

National Workshop on Learnings from WRC-23 and the way forward
WRC-27: Introduction to the Agendas on Satellite services

Session 2 - Briefing on the Outcomes of WRC-23- Space Services



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Topics of the WRC-23 Agenda Items (Subject)

Terrestrial service

Communication Services

Remote Sensing/Space Science services

Navigation Services

Regulatory provisions-N-GSO constellations

WRC-23 Outcome (Terrestrial services)

Agenda Item 1.2: Identification of IMT in 3300-3400 MHz(R1& R2), 3600-3800 MHz (R2), 6425-7025 MHz (R1), 7025-7125 MHz (G) and 10.0 - 10.5 GHz(R2)

Focus (6425 – 7025 MHz):

- In India, the band 6425-7025 MHz is used for :
 - ✓ VSAT services
 - ✓ TT&C
 - ✓ CDMA ranging
 - ✓ Feeder links for MSS
 - ✓ Antarctica connectivity

Carried onboard 10 communication satellites and 8 Navigation satellites

- No consensus at APG, Some of the countries wanted to introduce IMT in 6 GHz (R3)
- Neighboring countries China, Bangladesh and Sri Lanka supported this.
- Prior to WRC-23, a national level committee reviewed India Position. Decided to observe development and not to support footnotes, considering extant utilisation.

Outcome:

- IMT achieved in R1 not in R3. EIRP mask was adopted.
- IMT identification is made in Cambodia, Laos and Maldives (R3)
- RLAN considered

WRC-23 Outcome (Terrestrial services)

Agenda Item 1.4: Identification of HIBS in the frequency band 2500-2690 MHz

Background:

- 2500-2690 MHz band is being used for MSS and BSS services.
- Adjacent frequency band 2483.5-2500 MHz is being used in NavIC.
- Used in GSAT-6, GSAT-7 and GSAT-17 and Navigation satellites.
- Coexistence analysis done w.r.t existing services – protection criteria exceeded

Outcome:

- HIBS operation will be on Non Interference Non Protection basis.
- For protection of Satellite services:
 - ✓ Power flux density limits(PFD).
 - ✓ Commitment.
 - ✓ Out of band emission limits.

WRC-23 Outcome (Satellite services)

Agenda Item 1.15: New Service, ESIMs for GSO in planned FSS Ku band

Background:

- ESIMs, in the frequency band, 12.75 -13.25 GHz, Plan Band
- Planned band:
 - ✓ One orbital slot for each country.
 - ✓ Requires explicit agreement for service area.
- Used on GSAT-19, GSAT-9 , GSAT-11 and GSAT-7A .
 - ✓ Protection of existing services
 - ✓ No well defined mechanism for interference management

Outcome:

- New ITU filing has to be made under existing FSS.
- Notifying administration is responsible for the mitigation of interference.
- Network Control and Monitoring Centre (NCCMC).
- Power levels and regulatory measures.

WRC-23 Outcome (Satellite services)

Agenda Item 1.16: New Service, ESIMs for N-GSO in Ka band

Background:

- ESIMs, in Ka band for N-GSO (2.5GHz bandwidth).
- Previous WRC's identified ESIMs for GSO's in Ka band.
- Protection of other incumbent services like GSO and terrestrial services.
- Frequency band used on GSAT-19, GSAT-9 , GSAT-11 and GSAT-7A .
- Interference monitoring considering the dynamic nature of satellites and mobile nature of terminals - No well defined mechanism for interference management

Outcome:

- New ITU filing has to be made under existing FSS.
- Notifying administration is responsible for the mitigation of interference.
- Network Control and Monitoring Centre (NCCMC).
- Power levels and regulatory measures.

WRC-23 Outcome (Satellite services)

Agenda Item 1.17: New Service, Inter-satellite link (ISL) in Ka band

Background:

- Frequency band: 11.7-12.7 GHz; 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz.
- S & Ka band (22/26 GHz) are predominantly used for ISL.
- IDRSS also utilizes S and Ka band for ISL
- Used in GSAT-19, GSAT-29 and GSAT-11 satellites.
- Protection of existing services
- No well defined mechanism for interference management

Outcome:

- Discussions were held on protection of – Terrestrial, NGSO, GSO,
- ISL in Ka band is allowed, not in Ku
- Orbital altitude (>350km) and transmission direction specified .
- New ITU filing has to be made.
- For protection of existing services:
 - ✓ PFD to protect terrestrial services
 - ✓ on-axis EIRP and off-axis antenna patterns to protect N-GSO
 - ✓ Seek agreement with GSO

WRC-23 Outcome (Space Science services)

Space Science Services

Agenda Item 1.13: Identification of frequency band 14.8-15.35 GHz for Space research.

Background:

- S, X and Ka band are currently used.
- In Ku band, there is no allocation for space science missions.
- Protection of existing services in adjacent band.

Outcome:

- Allocated for near earth space research missions (<2m Km), not for deep space.
- Identified for IMT study, in WRC-27

WRC-23 Outcome (Navigation services)

Agenda Item 1.11C: Inclusion of Beidou system of China into GMDSS (1.6 GHz, 2.4GHz)

Focus (2483.5 – 2500 MHz):

- Beidou system has S-band used in NavIC
- Not coordinated with satellite networks of USA and France.
- France and USA have reported ITU of presence of interference

Outcome:

- Considered after completion of coordination France and USA and to report to WRC-27
- To coordinate with operational Navigation satellite networks.
- Will help India to complete coordination.

WRC-23 Outcome (Regulatory measures)

Agenda Item 7: Mega constellations in N-GSO

Focus (Orbital Tolerance, Post Milestone reporting and Aggregate epfd):

- Current regulations does not address the specifics of this.
- Orbital tolerance has to be evolved.
- Regulatory mechanism to adopt when there is a reduction in the number of satellites.
- Suitability of current EPFD values from N-GSO for protection of GSO satellites.

Outcome:

- Initial orbital tolerance values are specified for orbital altitude lower than 2000 Kms (70Km, 2deg i) and greater than 2000 Kms (5-10% of the altitude, 3-4 deg i).
- Formula based approach adopted to report the constellation size to ITU
- No regulatory changes to alter the existing aggregate epfd. However resolves to further studies without any regulatory changes.



Thank you for your attention