

AMERICAS

GSOA Positions WRC-23 Agenda Items Presentation for CTU's SMTF

27 July 2023



ESIM

MSS

Identification
IMT

Ku-BAND

GSO ESIM in the Ku-band

- **Aero and Maritime ESIM**, using the same frequency bands used to provide FSS broadband services
- The amount of uplink spectrum currently available for Ku-band ESIM is **not sufficient** to support predicted ESIM market growth

GSOA Supports Method B

- Add a new footnote in RR Article referring to a new WRC Resolution with technical, operational and regulatory conditions for the operation of A-ESIM and M-ESIM communicating with FSS GSO space stations in the frequency band 12.75-13.25 GHz (Earth-to-space) while ensuring protection of allocated services and suppression of Resolution **172 (WRC-19)**.”

DIAP supporting Method B

- Support from 7 Administrations, but 4 administrations currently have square brackets on the draft Resolution text.
- Work will continue in Ottawa

NGSO ESIM in the Ka-band

- Necessary to address growing demand for maritime and aeronautical connectivity worldwide
- New NGSO will be well positioned to provide services via ESIM, providing ubiquitous broadband connectivity to passengers/crew on aircraft and vessels
- NGSO ESIM have technical characteristics that are similar to GSO ESIM

GSOA Supports Method B

- Add a new footnote in RR Article 5 that refers to a new WRC Resolution with technical, operational & regulatory conditions for the operation of NGSO maritime & aeronautical ESIMs while ensuring protection of allocated services & consequential suppression of Resolution 173 (WRC-19)

DIAP supporting Method B

- Support from 6 Administrations, but some administrations have square brackets on the draft Resolution text and Annex 2
- Work will continue in Ottawa

Future Agenda Item ESIM Q/V

- Resolution 176 (WRC-19) calls for studies on the use of the Q/V frequency bands by aeronautical and maritime ESIM with **geostationary** FSS space stations
- Antenna & terminal technology enhancements enable usage of these bands by GSO FSS networks & non-GSO FSS systems

GSOA supports **this AI for WRC-27 with extended scope to consider GSO FSS networks & non-GSO FSS systems (LEO, MEO)**

Future Agenda Item 12.75-13.25

- WRC-23 AI 1.15 studies the identification of the GSO FSS (Earth-to-space) for ESIMs.
- NGSO Earth Stations are allocated in the same frequency band but limited to traditional fixed earth station terminals.

GSOA supports **including studies on using 12.75 - 13.25 GHz NGSO ESIM earth stations transmitting to non-GSO FSS satellite systems (Earth-to-space) for WRC-27**

Consider studies for new allocations to MSS for narrowband services per Resolution 248 WRC-19

- Studies relating to spectrum needs and potential new allocations to the mobile-satellite service in the frequency bands 1 695-1710 MHz, 2010-2025 MHz, 3300-3315 MHz and 3385-3400 MHz for future development of narrowband mobile-satellite systems

**GSOA Supports
Method A**

- Technical & operational characteristics in accordance with Resolution 248 (WRC-19) & spectrum needs, associated sharing & compatibility studies were **NOT AGREED NOR COMPLETED**
- **No Change** to the Radio Regulations & **Suppression** of Resolution 248 (WRC-19)

**IAP supporting
Method A**

- 10 Supporting Administrations: Argentina, Brazil, Bahamas, Costa Rica, Ecuador, Guatemala, Paraguay, Uruguay, United States of America, and Mexico

New allocations to the Mobile-Satellite Service

There is demand for new harmonized spectrum for Mobile Satellite Service (MSS)

- To satisfy a wide variety of applications covering both narrowband emissions such as IoT/M2M, and wider band emissions such as non-terrestrial network (NTN) MSS voice and data communications.

Goal: Create a new AI to consider potential allocations to the MSS in the bands 2 010-2 025 MHz (E-s) and 2 160-2 170 MHz (s-E) in Regions 1 and 3 (already allocated to the MSS in Region 2), and 2200-2 215 MHz (s-E) globally

- Aim of AI is to conduct sharing and compatibility studies that ensure the protection of incumbent services (in band and adjacent).

GSOA supports studies on 2 010-2 025 MHz, 2 160-2 170 MHz and 2 200-2 215 MHz for a potential allocation to the MSS

To consider a new primary FSS allocation in the space-to-Earth direction in the frequency band 17.3-17.7 GHz in Region 2, while protecting existing primary services in the band (Resolution 174 WRC-19).

- Expanding FSS allocation by 400 MHz would add contiguous spectrum in Region 2 for gateways & user terminals alike and give satellite operators flexibility to satisfy BSS or FSS service demand in same frequency band & in many cases no necessity to use exclusive payloads depending on the service

GSOA Supports Method D

- Development of regulatory framework to allocate 17.3 - 17.7 GHz to FSS (space-to-Earth) in Region 2, ensuring protection of BSS feeder links (Earth-to-space) subject to Appendix 30A & BSS (space-to-Earth).
- Modification of RR No. **5.516A** & the new footnote **22.5F.Y**.

IAP supporting Method D

- 10 Supporting Administrations: Argentina, Brazil, Canada, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay, Uruguay, USA

Revise conditions for use of 13.75-14 GHz

In Ku band, only 500 MHz (14.00 - 14.5 GHz) is allocated for return links

- There is not sufficient spectrum to attend the current demand, including ESIM services

Footnotes 5.502 & 5.503 apply to the 13.75 - 14.00 GHz band

- These footnotes create limitations on the minimum size of the e/s antenna and maximum pfd that a terminal can transmit, essentially invalidating this band for FSS return links

DIAP in CITEI

- Brazil and Mexico are supporting a DIAP for this to be an Agenda Item for WRC-27

GSOA supports reviewing the band's usage & sharing conditions 13.75-14 GHz as an Agenda Item for WRC-27

This AI considers identification of additional spectrum for IMT, and possible additional allocations to mobile service on a primary basis

- In Region 2, GSOA members are concerned about the 3600-3800 MHz

This spectrum is **heavily used for broadcasting** in the Americas

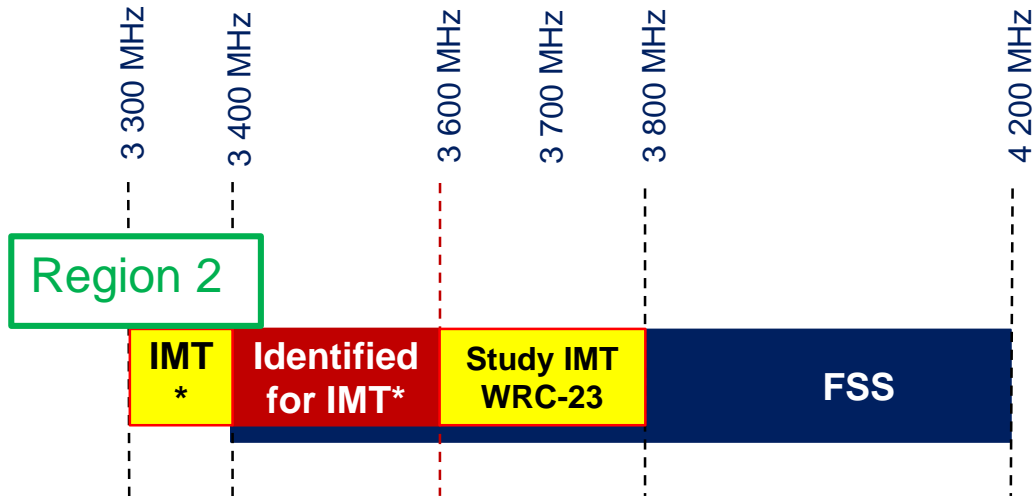
- C-band has unique characteristics for services that require **high availability** less susceptible to signal interruptions from **heavy rains** than higher bands (see next slide)

GSOA Supports Method 3E, from Argentina, Bolivia and Mexico

- NOC in the Frequency Table of allocations
- Invites administrations that want to identify IMT in the 3.6 - 3.7 GHz to add their names to the existing footnote 5.434 (footnote approach)
- Existing footnote 5.434 defines protection for FSS through a PFD limit

Multiple DIAPs and PP in CITEI

- 2 DIAPs
- 3 Preliminary Proposals



*Footnotes 5.429B , 5.429D, 5.429F, 5.430A, 5.431B, 5.432B, 5.433A

In Region 2, 500 MHz of mid-band spectrum has IMT identifications below 5 GHz in the following footnotes

- 5.429D: 3 300 – 3 400 MHz
- 5.431B: 3 400 – 3 600 MHz
- 5.434: 3 600 – 3 700 MHz
- 5.441A: that relates to 4 800 – 4 900 MHz

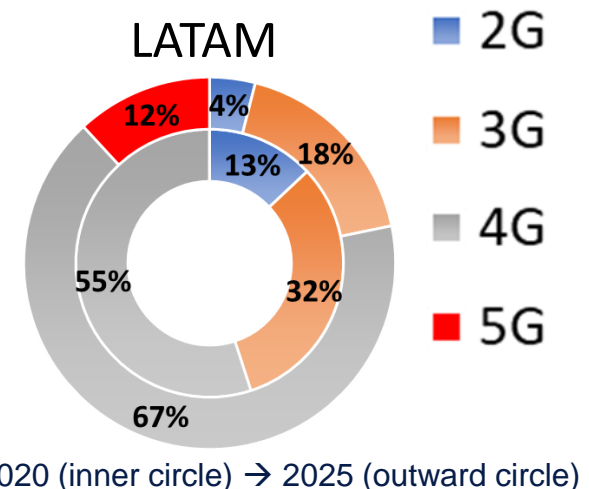
Practically 300 MHz of consecutive spectrum Harmonized Regionally for IMT 3.3 – 3.6 GHz

Source: https://www.lstelcom.com/fileadmin/content/lst/marketing/media/2019_Study_LicensingUseofMobileSpectrum.pdf



On average globally, only 50% spectrum available below 5GHz (low&mid band) is licensed. In America only 41%

- By 2025 only 12% of connections in Latin America are projected to be via 5G;
- 4G is projected to account for 67% of connections in 2025*
- Worldwide, 5G subscriptions increased by 446 million in 2022 versus 592 million for 4G**



*Source: GSMA | The Mobile Economy - The Mobile Economy

**Source: Omdia: Growth of 4G over 5G in 2022 raises concern for 5G evolution :: Omdia (informa.com)

Some ITU-R regional organizations are considering proposals to conduct studies for possible IMT identification in the range of 7-24 GHz towards WRC-27

- Identified IMT mmWaves spectrum in WRC-19 unused
- Additional 1.7GHz of mid-band spectrum for applications in dense urban areas being studied for WRC-23
- Justification & user requirements for additional IMT spectrum for dense urban applications must be clarified => 6G mobile systems still in research phase

GSOA Opposes the development of this FAI in core FSS & BSS Bands that are struggling to accommodate growing service

- Satellite deployments characterized by ubiquitous earth station receivers: direct-to-consumer services for media, broadband, cellular backhaul & mobility
- Co-frequency sharing with such satellite deployments & IMT services would be extremely difficult & risks interruption of satellite services in the band

Not yet clear if a proposal will be submitted to CITEC, as it has been in other regions

- Ask CTU to consider the negative impact this could have on essential satellite services being provided in the Caribbean.

GSOA opposes this possible future agenda item



**GSOA WRC-23
Positions**

Thank You



Appendix with detailed slides

- **Introductory words**
- **Agenda items with IAPs or DIAPs in CITEI**
 - **AI 1.15, 1.16, 1.18 and 1.19**
- **Agenda items needing further discussion/support**
 - **AI 1.2 and AI 9 (RR21.5 and Table 21-2)**
- **Future Agenda Items (AI10)**
 - **Q/V-band ESIM**
 - **Review of conditions FSS use 13.75-14 GHz (E-s)**
 - **NGSO Gateway Use in 51.4 - 52.4 GHz FSS (E-s)**
 - **ESIMs for NGSOs in 12.75 – 13.25 GHz (E-s)**
 - **New Spectrum allocations to the Mobile-Satellite Service**
 - **Studies on IMT identification on 7-24 GHz for 6G**
- **Q&A and Final Remarks**


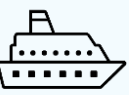
The use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed satellite service globally, in accordance with Resolution 172 (WRC-19);



Allocation to services		
Region 1	Region 2	Region 3
12.75-13.25 GHz	FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)	

- ❖ **Scope of WRC-23 Agenda Item 1.15 is limited to ESIM on aircraft & vessels**
- ❖ Using the same frequency bands, satellites, beams & control stations used to provide broadband services via earth stations at fixed locations
- ❖ Satellite operators will aim to provide the entire link to the customer by operating both satellite network and ESIM
- ❖ The amount of uplink spectrum currently available for Ku-band ESIM **not sufficient** to support predicted ESIM market growth

Technical measures to protect incumbents

5.487 5.487A	MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	FIXED-SATELLITE (space-to-Earth) 5.484B MOBILE except aeronautical mobile BROADCASTING 5.487 5.484A	<p>GSO Appendix 30B: Regulatory procedure in Annex 1 of draft new Resolution [A115] (WRC-23) and Appendix 30B envelope of characteristics.</p> <p>Non-GSO: e.i.r.p. limits in Annex 3 of draft new Resolution [A115] (WRC-23).</p>
12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space)	5.487A 5.488 5.490 12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	12.5-12.75 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	
5.494 5.495 5.496			<p> PFD mask at Earth's surface</p> <p> Distance to the low-water mark and max e.i.r.p. density towards horizon</p>
12.75-13.25	FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)		
13.25-13.4	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499		

None required

GSOA supports Method B

Operational, regulatory and technical conditions are contained in the draft Resolution [A115](WRC-23) developed under **Method B**:

“Add a new footnote in RR Article 5 that refers to a new WRC Resolution with technical, operational and regulatory conditions for the operation of A-ESIM and M-ESIM communicating with GSO space stations in the fixed-satellite service in the frequency band 12.75-13.25 GHz (Earth-to-space) while ensuring protection of allocated services inter alia protection of terrestrial services with both a minimum distance from the low-water mark and maximum e.i.r.p. density towards the horizon for M-ESIM, and pfd mask for A-ESIM and consequential suppression of Resolution **172 (WRC-19)**.”

to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-GSO FSS earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution 173 (WRC-19);

Resolution 173 (WRC-19)

Use of the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service

- There is growing demand for maritime and aeronautical connectivity worldwide
- Several NGSO constellations are being planned, in the process of being deployed or already operating in the Ka band and are positioned to provide service via ESIM
- NGSO ESIM in the Ka-band will provide ubiquitous broadband connectivity to passengers/crew on aircraft and vessels
- NGSO ESIM have technical characteristics that are similar to GSO ESIM





Method A

No change to the Radio Regulations and suppression of Resolution 173 (WRC-19)

Method B

Add a new footnote in RR Article 5 that refers to a new WRC Resolution with technical, operational & regulatory conditions for the operation of NGSO maritime & aeronautical ESIMs while ensuring protection of allocated services & consequential suppression of Resolution 173 (WRC-19)

NGSO ESIM operating in the frequency bands 17.7 - 18.6, 18.8 – 19.3 GHz & 19.7-20.2 GHz (No 5.524)

- shall not claim protection from terrestrial services

For the protection of secondary allocation to terrestrial services in the 29.5-30 GHz (No. 5.542)

- the conditions for NGSO ESIM in the 27.5-29.1 GHz shall apply with respect to admins mentioned in No. 5.542

Due to the similarities between NGSO ESIM & GSO ESIM

- existing GSO framework for protection of terrestrial services can be adopted for NGSO

For protection of space services

- NGSO ESIM characteristics shall remain within the envelope characteristics of typical earth stations associated with NGSO system they communicate with

For the protection of GSO FSS networks

- relevant EPFD limits in Article 22 shall apply together with the examination by the BR under ITU-R S.1503

For the protection of Earth exploration-satellite service (EESS passive) in the 18.6 - 18.8 GHz band

- pfd limits from technical studies (Annex 3 of draft Resolution) shall apply

Agenda Item 1.16

GSOA Position

CPM23-2 updates

- Work in the CPM text and draft Resolution progressed well. Main discussion was on “responsibilities”, which refers to entity responsible for the ESIM operation including addressing interference. The debate is whether the notifying administration should be solely responsible or if also the administration authorizing ESIMs operation in its territory and the “flag” administration should be involved to some extent
- Several options to address these issues, are included in the draft Resolution

GSOA supports **Method B**

- Support finalizing a New Draft Resolution on this Agenda Item
- Support the development of a methodology (Annex 2 of new Resolution) for examination by the Bureau of compliance of NGSO Aero ESIM with pfd limits on the ground and of adequate transitional measures in case WRC-23 does not finalise the methodology
- For protection of terrestrial services in the 27.5 – 29.1 GHz frequency band, the same technical conditions as applicable to GSO ESIM in Resolution 169 (WRC-19) should apply (same pfd limit on the ground for A-ESIM; same minimum distance from the coast and max EIRP spectral density towards the horizon for M-ESIM)
- Support for the options that are viable, implementable, and do not impose additional burden to the authorizing administrations
- Oppose to unnecessary differentiations in the regulatory framework of NGSO ESIM compared to the one of GSO ESIM.



to consider studies relating to spectrum needs and potential new allocations to the mobile-satellite service for future development of narrowband mobile-satellite systems, in accordance with Resolution 248 (WRC-19);

Resolution 248 (WRC-19)

Studies relating to spectrum needs and potential new allocations to the mobile-satellite service in the frequency bands 1 695-1710 MHz, 2010-2025 MHz, 3300-3315 MHz and 3385-3400 MHz for future development of narrowband mobile-satellite systems



Study Results

Technical & operational characteristics in accordance with Resolution 248 (WRC-19) & spectrum needs, associated sharing & compatibility studies were **NOT AGREED NOR COMPLETED**



NOT POSSIBLE to ensure the protection of existing services (in-band & adjacent band) with potential new allocations to the MSS in the frequency bands 1695-1710 MHz in Region 2, 2010-2025 MHz in Region 1, 3300-3315 MHz, 3385-3400 MHz in Region 2.

Not possible to advance: Work at ITU-R WP4C on AI 1.18 during this study cycle characterized by a lack of agreement on the interpretation of Resolution 248 (WRC-19) & the technical parameters for performing the necessary sharing & compatibility studies. Prevented the conclusion of those studies

Two **No change** methods

Method A

No change to the Radio Regulations & Suppression of Resolution 248 (WRC-19)

Method B

No change to any Articles of the Radio Regulations & its Appendices except revision of Resolution 248 (WRC-19)

A new Method C was introduced at CPM

Method C

Primary allocation to the mobile satellite service in the frequency band 2 010-2 025 MHz (Earth-to-space) in Region 1.



Alternative 1: Limited to MSS narrowband
Alternative 2: MSS allocation

Two options for both Alternatives:
Option 1: For all countries in Region 1;
Option 2: For a list of countries in Region 1



GSOA supports Method A

Given the ambiguity & lack of agreed technical & operational characteristics of narrowband MSS as well as the impossibility to perform sharing and compatibility studies with existing primary services and studies on the spectrum needs to ensure the protection of existing services (in-band and adjacent band) with potential new allocations to the MSS in the frequency bands under study

GSOA view on Method C

There have been no studies performed to justify an allocation of spectrum at the WRC-23. This would set a bad precedent for future spectrum allocations to move forward without agreed technical and operational characteristics of spectrum and where there have been no studies performed to ensure protection of incumbent services.

In addition, GSOA does not support allocations limited to certain applications.

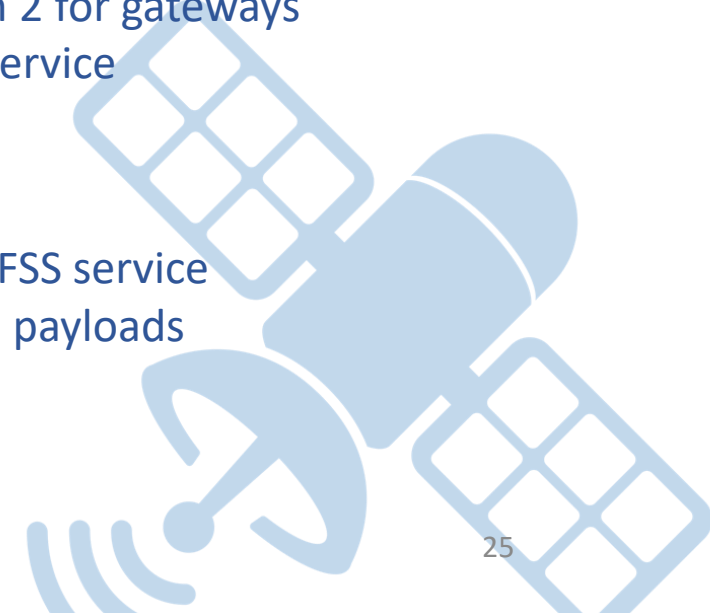
CITEL status: Inter-American Proposal supporting Method A

- 10 supporting Administrations: Argentina, Brazil, Bahamas, Costa Rica, Ecuador, Guatemala, Paraguay, Uruguay, United States of America, and Mexico

to consider a new primary FSS allocation in the space-to-Earth direction in the frequency band 17.3-17.7 GHz in Region 2, while protecting existing primary services in the band (Resolution 174 WRC-19).

17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation 5.514	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.514 5.515	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation 5.514
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- Expanding FSS allocation by 400 MHz would add contiguous spectrum in Region 2 for gateways & user terminals alike, responding to growing demand for broadband satellite service throughout in Americas
- New allocation would provide satellite operators the flexibility to satisfy BSS or FSS service demand in same frequency band & in many cases no necessity to use exclusive payloads depending on the service





GSOA supports Method D

- GSOA supports development of regulatory framework to allocate 17.3 - 17.7 GHz to FSS (space-to-Earth) in Region 2, ensuring protection of BSS feeder links (Earth-to-space) subject to Appendix 30A & BSS (space-to-Earth).
- GSOA supports the modification of RR No. **5.516A** & the new footnote **22.5F.Y**.
- CITELE IAP has the support of 10 countries: Argentina, Brazil, Canada, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay, Uruguay, USA

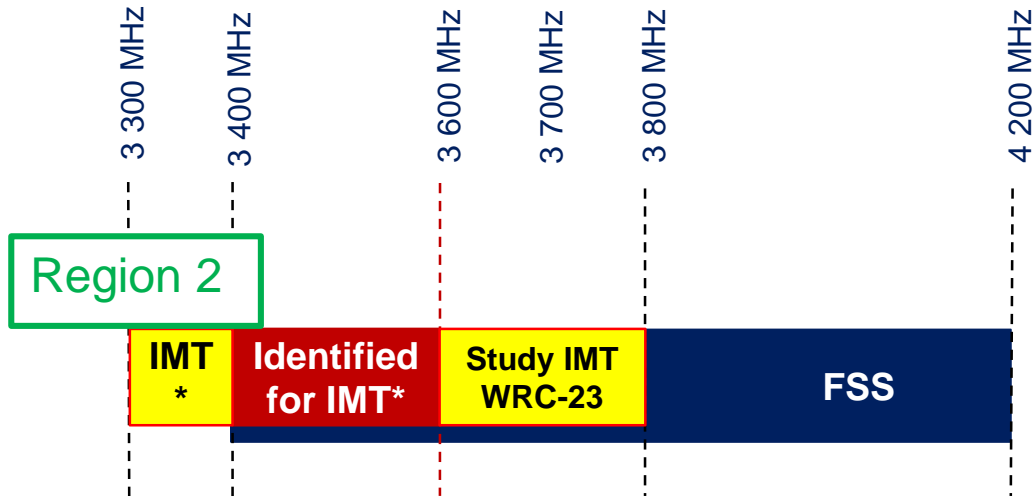
This agenda item considers identification of additional spectrum for IMT, and possible additional allocations to mobile service on a primary basis

In Region 2, GSOA members are concerned about the 3600-3800 MHz

Resolution 245 (WRC-19) calls for studies for the terrestrial component of IMT in the bands:

- **3600-3800 MHz (Region 2);**
- 3300-3400 MHz (Region 2);
- 3300-3400 MHz (amend footnote in Region 1);
- 7025-7125 MHz (globally);
- 6425-7025 MHz (Region 1);
- 10000-10500 MHz (Region 2)

- This spectrum is **heavily used for broadcasting** in the Americas
- **New high throughput satellites (HTS)** services will be available
- C-band has unique characteristics for services that require **high availability** less susceptible to signal interruptions from **heavy rains** than higher bands



*Footnotes 5.429B , 5.429D, 5.429F, 5.430A, 5.431B, 5.432B, 5.433A

In Region 2, 500 MHz of mid-band spectrum has IMT identifications below 5 GHz in the following footnotes

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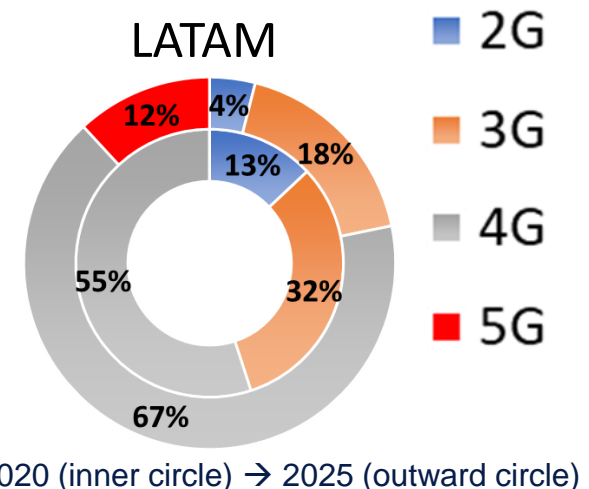
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On average globally, only 50% spectrum available below 5GHz (low&mid band) is licensed. In America only 41%

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*Source: GSMA | The Mobile Economy - The Mobile Economy

**Source: Omdia: Growth of 4G over 5G in 2022 raises concern for 5G evolution :: Omdia (informa.com)

2 Draft Inter-American Proposal (DIAPS)

DIAP Argentina, Bolivia and Mexico - Method 3E of the CPM Text

- NOC in the Frequency Table of allocations
- Invites administrations that want to identify IMT in the 3.6 - 3.7 GHz to add their names to the existing footnote 5.434 (footnote approach)
- Existing footnote 5.434 defines protection for FSS through a PFD limit

DIAP USA and Perú [Uruguay] – Method 3B of the CPM Text

- Regional harmonization for 3.6 - 3.8 GHz
- Does not contemplate any regulatory measure to protect FSS (it removes the PFD limit protection criteria defined in 5.434)

3 Preliminary Proposals (PP)

Brazil - Method 3F of the CPM Text

- Regional harmonization for 3.6 - 3.7 GHz
- Proposes to maintain the PFD limits defined in footnote 5.434 to protect FSS

Canada - Method 3C of the CPM Text

- Regional harmonization for 3.6 - 3.8 GHz
- Proposes to maintain the PFD limits defined in footnote 5.434 to protect FSS

Ecuador

- Maintain country footnote for 3.6 – 3.7 GHz (5.43) and new country footnote for 3.7 – 3.8 GHz
- Proposes to maintain the PFD limits defined in footnote 5.434 to protect FSS

GSOA supports the proposal from Arg, Bol, Mex
GSOA supports **Method 3E**

RR21.5 & IMT stations *“ITU-R is invited to study, as a matter of urgency, the applicability of the limit specified in No. 21.5 of the Radio Regulations to IMT stations, that use an antenna that consists of an array of active elements, with a view to recommend ways for its possible replacement or revision for such stations, as well as any necessary updates to Table 21-2 related to terrestrial and space services sharing frequency bands. Furthermore, the ITU-R is invited to study, as a matter of urgency, verification of No. 21.5 regarding the notification of IMT stations that use an antenna that consists of an array of active elements, as appropriate.” (WRC-19 doc. 550);*

21.5 *3) The power delivered by a transmitter to the antenna of a station in the fixed or mobile services shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz, or +10 dBW in frequency bands above 10 GHz, except as cited in No 21.5A (WRC-2000)*

ITU approach to the issue:

- This is not a standard WRC-23 agenda item.
- However the scope refers to possible replacement or revision of No. 21.5 and Table 21-2, that could only be effected by a WRC.
- Discussed in WP 5D but there are different views on the best approach:
 - Using the Total Radiated Power (TRP) of the antenna;
 - Using each radiating element or “transmitter” of the antenna **-exceeding satellite protection criteria-**
- Expected to be addressed at WRC-23 under agenda item 9, following the Director’s Report to WRC.



GSOA POSITION

- **Clarification of application of RR 21.5 for AAS antennas is necessary, to ensure the long-term protection of satellite systems** (definition of TRP for the “power delivered by the transmitter to the antenna” for AAS could occur during WRC-23)
- **RR21.5 power limits should apply to all stations in the fixed or mobile service including IMT stations**
- For the band 24.25 - 29.5 GHz, apply Article 21 to AAS antennas for stations in the fixed or mobile service including IMT stations through **confirmation of the RR21.5 limit of +10dBW using the Total Radiated Power (TRP) of the antenna with a reference bandwidth of 200MHz** (as per WRC-19 studies)
- **Update Table 21-2 to apply TRP** to frequency bands shared with equal rights with fixed or mobile services (including for IMT stations) & those not yet included:
 - FSS allocations in 24.65 - 25.25 GHz (Region 1), 24.75-25.25 GHz (Region 2), 42.5 - 43.5 GHz, 47.2 -50.2 GHz, 50.4 - 51.4 GHz and 81 - 86 GHz.
 - MSS allocations in 43.5 - 47 GHz, 66 - 71 GHz, and 81-84 GHz; ISS allocations to be assessed

to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the Convention and Resolution 804 (Rev. WRC-19);

Resolution 804 (rev. WRC-19): Principles for establishing agendas for world radiocommunication conferences

Resolution 812 (WRC-19): Preliminary agenda for the 2027 World Radiocommunication Conference

Background:

Resolution **812 (WRC-19)** contains 13 AI proposals carried forward from WRC-19 to WRC-23. Six of these relate to satellite services (Study Group 4), five to terrestrial services (Study Group 5) & three to scientific services (Study Group 7). Additionally, ITU regional organizations are discussing further Agenda Item proposals for WRC-27.



WRC-27

Resolution **176 (WRC-19)** calls for studies on the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5GHz (space-to-Earth), 47.2-50.2GHz (Earth-to-space) & 50.4-51.4GHz (Earth-to-space) by aeronautical & maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service

- While Resolution **176 (WRC-19)** developed for GSO only...
 - Antenna & terminal technology enhancements enable usage of these bands by GSO FSS networks & non-GSO FSS systems
 - Non-GSO satellite constellations in these bands allow broadband connectivity enhanced applications.
 - More non-GSO systems will be deployed to meet the increasing consumer demand for access to broadband connectivity, regardless of location
- Studies under AI 1.16 => same band can be used by GSO FSS networks & non-GSO systems to provide connectivity for ESIM

GSOA supports this AI for WRC-27 with extended scope to consider GSO FSS networks & non-GSO FSS systems (LEO, MEO)

Review of conditions FSS use 13.75-14 GHz (E-s)

- In Ku band, only 500 MHz (14.00 - 14.5 GHz) appropriate for return links
- Not sufficient spectrum to attend the current demand like ESIM type services

Footnotes 5.502 & 5.503 apply to the 13.75 - 14.00 GHz band:

⇒ **Limitations on the minimum size of the earth station antenna & maximum power flux density that a terminal can transmit**

=

invalidation of this band for FSS return links

Regional organizations ➡ proposal to review usage & sharing conditions to enable efficient use of the band by uplink GSO & non-GSO FSS earth stations - including FSS earth stations using smaller antenna sizes

(Attachment 2 APG23-5 OUT-39)

**GSOA supports reviewing the band's usage & sharing conditions
13.75-14 GHz as an AI for WRC-27**

NGSO Gateway Use in 51.4 - 52.4 GHz FSS (E-s)

Background:

- Report ITU-R S.2461 under WRC-19 9.1.9: partial response established need for additional FSS spectrum in the 50 GHz range for non-GSO FSS gateway uplinks. Studies included need for spectrum for non-GSO systems & GSO FSS networks
- In response to Res. 162 (WRC.15), WRC-19 allocated 51.4-52.4 GHz to the FSS (Earth-to-space) on a primary basis & adopted No. 5.555C which limited the use of the FSS allocation to geostationary satellite networks
- **Enable efficient spectrum use to allow fixed-satellite services to meet the ever-increasing demand:**
Consider expanding the use of the 51.4 - 52.4GHz band by gateway earth stations transmitting to non-geostationary FSS satellite orbit systems (Earth-to-space)

GSOA supports including studies on using 51.4 - 52.4 GHz by gateway earth stations transmitting to non-GSO FSS satellite systems (Earth-to-space) for WRC-27

Background:

- **WRC-23 Agenda Item 1.15** studies the identification of the GSO FSS (Earth-to-space) for ESIMs.
- **NGSO Earth Stations** are allocated in the same frequency band but limited to traditional fixed earth station terminals.
- A new agenda item for NGSO ESIMs is the natural continuation of 1.15. This agenda item would help to meet the increasing demand for NGSO mobility services in the Ku band.

GSOA supports including studies on using 12.75 - 13.25 GHz NGSO ESIM earth stations transmitting to non-GSO FSS satellite systems (Earth-to-space) for WRC-27

New Spectrum allocations to the Mobile-Satellite Service

Background:

- There is a demand for new harmonized spectrum for Mobile Satellite Service (MSS) to satisfy the demand of a wide variety of applications covering both narrowband emissions such as IoT/M2M, and wider band emissions such as non-terrestrial network (NTN) MSS voice and data communications.
 - WRC-23 Agenda Item 1.18 failed to provide new allocations to the mobile-satellite service in the frequency bands 1 695-1 710 MHz, 2 010-2 025 MHz, 3 300-3 315 MHz and 3 385-3 400 MHz due to the lack of agreement on the interpretation of Resolution 248 (WRC-19) and the pre-requisite to make this spectrum available for the exclusive use of low duty cycle narrowband applications.
- **Goal:** Create a new Agenda Item to considerate potential allocations to the MSS in the bands 2 010-2 025 MHz (E-s) and 2 160-2 170 MHz (s-E) in Regions 1 and 3 (already allocated to the MSS in Region 2), and 2 200-2 215 MHz (s-E) globally, with the aim to conduct sharing and compatibility studies that ensure the protection of incumbent services (in band and adjacent).

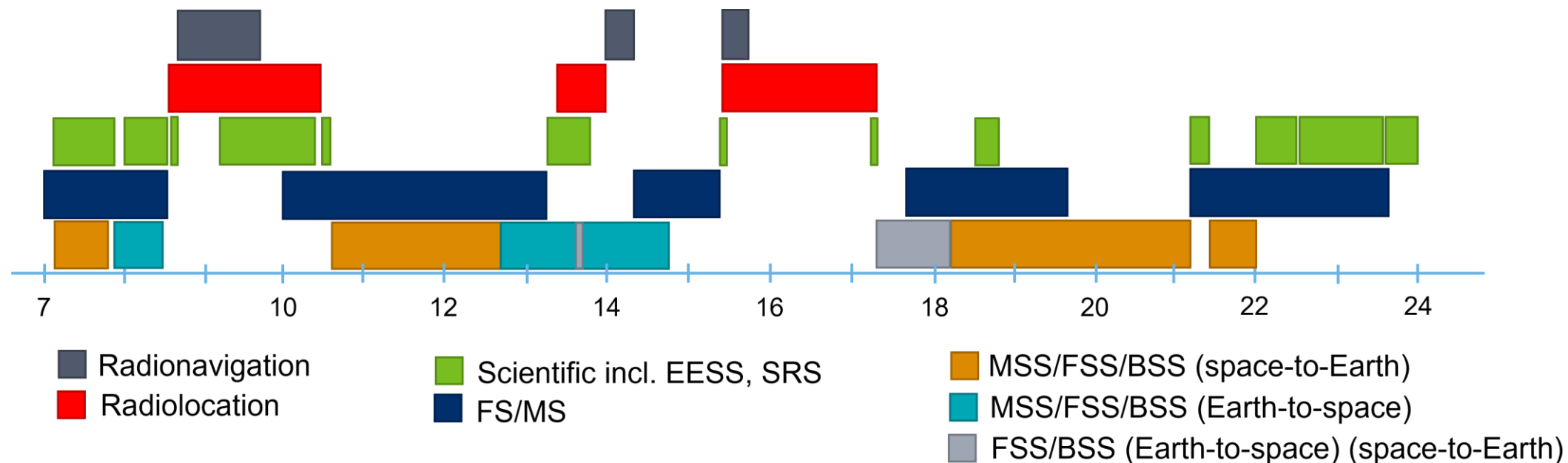
GSOA supports studies on 2 010-2 025 MHz, 2 160-2 170 MHz and 2 200-2 215 MHz for a potential allocation to the MSS

Studies on IMT identification on 7-24 GHz for 6G

Some ITU-R regional organizations received & are considering proposals to conduct studies for possible IMT identification in the range of 7-24 GHz or a focused range towards WRC-27

- Identified IMT mmWaves spectrum in WRC-19 unused
- Additional 1.7GHz of mid-band spectrum for applications in dense urban areas being studied for WRC-23
- Justification & user requirements for additional IMT spectrum for dense urban applications must be clarified => 6G mobile systems still in research phase

- ✓ Core FSS & BSS bands => satops struggle to accommodate the growing service demand
- ✓ Satellite deployments characterized by ubiquitous earth station receivers: direct-to-consumer services for media, broadband, cellular backhaul & mobility
- ✓ Co-frequency sharing with such satellite deployments & IMT services would be extremely difficult & risks interruption of satellite services in the band



GSOA disagrees with the proposal under AI10 for new IMT identification in the 7-24 GHz for WRC-27

- 7-24 GHz shared among various services & very congested
- Frequency range already considered for IMT in WRC-15, but no large continuous band as possible
- Since 2015, thousands more LEOs & new HTS, VHTS, & SDS GSO satellites using Ku & Ka bands came into service
- Several AIs in WRC-23 - ISL, ESIMs - show possible additional usage for satellite on those bands
- IMT obtained 17.5 GHz of mmWave, mostly unused, additional 2 GHz under consideration in WRC-23 AIs