

Spectrum Issues for satellite services at WRC-27

- Agenda Item 1.2: **Smaller antenna size in 13.75 – 14 GHz**
- Agenda Item 1.3: **NGSO Gateway in 51.4-52.4 GHz frequency band**
- Agenda Item 1.4: **New Region 3 FSS/BSS allocation in the 17 GHz frequency band**

Agenda Item 1.2

Smaller antenna size in 13.75 – 14 GHz

Proposal under this AI

- Possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink FSS E/S with smaller antenna sizes

Background:

- WARC-92 imposed power limitations and set min. antenna diameter sizes
- WRC-03 evaluated sharing conditions: did not change NGSO, relaxed for GSO
- U/L band is **shared** by both GSO and NGSO
- Constraints on minimum antenna size of E/S: 1.2m (GSO), 4.5m (NGSO)
- Constraints on PFD for E/S in FSS to protect RLS and certain SRS stations (receiving from 8 GSO satellites)

Other issues:

- **Imbalance** of UL/ DL in Ku Band for smaller antennas
- In Region 3: U/L Band is 14 – 14.5 GHz (**500 MHz**); D/L band are 10.95 – 11.2, 11.45 – 11.7 GHz and 12.2 – 12.75 GHz (i.e., **1050 MHz**)

Agenda Item 1.2

Smaller antenna size in 13.75 – 14 GHz

Impact of revision in sharing conditions

A. Satellite Services:

- More efficient use of spectrum
- Higher data rates for ESIMs
- Satellite connectivity more accessible
- Perhaps growth of new applications (GSO and NGSO)

B. Incumbent Services

- Revised sharing conditions must ensure protection of incumbent.
- Operational limits for GSO/NGSO

Agenda Item 1.2

Smaller antenna size in 13.75 – 14 GHz

Summary of ongoing technical studies in WP4A

- (i) applicable single-entry and aggregate interference of small FSS earth stations of both GSO FSS and NGSO FSS into RLS and SRS
- (ii) Discussions on
 - Deployment density of small FSS earth stations
 - Methodologies for aggregate interference studies
 - Protection criteria of RLS (i.e. interference-to-noise ratio (I/N))
 - Antenna patterns, elevation angles, pointing, etc.
 - List of SRS characteristics to be used in the sharing studies
- (iii) One study by PNG/ Singapore/ Indonesia/ Thailand/ China/ **India**

Agenda Item 1.3

NGSO Gateway in 51.4-52.4 GHz frequency band

Proposal under this AI

Studies relating to the use of the frequency band 51.4-52.4 GHz to enable use by gateway ES transmitting to NGSO systems in the FSS (Earth-to-space), in accordance with Resolution 130 (WRC-23);

Background:

- WRC-19 allocated this band to FSS (Earth-to-space) on a primary basis for all regions
- Footnote 5.555C limited this band to only GSO networks with 2.4m antenna diameters
- Global Allocation also to FS and MS on Primary basis in these bands. Radio Astronomy Service (RAS) may be used under national arrangement.

Adjacent bands:

- Global Allocation to EESS(Passive) and Space Research(passive) on primary basis:
 - 50.2-50.4 GHz
 - 52.6-54.25 GHz
- 50.4-51.4 GHz , FS, MS and FSS(E to S) on primary basis,
- 52.4-52.6 Global Allocation to FS, and MS on Primary basis;

Agenda Item 1.3

NGSO Gateway in 51.4-52.4 GHz frequency band

Status of Current studies in WP4A

(i) Sharing with GSO FSS

Simulation studies seem to suggest that sharing is technically feasible with minimal impact on GSO link availability and throughput.

(ii) Sharing with Fixed Service

27 - 40 Km required separation distance between NGSO FSS E/S and FS stations

(iii) Sharing with Mobile Service

Further study required

(iv) Compatibility with RAS

45 - 77 Km to 28-58 Km protection distance

(v) Compatibility with EESS (Passive) and SRS (Passive)

Unwanted NGSO FSS E/S power would need to be reduced substantially (7.5 to 17.8 dB)

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New Region 3 FSS/BSS allocation in the 17 GHz frequency band

Proposal under this AI

possible new primary allocation to the FSS (S-to-E) in the frequency band 17.3-17.7 GHz and a possible new primary allocation to the BSS (S-to-E) in the frequency band 17.3-17.8 GHz in Region 3, while ensuring the protection of existing primary allocations in the same and adjacent frequency bands, and to consider epfd limits to be applied in Regions 1 and 3 to NGSO satellite systems in the FSS (space-to-Earth) in the frequency band 17.3-17.7 GHz,

Agenda Item 1.4

New Region 3 FSS/BSS allocation in the 17 GHz frequency band

Current Status of this band:

- 17.3 - 17.7 GHz:
 - Global Allocation to FSS (Earth-to-space) on Primary basis
 - Only Region-1 and Region-2 allocation to FSS (Space-to-Earth) on Primary basis
 - Radiolocation on Secondary basis,
- 17.3 - 17.8 GHz:
 - Region-2 allocation to BSS on Primary basis in this band.
- **Imbalance** of UL/ DL in 17 GHz/ 27 GHz Band in Region 3
- A new allocation in Region 3 for FSS (Space-to-Earth) may progress the global harmonisation.
- In adjacent band 17.2-17.3 GHz, EESS(active), RLS and SRS(active) on primary basis, 17.7-18.1 GHz FS primary.

Currently, there are different mechanisms in different regions on how non-GSO FSS is protecting GSO FSS in the 17.3-17.7 GHz band:

- Region 1: RR No.**22.2**, no epfd;
- Region 2: RR **22.2** + epfd -- that was the decision at WRC-23;
- Region 3: Nothing since there is no Region 3 FSS allocation at the moment.

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New Region 3 FSS/BSS allocation in the 17 GHz frequency band

Status of Current studies in WP4A: ITU WP4A is currently developing a Working Document:

- (i) propagation models and characteristics of FSS and BSS to be used in the sharing studies
- (ii) Some of the studies show that the co-existence between the potential new BSS service in R3 and the potential new NGSO FSS service in R3 in the 17 GHz band may pose some challenges

Possible update of the epfd value in Table 22-1D and its implications/
limitations to the NGSO FSS

Thank You