Towards the World Radiocommunication Conference 2019

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Summary

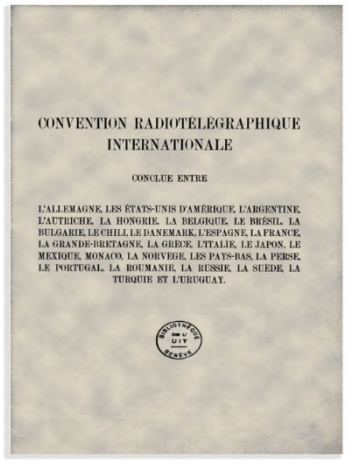
1. Radio Regulations overview
2. WRC's Role and Cycle
3. WRC-19 preparation process
4. WRC-19 Agenda Items (AI) dealing with broadband
5. WRC-19 Challenges

112 YEARS OF INNOVATION

1906 → **2018**

From the first **International Radiotelegraph Convention**

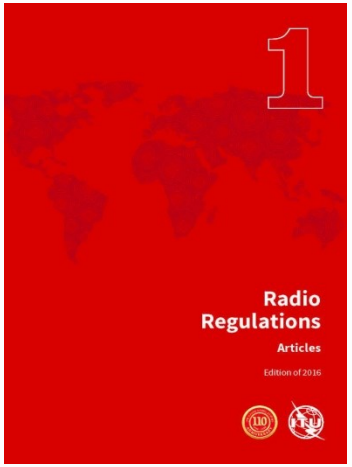
to the current **Radio Regulations**


CONVENTION RADIOTÉLÉGRAPHIQUE INTERNATIONALE

CONCLUE ENTRE

L'ALLEMAGNE, LES ÉTATS-UNIS D'AMÉRIQUE, L'ARGENTINE, L'AUTRICHE, LA HONGRIE, LA BELGIQUE, LE BRÉSIL, LA BULGARIE, LE CHILI, LE DANEMARK, L'ESPAGNE, LA FRANCE, LA GRANDE-BRETAGNE, LA GRÈCE, L'ITALIE, LE JAPON, LE MEXIQUE, MONACO, LA NORVÈGE, LES PAYS-BAS, LA PERSE, LE PORTUGAL, LA ROUMANIE, LA RUSSIE, LA SUÈDE, LA TURQUIE ET L'URUGUAY.

Radio Regulations follow and anticipate technological advancements



RADIO REGULATIONS (RR)

RR are the international rules governing the use of radio spectrum and satellite orbits.

- **International Treaty** ratified by governments → Mandatory
- **Rights and obligations** of ITU Member States when using spectrum/orbit resources
- **Long term commitment** from regulators and governments worldwide → Stable regulatory environment
- **Updated every 3-4 years** by World Radiocommunication Conferences (WRCs)

Goals:

- Interference-free operations
- Harmonization of spectrum/orbit use

WRC, RRB and RA

WRC (World Radiocommunication Conference)

- Reviews and revises the Radio Regulations and sets the draft agenda for the following WRC
- Held every 3 to 4 years

RRB (Radio Regulations Board)

- Approves Rules of Procedure to be used by the Radiocommunication Bureau
- Addresses matters which cannot be resolved through the application of the Radio Regulations and Rules of Procedure and provides advice to Radiocommunication Conferences and RA

RA (Radiocommunication Assembly)

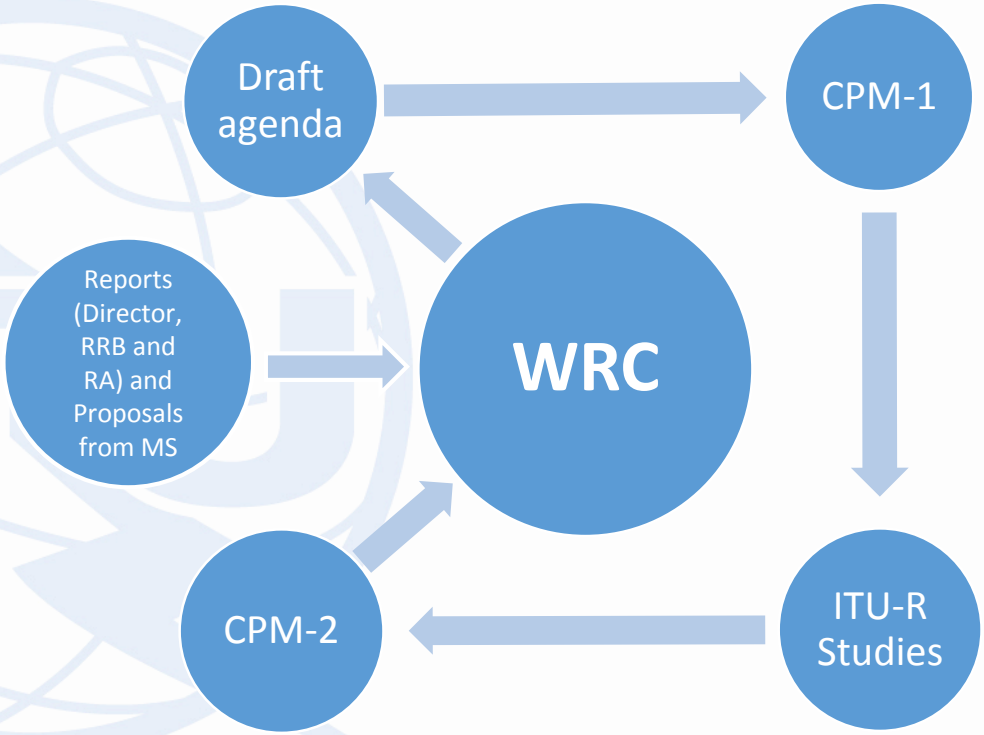
- Defines the structure and programme of radiocommunication studies and approves Studies, Recommendations and Questions developed by ITU-R Study Groups.
- Normally convened every 3 to 4 years and associated in time and place with WRC

WRCs ROLE

- Allocate **spectrum/orbit resources** for emerging radio applications, while protecting the existing usage
- Maintain the **right balance** between the spectrum requirements of all radiocommunication services
- Achieve **global spectrum harmonization** for economies of scale and interoperability of the equipment
- Create **regulatory certainty** for users, regulators and telecommunication industry

THE WRC CYCLE

- **Agenda**: Established by WRC for the next WRCs (final agenda is approved by ITU Council 2 years before WRC)
- **CPM-1** (Conference Preparatory Meeting): Coordinates the work programmes of ITU-R Study Groups and prepares the draft structure of the CPM Report
- **ITU-R Studies**: Heart of WRC preparations, development of its technical/regulatory basis
- **CPM-2**: Prepares the consolidated Report that will be used by WRC
- **Reports**: BR Director, RRB and RA submit their Reports as contributions to WRC



WRC-19 AGENDA

- The provisional Agenda was established by WRC-12 and the **draft Agenda** was established by WRC-15 (Resolution 809)
- The **final Agenda** was adopted by ITU Council 2017 (Resolution 1380)
- **www.itu.int/oth/R1402000001**

DRAFT CPM REPORT TO WRC-19

Chapters of the Report

- **Chapter 1** - Land mobile and fixed services - Ms K. ZHU (China)
- **Chapter 2** - Broadband applications in mobile service - Mr J Arias Franco (Mexico)
- **Chapter 3** - Satellite services – Mr N. Varlamov (Russia)
- **Chapter 4** - Science services – Mr V. Meens (France)
- **Chapter 5** - Maritime, aeronautical and amateur services - Mr El Sayed (Egypt)
- **Chapter 6** - General issues – Mr P.N. Ngige (Kenya)

Structure of texts

- **Executive summary**
- **Background**
- **Summary and analysis of ITU-R studies**
- **Methods to satisfy the Agenda Item**
- **Regulatory and procedural considerations**

WRC-19 STUDIES

Web page with up-to-date information on the work of the different groups:

www.itu.int/go/rcpm-wrc-19-studies

Agenda Item

WRC Resolution

ITU-R Responsible Group

Latest documents

Resolution 809 (WRC-15) contains the WRC-19 agenda.

WRC-19 agenda item (Chapter)	Issue	WRC Resolution (*)	Responsible Group(s)	Information from Responsible Group(s)
1		-	-	-
1.1 (5)		Res. 658 (WRC-15)	WP 5A	Doc. 5A/469 Sections 3.3 & 4 and Annexes 4 (c), 5 (b) & 14 Doc. 5A/298 Annex 15
1.2 (4)		Res. 765 (WRC-15)	WP 7B	Doc. 7B/170 Section 3.3.1 and Annexes 1 (c), 2 (b), & 18
1.3 (4)		Res. 766 (WRC-15)	WP 7B	Doc. 7B/170 Section 3.3.2 and Annexes 3 (c), 4 (b), & 19
1.4 (3)		Res. 557 (WRC-15)	WP 4A	Doc. 4A/364 Section 4.1.1 and Annexes 7, 29 (b) and 30 (c)
1.5 (3)		Res. 158 (WRC-15)	WP 4A	Doc. 4A/364 Section 4.1.2 and Annexes 8 to 11, 19, 31 (b) & 32 (c)
1.6 (3)		Res. 159 (WRC-15)	WP 4A	Doc. 4A/364 Section 4.1.3 and Annexes 5, 12, 13, 33 (b) & 34 (c)
1.7 (4)		Res. 659 (WRC-15)	WP 7B	Doc. 7B/170 Section 3.1.6 and Annexes 5 (c), 6 (b), 7, 8, 9 & 20
1.8 (5)		Res. 359 (Rev.WRC-15)	WP 5B (1)	Doc. 5B/305 Sections 2.1.1 & 3.3.1.2 and Annexes 1 (c) & 2 (b) Doc. 4C/192 Sections 3.2.3 & 4.2 and Annexes 14, 15 (c), 17
1.9 / 1.9.1 (5)		Res. 362 (WRC-15)	WP 5B	Doc. 5B/305 Sections 2.1.1 & 3.3.1.3 and Annexes 3 (c), 5 (b), 22 & 23
1.9 / 1.9.2 (5)		Res. 360 (Rev. WRC-15)	WP 5B	Doc. 5B/305 Sections 2.1.1 & 3.3.1.4 and Annexes 5 (c), 6 (b)

REGIONAL PREPARATIONS

- They consolidate **views at regional level**, assist in interregional discussions, facilitate reaching a common understanding, and save time during WRCs (6 views instead of 193)
- The role of the 6 Regional Telecommunication Organizations is constantly growing, both before and during WRCs
- In WRC-15 out of 678 documents 66% were common proposals
- ITU-R facilitates the coordination between regions by organizing **ITU Inter-regional Workshops**

Asia-Pacific Telecommunity (APT)

Arab Spectrum Management Group (ASMG)

African Telecommunications Union (ATU)

European Conference of Postal and Telecommunications Administrations (CEPT)

Inter-American Telecommunication Commission (CITEL)

Regional Commonwealth in the Field of Communications (RCC)

ITU INTER-REGIONAL WORKSHOPS

- They facilitate the coordination between regions
- They provide an opportunity to exchange views and have a better understanding of the draft common views, positions and/or proposals.
- Issues can be discussed informally

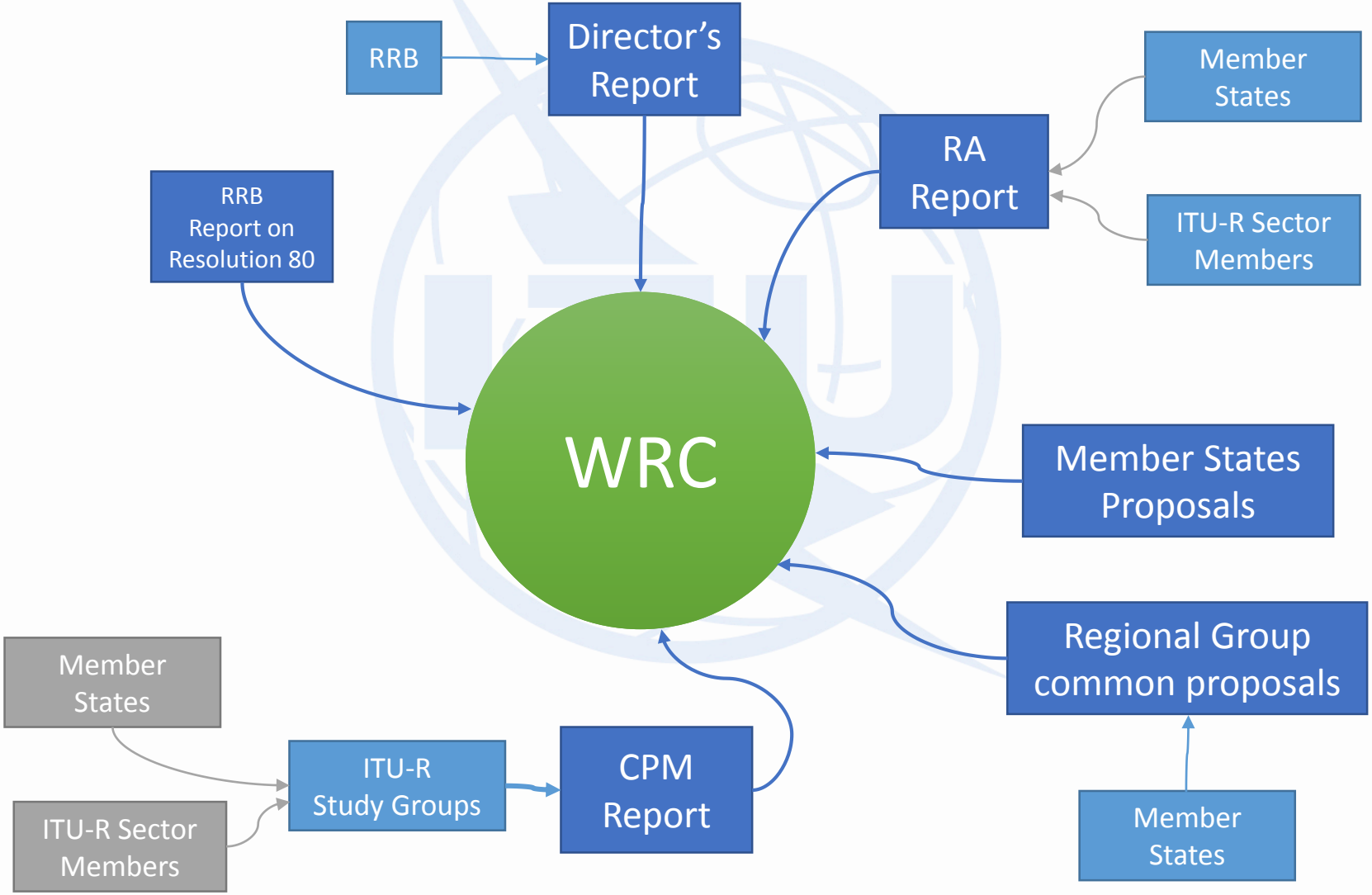
WRC-19 INTER-REGIONAL WORKSHOPS

- **1st -** 21-22 November 2017, Geneva
  - Presentation and review of the on-going Studies from ITU-R Study Groups
  - Positions of regional groups and international organizations

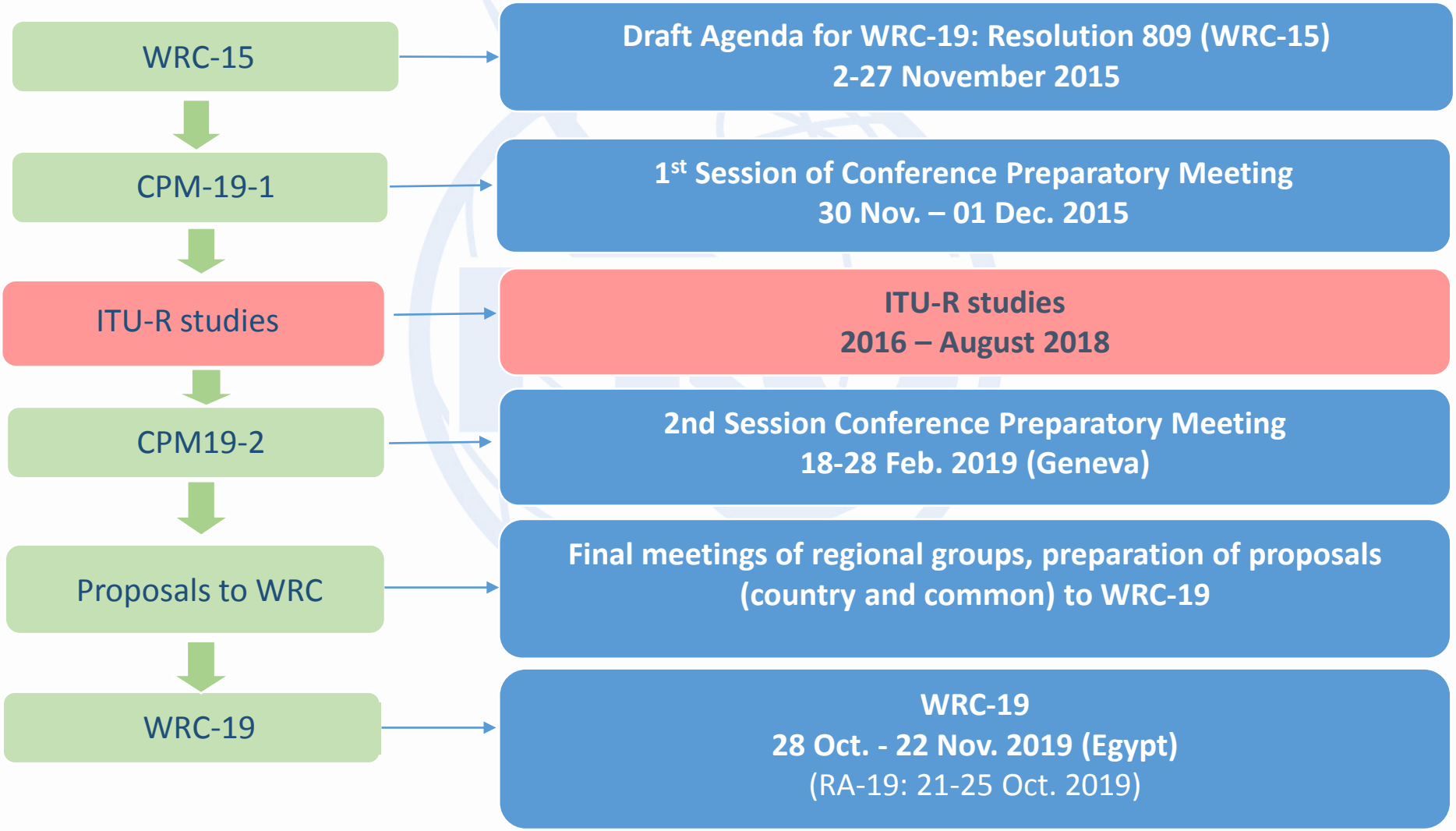
- **2nd -** 21-23 November 2018, Geneva
  - Presentation of the draft CPM report.
  - Positions and common proposals for CPM-2 of the regional groups and international organizations

- **3rd** – Q3 2019, Geneva
  - Presentation of CPM & Director's Reports to WRC-19
  - Positions and common proposals to WRC from regional groups and international organizations

CONTRIBUTIONS TO THE WRC



WRC-19 PREPARATIONS



WRC-19 AGENDA ITEMS (AI) RELATED TO BROADBAND

- **1.13**: International Mobile Telecommunications (**IMT**)
  Responsible ITU-R Group: **TG 5/1**

- **1.14**: High-Altitude Platform Stations (**HAPS**)
  Responsible ITU-R Group: **WP 5C**

- **1.16**: Wireless Access Systems (**WAS**) and Radio LANs (**RLAN**)
  Responsible ITU-R Group: **WP 5A**

- **9.1.8**: Broadband Machine-Type Communications (**MTC**)
  Responsible ITU-R Group: **WP 5D**

IMT (AI 1.13)

“to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238”

- **Resolution 238 (WRC-15)** established the need of studies to determine the IMT spectrum needs between 24.25 – 86 GHz

- IMT-2020 (5G) needs spectrum within three key frequency ranges to deliver widespread coverage and support all use cases: Sub-1 GHz, 1-6 GHz and above 6 GHz

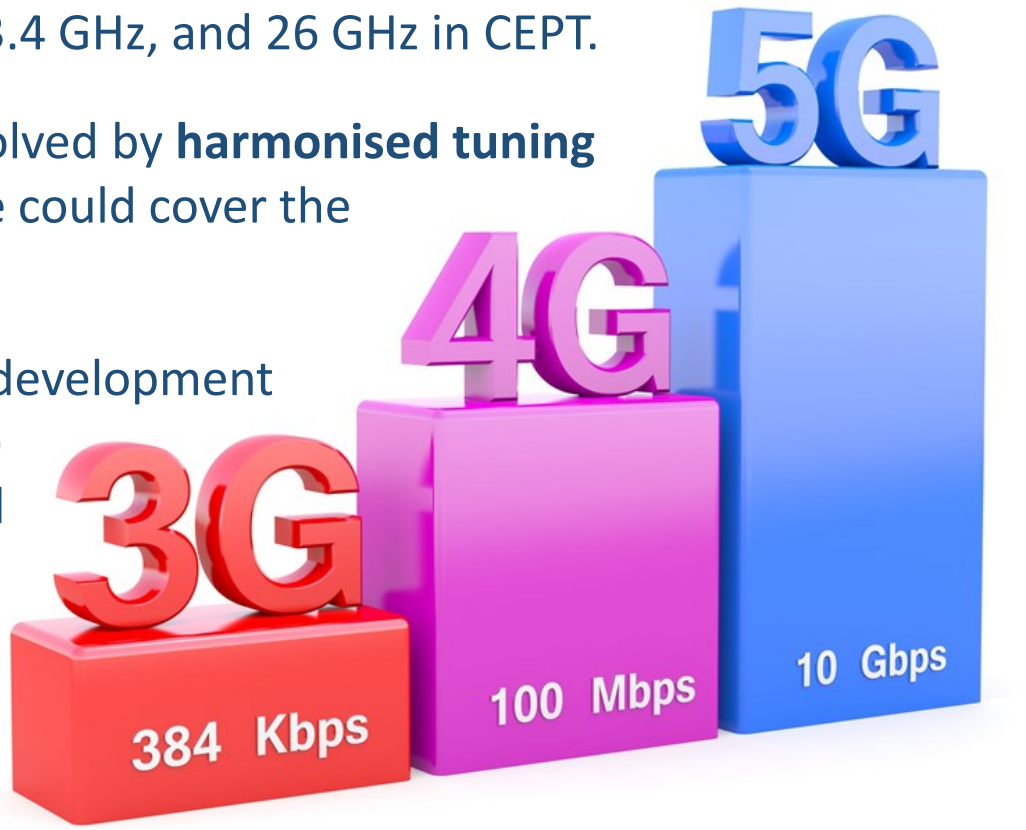
IMT SPECTRUM ALLOCATION

Sharing and compatibility studies are to be conducted on the following bands (Res. 238)

Existing mobile allocation	Possible additional allocation
24.25 GHz – 27.5 GHz	31.8 – 33.4 GHz
37 – 40.5 GHz	40.5 – 42.5 GHz
42.5 – 43.5 GHz	
45.5 – 47 GHz	47 - 47.2 GHz
47.2 -50.2 GHz	
50.4 – 52.6 GHz	
66 – 76 GHz	
81 – 86 GHz	

CONSIDERATIONS ON IMT SPECTRUM

- **Growing consensus** of countries, regional groups and industry on some initial 5G bands: 700 MHz, 3.4 GHz, and 26 GHz in CEPT.
- Regional differences could be resolved by **harmonised tuning ranges**, e.g. a 40 GHz tuning range could cover the 38 GHz and 42 GHz bands.
- **Bands above 24 GHz** (worldwide development concentrates on 24.25-43.50 GHz) are critical for IMT-2020. They will provide wide channels, high data rates and backhaul links to base stations.



HAPS (AI 1.14)

HAPS: High-Altitude Platform Stations

- **Resolution 160 (WRC-15)** calls for a study on additional bands for HAPS in Fixed Service allocations:
  - globally: 38-39.5 GHz, and
  - regionally: in R2: 21.4-22 GHz and 24.25-27.5 GHz

- **Existing allocations:**
  - 2 GHz (170 MHz in Regions 1 and 3) – MS
  - 6.5 GHz (2x80 MHz in 5 countries) – FS
  - 27/31 GHz (2x300 MHz, 23 countries)- FS
  - 47/48 GHz (2x300 MHz worldwide) - FS

- The above bands have geographical limitations and may be not large enough to provide **high-rate broadband** (about 10 Gbps for mobile service backhaul needed -> 2 GHz bandwidth)

WAS and RLANs (AI 1.16)

WAS: Wireless Access Systems
RLANs: Radio Local Area Networks

- **Resolution 239 (WRC-15)** calls to conduct compatibility and sharing studies for WAS/RLAN applications between 5 150 and 5 925 MHz
- Growth in demand for WAS
- Worldwide harmonized spectrum for WAS/RLANs is highly desirable (economies of scale and compatibility of equipment)

mMTC and URLLC (AI 9.1.8)

mMTC: massive Machine Type Communications
URLLC: Ultrareliable and Low Latency Communications

- **Resolution 958 (WRC-15)** calls for studies on technical aspects as well as spectrum needed to support the implementation of MTC
- Internet of Things (IoT) is growing very fast (20 billion devices estimated by 2030)
- Low latency of 1 ms and high mobility up to 500 km/h are important for mission critical services (example: self driving cars)
- 5G networks might support a number of such applications: connected cars, connected drones, wireless robotics, etc.

WRC-19 CHALLENGES

- WRC-19 will consider virtually all radiocommunication services
- The main focus will be on broadband technologies provided by different platforms, e.g. GSO space, NGSO, IMT, HAPS, WiFi, etc.
- Several technologies target the same bands -> need for studies between them

1.6 – NGSO FSS Res. 159 (WRC-15)	1.13 – IMT Res. 238 (WRC-15)	1.14 – HAPS Res. 160 (WRC-15)	9.1 (9.1.9) – FSS Res. 162 (WRC-15)
	24.25-27.5	24.25-27.5 (Reg. 2)	
37.5-39.5 (s-E*)	37-40.5	38-39.5 (globally)	
39.5-42.5 (s-E*)	40.5-42.5		
47.2-50.2 (E-s*)	47.2-50.2		
50.4-51.4 (E-s*)	50.4-52.6		51.4-52.4 (E-s*)
* E-s: Earth-to-space; s-E: space-to-Earth.			

Thank you!

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