

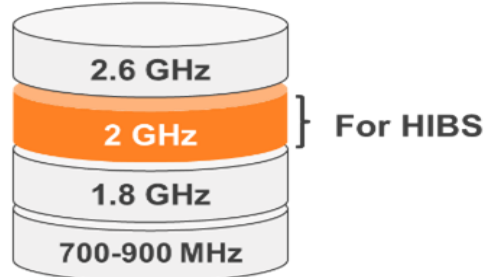
An aerial photograph of a mountain range, likely the Andes, with a thick layer of white clouds covering the lower slopes and valleys. The sky is a clear, deep blue. The text is overlaid on the upper portion of the image.

Updates on WRC-23 agenda item 1.4

July 27, 2023
SoftBank Corp.

WRC-23 Agenda Item 1.4

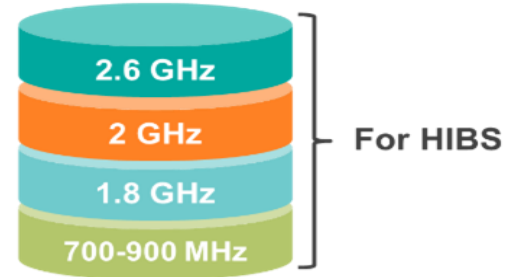
Current Regulation



NO FLEXIBILITY

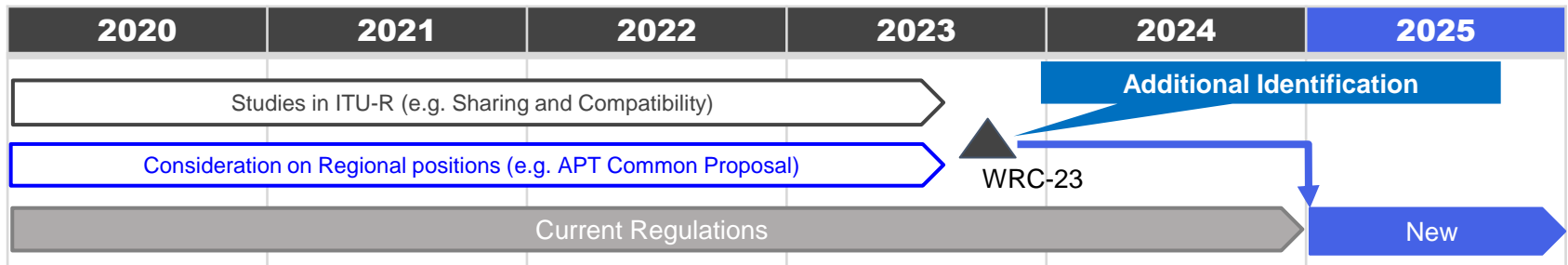
Only 2GHz is allowed in the RR

Candidate bands for WRC-23

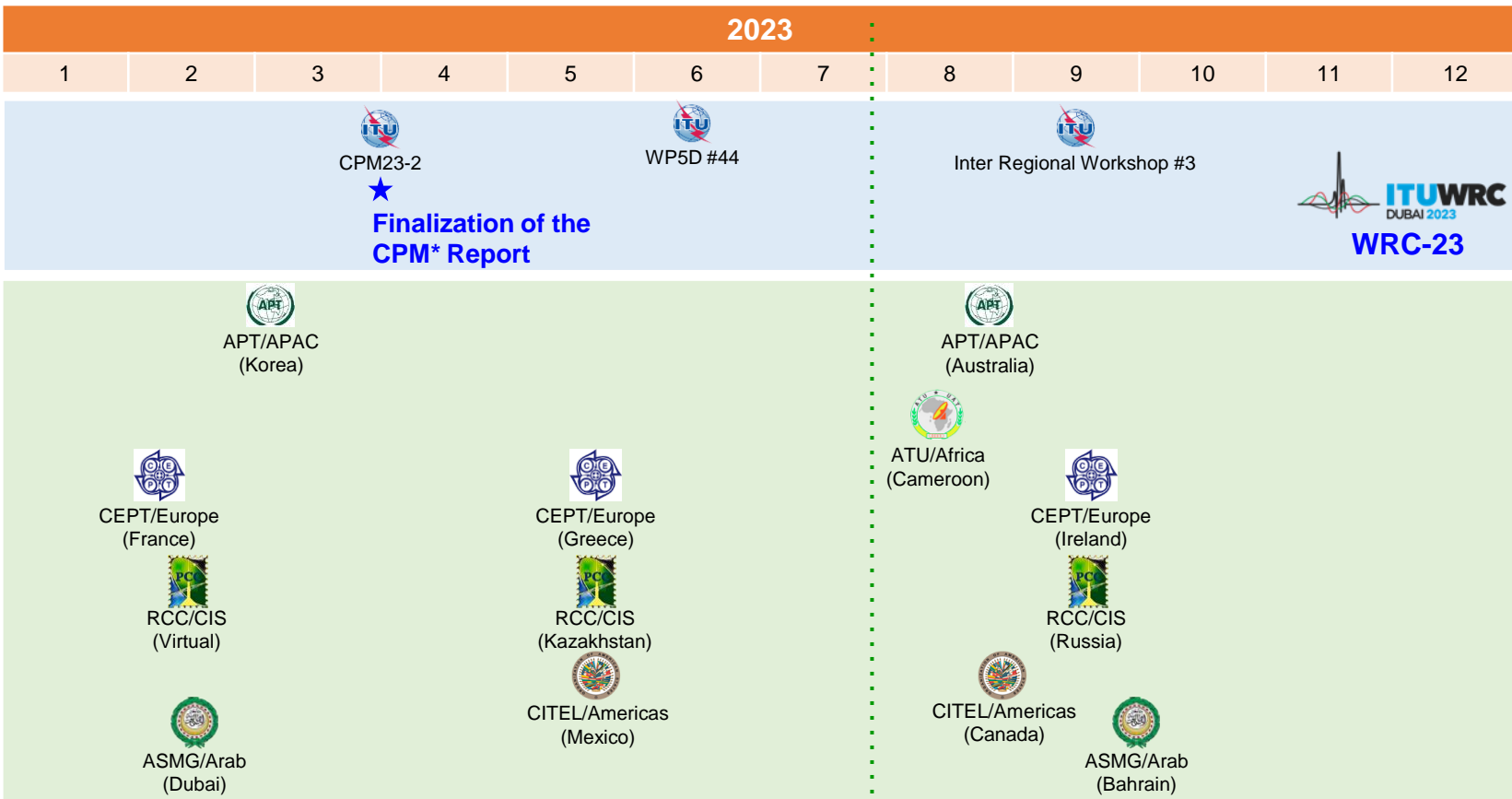


FLEXIBILITY

Originally proposed by 3 regions (CITEL, ATU and APT) as a new agenda item at WRC-19

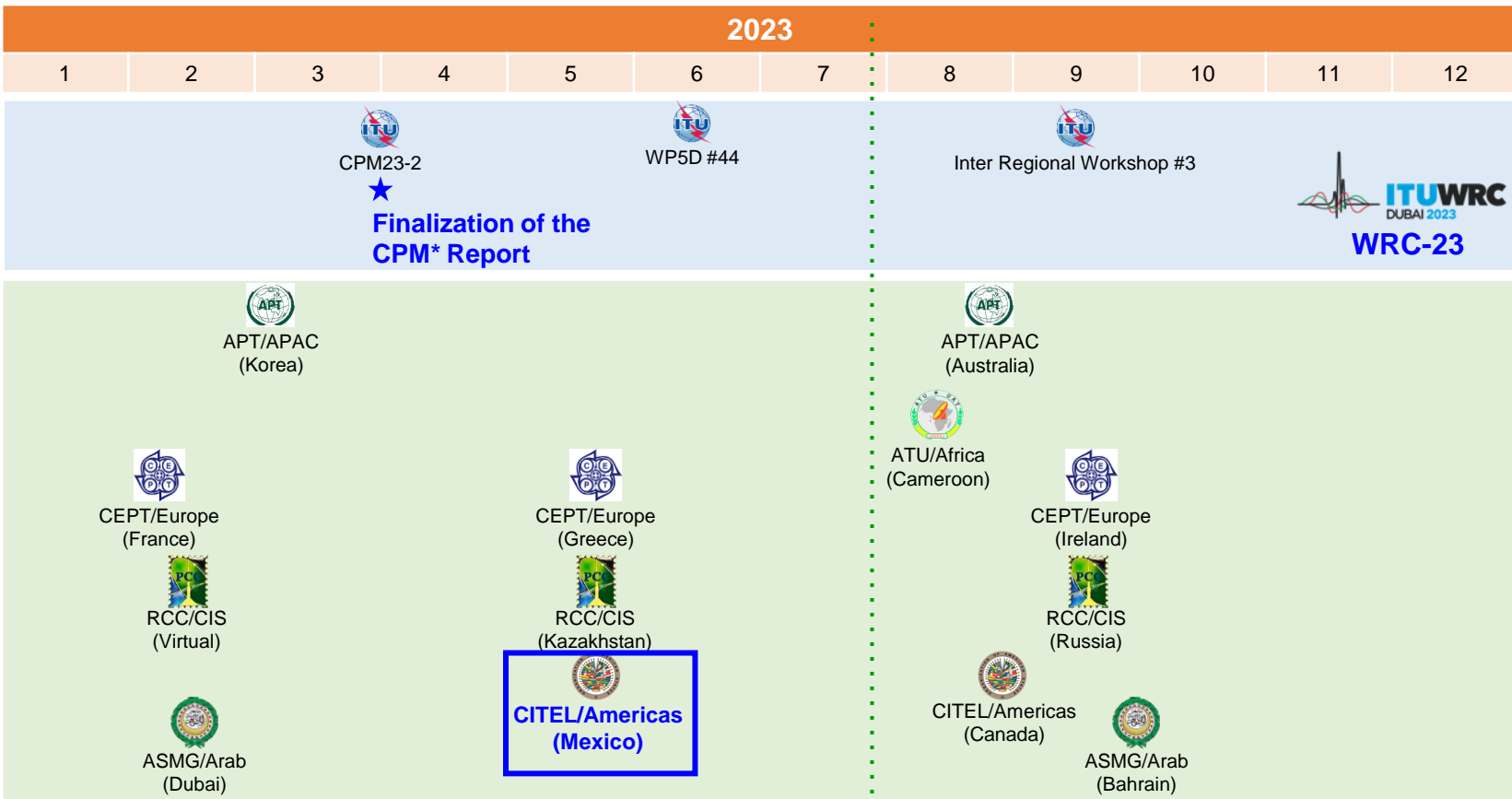


Overall schedule on WRC-23 AI 1.4



Today

Overall schedule on WRC-23 AI 1.4



Inter American Proposal (IAP) on AI 1.4

IAPs supporting Methods X2 (Identifications for HIBS globally) in the bands under AI1.4 were developed

700-900M

2G

2.6G

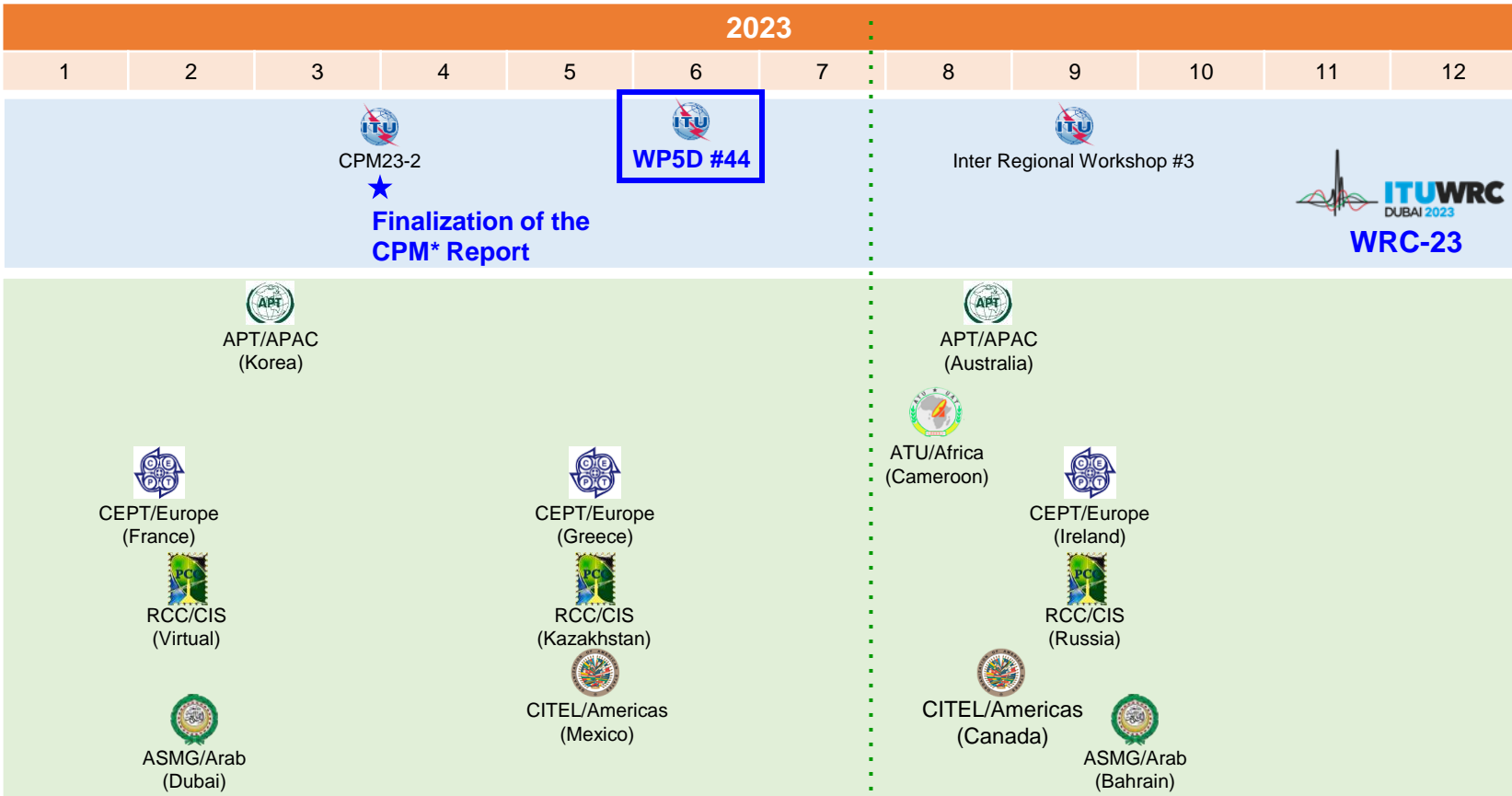
- IAPs supported by B, CLM, CTR, [DOM], EQA, GTM, MEX, URG, USA
 - Support Methods A2, C2 and D2 (Identifications for HIBS globally)

1.7G

- IAP supported by B, CLM, CTR, [DOM], EQA, GTM, MEX, URG
 - Support Method B2 (Identifications for HIBS globally)
- PP supported by USA
 - Support Method B1 (No change: NOC)

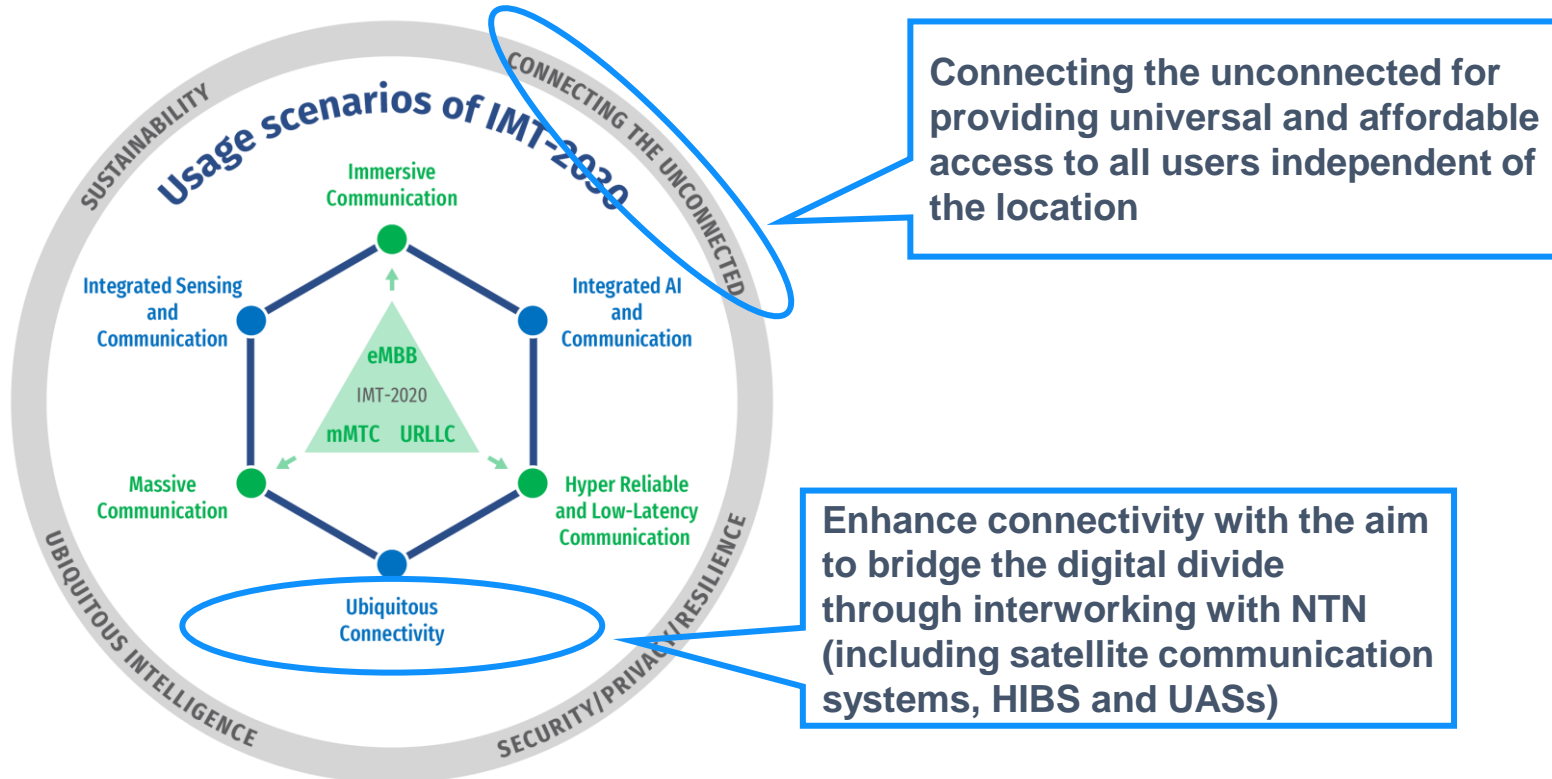
Current IAPs are preferable for HIBS industry members

Overall schedule on WRC-23 AI 1.4



IMT-2030 Framework (agreed by WP5D#44 in June 2023)

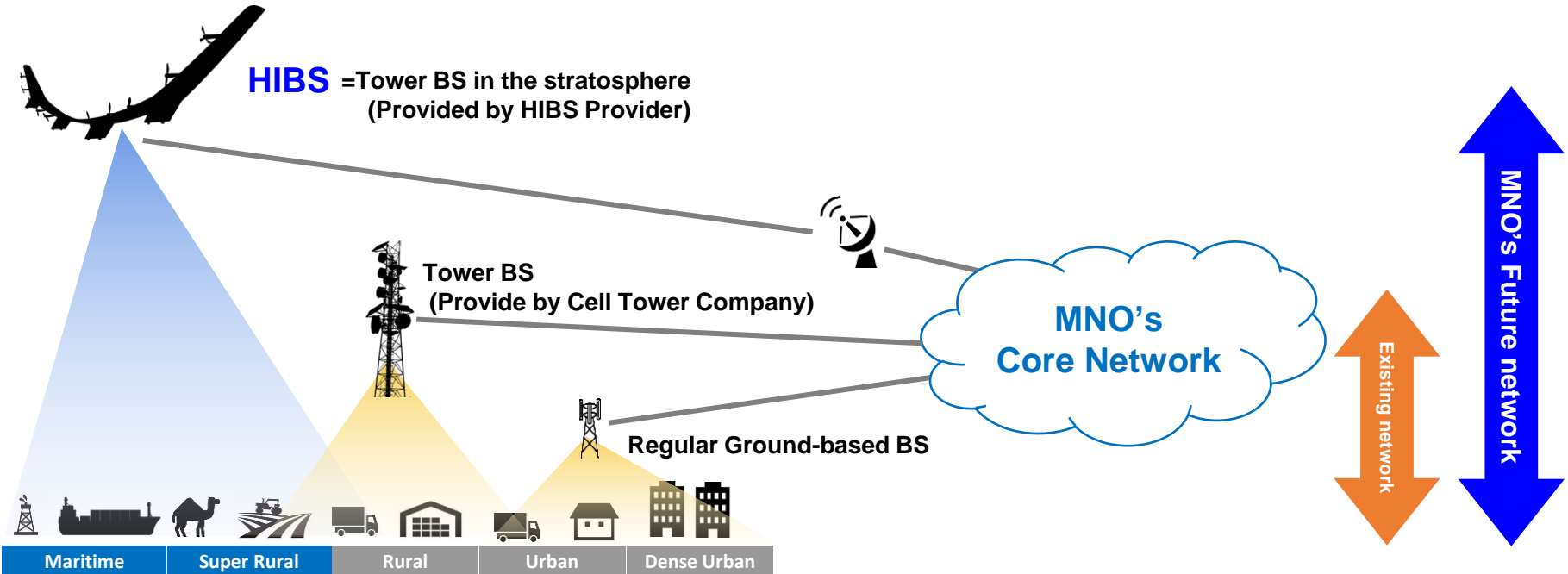
Usage scenarios and overarching aspects of IMT-2030



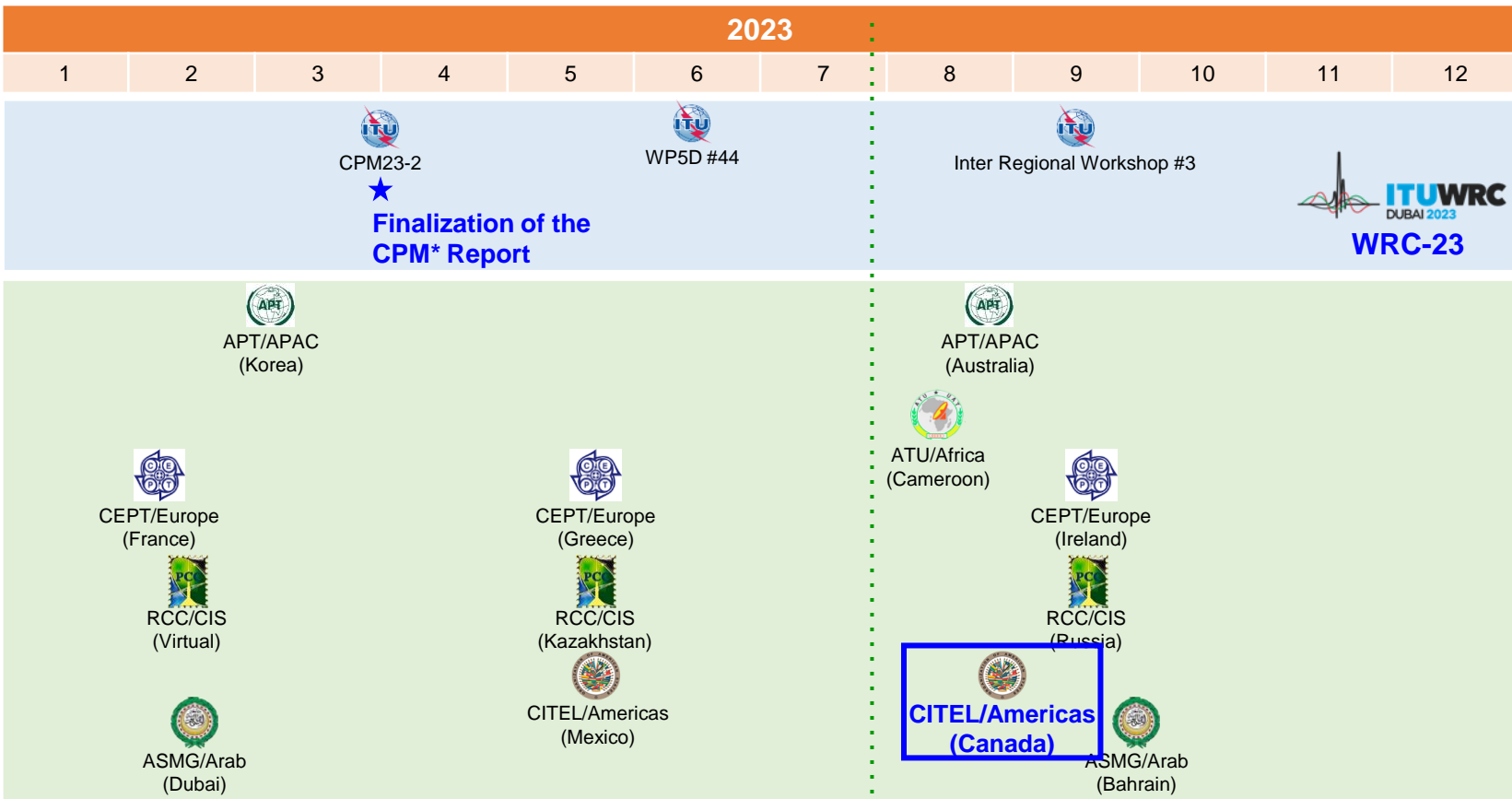
Future IMT networks

Interworking with NTN (HIBS) is key for next-gen communication

- ✓ “Connecting the Unconnected” and “Ubiquitous Connectivity” are important elements in 6G (IMT-2030) concept.
- ✓ HIBS would be used for MNOs as one of the cost-effective deployment methods to extend their service areas that were difficult to cover with conventional ground-based BS, like the current tower BS provided by Cell Tower Company.



Overall schedule on WRC-23 AI 1.4



Methods to satisfy WRC-23 AI 1.4

Issue A (694-960 MHz)

- A1: NOC (No change)
- A2: Identification for HIBS globally
- A3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference
- A4: Identification for HIBS per Region or country

Issue B (1 710-1 885 MHz) Issue C (1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz)

- B1/C1: NOC (No change)
- B2: Identification for HIBS globally
- B3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference
- B4: Identification for HIBS per Region
- C2: Review existing conditions
- C3: Review existing conditions not claiming protection and commitment to reduce unacceptable interference

Issue D (2 500-2 690 MHz)

- D1: NOC (No change)
- D2: Identification for HIBS globally
- D3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference
- D4: Identification for HIBS per Region

Methods to satisfy WRC-23 AI 1.4

Encourage support for the current IAPs based on Methods X2

Issue A (694-960 MHz)	
A1: NOC (No change)	IAP
A2: Identification for HIBS globally	
A3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference	
A4: Identification for HIBS per Region or country	

Issue B (1 710-1 885 MHz) Issue C (1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz)	
B1/C1: NOC (No change)	IAP
B2: Identification for HIBS globally	
B3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference	
B4: Identification for HIBS per Region	IAP
C2: Review existing conditions	
C3: Review existing conditions not claiming protection and commitment to reduce unacceptable interference	

Issue D (2 500-2 690 MHz)	
D1: NOC (No change)	IAP
D2: Identification for HIBS globally	
D3: Identification for HIBS globally not claiming protection and commitment to reduce unacceptable interference	
D4: Identification for HIBS per Region	

- ✓ Methods X2 (A2, B2, C2 and D2) enables a global harmonization and the introduction of national regulation for use of HIBS in many countries, while establishing the technical and regulatory conditions to protect existing services

Regulatory conditions to protect other services in IAPs

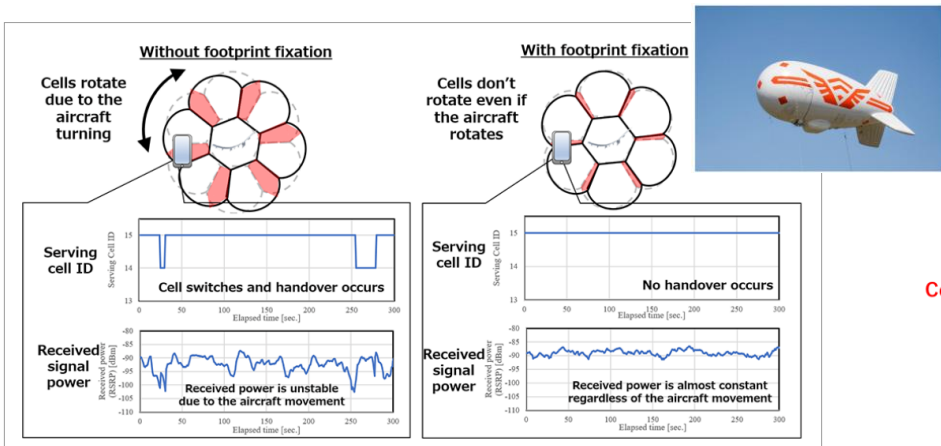
HIBS BAND 1 Issue A - (694-960 MHz)		HIBS BAND 2 Issue B - (1 710-1 885 MHz) Issue C - (1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz)		HIBS BAND 3 Issue D - (2 500-2 690 MHz)	
Land mobile	✓	Land mobile	✓	IMT	PFD
IMT	PFD	IMT	PFD	FS	PFD
ARNS	NO. 9.21 (DISTANCE)	FS	PFD	BSS	PFD
Broadcasting	NO. 9.21	SRS/SOS	DL ONLY	MSS	✓
ARNS adjacent	✓	AMS	✓	MSS adjacent	UNWANTED EMISSION
AM(R)S adjacent	✓	MetSat adjacent	UL ONLY	RDSS adjacent	UNWANTED EMISSION
[RAS 2 nd harmonics]	✓	MSS adjacent	PFD	ARNS adjacent	PFD
		FS adjacent	✓	Meteorological radars adj.	PFD
		SRS/SOS/EESS adj.	DL ONLY	RAS adjacent	PFD

- ✓ Technical and regulatory conditions are included in WRC Resolutions to ensure the protection of these services without any change to the provisions of existing services in RR.
⇒ IAPs support appropriate technical and regulatory conditions. Therefore, no impact on use of the bands by the existing services

Examples of flexible operations

- The following measures would ensure that HIBS does not simply maintain large separation distances, but provides connectivity near the border while protecting existing services. (See also [5D/1275](#)):

Footprint fixations



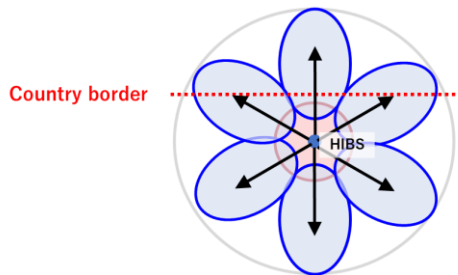
(e.g. Beamforming and mechanical adjustment of antenna direction)

- ✓ SoftBank successfully tested footprint fixation technology with high altitude tethered balloon system in June 2022.

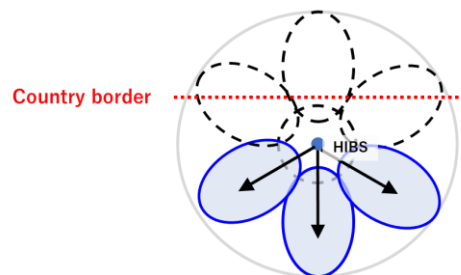
(URL:https://www.softbank.jp/en/corp/news/press/sbkk/2022/20220622_01/)

Beam suppression

Transmission with all antennas



Transmission suspending for 4 antennas



HAPS industry's views on WRC-23 AI 1.4

- ✓ HIBS would be used for MNOs as one of the cost-effective deployment methods in future IMT networks to extend their service areas that were difficult to cover with conventional ground-based BS.
- ✓ WRC-23 is timely opportunity to make enabling provisions for HIBS harmonized globally without negatively impacting existing services.
- ✓ Methods and regulatory conditions included in the current IAPs have a good balance between flexible operation of HIBS and appropriate protection of existing services.
- ✓ We encourage the CTU Member countries to positively consider supporting the current IAPs to be approved at the next PCCII meeting in August-September.

HAPS

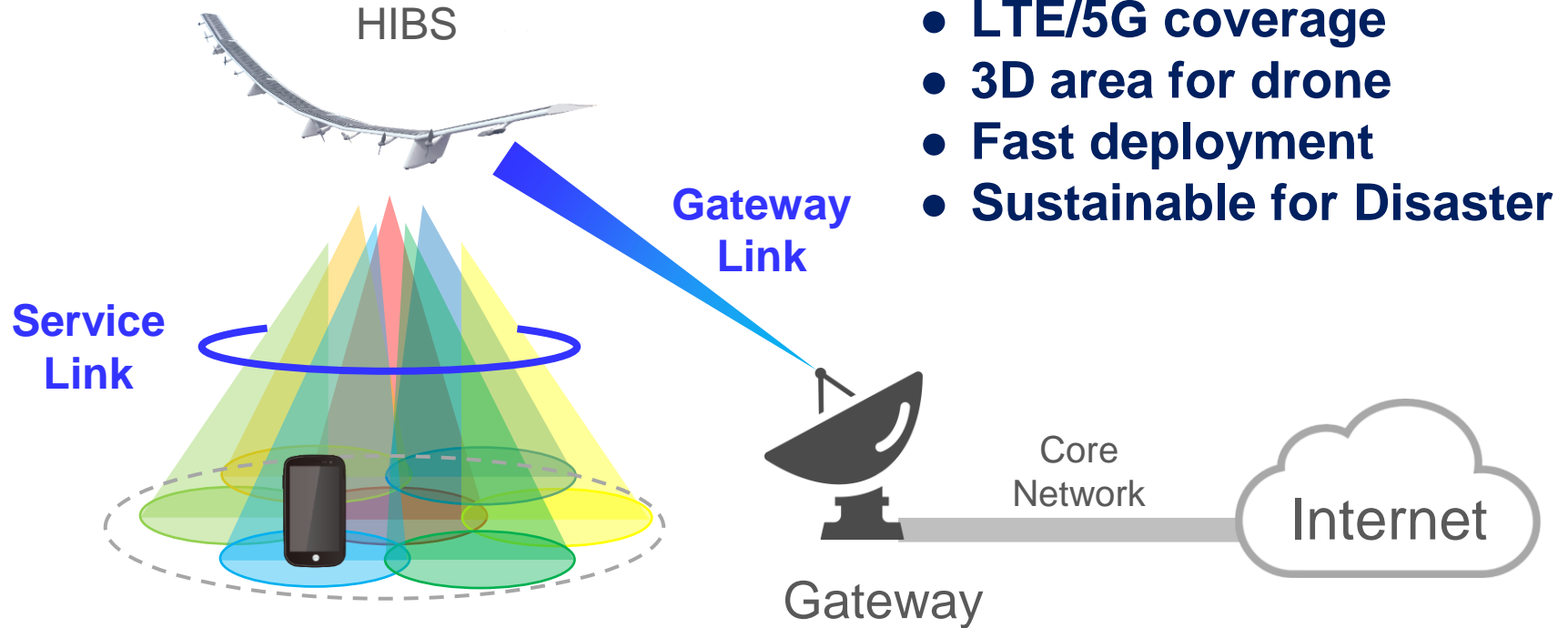
High Altitude Platform Station

Today's challenge will be tomorrow's normal



Appendix

Network structure of HIBS



Frequencies Available for HIBS

Mobile service (Service link)

1885-1980/2010-2025/2110-2170 MHz Region 1, 3
1885-1980/2110-2160 MHz Region 2

694-960 MHz

1710-1885 MHz

2500-2690 MHz

Consideration for appropriate modification in WRC-23 AI1.4

Consideration for additional identification in WRC-23 AI1.4

Fixed service (Feeder link)

6440-6520/6560-6640 MHz 5 countries

21.4-22 GHz Region 2

24.25-27.5 GHz Region 2

27.9-28.2 GHz 24 countries

31-31.3 GHz Worldwide

38-39.5 GHz Worldwide

47.2-47.5/47.9-48.2 GHz Worldwide

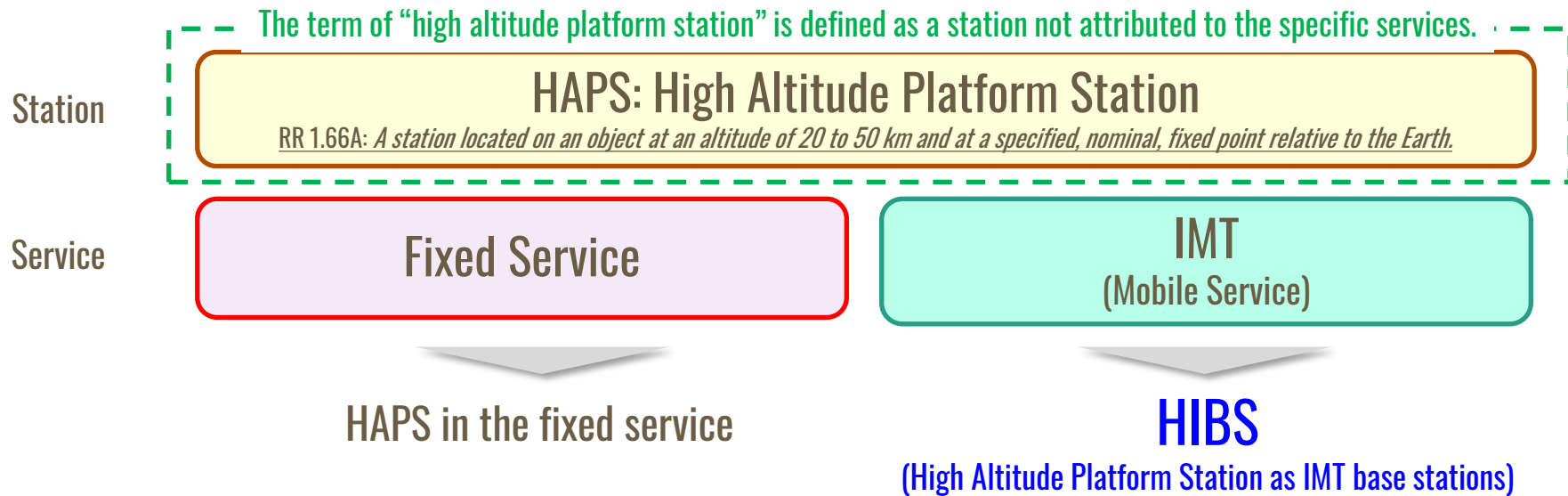
WRC-23 Agenda Item 1.4

1.4 to consider, in accordance with Resolution **247 (WRC-19)**, the use of highaltitude platform stations as IMT base stations (HIBS) in the mobile service in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level;

resolves to invite the ITU Radiocommunication Sector in Resolution 247

- 1 to study spectrum needs, as appropriate, for high-altitude platform stations as IMT base stations to provide mobile connectivity in the mobile service taking into account:
 - the existing identification in *2GHz frequency band*;
 - the usage and deployment scenario envisioned for high-altitude platform stations as IMT base stations as complementary for terrestrial IMT networks;
 - the technical and operational characteristics and requirements of high-altitude platform stations as IMT base stations;
- 2 to conduct and complete in time for WRC-23, taking into account the results of studies already performed and those in progress within ITU-R, sharing and compatibility studies to ensure the protection of services, without imposing any additional technical or regulatory constraints in their deployment, to which the frequency band is allocated on a primary basis, including other IMT uses, existing systems and the planned development of primary allocated services, and adjacent services, as appropriate, for certain frequency bands below 2.7 GHz, or portions thereof, globally or regionally harmonized for IMT, i.e.:
 - 694-960 MHz;
 - 1 710-1 885 MHz (1 710-1 815 MHz to be used for uplink only in Region 3);
 - 2 500-2 690 MHz (2 500-2 535 MHz to be used for uplink only in Region 3, except 2 655-2 690 MHz in Region 3);
- 3 to study appropriate modifications to the existing footnote and associated resolution in the identification in *recognizing b*) in order to facilitate the use of high-altitude platform stations as IMT base stations with the latest radio interface technologies of IMT;
- 4 to study the definition of high-altitude platform stations as IMT base stations (HIBS) including possible modifications to the provisions of the Radio Regulations, as appropriate;
- 5 to develop ITU-R Recommendations and Reports, as appropriate, taking into account *resolves to invite ITU-R 1, 2, 3, and 4 above*,

HIBS definition in the Radio Regulations (RR)



HIBS is still addressed as “high altitude platform station” as per RR1.66A in ITU-R studies.

- ✓ The only issues is operational altitude of HIBS: Although RR 1.66A defines the altitude of HAPS (20-50 km), operational altitude lower than 20 km should also be allowed for flexible operation of HIBS considering the stratospheric environment.

➔ Discussion on HIBS definition under WRC-23 AI1.4 can be focused on the regulation of operational altitude.

EOF