



4th India Spectrum Management Conference

WRC-27 Preparations,
Follow up and learnings from WRC-23

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Agenda Item 1.11 - Inter Satellite Link

Background



- ISL in L and S-band 1 518-1 544 MHz, 1545-1559 MHz, 1610-1645.5 MHz, 1646.5-1660 MHz, 1670-1675 MHz and 2483.5-2 500 MHz
- N-GSO satellites and Short duration missions are increasing in number.
- Data has to be made available in real time
- MSS allocations in 1-3 GHz. No space to space allocations within this band
- Possibility of space-to-space links exist within MSS band.
- To explicitly address the use of space-to-space transmission links.

Current Work Progress:

- Key stations definition (User station and Service provider stations)
- Direction of transmission -existing MSS
- GSO & N-GSO MSS service provider and User space station characteristics



Agenda Item 1.11 - Inter Satellite Link

Compatibility studies:(In-band and adjacent band)

- Depends on several factors: Orbital parameter, Power levels, and antenna pattern
- Focus in the uplink direction.
- MSS characteristics- ITU –R M.1184, MIFR parameters
- RDSS characteristics
- ARNSS
- Radio astronomy

ISRO's interest:

- Protection of navigation services in 2483.5 -2500 MHz band
- Regulatory provisions for operation of ISL.

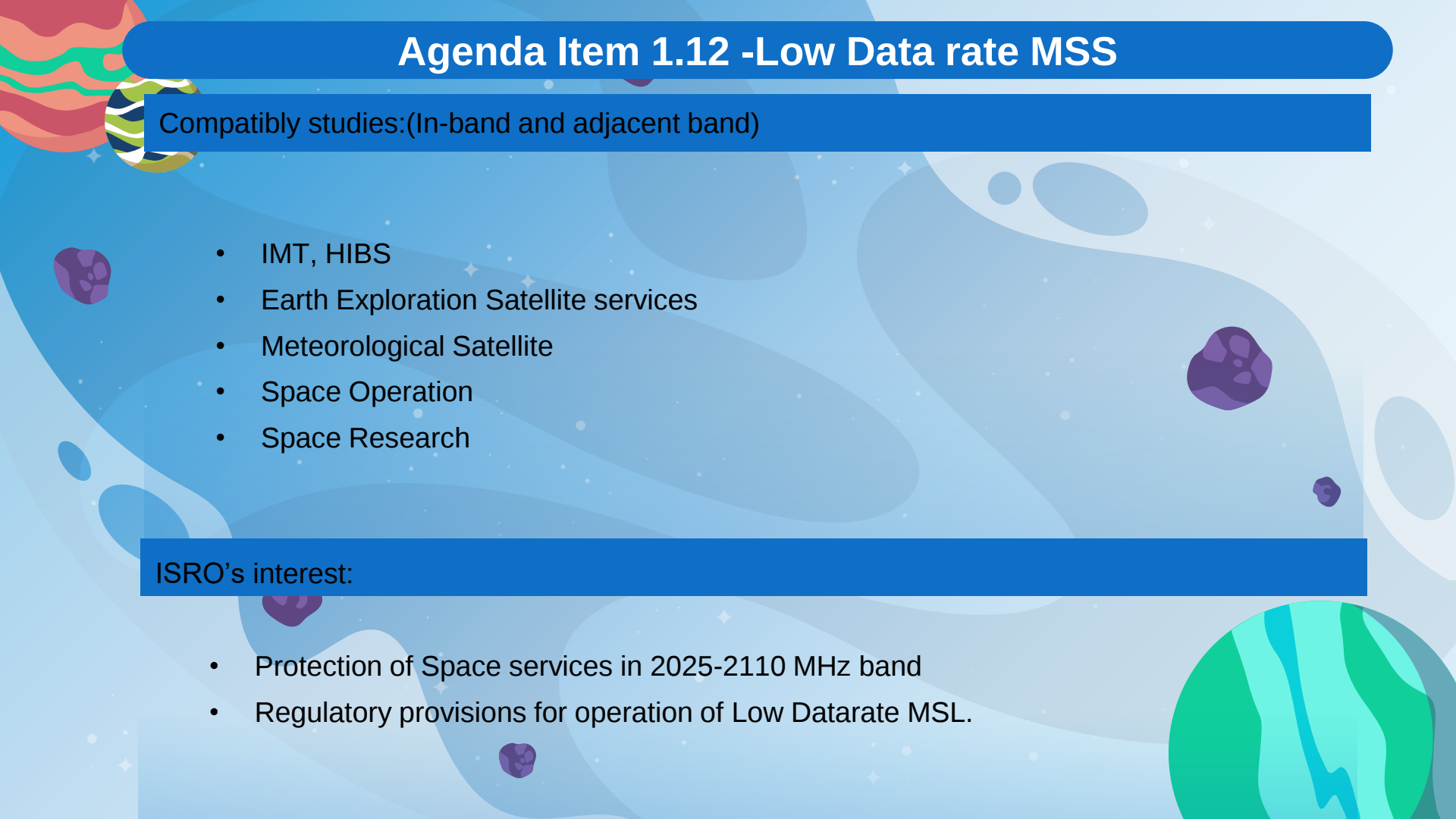
Agenda Item 1.12 -Low Data rate MSS

Background

- Requirement of low-data-rate (LDR)MSS systems.
- Limited to non-geostationary systems
- Candidate frequency bands :
 - ❑ 1 427-1 432 MHz
 - ❑ 1 645.5-1 646.5 MHz
 - ❑ 1 880-1 920 MHz
 - ❑ 2 010-2 025 MHz

Current Work Progress:

- Definition of LDR systems
- Spectrum requirements
- Technical and Operational Characteristics
- Spectrum sharing and interference mitigation techniques.
- Preliminary study on co-existence of N-GSO LDR MSS system



Agenda Item 1.12 -Low Data rate MSS

Compatibility studies:(In-band and adjacent band)

- IMT, HIBS
- Earth Exploration Satellite services
- Meteorological Satellite
- Space Operation
- Space Research

ISRO's interest:

- Protection of Space services in 2025-2110 MHz band
- Regulatory provisions for operation of Low Datarate MSL.

Agenda Item 1.14 Additional MSS allocations

Background

- Harmonisation of allocation in all regions
- Candidate frequency bands:
 - ☐ 2 010-2 025 MHz (Earth-to-space)
 - ☐ 2 160-2 170 MHz (space-to-Earth)
 - ☐ 2 120-2 160 MHz (space-to-Earth)

Current Work Progress:

- Spectrum requirements
- Technical and Operational Characteristics

Agenda Item 1.14 Additional MSS allocations

Compatibility studies:(In-band and adjacent band)

- IMT, HIBS
- Earth Exploration Satellite services
- Meteorological Satellite
- Space Operation
- Space Research

ISRO's interest:

- Protection of EESS & Space operations in adjacent band

Activities in Navigation area

- ITU R-M 1787 provides Description of systems and networks in the radionavigation-satellite service in L band. This recommendation is revised to take into account the new emerging systems.
- Recommendation on Protection of RNSS operations in L-band from the adjacent and spurious emissions of IMT transmissions
- Methodology of computation of aggregate interference from L-band SAR into RNSS in 1215-1300 MHz band.

Agenda Item 1.1 ESIMS in Q& V band

Background

- ESIMs, in V band for both GSO and N-GSO (~4 GHz).
- Aeronautical and Maritime ESIMS , Land ESIMS subject to national prerogative.
- Not to be used for Safety of life applications
- Candidate frequency bands:
 - ❑ 47.2-50.2 GHz
 - ❑ 50.4-51.4 GHz

Current Work Progress:

- Spectrum requirements
- FSS ESIM Characteristics(GSO & N-GSO)
- Regulatory procedures
- Role of Notifying administration
- Role of NCMC

Agenda Item 1.1 ESIMS in Q& V band

Compatibility Studies:

- FSS ESIM with FS
- FSS ESIM with MS
- FSS ESIM with EESS (passive) operating in 50.2-50.4 GHz
- FSS ESIM with RAS operating in the frequency bands 48.94 - 49.04 GHz and 51.4-54.25 GHz
- Intra-service sharing
- Aggregate FSS GSO and N-GSO ESIMS emissions into EESS passive sensors

ISRO's interest:

- GSAT-29 satellite has payload in this band.
- Additional 4 GHz spectrum for ESIMS

Agenda Item 1.2 Reduction of antenna diameter in 13 GHz

Background

- WARC-92 allocated 13 GHz band to FSS.
- GSO Antenna size: 1.2m, N-GSO Antenna size: 4.5m.
- Enhancement of operating conditions required for efficient usage.

Compatibility studies:

- Radio Location services:
 - Single FSS Earth station interferer
 - Aggregate interference considering single FSS network or FSS system
 - aggregated Earth stations interference from all FSS (GSO +NGSO systems)
- Space Research Service

ISRO view: Beneficial for Satellite industry

Other activities

Activities	Details
N-GSO	• N-GSO modelling • N-GSO-N-GSO/GSO interference • Article -22 EPFD limits • Rec 1503: ➤ Worst case Geometry ➤ Multiple EIRP/pfd masks ➤ Sidelobes of N-GSO station ➤ Beam to Beam modelling
Sustainability	• PP-22 and RA-23 • Instructed ITU-R Study groups to study • Handbook on best practices for the sustainable use of frequencies and associated non-GSO orbits • Recommendation on disposal orbits for N-GSO