



Meeting of the Caribbean Spectrum Management Task Force 10 May 2023 (Online)

Outcome of CPM23-2 for Terrestrial issues

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Topics on the WRC-23 Agenda





Note: Res. 811 (WRC-19) contains 19 specific and 11 standing agenda items for WRC-23. 10 standing agenda items (2, 3, 4, 5, 6, 8, 9 (9.1, 9.2, 9.3) and 10) are not mentioned here.



Shaping Caribbean Telecommunications

Mobile issues IMT, HIBS and IMT for FS

(agenda items 1.1, 1.2, 1.3, 1.4, 1.5 and 9.1 topic C)



Report of the Conference Preparation Meeting (CPM) to WRC-23, held from 27 March to 6 April 2023





Al 1.1 For protection of aircraft and ship stations in international airspace and waters from IMT stations located in national territories in the band 4 800-4 990 MHz, review the PFD criteria in No. **5.441B**

Resolution 223 (WRC-19)

- WRC-15 and WRC-19 has identified 4800-4990 MHz for IMT in 40 countries, subject to a PFD limit and No. 9.21 coordination
- PFD limit is for protection of aircraft and ship stations operating in international airspace/waters and is very stringent (> 500 km)
- No specific provisions exist in current RR for protecting stations in international airspace/waters





WRC-23 AI 1.1 – ITU-R Studies (responsible groups: WP 5B and WP5D)

• The <u>CPM text</u> contains 6 Methods:

- Method A: No change to the RR
- Method B: Keeping the existing PFD and applying it to all countries listed in RR No. 5.441B
- > Method C: New pfd value and maintaining the exempted countries
 - ✓ As for new pfd value, 5 Alternatives were proposed based on coastline or EEZ line
- Method D: New pfd value and applying it to all countries in RR No. 5.441B
- Method E: Existing or a new PFD value for RR No. 5.441B and a separate footnote for countries wishing to apply only RR No. 9.21 coordination
- Method F: RR No. 9.21 or Bilateral/multilateral coordination between concerned countries





WRC-23 agenda item 1.2

Al 1.2 to consider identification of the frequency bands 1: 3 300-3 400 MHz (sub-Reg.1 & Reg.2 *), 2: 3 600-3 800 MHz (Reg.2 *), 3: 6 425-7 025 MHz (Reg.1*), 4: 7 025-7 125 MHz (globally*) and 5: 10.0-10.5 GHz (Reg.2*) for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with

Resolution 245 (WRC-19)

- ultra-low latency and high bit-rate IMT require contiguous blocks of spectrum
- mid-band spectrum has a good balance for coverage and capacity, support MIMO and beam-forming antenna
- Challenge: protection of in-band and adjacent band existing services

"compared with lower and higher frequency bands, the mid-band spectrum can provide better balance for meeting needs for both coverage and capacity" (from Res. 245 (WRC-19)





- Possible Methods are contained band by band in the <u>CPM Text</u>
- Band 1: 3 300-3 400 MHz in Region 1
 - > Method 1A: No change to the RR
 - Method 1B: MOD Nos. 5.429A and 5.429B to add interested Region 1 countries south of 30° N, for allocation to MS ex AMS and identification for IMT, keeping current conditions
 - Method 1C: Method 1B including revision of conditions
 - Method 1D: Primary allocation to the MS ex AMS and identification for IMT in interested Region 1 countries (No limit in latitude)
 - Method 1E: Primary allocation to the MS ex AMS in Region 1(in the Table of Frequency Allocations, TFA) and identification for IMT (Regional allocation)
 - > Method 1F: Primary allocation to the MS in Region 1 (in TFA) and identification for IMT

(This method was newly added at the CPM23-2)





Band 2: 3 300-3 400 MHz in Region 2

- Method 2A: No change to the RR
- Method 2B: Allocation of the band to the MS on a primary basis and identification for IMT.
- Method 2C: Allocation of the band to the MS ex AMS on a primary basis and identification for IMT





- Band 3: 3 600-3 800 MHz in Region 2
 - > Method 3A: No change to the RR, except suppression of Resolution 245 (WRC-19)
 - > Method 3B: Identification for IMT with conditions (RR Table 21-4)
 - Method 3C: Identification for IMT 2 with conditions (RR Table 21-4, pfd limit and RR Nos. 9.17, 9.18 coordination)
 - Method 3D: Identification for IMT with conditions (RR Table 21-4, pfd limit (short-term criteria) and RR Nos. 9.17, 9.18).
 - Method 3E: Identification for IMT in additional countries in No. 5.434 while maintaining all existing conditions
 - > Method 3F: Identification for IMT by modifying No. 5.434 while maintaining all existing





Band 4: 6 425-7 025 MHz in Region 1

- Method 4A: No change to the RR
- Method 4B: Identification for IMT without any additional conditions or constraints to the IMT deployment other than those existing in the RR.
- > Method 4C: Identification for IMT with conditions contained in a new WRC Resolution.
- Method 4D: Identification for IMT with conditions contained in a new WRC Resolution, applied only within a portion of the band.
- Method 4E: Identification for IMT with conditions contained in a new WRC Resolution, with use expectation as of 2030.





Band 5: 7 025-7 125 MHz globally

- Method 5A: No change to the RR
- Method 5B: Identification for IMT without any additional conditions or constraints to the IMT deployment other than those existing in the RR
- Method 5C: Identification for IMT by a new footnote with conditions contained in a new WRC Resolution.
- Method 5D: Identification of the band 7 025-7 100 MHz for IMT by a new footnote with a requirement to implement technical and regulatory measures to protect and not impose constraints on existing services in the band above 7 100-7 155 MHz.
- Method 5E: Identification for IMT with conditions contained in a draft new WRC Resolution, with use expectation as of 2030





Band 5: 10-10.5 GHz in Region 2

- > Method 6A: No change to the RR
- Method 6B: Allocation to the MS on a primary basis and identification for IMT with conditions contained in a new WRC Resolution.
- Method 6C: Allocation to the MS ex AMS on a primary basis and identification for IMT with conditions contained in a new WRC Resolution, and protection of the radiolocation service.

All methods in all bands include follow-up action for suppression of Resolution 245 (WRC-19)





WRC-23 agenda item 1.3

Al 1.3 to consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with

Resolution 246 (WRC-19)

- The band 3 600-3 800 MHz is allocated to the MS, except AMS on a secondary basis in Region 1, while it is on a primary basis in Regions 2 and 3. Some administrations in Region 1 are currently using this band, or part of this band, for IMT implementation.
- This band is allocated to the FS and FSS on a primary basis in all three Regions.
- For African countries, especially those in tropical areas, the operations of FSS systems are more reliable for use in at C band frequencies (3 400-4 200 MHz), rather than in higher frequency bands.







WRC-23 agenda item 1.3

WRC-23 AI 1.3 – ITU-R Studies (responsible group WP5A)

- 5 Methods are proposed in the <u>CPM Text</u>
 - Method A: No change to the RR
 - Method B: Upgrade of the allocation to the MS except AMS to a primary basis in Region 1 without conditions (No identification for IMT)
 - Method C: Upgrade of the allocation of 3 600-3 800 MHz to the MS except AMS to a primary basis within Region 1 with regulatory and/or technical conditions. This Method includes five alternatives according to the conditions (No identification for IMT)
 - ✓ Alternative 1: No. 9.21 coordination and pfd limit, Alternative 2: pfd limit only
 - ✓ Alternative 3: Upgrade of a part of the band with pfd limit, Alternative 4: No. 9.21 and regulatory condition
 - ✓ Alternative 5: Alternative short-term pfd limit
 - Method D: Upgrade of the allocation of 3 600-3 800 MHz to the MS on a primary basis in Region 1 without conditions, and identification for IMT
 - Method E: Upgrade of the allocation to the MS except AMS to a primary basis and identification for IMT with regulatory and/or technical conditions of 3 600-3 700 MHz in Region 1 and 3 700-3 800 MHz in some Region 1 countries





AI 1.4 use of HAPS as IMT base stations (HIBS) in the mobile service in bands below 2.7 GHz already identified for IMT

Resolution 247 (WRC-19)

- HIBS can be a part of IMT. Connectivity to underserved, rural and remote areas, large footprint
- Some frequencies in the 2GHz band are already allowed by RR for HAPS in the mobile service
- Candidate bands are 694-960 MHz; 1 710-1 885 MHz, 2 500-2 690 MHz, with regional limitations





AI 1.4 – ITU-R studies (responsible group WP5D)

The <u>CPM Text</u> contains 2 Methods band-by-band

Issue	A	В	С	D
	694-960 MHz	1710-1885 MHz	1 885-1 980 MHz,	2 500-2 690 MHz
			2 010-2 025 MHz and	
			2 110-2 170 MHz	
Method 1	A1: NOC to RR	B1: NOC to RR	C1: NOC to RR	D1: NOC to RR
Method 2	A2: Identification of	B2: Identification of	B2: Identification of	D2: Identification of
	this band for HIBS by	this band for HIBS by	these bands for HIBS	this band for HIBS by
	a new footnote and a	MOD to No. 5.388A	by MOD to No.	a new footnote and
	WRC Res.	and revised Res. 221	5.388A and revised	new WRC Res.
		(Rev. WRC-07)	Res. 221 (Rev. WRC-	
			07)	





WRC-23 agenda item 1.5

- AI 1.5 Studies to review the current **spectrum use** in the frequency band **470-960 MHz** and consider **regulatory actions** in the band **470-694MHz** in **Region 1** in accordance with
- Resolution 235 (WRC-19)
- The <u>CPM Text</u> provides 7 Methods and 19 Alternatives
 - Method A: No Change to RR (2 Alternatives)
 - ✓ Alternative 1: NOC and suppression of Res. 235 (WRC-19)
 - ✓ Alternative 2: MOD to Res. 235 (WRC-19) to review the situation in the future
 - Method B: Primary allocation of the frequency band 470-694 MHz to the MS with or without identification of the band 470-694 MHz or parts thereof for IMT in Region 1
 - ✓ Alternative 1: MOD No. 5.317A for allocation of the band 470-694 MHz and identification of the band 614-694 MHz
 - ✓ Alternative 2: MOD No. 5.317A for for allocation of the band 470-694 MHz and identification of the band 470-694 MHz for IMT
 - ✓ Alternative 3: No identification of this band for IMT





- Method C: Primary allocation to the mobile, except aeronautical mobile, service of the frequency band 470-694 MHz in Table of Frequency Allocations and identification for IMT of the frequency band 470-694 MHz or parts thereof in Region 1 (9 Alternatives)
 - ✓ Alternative 1: MOD No. 5.317A for identification of the band 614-694 MHz for IMT. SUP No. 5.296
 - ✓ Alternative 2: MOD No. 5.317A for identification of the band 470-694 MHz for IMT. SUP No. 5.296
 - ✓ Alternative 3: MOD No. 5.317A for identification of the band 614-694 MHz for IMT and ADD a new footnote and a new Resolution for conditions. MOD No. 5.296 to highlight the use of application ancillary to BS
 - ✓ Alternative 4: MOD No. 5.317A for identification of the band 470-694 MHz for IMT and ADD a new footnote and a new Resolution for conditions. MOD No. 5.296
 - Alternative 5: MOD No. 5.317A for identification of the band 614-694 MHz for IMT. MOD No. 5.296 and ADD a new footnote to clarify use of application ancillary to BS





- Method C: Primary allocation to the mobile, except aeronautical mobile, service of the frequency band 470-694 MHz in Table of Frequency Allocations and identification for IMT of the frequency band 470-694 MHz or parts thereof in Region 1 (9 Alternatives)
 - Alternative 6: MOD No. 5.317A for identification of the band 614-694 MHz for IMT. MOD No. 5.296 and ADD a new footnote to clarify use of application ancillary to BS. ADD a new Resolution for conditions.
 - ✓ Alternative 7: ADD a new footnote for allocation of this band to the MS ex AMS and MOD No. 5.317A for identification of the band 614-694 MHz for IMT. MOD No. 5.296 to highlight the use of application ancillary to BS. ADD a new Resolution for conditions.
 - Alternative 8: ADD a new footnote for allocation of this band to the MS ex AMS and MOD No. 5.317A for identification of the band 470-694 MHz for IMT. MOD No. 5.296 to highlight the use of application ancillary to BS. ADD a new Resolution for conditions.
 - Alternative 9: ADD a new footnote for allocation of the band 614-694 MHz to the MS ex AMS and MOD No. 5.317A for identification of the band 614-694 MHz for IMT. MOD No. 5.296 to highlight the use of application ancillary to BS. ADD a new Resolution for conditions.





- Method D: Primary allocation of the frequency band 470-694 MHz to the mobile, except aeronautical mobile, service MHz in TFA without identification for IMT in Region 1 (5 Alternatives)
 - ✓ Alternative D1: MOD No. 5.296 to highlight the use of application ancillary to BS. ADD a new footnote and a new Resolution for conditions of the MS ex AMS
 - ✓ Alternative D2: SUP No. 5.296. No conditions for MS ex AMS
 - Alternative D3: Allocation in some countries by a new footnote, MOD No.
 5.296 and ADD a new footnote to clarify the use of application ancillary to BS. A new footnote and a new Resolution for conditions of MS ex AMS
 - ✓ Alternative D4: Preliminary allocation for use from [1/1/2031]. MOD No. 5.296 to highlight the use of application ancillary to BS. ADD a new footnote and a new Resolution for conditions of the MS ex AMS
 - ✓ Alternative D5: Similar to D1, D2, D3, D4 but only for a part of the band (e.g. 614-694 MHz)





- Method E: Primary allocation of the frequency band 470-694 MHz to the mobile, except aeronautical mobile, service MHz in Region 1 but only for downlink by ADD a new footnote. SUP 5.296.
- Method F: Secondary allocation of the band 470-694 MHz to mobile, except aeronautical mobile, service in Region 1
- ➢Alternative F1: Consider upgrade at WRC-31
- >Alternative F2: Under condition of No. 9.21 coordination
- Alternative F3: Secondary allocation in some Region 1 countries. SUP Res. 235 (WRC-19)





WRC-23 agenda item 9.1, Topic C

9.1 (c) Studies to consider the use of **IMT systems** for fixed wireless broadband in the frequency bands allocated to the fixed service on primary basis

Resolution 175 (WRC-19)

The <u>CPM text</u> provides two alternatives:

- Alternative 1: to have a WRC-23 Resolution or a RA-23 Resolution to continue conducting the studies until WRC-27.
- Alternative 2: neither a WRC Resolution nor a RA Resolution is needed since WP 5A and WP 5C may continue conducting studies on this matter, taking into account the existing and new ITU-R Study Questions.





Aeronautical and maritime issues

Report of the Conference Preparation Meeting (CPM) to WRC-23, held from 27 March to 6 April 2023

Sub-orbital vehicles





1.7 Aviation 1.8 1.9 New AMS(R)S) VHF allocation UAS CNPC links via FSS Digital technology for aviation safety-of-life applications (App.27)



New AMS alloc. (around 15.5 & 22 GHz) for non-safety applications





Modernization of GMDSS

Aeronautical issues (WRC-23 agenda item 1.6)



Studies to consider **regulatory provisions** to facilitate radiocommunications for **sub-orbital vehicles Resolution 772 (WRC-19)**

- Fly below and above 100 km, as aircraft and as spacecraft
- Require spectrum for voice/data, navigation, surveillance, telemetry, tracking and command
- Al started at WRC-19, different views on regulations, challenge of communications blackout
- Methods currently available in the CPM Report
 - Method A: NOC
 - Method B: A new WRC Resolution containing the provisions for sub-orbital vehicles. Three alternative approaches were considered:
 - **Approach A:** Providing definitions of sub-orbital flight and sub-orbital vehicles; Listing minimum required frequency bands;
 - **Approach B:** Referring to Report ITU-R M.2477 for definitions; to use the existing allocations instead of listing the specific frequency bands;
 - **Approach C:** Providing definition of stations on a sub-orbital vehicle; to identify the specific services to be used by such stations.
 - **Approach D:** The same as Approach C but The RR No. 4.4 shall be applied when the services are used by stations on board sub-orbital vehicles beyond the major portion of the atmosphere.
 - Method C: A Revision to Resolution 772 (WRC 19). To clarify the list of possible interference scenarios as well as the compatibility studies to extend the study after WRC-23.







Spectrum needs, new allocations and regulations for the aeronautical mobile service for non-safety applications **> Resolution 428 (WRC-19)**

Methods currently available in the CPM Report

- Method A: NOC
- Method B: New allocation to the AMS(R)S in the frequency band 117.975-137 MHz. There are four different Method B considered.
 - **Method B1:** ICAO existing plan procedure; requirement of the protection of adjacent band services operating above 137 MHz by limitation of unwanted emissions;
 - Method B2: to apply RR No. 9.11A coordination procedures (including RR No. 9.14, applying coordination threshold –140 dB(W/(m2 · 4 kHz)) and non-protection from AM(R)S and AM(OR)S; requirement of the protection of adjacent band services operating above 137 MHz by limitation of unwanted emissions
 - Method B3: New allocation to the AMS(R)S in the frequency band 117.975-136.8 MHz. The coordination procedures under RR No. 9.11A applies to both space and terrestrial stations (AM(R)S and M(OR)S).
 - Method B4: New allocation to the AMS(R)S in the frequency band 117.975-136 MHz. In-band coexistence between the AMS(R)S and AM(R)S will be ensured through RR No. 9.11A coordination through ITU-R and operational frequency planning and

coordination in ICAO to protect AM(R)S designated operational coverage of 480 kilometres from a country's border.



PDN Report ITU-R M.[Space-VHF] (Doc. 5B/731 Annex 25





Studies to consider, appropriate regulatory actions, a view to reviewing, if necessary, revising **Resolution 155 (Rev.WRC-19)** and **No. 5.484B** to accommodate the use of FSS networks by control and non-payload communications of unmanned aircraft systems. (Use of FSS networks by UAS CNPC) **Resolutions 171 (WRC-19) & 155 (Rev.WRC-19)**

Methods currently available in the CPM Report

- Method A: To suppress RR No. 5.484B together with Resolution 155 (Rev.WRC-19) as well as Resolution 171 (WRC-19).
- Method B: To revise Resolution 155 (Rev.WRC-19) in accordance with Resolution 171 (WRC-19); the revision of RR No. 5.484B as an option; no interference and no protection from terrestrial service

- **Method B1:** to clearly separate between the responsibilities of ICAO and ITU, to ensure the safety of flight applying RR No. **4.10** and provide a process to treat cases of interference caused by UA earth station.

- **Method B2:** require that the FSS frequency bands shall not be used for the UAS CNPC links before the issue of safety of life referred to in RR No. **4.10** is solved and agreed in ITU-R framework.

- **Method B3:** clearly separate between the responsibilities of ICAO and ITU; confirm that the provisions of RR No. 4.10 shall not apply to the use of UAS CNPC links through FSS networks



ITU-R M.2171, ITU-R M.2233





Studies to review **Appendix 27** of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU-R studies (Review of Appendix 27)

▶ Res. 429 (WRC-19)

 Introducing wideband digital technologies in AP27 currently limited to 2.8 kHz channels

Methods currently available in the CPM Report

Method A: NOC

It may be considered that the current version of Appendix 27 does **not preclude** the **digital HF communication** for the relevant type of classes.

 Method B: Inclusion of the relevant part of the Rules of Procedure relating to RR Appendix 27 into the RR and the introduction into RR Appendix 27 of other provisions related to wideband digital communications, e.g., to replace JXX by J2B, J2D, J7B, J7D, J9B, J9D.







Methods currently available in the CPM Report

- Method A: NOC
- Method B: AM(OR)S allocation in 15.4-15.7 GHz band with an associated footnote
- Method C: AM(OR)S allocation in 22-22.21 GHz band with an associated footnote
- Method D: Combination of Methods B and C
- Method E: Combination of Methods B and C with 10 MHz guardbands



WD to PDN Report ITU-R M.[NON-SAFETY AMS CHARACTERISTICS AND SHARING STUDIES] (Doc. 5B/731 Annex 15)





Typical scenarios involving WB LoS DLs

Maritime issues (WRC-23 agenda item 1.11)

Regulations to support the modernization of the Global Maritime Distress and Safety System and the implementation of e-navigation (Resolution **361** (Rev.WRC-19)

- IMO works on modernization of GMDSS and implementing e-navigation -> reflect in the RR
 - Issue 1 (modernization of the GMDSS), Method A removal of Narrow Band Direct Printing (NBDP) for distress and safety communication, since after the revision of SOLAS by IMO, Chapter IV no longer include NBDP as a part of the GMDSS, introduction of a new Automatic Connection System (ACS) for MF and selected HF
 - Issue 2 (implementation of e-Navigation) NOC
 - Issue 3 (introduction of additional satellite systems into the GMDSS) Method C1: No Change (NOC), Method C2 regulatory actions to introduce an additional satellite system into the GMDSS (Option 2).





Maritime issues (WRC-23 agenda item 1.11)

Regulations to support the modernization of the Global Maritime Distress and Safety System and the implementation of e-navigation (Resolution **361** (Rev.WRC-19)

- IMO works on modernization of GMDSS and implementing e-navigation -> reflect in the RR
 - Issue 1 (modernization of the GMDSS), Method A removal of Narrow Band Direct Printing (NBDP) for distress and safety communication, since after the revision of SOLAS by IMO, Chapter IV no longer include NBDP as a part of the GMDSS, introduction of a new Automatic Connection System (ACS) for MF and selected HF
 - Issue 2 (implementation of e-Navigation) NOC
 - Issue 3 (introduction of additional satellite systems into the GMDSS) Method C1: No Change (NOC), Method C2 regulatory actions to introduce an additional satellite system into the GMDSS (Option 2).





Overlapping frequency bands between some WRC-23 agenda items

1.2 (IMT) WP 5D	1.4 (HIBS) WP5D	1.16 (non-GSO FSS ESIMs) WP 4A	1.17 (ISL) WP 4A	1.18 (narrowband MSS) WP 4C
	<mark>2 010-2 025 MHz</mark> (Region 1 & 3)			<mark>2 010-2 025 MHz</mark> (Region 1)
3 300-3 400 MHz (region 1 & 2)				3 300- <mark>3 315</mark> MHz <mark>3 385</mark> -3 400 MHz (Region 2)
		27.5-29.1GHz (E-s) 29.5-30 GHz (E-s)	27.5-30 GHz(s-s)	

* E-s: Earth-to-space; s-s: space-to-space.

- 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.



Telecommunications

Shaping Caribbean Telecommunications



Standing agenda items (AI 2, 4, 8, 9.2...)





"House keeping" agenda items

- AI 2 Revision of ITU-R Recommendations incorporated by reference in the RR
- **AI 4** Review the Resolutions and Recommendations of previous WRCs;
- Al 8 Deletion of country footnotes or country names from RR footnotes
- AI 9.2 Consideration of BR Director's Report on difficulties and inconsistencies in the application of the Radio Regulations





Thank you!

ITU – Radiocommunication Bureau

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