

SPECTRUM HARMONIZATION AND REGULATORY ISSUES

6TH GLOBAL 5G EVENT – 5G TECHNOLOGY CHANGING PARADIGMS OF A NEW SOCIETY

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Bands Identified for IMT

- Rec. M-1036-5 (10/2015)

Band (MHz)	RR Footnote
450-470	5.286AA
698-960	5.313A, 5.317A
1 710-2 025	5.384A, 5.388
2 110-2 200	5.388
2 300-2 400	5.384A
2 500-2 690	5.384A
3 400-3 600	5.430A, 5.432A, 5.432B, 5.433A

- WRC-15: 470 – 698 MHz; **1427 – 1518 MHz**; 3300 – 3400 MHz; 3600 – 3700 MHz; 4800 – 4990 MHz (only 1.5 GHz is harmonized in Region 2)



5G NR-NSA

NR Operating Band	Uplink (UL) operating band BS receive UE transmit	Downlink (DL) operating band BS transmit UE receive	Duplex Mode
	F _{UL_low} – F _{UL_high}	F _{DL_low} – F _{DL_high}	
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL



Spectrum Designated for Personal Mobile Service

Start (MHz)	Stop (MHz)	BW (MHz)	Start (MHz)	Stop (MHz)	BW (MHz)
451	458	7	1805	1880	75
461	468	7	1885	1900	15
698	806	108	1920	1930	10
806	821	15	1930	1970	40
824	849	25	1970	1980	10
851	866	15	2110	2120	10
869	873	4	2120	2160	40
873	890	17	2160	2170	10
890	894	4	2300	2400	100
898,5	901	2,5	2500	2520	20
907,5	915	7,5	2520	2655	135
943,5	946	2,5	2655	2670	15
952,5	960	7,5	2670	2690	20
1710	1785	75	3400	3600	200

Below 1 GHz: 222 MHz

Between 1 and 3 GHz: 575 MHz

Above 3 GHz: 200 MHz

Spectrum for coverage,
capacity and performance;

TOTAL 997 MHz



WRC-19 – Item 1.13

IMT-2020: 33.25 GHz under study (mmWave)

1.13 to consider identification of frequency bands for the future development of IMT, including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238 (WRC-15)

Band (GHz)	Bandwidth (GHz)
24.25 – 27.5	3.25
31.8 – 33.4	1.6
37 – 43.5	6.5
45.5 – 50.2	4.7
50.4 – 52.6	2.2
66 – 76	10
81 – 86	5
<u>TOTAL:</u> 33.25 GHz a serem estudados para possível identificação.	



Conference Preparatory Meeting (CPM19-2)

In accordance with [Resolution ITU-R 2-7](#), the CPM shall prepare a consolidated Report on the ITU-R preparatory studies and possible solutions to the WRC agenda items, to be used in support of the work of World Radiocommunication Conferences.

Task Group (TG 5/1) was created as the responsible group for WRC-19 AI 1.13

TG 5/1 drafted the CPM text, which considers the following topics:

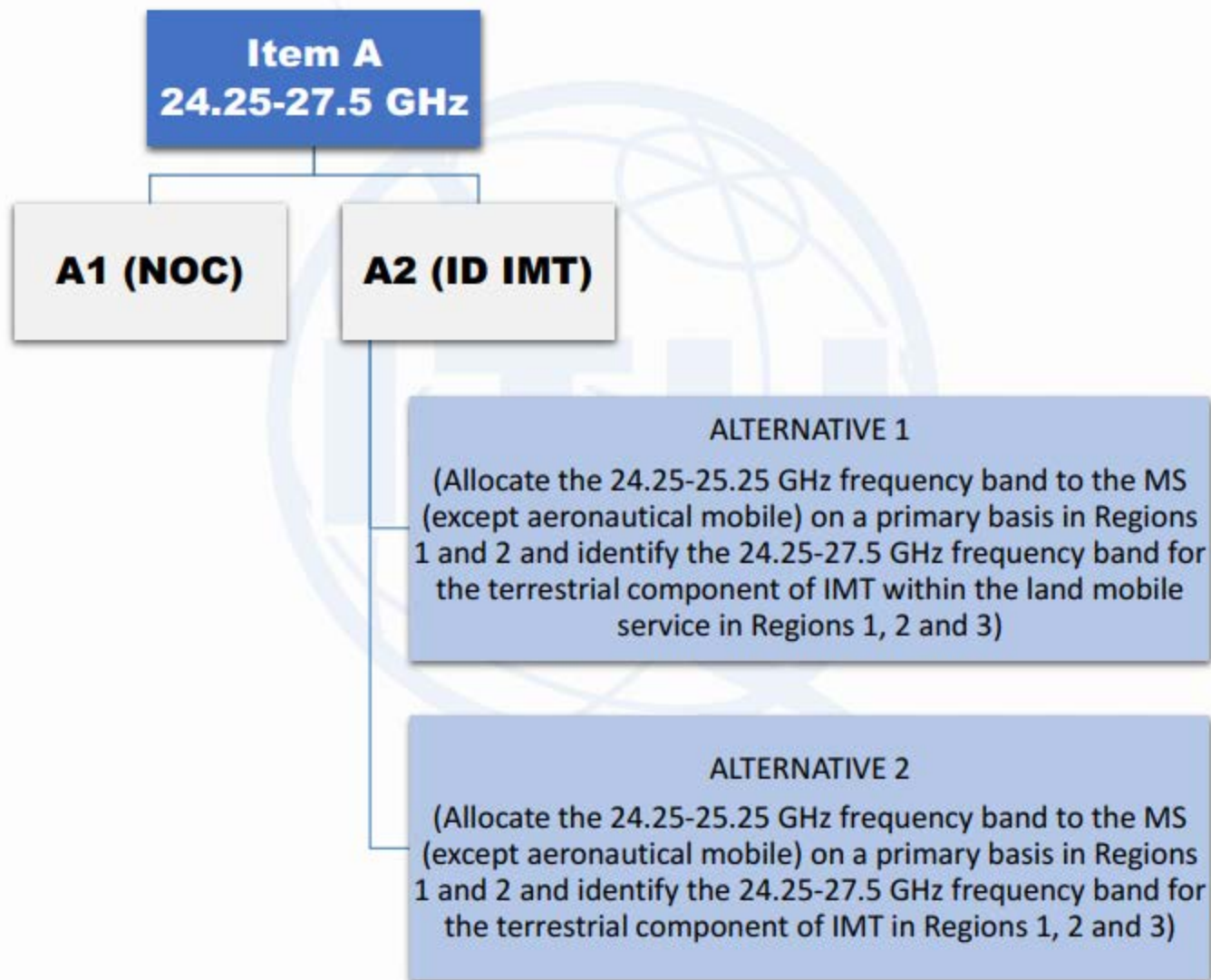
- 1. Spectrum needs*
- 2. Sharing and compatibility studies*
- 3. The methods to satisfy AI 1.13*
- 4. Regulatory and procedural considerations*

Methods, regulatory and procedural considerations sections are in divided from A to L Items:

<i>24.25-27.5 GHz (A)</i>	<i>42.5-43.5 GHz (E)</i>	<i>50.4-52.6 GHz (I)</i>
<i>31.8-33.4 GHz (B)</i>	<i>45.5-47 GHz (F)</i>	<i>66-71 GHz (J)</i>
<i>37-40.5 GHz (C)</i>	<i>47-47.2 GHz (G)</i>	<i>71-76 GHz (K)</i>
<i>40.5-42.5 GHz (D)</i>	<i>47.2-50.2 GHz (H)</i>	<i>81-86 GHz (L)</i>



Item A, Method A1 & A2 for AI 1.13



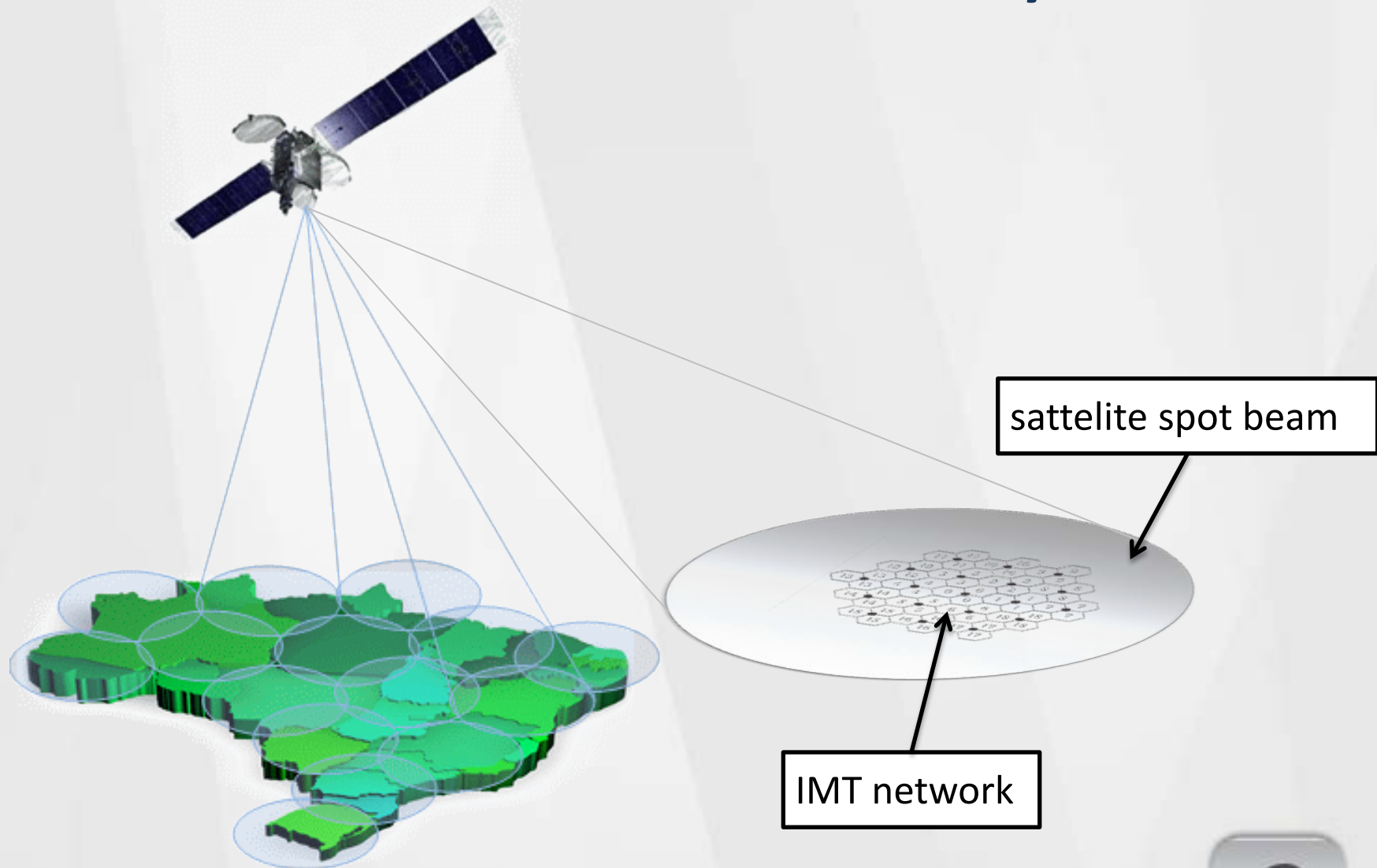
Item A, Method A1 & A2 for AI 1.13

Conditions for method A2

A2a	<ul style="list-style-type: none">• Protection measures for EESS (passive) in 23.6-24 GHz (Covers 3 different options)
A2b	<ul style="list-style-type: none">• Protection measures for EESS (passive) in 50.2-50.4 GHz and 52.6-54.25 GHz (Covers 3 different options)
A2c	<ul style="list-style-type: none">• Protection measures for earth stations in the SRS/EESS (Covers 4 different options)
A2d	<ul style="list-style-type: none">• Measures related to transmitting earth stations in the FSS (Earth-to-space) at known locations (Covers 4 different options)
A2e	<ul style="list-style-type: none">• Protection measures for the ISS and FSS (Earth-to-space) receiving space stations (Covers 9 different options)
A2f	<ul style="list-style-type: none">• Protection measures for the RAS (Covers 3 different options)
A2g	<ul style="list-style-type: none">• Protection measures for multiple services (Covers 4 different options)



SHARC – Sharing and Compatibility Between IMT-2020 and Other Radiocommunication Systems



Final Comments

- **We need a stable and predictable regulatory environment to:**
 - ✓ Facilitate the deployment of new technologies,
 - ✓ Improve service quality,
 - ✓ Country development.
- **We should not overprotect incumbent services;**
- **Brazil is making new frequency bands available for IMT (1.5 GHz; 2.3 GHz and 3.5 GHz);**
- **Brazil is working toward to release 26 GHz band right after WRC-19**
- **Keep an open and frank dialogue with all players.**



THANK YOU!

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