

Presentation to CTU SMTF Meeting- WRC-23 outcome for Mobile service and IMT

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- 1.1 (IMT in select countries in 4800-4990 MHz)
- 1.2 (IMT in bands in the range 3-10.5 GHz)
- 1.3 (Primary allocation to Mobile Service in R1)
- 1.4 (HIBS- High Altitude IMT Base Stations)
- 1.5 (470-960 MHz Review in R1)
- 8 (Deletion of country names from FN's)
- Topic 9.1c (IMT in the fixed service)
- Article 21.5 (TX power output limit in Article 21)

Bands	Region 1	Region 2	Region 3	Group
470-960 MHz	AI1.5 (IMT)	-	-	TG 6/1
3300-3400 MHz	AI1.2 (IMT)		-	WP5D
3600-3800 MHz	AI1.3 (MS)	AI1.2 (IMT)	-	WP5A / 5D
4800-4990 MHz	AI 1.1 (IMT)			WP5B / 5D
6425-7025 MHz	AI1.2 (IMT)	-	-	WP5D
7025-7125 MHz	AI1.2 (IMT)			WP5D
10-10.5 GHz	-	AI1.2 (IMT)	-	WP5D
IMT in the fixed service	Topic 9.1.c			WP5A / 5C
Article 21	21.5			WP5D

- Difficult item; complex discussions due to NATO use and interest in IMT use by others.
- IMT identification by FN in Argentina, Brazil, large number of countries from Africa and in some from R3 (MOD 5.441B and Resolution 223 refers to pfd condition to protect AMS and MMS in international space and waters.
- Some countries exempt from the pfd application, and some do not want to implement pfd.

- **3.3-3.4 GHz and 3.6-3.7 GHz:** harmonized for IMT in R2 . Protection to RLS in 3.3-3.4 GHz
- **3.7-3.8 GHz:** (IMT in 15 R2 countries - Bahamas, Belize the French overseas departments and communities in Region 2, the overseas countries and territories within the Kingdom of the Netherlands in Region 2, Trinidad and Tobago)
- **6425-7125 MHz:** IMT identified in the full band in R1. In R3 : Cambodia, Lao P.D.R. and the Maldives and in R2: Brazil and Mexico. Condition to protect FSS. Use of the band by RLANs noted in the FN's for R1 and R2, NOT in R3
- **10-10.5 GHz:** 12 countries in R2 (Cuba, Dominican Republic, Jamaica...) with IMT identification; Band allocated on primary basis to FS and MS in Cuba, Dominican Republic, Jamaica, Suriname the overseas countries and territories within the Kingdom of the Netherlands in Region 2 (10-10.45 GHz). Conditions for protection of EESS and RLS

- Primary allocation to the mobile, except aeronautical mobile, service in R1 in the 3 600-3 800 MHz frequency band
- Several footnotes to this allocation to identify the frequency range, or parts thereof, for IMT in many countries of Africa and some of Middle East

- Regulatory text to identify the 694-960 MHz, 1 710-1 885 MHz, and 2 500-2 690 MHz frequency bands for the use of high-altitude platform stations (HAPS) as IMT base stations (HIBS) on a global basis, except for within certain countries in Region 3 in 694-960 MHz with conditions to protect incumbents.
- MODS to existing Resolution **221 (Rev. WRC-07)** to update the conditions for use of HIBS within the 1 885-1 980 MHz, 2 010-2 025 MHz, and 2 110-2 170 MHz frequency bands.

Three new country footnotes with various conditions to allow for the additional allocation of the mobile service within the 470-694 MHz frequency band in various Region 1 countries:

- **RR 5.15A:** allocation to the mobile, except aeronautical mobile, service on a secondary basis in the 470-694 MHz frequency band within 44 countries of CEPT
- **RR 5.15B:** allocation to the mobile, except aeronautical mobile, service on a primary basis and IMT identification in the 614-694 MHz frequency band within 11 countries of ASMG
- **RR 5.15C:** allocation to the mobile service on a secondary basis in the 614-694 MHz frequency band within 8 countries in Africa.
- **MODS** to Resolution 235 for a WRC-31 Agenda item for possible regulatory actions:
 - for a review of the allocation of the frequency band 614-694 MHz to the mobile service for countries listed in No. **5.15A (i.e. CEPT countries)**
 - protection to Radio Astronomy in 608-614 MHz

MOD

5.308A In the Bahamas, Barbados, Belize, Canada, Colombia, **El Salvador**, the United States, Guatemala, **Jamaica** and Mexico, the frequency band 614-698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-19/23)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. **9.21** and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighboring countries. Nos. **5.43** and **5.43A** apply. (WRC-23)

Inclusion of Total Radiated Power TRP as an option for notifying antennas information for Active Antenna Systems:

- **8.3 8AA:** the power delivered to the antenna, in dBW for stations where the power delivered to the antenna cannot be measured:
 - the total radiated power (TRP*); or
 - the calculated TRP (e.i.r.p. minus antenna directivity); or
 - the calculated power delivered to the antenna (e.i.r.p. minus maximum antenna gain (9G))

* The TRP is to be understood here as the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere

- No changes to the Radio Regulations were necessary to use IMT technologies in the fixed service.
- The Radiocommunication Assembly 2023 (RA-23):
 - *Approved Resolution ITU-R 73, Use of International Mobile Telecommunications technologies for fixed wireless broadband in the frequency bands allocated to the fixed service on a primary basis.*
 - Invited ITU-R to conduct studies to develop ITU-R Recommendations, Reports and/or Handbooks.

The Results

**6 GHz**

- **IMT throughout EMEA and CIS**
- **IMT country footnotes for APAC and Americas**

**3.5 GHz**

- **Harmonisation throughout EMEA, CIS and the Americas**

**Low Bands**

- **IMT throughout Middle East in 600 MHz**
- **Mobile allocations in Europe and parts of Africa**

WRC-27 Agenda

Region 1 	Region 2 	Region 3 
4 400-4 800 MHz		4 400-4 800 MHz
7 125-7 250 MHz 7 750-8 400 MHz	7 125-8 400 MHz	7 125-8 400 MHz
14.8-15.35 GHz	14.8-15.35 GHz	14.8-15.35 GHz



Direct to Device

Mobile satellite in IMT bands between **694/698 MHz** and **2.7 GHz**



New Mobile Satellite

1 427-1 432 MHz
1 645.5-1 646.5 MHz
1 880-1 920 MHz
2 010-2 025 MHz
2 120-2 170 MHz

Challenges

- Keeping industry united on positions for WRC-27
- Huge number of incumbents to gauge co-existence for new development spectrum
- Intricacies of new satellite projects fall inside and outside ITU

MOD

5.441B In Angola, Argentina, Armenia, Azerbaijan, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Chile, China, Colombia, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Eswatini, Russian Federation, Gabon, Ghana, Guinea, Iran (Islamic Republic of), Iraq, Kazakhstan, Lao P.D.R., Lesotho, Liberia, Madagascar, Malawi, Mali, Mongolia, Namibia, Niger, Uganda, Uzbekistan, the Dem. Rep. of the Congo, Kyrgyzstan, the Dem. People's Rep. of Korea, South Sudan, South Africa, Chad, Togo, Viet Nam, Zambia and Zimbabwe, the frequency band 4 800-4 990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. **9.21** with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density (pfd) produced by this station does not exceed $-155 \text{ dB(W/(m}^2 \cdot 1 \text{ MHz))}$ produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. Resolution **223 (Rev.WRC-23)** applies. (WRC-23)

ADD

5.A12 Stations in the mobile, except aeronautical mobile, service operating in the frequency band 3 300-3 400 MHz in Region 2 shall not cause harmful interference to, or claim protection from, systems operating in the radiolocation service. (WRC-23)

MOD

5.429D **In Region 2**, the use of the mobile, except aeronautical mobile, service in the frequency band 3 300-3 400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC-23). The use of the frequency band 3 300-3 400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-23)

MOD

5.434 In **Region 2**, the frequency band **3 600-3 700 MHz** is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Administrations wishing to implement IMT shall obtain the agreement of neighboring countries to ensure the protection of the fixed-satellite service (space-to-Earth). (WRC-23)

ADD

5.36A12 In the **Bahamas, Belize**, Brazil, Canada, Colombia, Costa Rica, United States, Guatemala, the French overseas departments and communities in Region 2, Greenland, **the overseas countries and territories within the Kingdom of the Netherlands in Region 2**, Paraguay, Peru, **Trinidad and Tobago** and Uruguay, the frequency band **3 700-3 800 MHz** is identified for use by any of these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to ensure the protection of the fixed-satellite service (space-to-Earth). (WRC-23)

ADD

5.6A12 The frequency bands 6 425-7 125 MHz in Region 1 and 7 025-7 125 MHz in Region 3 are identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution COM4/7 (WRC-23) applies.

The frequency bands are also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). (WRC-23)

ADD

5.6B12 In Cambodia, Lao P.D.R. and the Maldives, the frequency band 6 425-7 025 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution COM4/7 (WRC-23) applies. (WRC-23)

38

ADD

5.6C12 In **Brazil and Mexico**, the frequency band 6 425-7 125 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). The use of this frequency band for the implementation of IMT is subject to seeking agreement under No. 9.21 with neighboring countries. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution COM4/7 (WRC-23) applies.

The frequency band is also used for the implementation of wireless access systems (WAS), including radio local area networks

ADD

5.10B12 In the following countries in **Region 2**: Brazil, Colombia, Costa Rica, **Cuba, the Dominican Republic**, Ecuador, Guatemala, **Jamaica**, Mexico, Paraguay, Peru and Uruguay, the frequency band 10-10.5 GHz is identified for the implementation of the terrestrial component of International Mobile Telecommunications (IMT). The implementation of this identification in Mexico is subject to seeking agreement with the United States under No. 9.21. The use of the frequency band 10-10.5 GHz by IMT stations in the mobile service shall not claim protection from systems in the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution COM4/6 (WRC-23) applies. (WRC-23)

MOD

5.480 *Additional allocation:* in Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Paraguay, the overseas countries and territories within the Kingdom of the Netherlands in Region 2, Peru, Suriname and Uruguay, the frequency band 10-10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Venezuela, the frequency band 10-10.45 GHz is also allocated to the fixed service on a primary basis. (WRC-23) 42

MOD

5.481 *Additional allocation:* in Algeria, Germany, Angola, Brazil, China, Colombia, Costa Rica, Côte d'Ivoire, Cuba, Djibouti, the Dominican Republic, Egypt, El Salvador, Ecuador, Spain, Guatemala, Hungary, Jamaica, Japan, Kenya, Morocco, Mexico, Nigeria, Oman, Uzbekistan, Pakistan, Palestine*, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania, Somalia, Suriname, Tunisia and Uruguay, the frequency band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-23)

Agenda

ADD

5.A13D In Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, Benin, Burkina Faso, Burundi, Cameroon, Central African Rep., Comoros, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Eswatini, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Liberia, Libya, Madagascar, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Uzbekistan, Palestine*, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, South Africa, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, the frequency band 3 600-3 800 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of the frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The conditions of No. **5.A13A** shall apply.