

Agenda Item 1.6
- Overview & draft
India proposal

by

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Agenda Item 1.6

'The Take-aways'

- Overview of the AI 1.6 and the issues involved
- Draft India Proposal
- Indian perspective
 - Importance of AI 1.6 to India

BACKGROUND

- *Devl. of New technologies in FSS above 30 GHz for world-wide use of satellite constellations in both GSO & NGSO*
- *High-capacity / low-cost comm. systems especially in remote areas*
- *Radio Regulations should enable their introduction*
- *Currently no technical provisions / existing mechanisms in RR Coordination procedures, such No. 9.12 (non-GSO to non-GSO)*
- *Equivalent power flux density $epfd\uparrow$ and $epfd\downarrow$ limits in Article 22 for sharing between non-GSO & GSO networks in the 50/40 GHz frequency bands do not exist*
($epfd\uparrow$ and $epfd\downarrow$ limits exists presently for 14/11 GHz and 30/20 GHz bands)

BACKGROUND (Cont.)

WRC-15 established agenda item 1.6 and associated Resolution 159 (WRC-15) for WRC-19 to address these issues in frequency bands 37.5-39.5 GHz (s-E), 39.5-42.5 GHz (s-E), 47.2-50.2 GHz (E –s) and 50.4-51.4 GHz (E –s)

Sharing studies with GSO, EESS, and RAS were carried out under Res.159 (WRC-15) for development of regulatory provisions for operation of NGSO FSS satellite systems in 50/40 GHz bands

AI 1.6

to consider the **development of a regulatory framework for non-GSO FSS satellite systems** that may operate in 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), in accordance with Resolution **159 (WRC-15)**;

Resolution **159 (WRC-15)** – **Studies of technical, operational issues and regulatory provisions** for non-geostationary fixed-satellite services satellite systems in 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).

Studies concluded that:

Protection of GSO networks is possible based on an assessment of aggregate interference from multiple non-GSO systems, with different configurations and orbits.

ITU-R studies were unable to conclude on the appropriate efd limits to protect GSO FSS and BSS networks from the operation of non-GSO FSS systems, due to the number of possible configurations and the complexity of the non-GSO FSS systems

WRC-19 AI 1.6 also considered the protection of the Earth exploration-satellite service (EESS) (passive) and radio astronomy services in adjacent bands

Methods to satisfy the agenda item

There are two issues within WRC-19 agenda item 1.6

Issue 1: Developing a regulatory framework for non-GSO FSS satellite systems to protect GSO systems & add coordination mechanism between non-GSO systems

There are two methods to address issue 1 – Methods A & B

Method A: Add footnotes to RR Article **5** & add provisions to RR Article **22** and establish a consultation group to coordinate aggregate interference in order to protect GSO satellite networks.

Method B: Carry forward the studies to ensure the protection of GSO satellite networks under WRC-19 agenda item 1.6 to a **new WRC-23 agenda item**

Issue 2: Modify Resolution **750 (Rev.WRC-15)** for the protection of EESS (passive) in the band 50.2-50.4 GHz

Regulatory and procedural considerations

For Method A of Issue1:

- Add a new footnote RR No. 5.A16, that subjects non-GSO FSS and MSS systems to coordination provision No. **9.12***
- Modify RR Article 22 (Control of interference to GSO from N-GSO) by adding provisions to RR Article **22** in order to protect GSO satellite networks*
- Consultation group to coordinate aggregate interference in order to protect GSO satellite networks*

Regulatory and procedural considerations (Cont.)

For Method A of Issue1 (Cont.):

ADD

Draft New RESOLUTION [A16] (WRC-19)

Protection of geostationary FSS, BSS and MSS networks from unacceptable interference from non-GSO FSS systems in the 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands

ANNEX 1 TO draft new RESOLUTION [A16] (WRC-19)

List of geostationary networks characteristics and format of the result of the aggregate calculation to be provided to BR for publication for information

ANNEX 2 TO draft new RESOLUTION [A16] (WRC-19)

List of criteria for the application of resolves 5

The Indian proposal on AI 1.6

The Indian proposal for agenda item 1.6 aims to provide:

- ❖ a sharing mechanism between non-GSO systems (i.e. from a non-GSO to another non-GSO system). For this purpose, **a new footnote No.5.A16** is proposed for **protecting a non-GSO FSS or MSS from another non-GSO FSS or MSS**;
- ❖ a **Draft New Resolution[A16] (WRC-19)** for **protection of GSO FSS, MSS, BSS from non-GSO FSS** in freq. bands 37.5 – 39.5 GHz (s-E), 39.5 – 42.5 GHz (s-E) & 47.2 – 50.2 GHz (E-s) & 50.4 – 51.4 GHz (E-s) and protection of GSO FSS, MSS, BSS from non-GSO MSS in freq. bands 39.5-40 GHz & 40-42.5 GHz;
- ❖ **protection of EESS (passive) at 50.2-50.4 GHz from NGSO systems** in the band **50.2-50.4 GHz**. For this, **Resolution 750 (WRC-15)** **needs to be revised** to ensure compatibility between EESS (passive) systems and non-GSO FSS systems;

The Indian proposal on AI 1.6 (Cont.)

ADD IND /1.6/2

5.A16 The use of 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) by a **non-GSO-satellite system in the fixed-satellite service or mobile satellite-service is subject to the application of the provisions of No. 9.12 for coordination with other non-GSO-satellite systems in the fixed-satellite service and/or non-GSO satellite systems in the mobile satellite service, but not with non-GSO systems in other services. Draft new Resolution [A16] (WRC-19) shall also apply, and No. 22.2 shall continue to apply. (WRC-2019)**

Reasons: To address coordination among non-GSO FSS systems in the 50/40 GHz bands

MOD IND /1.6/3

5.338A In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.6 GHz, 81-86 GHz and 92-94 GHz, **Resolution 750 (Rev.WRC-19) applies. (WRC-2019)**

Reasons: Consequential change

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The Indian proposal on AI 1.6

- ❖ *Modify RR Article 22 (Control of interference to GSO from N-GSO) by adding provisions to RR Article 22 in order to protect GSO satellite networks (Nos. 22.5L & 22.5M have been added)*

The Indian proposal on AI 1.6 (Cont.)

22.5L A non-GSO satellite system in the fixed-satellite service in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz

- single-entry increase of 3% of time allowance for the C/N values associated with the shortest percentage of time specified in the short-term performance objectives of GSO reference links;

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- a single-entry permissible allowance of at most 3% reduction in time average spectral efficiency calculated on an annual basis of the GSO reference link long term performance

22.5M Administrations operating or planning to operate non-GSO-satellite systems in the fixed-satellite service in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz shall ensure that the aggregate interference to GSO FSS, MSS, and BSS networks caused by all non-GSO FSS and non-GSO MSS systems operating in these frequency bands does not exceed 10% of the short-term and long-term performance objectives of GSO satellite networks by applying the provisions of draft new Resolution [A16] (WRC-19).

The Indian proposal on AI 1.6 (Cont.)

DRAFT NEW RESOLUTION [A16] (WRC-19)

Protection of geostationary satellite FSS, MSS, and BSS networks from unacceptable interference from non-GSO satellite FSS systems in the 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands and from non-GSO MSS systems in the 39.5-40.0 GHz and 40.0-42.5 GHz frequency bands

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resolves

- 1 that administrations operating or planning to operate non-GSO FSS and non-GSO MSS systems in the frequency bands referred to in *considering a)* above, shall, in collaboration, take all necessary steps, including, if necessary, by means of appropriate modifications to their systems or networks, to ensure that the **aggregate interference into GSO FSS, MSS and BSS satellite networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate protection limits as determined pursuant to No. 22.5M of the Radio Regulations;**
- 2 that **to carry out the obligations in *resolves 1* above,** administrations operating or planning to operate non-GSO FSS and non-GSO MSS systems **shall agree cooperatively through regular consultation meetings** referred to in recognizing b) **to ensure that operations of all non-GSO networks do not exceed the aggregate level of protection for GSO satellite networks;**

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Indian perspective - Importance of AI 1.6 to India

1. **Having necessary provisions in the Radio Regulations for Coordination procedures, such **No. 9.12 (non-GSO to non-GSO) and Equivalent power flux density $epfd_{\uparrow}$ and $epfd_{\downarrow}$ limits in Article 22 for sharing between non-GSO & GSO networks in the 50/40 GHz** are essential for harmonious coexistence of above satellite networks/systems.**
2. **Protection of 'in-band' and 'adjacent-band' 'active and passive' EESS networks would be necessary;**

Indian perspective - Importance of AI 1.6 to India (Cont.)

3. *Protection of GSO FSS, MSS, BSS systems from non-GSO FSS constellations / systems in higher frequency bands above 30 GHz is necessary;*
4. *A number of new non-GSO constellations in Fixed Satellite Service (FSS), providing high-capacity and low-cost communications in various parts of the world, especially in remote and isolated areas, would come up and may have the potential to cause harmful interference to planned and future Indian GSO & non-GSO satellite networks.*

Thank You

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