WRC-23 outcome and WRC-27 preparations

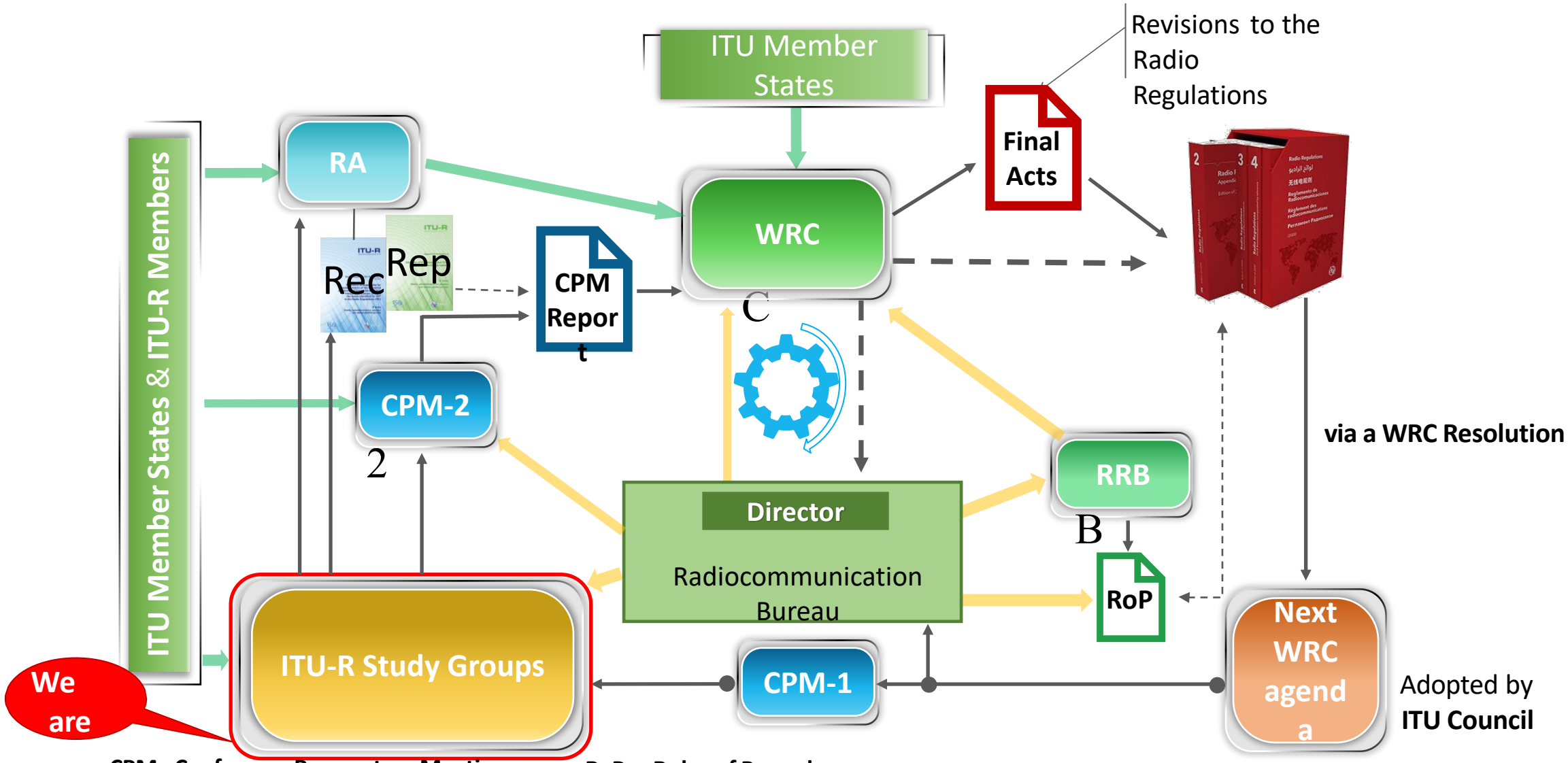
32nd ASMG meeting- 13-16 May 2024, Amman- Jordan

Role of World Radiocommunication Conferences

- Allocate spectrum for emerging radio applications <-> protect existing users
- Maintain balance between all radiocommunication services
- Achieve spectrum harmonization -> economies of scale and equipment interoperability
- Create regulatory certainty for spectrum users, regulators and industry

- WRCs are organized every 3-4 years
- WRCs update the Radio Regulations (RR)
- RR is intergovernmental treaty, which is are ratified by governments –> mandatory for application by countries

The WRC cycle



CPM: Conference Preparatory Meeting
RA: Radiocommunication Assembly
Rec/Rep: ITU-R Recommendation/Report
RoP: Rules of Procedure
RRB: Radio Regulations Board
WRC: World Radiocommunication Conference

Overview of RA-23 outputs

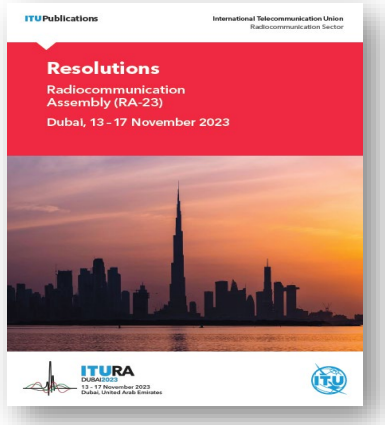
RA

Outputs related to WRC

Report from RA to WRC:

- List of **ITU-R Recommendations** in force;
- List of **ITU-R Questions** in force;
- Status of **ITU-R Recommendations incorporated by reference** in the RR;
- **Important matters** arising from the discussions and decisions **of the RA** to be brought to the attention of WRC.

Outputs related to ITU-R Study Groups activities



Currently, there are **40 ITU-R Resolutions** in force.
RA-23 decided as follows:

- Resolution ITU-R 72 - **Promoting gender equality and equity**
- Resolution ITU-R 73 - **Use of IMT technologies for fixed wireless broadband**
- Resolution ITU-R 74 - **Space sustainability**
- Resolution ITU-R 75 - **Strengthening intersectoral coordination** (from former Res. ITU-R 6-3, 7-4, 48

Key Outcomes of WRC-23

ITU WRC DUBAI2023

4 weeks

163 Member States

967 Docs.

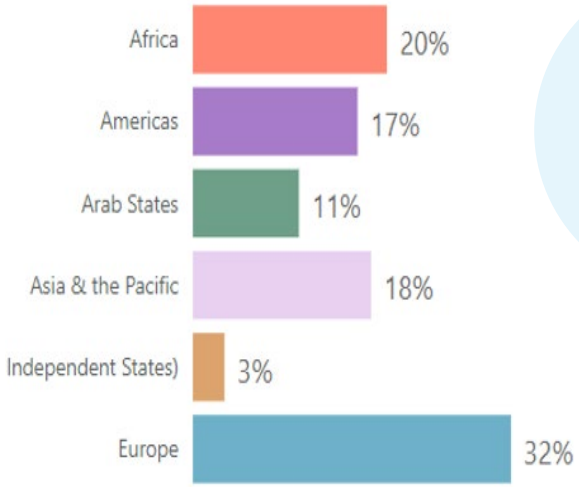
3987 Delegates

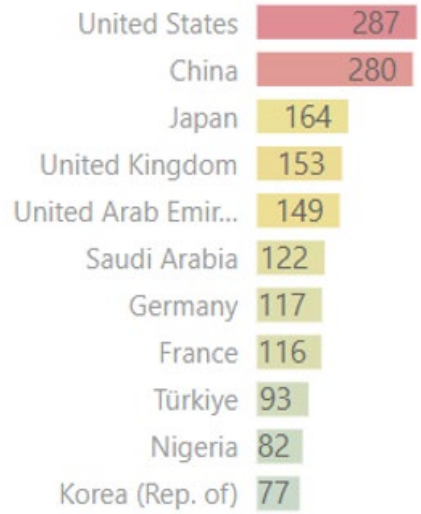
43 New resolutions

151 observers

6 024 proposals

22% Women





Fixed, Mobile and Broadcasting Issues

1.1 Fixed Mobile & Broadcasting issues

4 800-4 990 MHz

Agenda Item 1.1 - 4800-4990 MHz Band

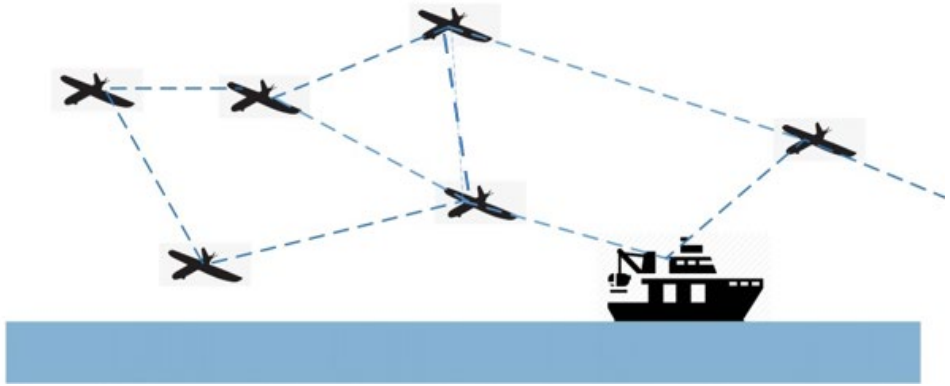
- 470 – 694 MHz
- 694 - 2700 MHz
- 3 300-3 400 MHz
- 3 600-3 800 MHz
- **4 800-4 990 MHz**
- 6 425-7 125 MHz
- 10.0-10.5 GHz

Background

- WRC-19 identified 4800-4990 MHz for IMT in 39 countries by RR **5.441B**, subject to a PFD limit and agreement seeking procedure of No. **9.21**
- PFD limit protects aircraft, ships in international waters but it is very stringent: exclusion zone for IMT > 500 km from the coast to comply with this limit

Results

- No change in PFD limit in RR **5.441B**
- No change in the list of countries excluded from the limit in Res. 223
- 14 R1 and R2 countries were added to RR **5.441B**, 7 R1 countries deleted



Agenda item 1.2 – IMT identifications in frequency ranges 3.3 GHz, 3.7 GHz, 6 GHz and 10 GHz

470 – 694 MHz

694 - 2700 MHz

3 300-3 400 MHz

3 600-3 800 Mz

4 800-4 990 MHz

6 425-7 125 MHz

10.0-10.5 GHz

3.3 - 3.4 GHz: allocated to MOB, identified for IMT for entire R2.
identified for IMT in 17 additional countries of R1 and R3
Non-interference basis vis-à-vis radiolocation (5.A12 and 5.429D)

3 600-3 700 MHz

Harmonization in Region 2, of the frequency band 3600-3700 MHz for IMT

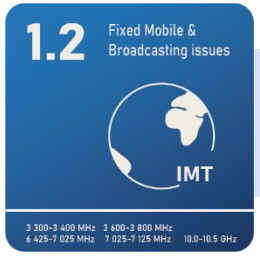
3 700-3 800 MHz

In some countries of Region 2, the frequency band 3700-3800 MHz was identified for IMT

Under 5.36A12 and 5.434
Administrations wishing to implement IMT shall obtain agreement of neighbouring countries to ensure the protection of the FSS.

6 GHz: 6 425-7 125 MHz - identified for IMT in entire R1 and 2 R2 countries
Region 3: 6 425-7 025 MHz identified for IMT in 3 countries/7 025 – 7 125 MHz for all R3.
The frequency band is also used for the implementation of wireless access systems (WAS) including radio local area networks (RLANs)

10 GHz: IMT identification in 12 countries of R2
ensures the protection of the radiolocation service and EESS, ITU-R is invited to develop a methodology for calculating the coordination zone around radio astronomy stations.



Summary of Agenda item 1.2 decisions

Band, MHz	Region	WRC-23 decisions	RR provisions
3 300 – 3400	R1	IMT identification in 16 additional countries (mainly African)	MOD 5.429B
	R2	Allocation for MOB and identification for IMT for entire R2	MOD Table, 5.429D
	R3	IMT identification in 1 additional country (Singapore)	MOD 5.429F
3 600 – 3 700	R2	IMT identification for entire R2	MOD 5.434
3 700 – 3 800	R2	IMT identification in 15 countries	ADD 5.435B (5.36A12)
6 425-7 125	R1	IMT identification for entire R1	ADD 5.457E (5.6A12)
	R2	IMT identification in 2 R2 countries (Brazil, Mexico)	ADD 5.457F (5.6C12)
6 425-7 025	R3	IMT identification in 3 R3 countries (Cambodia, Lao P.D.R., Maldives)	ADD 5.457D (5.6B12).
7 025-7 125	R3	IMT identification for entire R3	ADD 5.457E (5.6A12)
10-10.5 GHz	R2	IMT identification in 12 R2 countries	ADD 5.480A (5.10B12)

Agenda items 1.3 and 1.5 – IMT identifications in 3.6 – 3 8 GHz and below 694 MHz in Region 1

- 470 -694 MHz
- 694 – 2700 MHz
- 3 300-3 400 MHz
- 3 600-3 800 MHz
- 4 800-4 990 MHz
- 6 425-7 125 MHz
- 10.0-10.5 GHz

AI 1.5: frequency band 470 – 694 MHz:

- 470-694 MHz - secondary allocation to MS (– AMS) in 44 states, WRC-31 review
- 614-694 MHz- primary allocation to MS(-AMS) + IMT identification in 11 states
- 614-694 MHz - secondary allocation to MS in 8 African countries

All allocations are subject to field strength limit corresponding to GE06 and the first two allocations are also subject to RR9.21

AI 1.3: frequency band 3.6 – 3.8 GHz:

- upgrade of MOB (– AMS) in 3.6 – 3.8 GHz in the entire R1.
- IMT identification 3.6–3.8 GHz in 60 countries, 3.6–3.7 GHz in 6 countries

Agenda Item 1.4 - HIBS

694 - 2700 MHz

Frequency bands identified for use by high-altitude platform stations as IMT base stations (HIBS)

3 300-3 400 MHz

3 600-3 800 MHz

4 800-4 990 MHz

6 425-7 025 MHz

7 025-7 125 MHz

10.0-10.5 GHz

< 1 GHz

694 – 960 MHz	R1
698 – 960 MHz	R2 + 6/R3
parts of 703 – 960 MHz	8/R3

Resolution **213** COM4/3

2 GHz

1 710 – 1 980 MHz	Global
2 010 – 2 025 MHz	R1,3
2 110 -2 160 MHz	Global
2 160 – 2 170 MHz	R1,3

MOD Resolution **221** (Rev. WRC-23)

2.5 GHz

2 500 – 2 690 MHz	R1,2
2 500 – 2 655 MHz	R3

Resolution **218** (COM4/4)

***Implications**: HIBS – a new platform to provide mobile broadband with minimal infrastructure using the same frequencies and devices as IMT networks. Extending IMT coverage in remote and rural areas. Maintaining connectivity in case of natural disasters*

Aeronautical and maritime issues

Suborbital flights

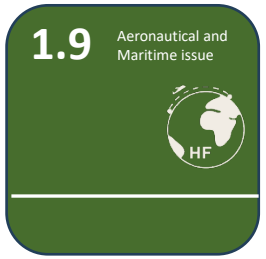
- NOC under this agenda item
- WRC-23 could not reach agreement on any regulations for suborbital flights

VHF satellite communications with aircraft

- allocation 117.975 – 137 MHz to aeronautical mobile-satellite (R) service. Protection of terrestrial VHF links, adjacent science services.
- Implications: relaying ground-to-pilots communications via NGSO satellites Complements terrestrial VHF links, enabling communications with planes everywhere, in oceanic and remote areas.

FSS for Unmanned Aircraft Systems

- No decision for using fixed-satellite service for UAS command and control (CNPC) under Res. 155 (Rev.WRC-19)
- WRC-23 suspended any further action on Res. 155, instructed to study AMS(R)S for command and control of UAS



Digitalization of HF aeronautical bands

- WRC-23 added new provisions to RR Appendix 27 to allow the aggregation of existing 3 kHz HF channels and using digital signals
- ***Implications:*** opens possibility to introduce digital wideband HF systems. HF comms are still extensively used by aviation for long-range communications over oceanic, polar and remote areas.

1.10 Aeronautical and Maritime issue

Aeronautical non-safety communications & modernization of GMDSS

1.11 Aeronautical and Maritime issue

22-22.2 GHz

15.41-15.7 GHz

15.41-15.7 GHz allocated to secondary AM(OR)S in R1 and 1 R3 country
22-22.2 GHz allocated to primary AM(OR)S in R1 and 5 R3 countries
Implications: enable transfer large data from aircraft, helicopters, drones for different purposes, e.g., surveillance, monitoring, mapping, etc.

HF

MF

Issue A: GMDSS modernization
- removal of NBDP for distress and safety purposes
- introducing automatic connection system (ACS) using DSC in 2/4/6/8/12/16 MHz
- introducing navigation data system (NAVDAT) in MF and HF bands

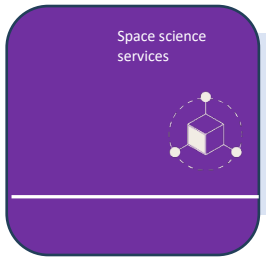
Issue B: E-Navigation – NOC
Implications: WRC-23 endorsed several modern maritime technologies to support GMDSS significantly contributing to the safety of life at sea.

1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz

2483.59-2499.91 MHz

Issue C: introduction of additional GMDSS satellite provider
Provisional Beidou recognition subject to completion of coordination and elimination of interference, see Res. 365 (COM4/5)

Satellite Issues



Science services

EESS (active)

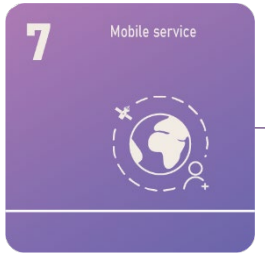
- Secondary allocation for spaceborne radar sounders in 40-50 MHz. Protection of existing services by geographical, time, PFD limitations, *see* Res. 677 (COM5/6)
- Implications: enable collection *of data from space-based ground penetrating radars on ice in the polar zone*

EESS (passive)

- allocations to in 239.2-242.2 GHz and 244.2-247.2 GHz bands. Non-interference basis vs. terrestrial services in 235-238 GHz.
- Implications: enable ice cloud imaging, measurement of chemical processes, including ozone, isotopic oxygen, etc.

Upgrade of SRS allocation

- to primary in the 14.8-15.35 GHz for operation in space-to-space, space-to-Earth and Earth-to-space directions. Protection of FX, MOB, RA, see Res. 678 (COM5/7)
- Implications: will allow for transmission of future scientific data at higher rates

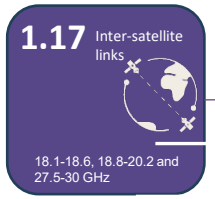


Consider possible changes on advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks

12.75 – 13.25 GHz	17.3 – 17.7 GHz	17.7 – 18.6 GHz	18.8 – 19.3 GHz	19.7 – 20.2 GHz	27.5 – 29.1 GHz	29.5 – 30 GHz

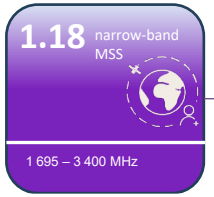
*12.75-13.25 GHz (Uplink) by ESIMs on aircraft and vessels communicating with GSOs. Protection of **AP30B** and List, in-band and adjacent band services, compatibility between ESIMs, see Res. **121***

*17.7-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz (downlink), 27.5-29.1 GHz and 29.5-30 GHz (Uplink) by aeronautical and maritime ESIMs communicating with NGSOs. Protection of FX, MOB, satellite and science services. Complex commitment regime monitored by BR, see Res. **123***



*Primary allocation of 18.1-18.6, 18.8-20.2 and 27.5-30 GHz to inter-satellite service. Limited to space research, space operation and/or EESS, and data transmissions of from industrial and medical activities in space. Res. **679***

1 695 – 3 400 MHz



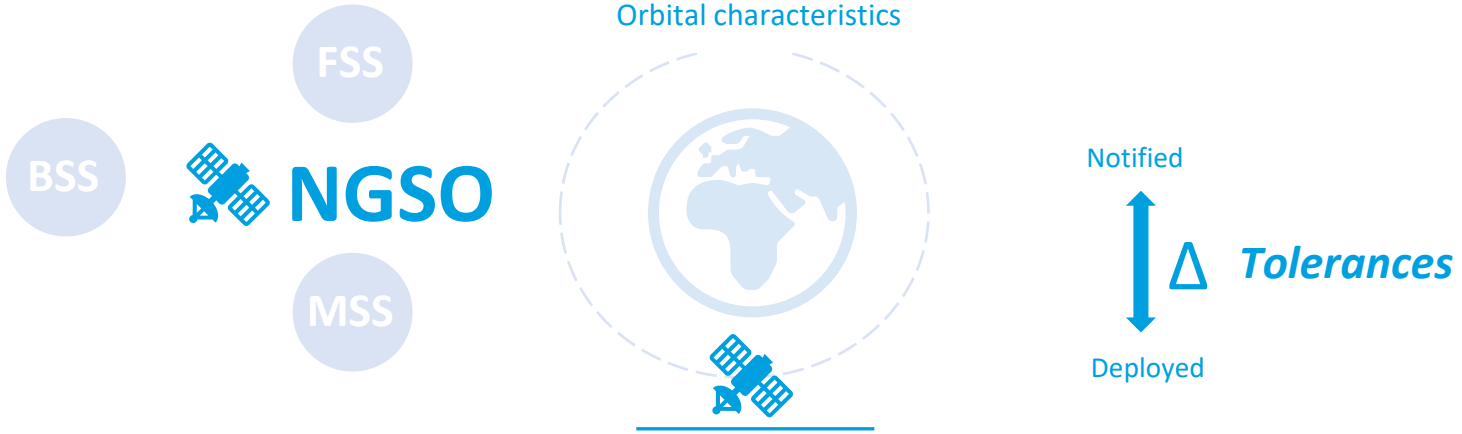
- *Narrow-band MSS between 1 695 and 3 400 MHz: NOC.*
- *Issue is included in the **WRC-27 AI 1.13** to support IoT requirements*

*New primary allocation to the fixed-satellite service in the downlink direction in the frequency band 17.3-17.7 GHz in **Region 2** for GSO and NGSO networks. Protection of existing services, including **AP30A** BSS feeder-links.*

Agenda Item 7 – Regulatory issues

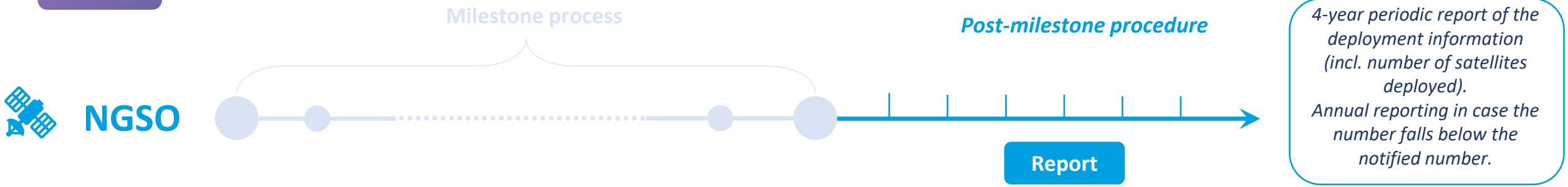
7 Mobile service A

*Defined tolerances for certain orbital characteristics of non-geostationary-satellite orbit systems in the fixed-satellite (FSS), broadcasting-satellite (BSS), or mobile-satellite service (MSS) to account for the potential differences between the notified and deployed orbital characteristics (e.g. altitude of the apogee, altitude of the perigee, angle of inclination of the orbital plane) (Res. **8**)*



7 Mobile service B

*Reviewed the milestone-based approach for the implementation of frequency assignments to space stations in a non-geostationary-satellite system in specific frequency bands and services (**Resolution 35**)*



7 Mobile service

Agenda Item 7 – Regulatory issues

Topic	Title	WC-23 decision
7C	Protection of GSO MSS networks in 7/8 GHz and 20/30 GHz from NGSO	Introduction of a non-interference basis for NGSO networks to protect GSO networks in the same bands
7D1	Modifications to Appendix 1 to Annex 4 of RR Appendix 30B	Correction of formula for calculating aggregate C/I ratio by mentioning correct values of the orbital separation
7D2	New RR AP 4 parameters for Rec. ITU-R S.1503 updates	MOD AP4 to reflect approved modifications in Recommendation ITU-R S.1503
7D3	BR Reminders for BIU and BBIU	BR sends reminders for 90-day requirement for BIU and BBIU. Reminders on completion of 90-day BBIU shall be sent 15 days after the end of the period
7E	RR Appendix 30B improved procedures for new Member States	Modification of Article 7 of Appendix 30B to facilitate creation of new FSS Plan allotments for ITU Member States without any allotment
7F	Excluding uplink service area in AP30A for Regions 1,3 and AP30B	Administration can object to being included in the feeder link service area of any assignment any time (during or after the 4-month period)
7G	Revisions to Resolution 770 (WRC-19) to allow its implementation	Modification of Resolution 770 to add the value of 10% of the probability of non-zero rain attenuation to the parameters of generic GSO reference links
7H	Enhanced protection of APP 30/30A in Regions 1 and 3 and AP 30B	For affected assignment in R1&3 Plan, no decision to assistance reminder = no objection. A commitment to respect the pfd and timeline = agreement
7I	Special agreements under RR Appendix 30B	Possibility to restore reference situation of allotment when assistance under §§ 6.13-6.15 applied by introducing agreement between concerned administrations
7J	Modifications to Res. 76 (protection GSO FSS and BSS from NGSO)	Regular meetings for non-GSO FSS operators to assess interference. Invitation to develop a methodology for calculating aggregate epfd produced by non-GSO FSS
7K	MOD Res. 553 to remove restrictions preventing effective using Resolution	Several mods to the application of the special procedure, e.g., possibility to apply it to 1 network at time, to change, withdraw CR/C sent under normal procedure

Post-conference activities

ALL WRC-23 DECISIONS WILL ENTER INTO FORCE ON 1.01.2025, EXCEPT THE ONES LISTED IN RESOLUTION 99 (REV.WRC-23)

WRC-23 DEFINITIVE FINAL ACTS NOW AVAILABLE **HERE**

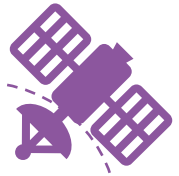
NEW RADIO REGULATIONS, EDITION 2024 IN AUGUST – SEPTEMBER 2024

BR ISSUED CIRCULAR LETTERS **CA/270** OF 26.01.24 ON THE RESULTS OF CPM27-1

ADMINISTRATIONS NEED TO UPDATE THE RELEVANT NATIONAL DOCUMENTATION, E.G., NATIONAL FREQUENCY ALLOCATION TABLES

WRC-27 Agenda Items

WRC-27 Agenda items (Res.813)



FIXED-SATELLITE AND BROADCASTING-SATELLITE

- **1.1** Aeronautical/maritime earth stations in motion
  47.2-50.2 GHz / 50.4-51.4 GHz
- **1.2** 13.75-14 GHz – **Uplink earth stations**
- **1.3** 51.4-52.4 GHz – **Gateway earth stations**
- **1.4** 17.3-17.7/8 GHz – **Fixed/broadcasting allocation in Region 3**
- **1.5** **Unauthorized operations of non-geostationary-satellite orbit earth stations**
- **1.6** **Space sustainability**
  37.5-42.5 GHz / 42.5-43.5 GHz / 47.2-50.2 GHz / 50.4-51.4 GHz
- **7** **Satellite regulatory issues**

MOBILE-SATELLITE

- **Space-to-space links** **1.11**
  1 518-1 544 MHz / 1 545-1 559 MHz
  1 610-1 645.5 MHz / 1 646.5-1 660 MHz
  1 670-1 675 MHz / 2 483.5-2 500 MHz
- **MSS - IoT development** **1.12**
  1427-1432 MHz / 1645.5-1646.5 MHz 1880-1920 MHz / 2010-2025 MHz
- **MSS - IMT- direct connectivity** **1.13**
- **MSS – additional allocation** **1.14**
- **Lunar communications** **1.15**
- **Radio Quiet Zones** **1.16**
- **Space weather sensors** **1.17**
- ≥ 76 GHz – **Earth exploration and radio astronomy** **1.18**
- **Earth exploration-satellite service** **1.19**
  4200 – 4400 MHz / 8400-8500 MHz

FIXED, MOBILE AND RADIOLOCATION

- **1.7** 4400-4800 MHz / 7125-8400 MHz / 14.8-15.35 – **IMT**
- **1.8** 231.5-275 GHz / 275-700 GHz – **Radiolocation**
- **1.9** **Aeronautical mobile (OR) high frequency modernization**
- **1.10** 71-76 GHz / 81-86 GHz – **Power flux-density / power limits**

SCIENCE

Overlapping frequency bands between some WRC-27 agenda items

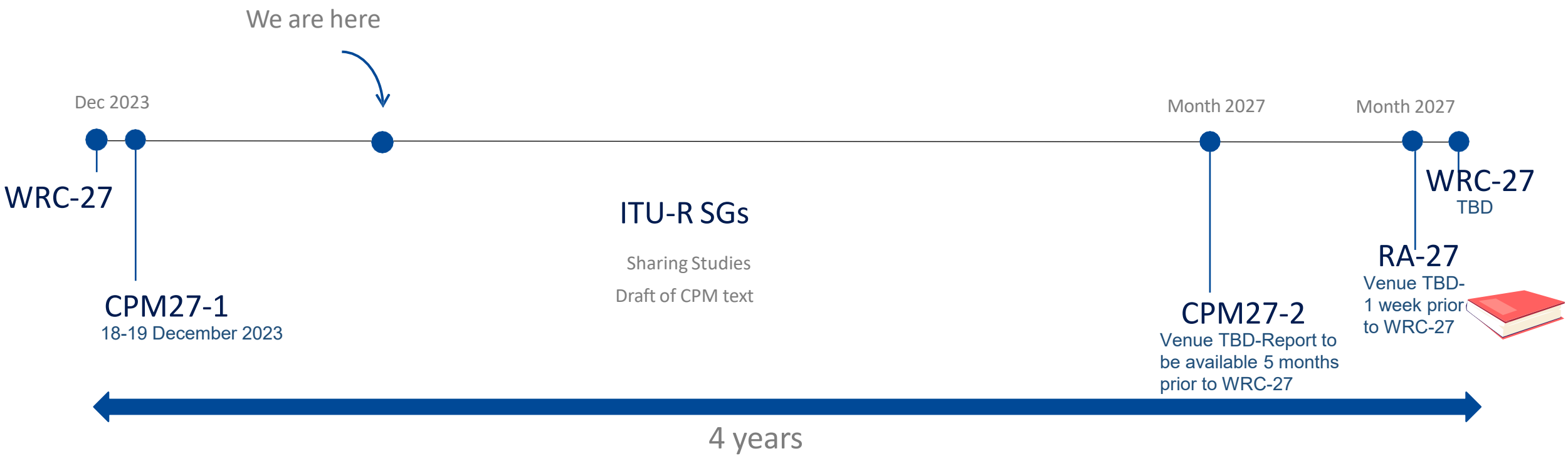
(see Annex 4 to CA/270)

Frequency bands	WRC-27 agenda items (responsible groups)
1 427-1 432 MHz; 1 645.5-1 646.5 MHz; 1 880-1 920 MHz	1.12 (WP 4C); 1.13 (WP 4C)
1 518-1 544 MHz; 1 545-1 559 MHz; 1 610-1 645.5 MHz; 1 646.5-1 660 MHz; 1 670-1 675 MHz	1.11 (WP 4C); 1.13 (WP 4C)
2 010-2 025 MHz	1.12 (WP 4C); 1.13 (WP 4C); 1.14 (WP 4C)
2 120-2 160 MHz; 2 160-2 170 MHz	1.13 (WP 4C); 1.14 (WP 4C)
2 483.5-2 500 MHz	1.11 (WP 4C); 1.13 (WP 4C); 1.15 (WP 7B)
2 400-2 483.5 MHz; 2 500-2 690 MHz	1.13 (WP 4C); 1.15 (WP 7B)
7 190-7 235 MHz	1.7 (WP 5D); 1.15 (WP 7B)
8 450-8 500 MHz	1.15 (WP 7B); 1.19 (WP 7C)
42.5-43.5 GHz	1.6 (WP 4A); 1.16 (WP 7D)
47.2-50.2 GHz; 50.4-51.4 GHz	1.1 (WP 4A); 1.6 (WP 4A)
71-76 GHz	1.10 (WP 5C); 1.16 (WP 7D); 1.18 (WPs 7C & 7D)
81-86 GHz	1.10 (WP 5C); 1.18 (WP 7C & WP 7D)
114.25-116 GHz; 130-134 GHz	1.16 (WP 7D); 1.18 (WP 7C & WP 7D)

- The responsible groups are invited to **exchange the necessary characteristics, parameters and protection criteria** to **complete studies** addressing **mutual compatibility and sharing feasibility** among the applicable services/applications.

- They should **coordinate their work** and **review**, as appropriate, the **progress of studies so that any potential difficulties can be addressed**.

Preparations for CPM27-2, RA-27 and WRC-27



- International Telecommunications Union
- Regional Groups
- National Administrations

CPM27-1 results (Resolution ITU-R 2-9)

Dubai, 18-19 December 2023 : results published in CA/270 of 26 January 2024 (see at www.itu.int/md/R00-CA-CIR-0270/en)

Appointed the CPM-27 Vice-Chairs and Chapter Rapporteurs

Defined the structure of the draft CPM Report (see Annexes 5, 6 and 10 to CA/270) with 5 Chapters, 2 Annexes and 7 Chapter (co-)Rapporteurs

Identified responsible ITU-R Groups :

- 8 existing ITU-R WPs responsible for 20 a.i.s for the WRC-27 a.i.s+ contributing ones
- 8 existing WPs for the 14 items on the WRC-31 preliminary agenda (see Annexes 7 and 8 to CA/270)

For the sharing and compatibility studies, deadline to provide criteria, characteristics and methodologies by **31 December 2024** (may be extended up to the **1 July 2025** by the CPM-27 Steering Committee if requested by a WP) (see Annex 4 to CA/270)

Draft CPM Report – ToC (see Annex 5 to CA/270)

Chapter number	Chapter title	WRC-27 agenda items	Chapter Rapporteurs
1	Fixed-satellite and Broadcasting satellite issues	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 7	Mr Andrew PEGUES (for 1.1, 1.2, 1.3, 1.4, 1.6) Mr Mostafa MOUSA (for 1.5, 7)
2	Fixed, mobile and radiolocation issues	1.7, 1.8, 1.9, 1.10	Mr Richard MAKGOTLHO (for 1.8, 1.9) Mr Abdulla JABER (for 1.7, 1.10)
3	Mobile-satellite issues	1.11, 1.12, 1.13, 1.14	Mr Sergey S. UVAROV
4	Science issues	1.15, 1.16, 1.17, 1.18, 1.19	Mr Jean PLA
5	General issues Annex 1 Annex 2	2, 4 10 (for information only) 8 (for information only)	Mr Bin LIU

Duties of Chapter Rapporteurs

- To act for the Chair of the CPM to ensure that the consistency of format and structure and the guidelines of amount of text are observed.
- To ensure integration of most recent Working Party outputs into consolidated draft CPM text by consultation with or assistance from Working Party Chairs to ensure that CPM work is complete and on time.

Structure of the draft CPM Report for a.i. in each chapter (see Annexes 6 and 10 to CA/270, see also Annex 2 to Res. ITU-R 2-9)

Chapter N

Agenda Item 1.XY

[Relevant WRC Resolutions if any]

N/1.XY/1	Executive Summary* (see § A2.1 of Res. ITU-R 2-9)
N/1.XY/2	Background* (see § A2.2 of Res. ITU-R 2-9, incl. "shall not include advertisement, promotional and commercial information")
N/1.XY/3	Summary and Analysis of the results of ITU-R studies, including a list of relevant ITU-R Recommendations
N/1.XY/4	Method(s) to satisfy the Agenda Item (see § A2.4 of Res. ITU-R 2-9)
N/1.XY/5	Regulatory and procedural considerations

Annex 1 – Information on WRC-27 AI 10

2.[x] **[label of the preliminary agenda item]**

[Text of a short summary of ITU-R studies completed under the preliminary agenda item]

Annex 2 – Information on WRC-27 AI 8

(see the Proposed detailed Structure for the draft CPM Report to WRC-27 at: www.itu.int/oth/R0A0A000023/en)

RA-23 changes to Res. ITU-R 2-9 – CPM

Technical studies contributing to the second session of CPM shall be limited to rationalization

Contributions/proposals by administrations regarding their country footnotes to CPM should be considered for information only (Annex of the CPM Report)

The background section shall not include advertisement, promotional and commercial information and it should avoid repetition or duplication

Page limit and format for draft CPM texts, should be as concise as possible

Acronyms/ abbreviations should be included in the beginning of the Report

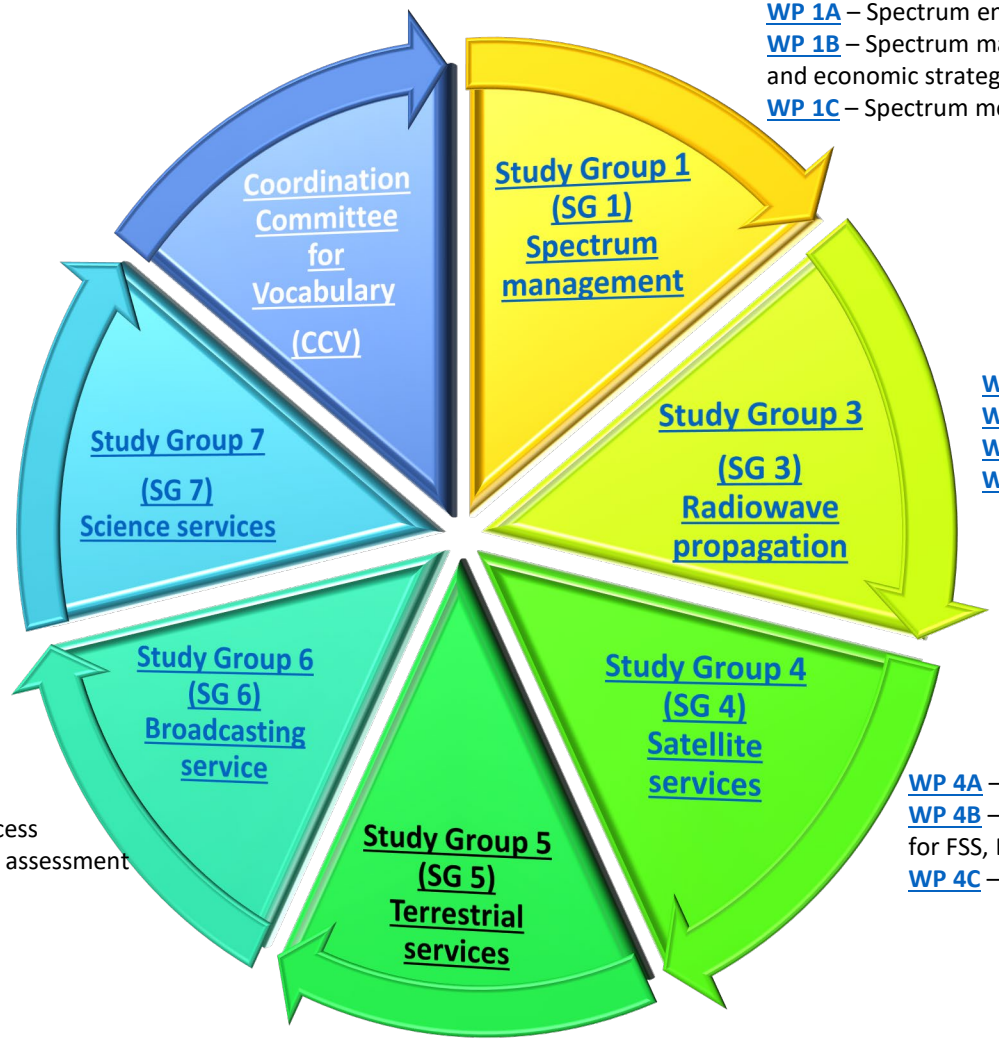
Views of Member States and/Regional Organizations should not be included in the draft CPM texts/ Report. A summary of supporting reasons and possible concerns may be included after the method description and should not exceed half a page

The number of new topics under the standing agenda item in accordance with Resolution 86 (Rev.WRC-07) (currently agenda item 7) shall be limited

Conclusions from 31st RAG meeting (25-27 Mach 2024)

- *A new Correspondence Group (CG), chaired by: Mr Fahad ALGHAMDI (Saudi Arabia)*
  - ✓ *to improve the CPM Process (see Res. ITU-R 2-9): Conduct a thorough review of the second session of the CPM, in order to identify areas for procedural improvements of preparing the CPM Report. CG features (SharePoint folder, Mailing List) on RAG CG webpage*
  - ✓ *CG to submit a comprehensive report 45 days prior to 32nd RAG Meeting (planned on 14-17 April 2025)*
- *RAG considered also:*
  - ✓ *need for seminars, workshops or training events on regulatory and technical aspects of constellation systems for non-GSO communications,*
  - ✓ *possibilities for the development of a comprehensive course of action to promote consistency and coherence in spectrum management practices for aeronautical and maritime services.*

ITU-R Study Groups (https://www.itu.int/en/ITU-R/study-groups/Pages/default.aspx)



WP 1A – Spectrum engineering techniques
WP 1B – Spectrum management methodologies and economic strategies
WP 1C – Spectrum monitoring

WP 3J – Propagation fundamentals
WP 3K – Point-to-area propagation
WP 3L – Ionospheric propagation and radio noise
WP 3M – Point-to-point and Earth-space propagation

WP 4A – Efficient orbit/satellite utilization for FSS and BSS
WP 4B – Systems, air interfaces, performance and availability objectives for FSS, BSS and MSS (incl. IP-based applications and SNG)
WP 4C – Efficient orbit/satellite utilization for MSS and RDSS

WP 5A – Land mobile > 30 MHz (excl. IMT), fixed WAS in the FS, amateur & amateur-satellite services
WP 5B – Maritime (incl. GMDSS) and aeronautical mobile services & radiodetermination
WP 5C – HF and other systems < 30 MHz in the fixed and land mobile services
WP 5D – IMT systems

WP 6A – Terrestrial broadcasting delivery
WP 6B – Broadcast service assembly and access
WP 6C – Programme production and quality assessment

WP 7A – Time signals and frequency standard emissions
WP 7B – Space radiocommunication applications: transmission and reception of telecommand, tracking and telemetry data for space operation…
WP 7C – Remote sensing systems (active and passive):
WP 7D – Radio astronomy

Studies updates are on: https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx

Thank you!

Ilham Ghazi
Head, Broadcasting Division
Radiocommunication Bureau

May 2024 – 32nd Arab Spectrum Management Group meeting - Jordan

WRC-27 agenda – FSS, BSS and MSS issues

No.	WRC-27 Agenda Item	Description	WRC-23 Resolution	Responsible ITU-R Group
1.1	Aeronautical/maritime ESIMs 47.2-50.2 GHz / 50.4-51.4 GHz	Studies for M-ESIMs/A-ESIMs, actions at WRC-27 to meet increasing needs in mobile satellite broadband	176	WP 4A
1.2	FSS earth stations with smaller antenna in 13.75-14 GHz	Revise sharing conditions in 13.75-14 GHz to allow FSS ES with smaller antennas, to provide for more spectrum	129 (COM6/1)	WP 4A
1.3	Enabling gateway stations in 51.4-52.4 GHz for NGSO FSS	Revise conditions in 51.4-52.4 GHz to enable FSS NGSO gateways for broadband services	130 (COM6/3)	WP 4A
1.4	FSS/BSS allocations in 17 GHz in Region 3	FSS allocation in 17.3-17.7 GHz and BSS in 17.3-17.8 GHz in R3, to globally harmonize FSS, provide BSS spectrum	726 (COM6/24)	WP 4A
1.5	Unauthorized operation of NGSO earth stations	Limit unauthorized operation of NGSO earth stations of FSS/MSS and associated issues of the service area	14 (COM6/6)	WP 4A
1.6	Equitable access to FSS in 40 GHz, 42GHz, 48GHz, 50 GHz	Technical, regulatory measures for equitable access to FSS 37.5-42.5 GHz/42.5-43.5 GHz/47.2-50.2 GHz/50.4-51.4 GHz	131 (COM6/7)	WP 4A
1.11	Space-to-space links in MSS bands 1.5/1.6 GHz, 2.5 GHz	Space-to-space links in MSS bands 1.5/1.6 GHz, 2.5 GHz, for near-real time relay of data to or from the ground	249	WP 4C
1.12	MSS allocations for IoT developments	MSS allocations in 1 427-1 432 MHz, 1 645.5-1 646.5 MHz, 1 880-1 920 MHz for development of IoT through NGSO	252 (COM6/8)	WP 4C
1.13	MSS – IMT direct to device connectivity	MSS allocations in 694 - 2 700 MHz for direct connectivity between space stations and IMT terrestrial devices	253 (COM6/9)	WP 4C
1.14	Additional MSS allocations	Additional MSS allocations in 2 010-2 025 MHz, 2 160-2 170 MHz in R1&3 and in 2 120-2 160 MHz globally	254 (COM6/10)	WP 4C

WRC-27 agenda – Fixed, mobile, science services

No.	WRC-27 Agenda Item	Description	WRC-23 Resolution	Responsible ITU-R Group
Fixed, mobile, radiolocation services				
1.7	IMT in 4400-4800 MHz / 7125-8400 MHz / 14.8-15.35 GHz	IMT identifications in in 4400-4800 MHz / 7125-8400 MHz / 14.8-15.35 GHz, mainly for IMT-2030 and beyond	**256 (COM6/26)**	WP 5D
1.8	Radiolocation in 231.5-275 GHz / 275-700 GHz	Allocations/ identification to RLS in 231.5-275 GHz/275-700 GHz for radars and radiometers for imaging and localization	**663**	WP 5B
1.9	Modernization of AP26 – High Frequency AM(OR)S	Introduction of wide-band digital channels in **AP26** – Plan for HF aeronautical mobile (off-route) service	**411 (COM6/2)**	WP 5B
1.10	PFD and EIRP limits in 71-76 GHz, 81-86 GHz	Inclusion pfd, e.i.r.p. limits in Article **21** for FSS, MSS, BSS to protect fixed and mobile services in 71-76 GHz, 81-86 GHz	**775**	WP 5C
Science services				
1.15	SRS for lunar communications	New/modified SRS allocations for systems on lunar surface and between systems in lunar orbit and on lunar surface	**680 (COM6/4)**	WP 7B
1.16	Radioastronomy operating in specific Radio Quiet Zones	Protection of radioastronomy from NGSO systems in Radio Quiet Zones in some bands between 10.6 and 134 GHz	**681 (COM6/11)**	WP 7D
1.17	Space weather sensors	Allocations to MetAids service for receive-only space weather sensors and developing protection criteria	**682 (COM6/12)**	WP 7C
1.18	EESS and Radioastronomy above 76 GHz	Protection of EESS (passive) and radio astronomy above 76 GHz from unwanted emissions of active services	**252 (COM6/8)**	WP 7C
1.19	EESS (passive) in 4 200-4 400 MHz and 8 400-8 500 MHz	Global allocations to EESS in 4200-4400 MHz, 8 400-8 500 MHz for measurements of sea surface temperature	**674 (COM4/8)**	WP 7C

Radio service abbreviations (1/2)

Abbreviations	Radio services	RR definition
AMS	aeronautical mobile service	No. **1.32**
AM(R)S	aeronautical mobile (route) service	No. **1.33**
AMSS	aeronautical mobile-satellite service	No. **1.35**
AMS(R)S	aeronautical mobile-satellite (route) service	No. **1.36**
ARNS	aeronautical radionavigation service	No. **1.46**
ARNSS	aeronautical radionavigation-satellite service	No. **1.47**
ARS	amateur service	No. **1.56**
ARSS	amateur-satellite service	No. **1.57**
BS	broadcasting service	No. **1.38**
BSS	broadcasting-satellite service	No. **1.39**
EESS	Earth exploration-satellite service	No. **1.51**
FS	fixed service	No. **1.20**
FSS	fixed-satellite service	No. **1.21**
ISS	inter-satellite service	No. **1.22**
LMS	land mobile service	No. **1.26**
LMSS	land mobile-satellite service	No. **1.27**
MetAids	meteorological aids service	No. **1.50**
MetSat	meteorological-satellite service	No. **1.52**

Radio service abbreviations (2/2)

Abbreviations	Radio services	RR definition
MMS	maritime mobile service	No. **1.28**
MMSS	maritime mobile-satellite service	No. **1.29**
MRNS	maritime radionavigation service	No. **1.44**
MRNSS	maritime radionavigation-satellite service	No. **1.45**
MS	mobile service	No. **1.24**
MSS	mobile-satellite service	No. **1.25**
RAS	radio astronomy service	No. **1.58**
RDS	radiodetermination service	No. **1.40**
RDSS	radiodetermination-satellite service	No. **1.41**
RLS	radiolocation service	No. **1.48**
RLSS	radiolocation-satellite service	No. **1.49**
RNS	radionavigation service	No. **1.42**
RNSS	radionavigation-satellite service	No. **1.43**
SOS	space operation service	No. **1.23**
SFTSS	standard frequency and time signal service	No. **1.53**
SFTSSS	standard frequency and time signal-satellite service	No. **1.53**
SRS	space research service	No. **1.55**