (GSO) and non-geostationary (NGSO) space stations in the fixed-satellite service (FSS).

The increasing demand for high-data-rate connectivity for aeronautical and maritime platforms is the primary reason for developing the regulatory framework for the use of V-Band. Main reasons are:

- Enhanced Passenger Experience**:** Passengers on aircraft and ships increasingly expect seamless access to broadband internet for communication, entertainment, and productivity. Even emerging/new applications like live video streaming, augmented reality for maintenance, and sophisticated sensor data transmission require significant bandwidth.
- Operational Efficiency**:** Airlines and shipping companies require reliable high-throughput links for various operational purposes, including real-time data transfer for flight management, weather updates, ship navigation, cargo tracking, and crew welfare.

Contact: **Email:**

- Safety and Security: High-bandwidth can enhance safety and security through improved surveillance, real-time monitoring of critical systems, and faster emergency response capabilities.

Currently, AESIMs and M-ESIMs utilize various frequency bands, but the demand for higher capacity necessitates exploring new spectrum allocations, for greater bandwidth to support future applications points towards exploring higher frequency ranges. The specific bands under consideration, 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), offer the potential for large contiguous bandwidth, which is crucial for delivering high data rates.
However, these bands are already allocated to other primary services, including Fixed Service - Terrestrial point-to-point communication links; Mobile Service - Terrestrial mobile communication systems; Radio Astronomy Service (RAS); Space Research Service (SRS) (passive) - Passive sensing of the Earth and space environment and Earth Exploration Satellite Service (EESS) (passive) - Passive sensing of the Earth's atmosphere, surface, and oceans.

The importance of single entry non-GSO interference towards GSO networks are dealt with in Resolution **770 (WRC-23)** which deals with different cases created by the introduction of ESIMs, in particular A-ESIMs. It is noted that single-entry permissible non-GSO interference and criteria in Resolution **770 (WRC-23)** for protection of GSO networks are based on the link performance degradation due to precipitation fade. A GSO ESIM would not be impacted by the rain attenuation the same way as a typical earth station on the ground, leading to a case where Resolution **770 (WRC-23)** cannot be applied – in absence of rain attenuation, there is no quantified limit on interference from non-GSO systems under current methodology.

Additionally, it is imperative that the protection criteria for GSO A-ESIMs are appropriately defined and enforced due to the inherent operational constraints faced by GSO networks. Unlike non-GSO systems, GSO networks serving a given geographic area typically operate without satellite diversity. If interference from non-GSO systems occurs, GSO networks cannot simply switch to another satellite or alter their positioning in orbit to avoid the interference. Consequently, when GSO networks experience interference from non-GSO systems, they have very limited (if any) practical and effective options for mitigating the impact. GSO infrastructure – the spacecraft itself, ground stations, user equipment, transponders, and associated control systems – are investments that are made well in advance of satellite deployment and once a GSO satellite is deployed it cannot be altered during its typical 15–20-year service life.

India's Preliminary Views:

India actively supports the development of comprehensive regulatory frameworks, encompassing the technical conditions and regulatory provisions, for the use of the frequency bands 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by A-ESIMs and M-ESIMs communicating with GSO and non-GSO networks, ensuring the protection of incumbent primary services in these frequency bands and adjacent frequency bands.

India is also of the view to assess the potential impact on passive services like the Radio Astronomy Service (RAS), Space Research Service (passive), and Earth Exploration Satellite Service (passive) operating in adjacent and near-adjacent bands. These services rely on

receiving extremely weak signals, and any out-of-band emissions or spurious signals from AESIM/M-ESIM transmissions could significantly degrade their observations.

India also support that ITU-R regulatory frameworks for ESIMs should be consistent across various bands. We also support the development of the ITU-R Recommendation for the Network Control and Monitoring Centre (NCMC) for ESIM operations that would ensure control of ESIM transmissions without jeopardizing their continued development.

Further, ITU-R studies under this agenda need to validate the assumptions and regulations outlined in Resolution 769 and Resolution 770, whether they adequately addresses the operational conditions for M-ESIMs and A-ESIMs, especially when considering the impact of propagation fading.