



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Bundesamt für Kommunikation
Konzessionen und Frequenzmanagement

Standardisierungsaktivitäten zu 5G im mmW-Bereich

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19.06.2019



Standardisation and Regulation

Overview

Standard Developing Organisations SDOs

Development of technical standards

Allow production and deployment of standardised products

Provide product interoperability

SDOs: National, Regional, Global

- ETSI in Europe
- 3GPP (7 national/regional SDOs)



Regulatory Bodies

Administrations

Industry Forums

Regulatory and legal requirements for communications systems

Efficient spectrum use

Licensing conditions

- National level (OFCOM)
- Regional level (CEPT for Europe)
- Global level (ITU)



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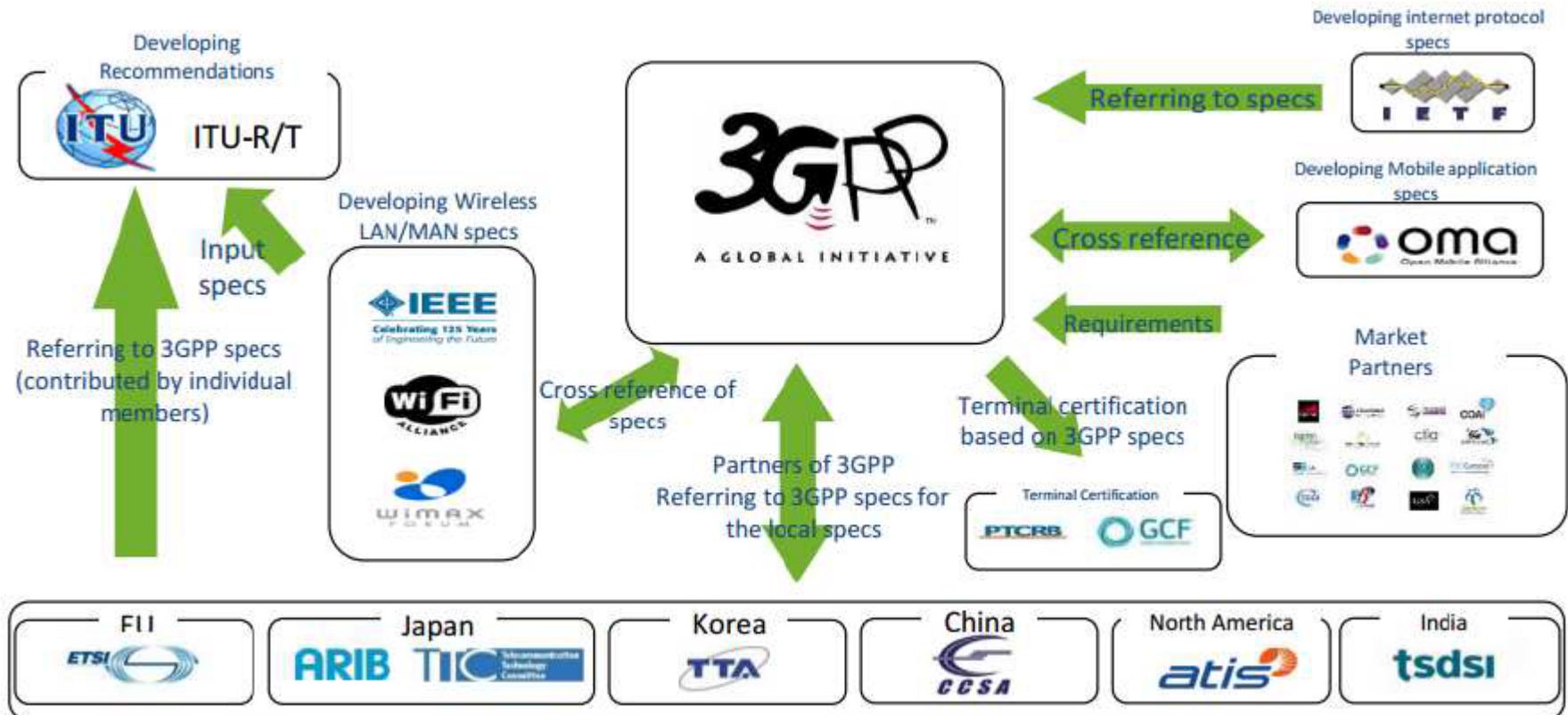
Office fédéral de la communication OFCOM

Industry lead groups promoting specific technologies



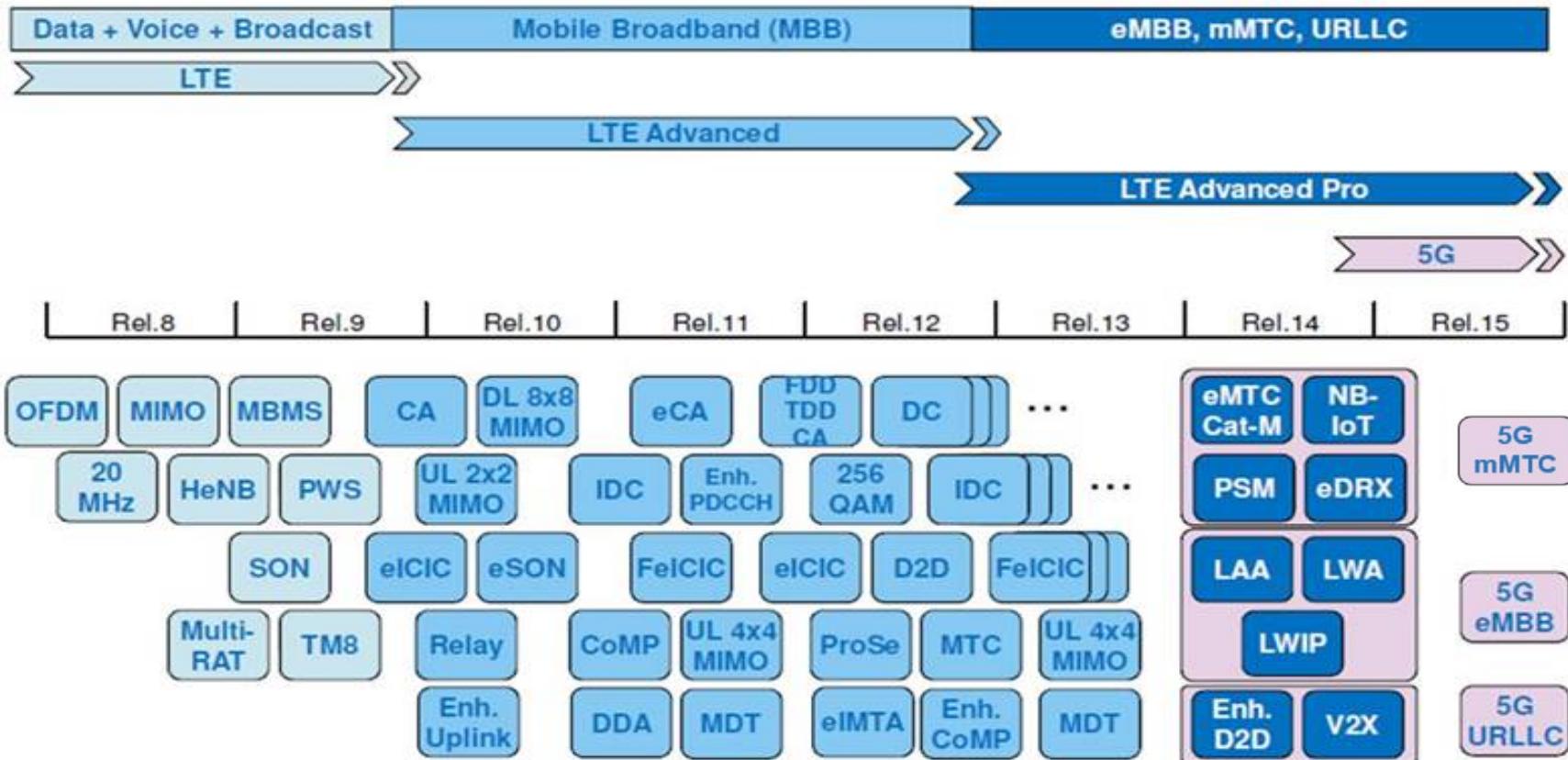


➤ Eco-System der 3. Generation (3GPP)





➤ 3GGP Planning



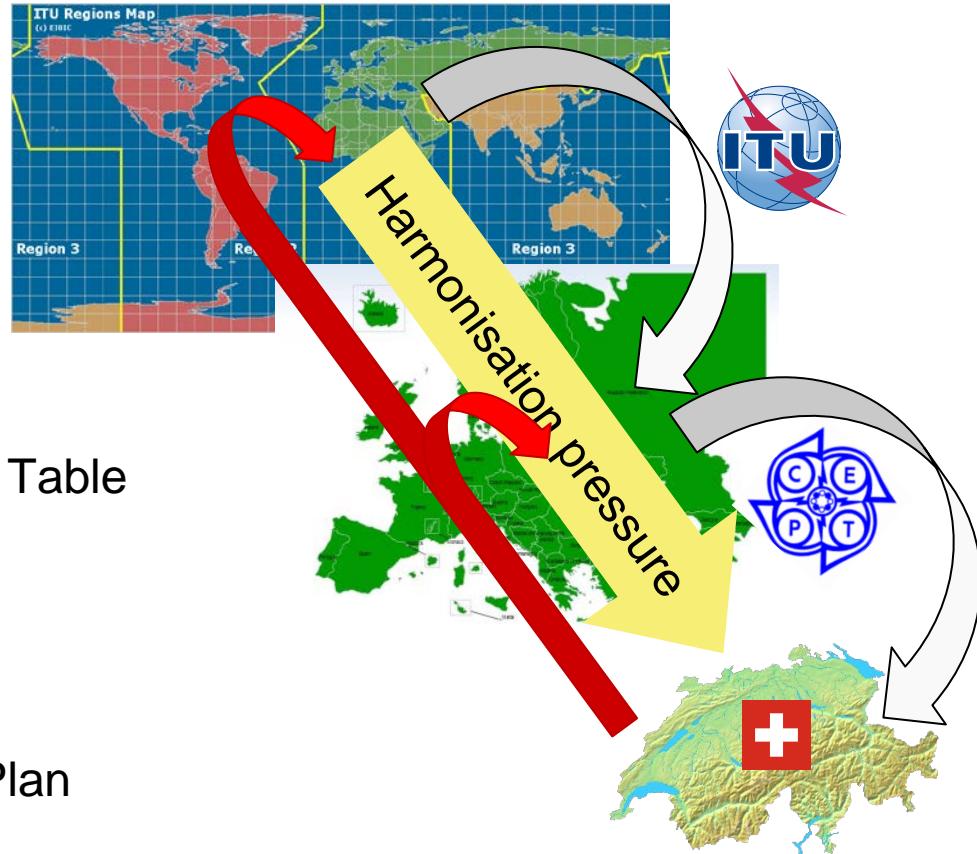


Harmonisation of Frequency Usage

3 Levels

Global level (ITU)

Radio Regulations
(RR, Art. 5)



Regional level (CEPT)

European Frequency Allocation Table
(ECA)

National level (Schweiz)

National Frequency Allocation Plan
(NaFZ)

Contribution of Swiss national interests to international organisations at global and regional levels

National coordination is essential!



Global Level

ITU International Telecommunication Union



The ITU is the United Nations agency specialised in Information and Communication Technologies

- The ITU has 193 member states; Switzerland is one of them
- The ITU-R (ITU Radio) allocates frequencies to radio services on a global scale

ITU-R organizes a world radio conference every 3 to 4 years (WRC)

- At the WRCs, the Radio Regulations (RR) are revised. RR regulate the use of the radio frequency spectrum on Earth and in orbit (for geo-stationary and non-geo-stationary satellites)

- **Objective: Global Harmonisation of the Frequency Usage**

(e.g. Frequency resources for aviation, for example for the location of aircraft in emergency situations, for maritime services, for mobile communications, scientific applications such as earth exploration, ...)

The existing (legal) framework should be adapted in such a way that existing applications can be further developed and new ones introduced

- Potential bands for 5G in the mm-Waves will be considered during WRC19



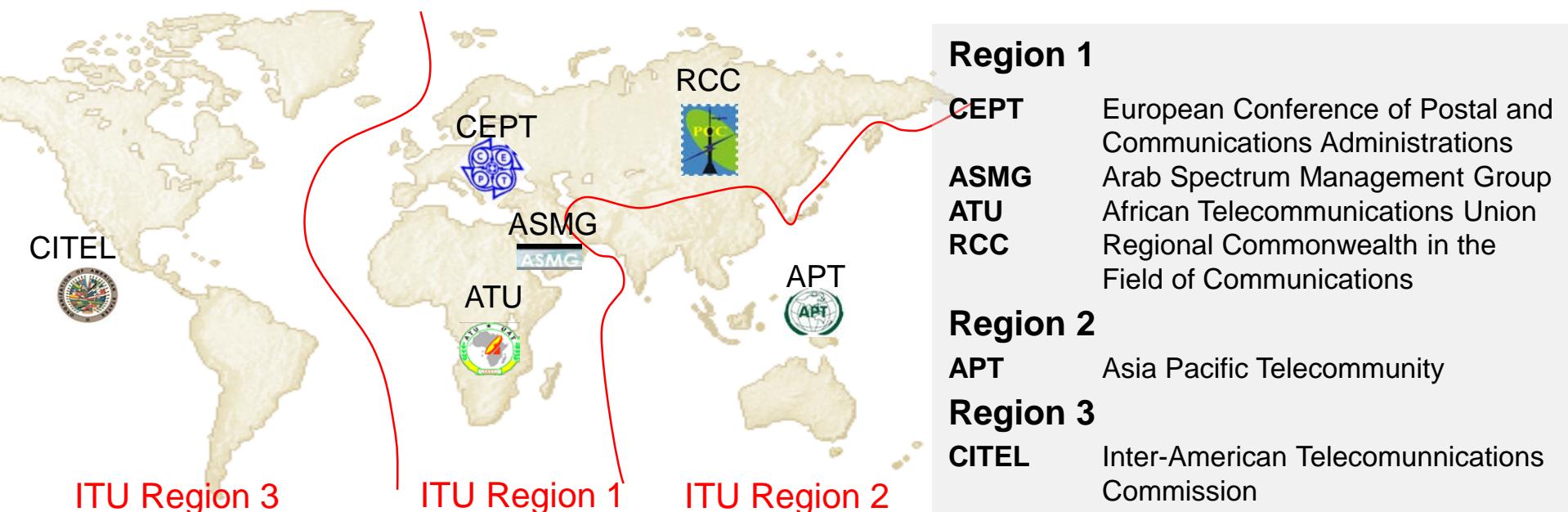


Global Level

ITU International Telecommunication Union



- ITU-R ensures efficient use of RF spectrum by all services
- ITU-R groups produce Reports and Recommendations that analyse/define conditions for use of RF spectrum
- ITU-R WP 5D (in cooperation with regional standardization bodies) develops a new Recommendation on 5G (ongoing work, 2019–2020)

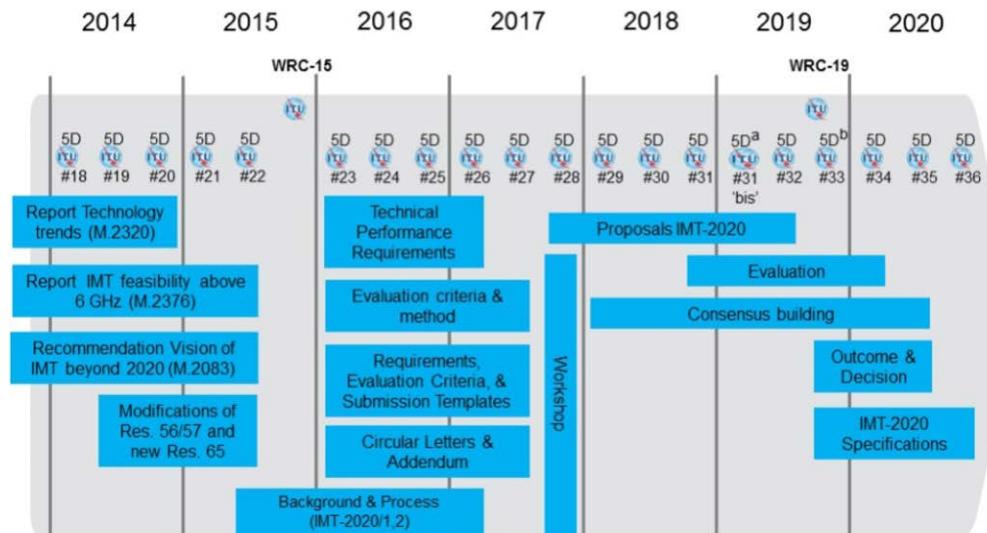




Global Level

IMT-2020 Standardisation Activities at ITU-R

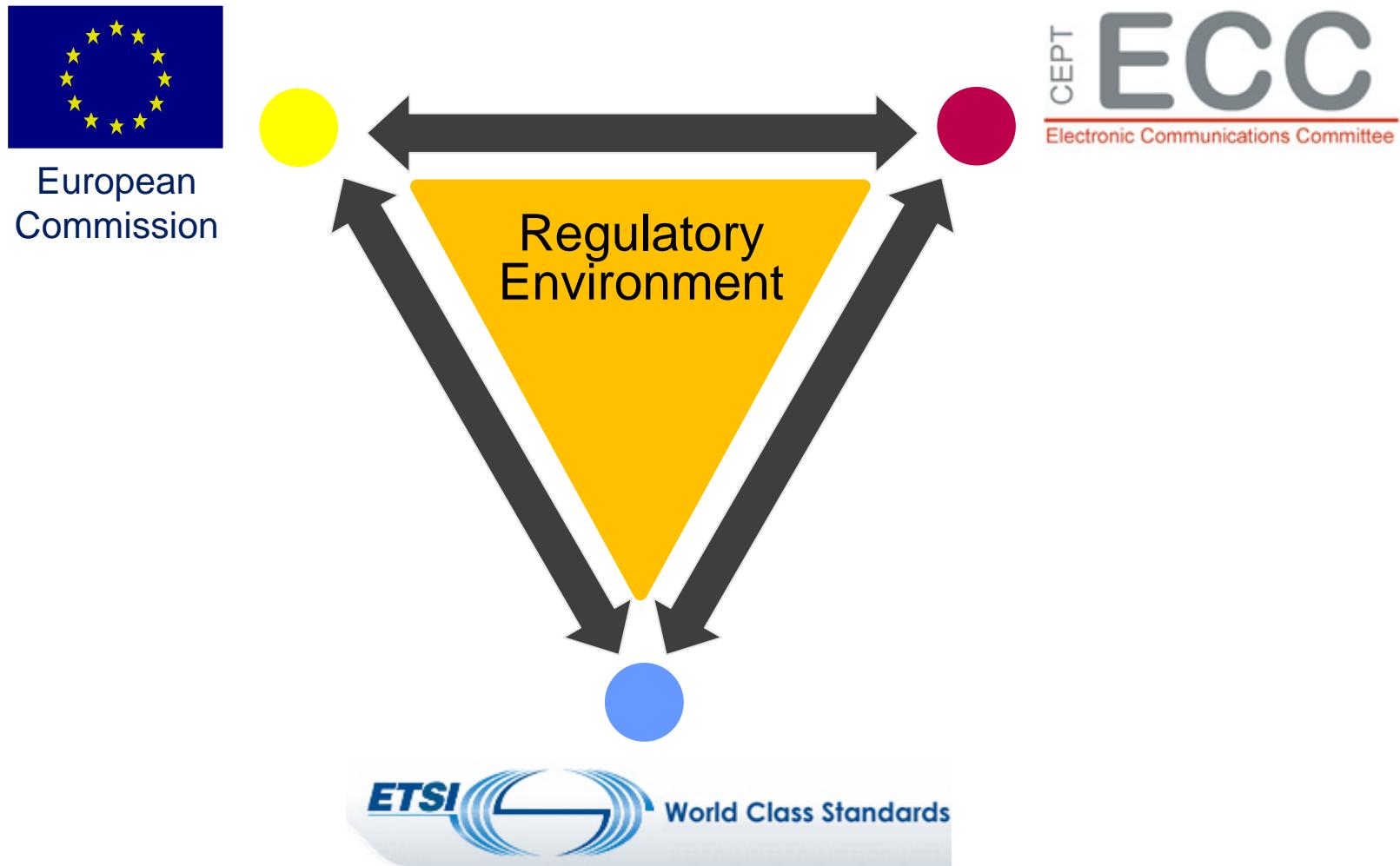
- In 2016–2017 ITU-R WP 5D defined performance requirements, evaluation criteria and methodology for the assessment of new IMT radio interface (IMT-2020/5G).
- In 2018–2020 the evaluation by independent external evaluation groups and definition of the new radio interfaces to be included in IMT-2020 takes place. One of the proponents is 3GPP.
- The whole process is planned to be completed in 2020. It is planned that the ITU-R recommendation containing the detailed specifications of IMT-2020 technologies will be ready in October 2020.





Regional Level

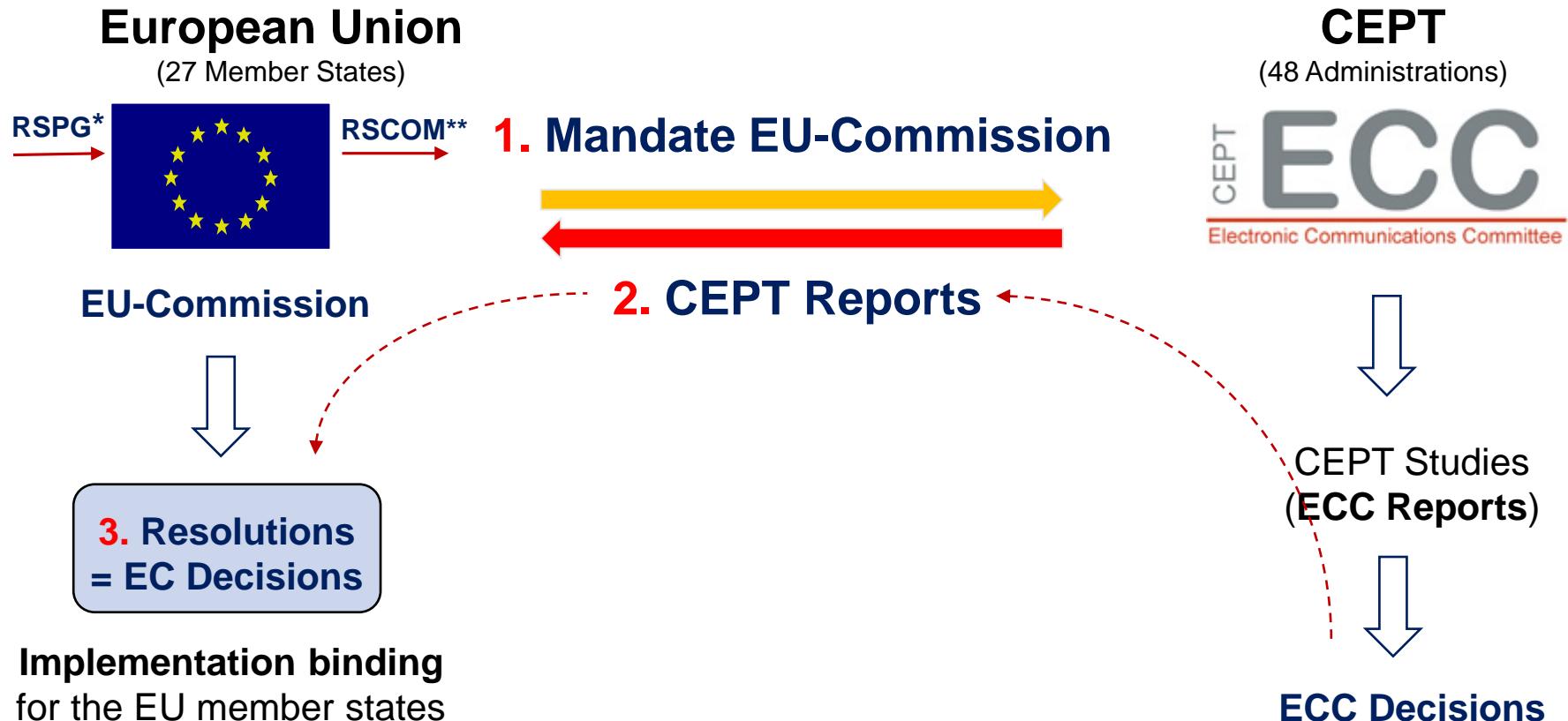
European Regulatory Environment





Regional Level

European Level



*RSPG

Assists the European Commission to develop the radio spectrum policy.
Develops opinions and contributes with inputs for the radio spectrum policy program ([RSPP](#))

**RSCOM

Assists the Commission for the development of technical implementing decisions to ensure harmonized conditions across Europe



Regional Level

26 GHz Band Harmonisation in Europe

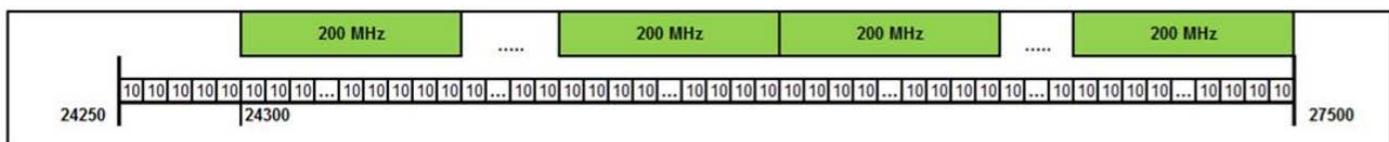


CEPT
ECC
Electronic Communications Committee

- Mandate of the EU-Commission to the CEPT
 - to develop harmonised technical conditions for spectrum use in support of the introduction of next-generation (5G) terrestrial wireless systems in the EU
 - study and assess the '26 GHz' frequency band as a 5G pioneer band for use under relevant 5G usage scenarios taking into account the co-existence issues with other services
 - develop channelling arrangements and common and minimal (least restrictive) technical conditions for spectrum use in the 26 GHz frequency band, which are suitable for 5G terrestrial wireless systems

• ECC Decision (18)06, CEPT Report 68, July 2018

- harmonisation of the frequency arrangements (TDD, block size...)
- for base and terminal stations: maximum power levels and reduced power levels for protection of other services (e.g. passive systems in lower adjacent band)



- Commission Implementing Decision (EU) 2019/784, May 2019



World Radio Conference



- **Conference for the revision of the Radio Regulations, legal instrument of ITU having a treaty status**
 - Rights and obligations of ITU Member States respectively to each other
- **Is held each 3-4 years with around 3'000 delegates from 192 ITU Member States**
 - WRC-15 will be held from 2 to 27 November 2015
- **WRC Agenda is defined at previous WRC**
 - Agenda is strictly listing items for revision of the RR
 - Any ITU Member State can submit proposals for modifications of the RR in response to this Agenda





Process for WRC preparation

(I) Global



(II) Regional



European
common
proposals

(III) National



Country
proposals

28 October - 22 November
Sharm El-Sheikh, Egypt



WRC-19 Agenda item 1.13

Spectrum for future development of IMT



ITU-T standardization
Resolution ITU-R 56-2



Provide enhanced mobile broadband, M2M,
ultra-reliable and low-latency communications

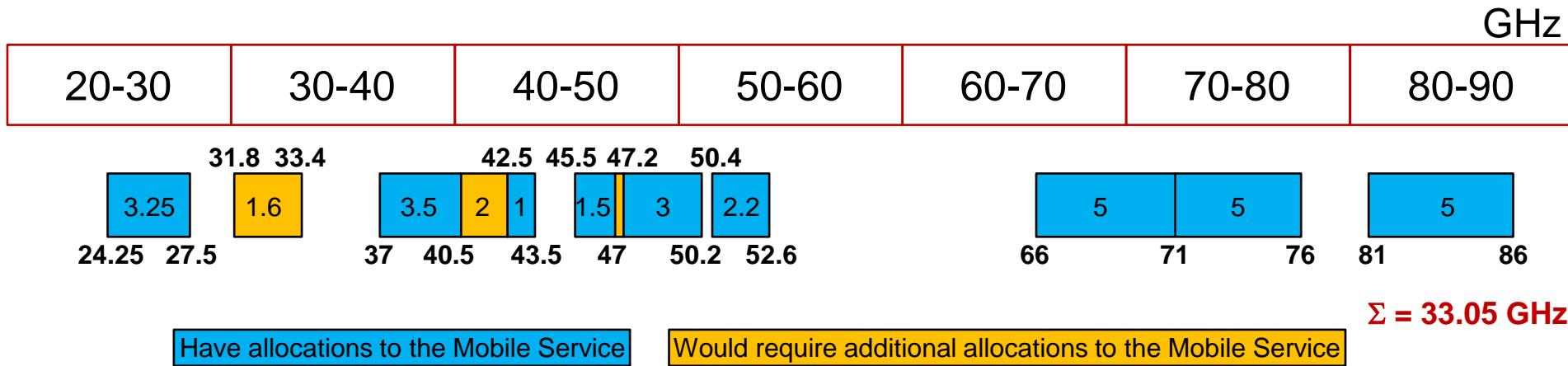
Require larger contiguous blocks of spectrum
than currently available for IMT

What is targeted:

- identification of frequency bands between 24.25 and 86 GHz for the future development of IMT
- possible additional allocations to the mobile service on a primary basis



AI 1.13: mmWave frequency bands



Spectrum needs (application based approach) by ITU-R WP 5D

Scenario	Total (GHz)	Per range (GHz)
Overcrowded, Dense urban and Urban areas	18.7	3.3 (24.25-33.4 GHz range) 6.1 (37-52.6 GHz range) 9.3 (66-86 GHz range)
Dense urban and Urban areas	11.4	2.0 (24.25-33.4 GHz range) 3.7 (37-52.6 GHz range) 5.7 (66-86 GHz range)



AI 1.13: 24.25-27.5 GHz band (1/2)



- **Support of IMT identification by all regional organisations**
- **Certainly the first 5G band in the mmWave range**
- **European framework is outlined in ECC Decision (18)06**

**The band 27.5-29.5 GHz is not on the WRC-19 agenda
⇒ can not be identified for IMT**



AI 1.13: 24.25-27.5 GHz band (2/2)

Protection of passive services in adjacent band:



- ✓ Passive band: 23.6-24 GHz
- ✓ Unwanted emissions into EESS (passive) sensors and Radioastronomy sites
- ✓ Protection of Radioastronomy is achieved by establishing exclusion zones \Rightarrow **national issue**

Hot debates in ITU-R on unwanted emission limits to be put in Radio Regulations to protect EESS (passive):

- ✓ Delicate choice: **to protect EESS (passive) effectively without unduly constraints on IMT 5G**
- ✓ Range of values

Base station: -30 -42 -49 dBW/200 MHz
Terminal: -29 -38 -48 dBW/200 MHz



AI 1.13: Other bands considered



31.8-33.4 GHz

- Incompatibility with radionavigation service (Enhanced Flight Visibility System)



40.5-43.5 GHz

- The potential for the 37-43.5 GHz band to become a 5G tuning range

66-71 GHz

- Sharing between IMT 5G and Multiple Gigabit Wireless Systems



71-76 GHz & 81-86 GHz

- Increased used for P2P links (mobile backhauling) + difficult sharing with automotive radars in 76-81 GHz