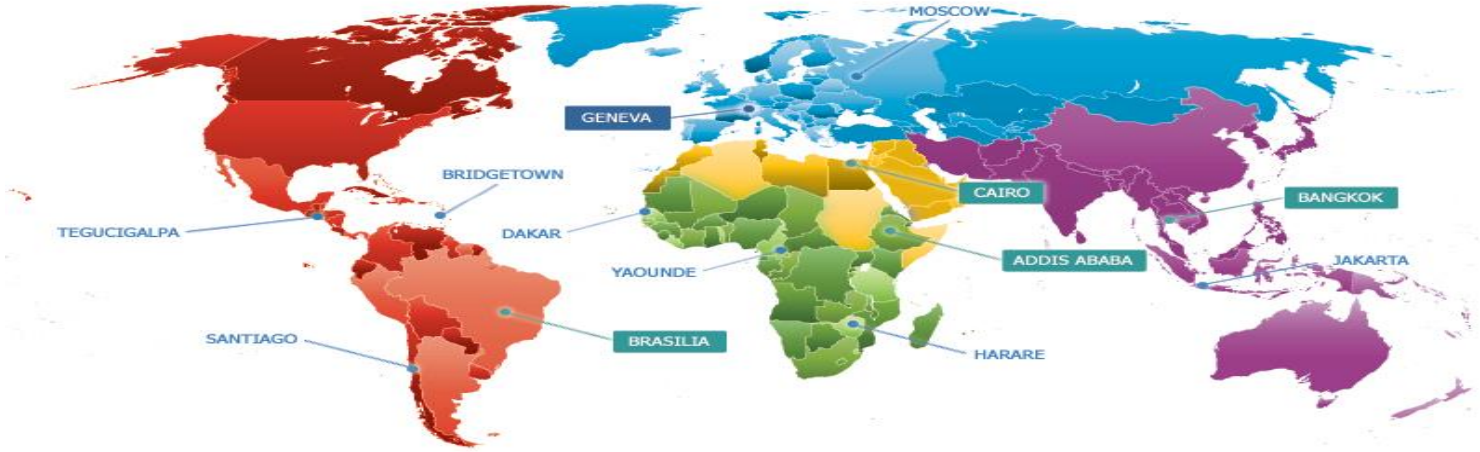
Towards 5G Enabled Gigabit Society
11-12 October 2018, Athens, Greece

Spectrum issues related to 5G

David Botha
ITU-R Study Group Department
Radiocommunication Bureau
International Telecommunication Union

International Telecommunication Union

- Created in 1865, based in Geneva, 193 Member States, around 800 entities and academic institutions
- 12 regional offices
- 3 ITU Sector:
  - ITU-R - Radiocommunications -> *global radio spectrum management and radiocommunication standardization*
  - ITU-T - Standardization –> *standardization of wireline networks, service aspects*
  - ITU-D – Development –> *assistance in the extension of ICTs to all the world's inhabitants, narrowing the digital divide*



ITU-R Study Group structure

- Study Group 1 (SG 1): Spectrum management
- Study Group 3 (SG 3): Radio wave propagation
- Study Group 4 (SG 4): Satellite services
- Study Group 5 (SG 5): Terrestrial services
- Study Group 6 (SG 6): Broadcasting service
- Study Group 7 (SG 7): Science services
- Coordination Committee for Vocabulary (CCV)
- Conference Preparatory Meeting (CPM)

The BR provides the Secretariat to every ITU-R SG, http://www.itu.int/en/ITU-R/study-groups

Spectrum for IMT-2020

ITU-R activities on IMT-2020

Spectrum

- **Output**: mobile spectrum allocations and IMT identifications
- **Where:** Radio Regulations
- **By whom**: WRCs
- **Contributors**: ITU membership, ITU-R Study Groups, Regional Groups, International organisations
- **How**: Member States driven

IMT-2020 Standards

- **Output**: IMT-2020 Vision, overall requirements, RAN specifications
- **Where:** ITU-R Reports & Recs approved by member states
- **By whom**: ITU-R Study Group 5
- **Contributors**: ITU membership, other standard making bodies
- **How**: Industry driven

ITU also develops harmonized channeling arrangements (Rec. ITU-R M.1036 of ITU-R WP 5D)

IMT-2020 standardization process

- Development plan
- Market/services view
- Technology/ research kick off
- Vision - IMT for 2020
- Name
- Process optimization

- Technical performance requirements
- Evaluation criteria
- Invitation for proposals
- Sharing study parameters (IMT-2020)
- Sharing studies in preparation for WRC-19

- Technical proposals
- Evaluation Groups
- Methodology
- Consensus building

- Spectrum/band arrangements
- Decision & radio framework
- Detailed IMT-2020 radio specifications
- Future enhancement/ update plan & process

IMT-2020 spectrum allocation process

- < 6 GHz Spectrum view
- ITU-R Study Group activities/studies
- Spectrum/band arrangements (post WRC-15)

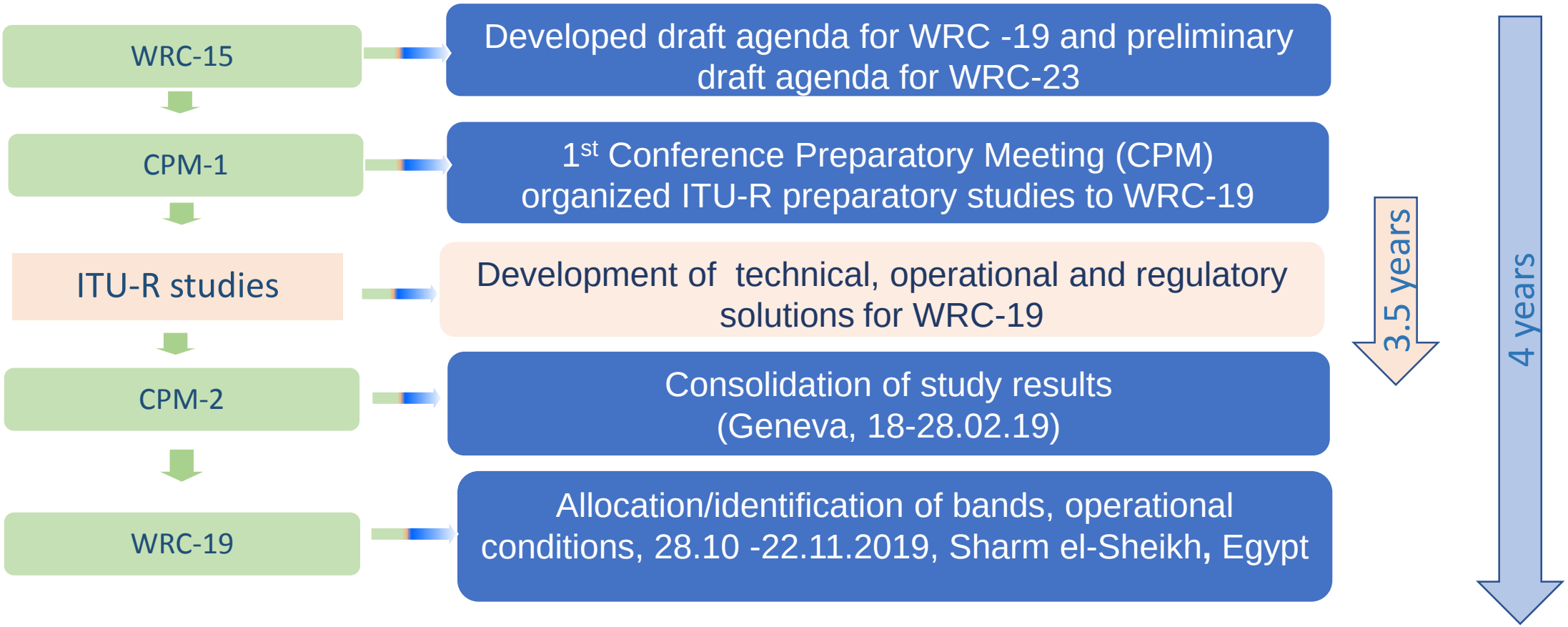
- CPM Report (IMT- WRC-19)
- Sharing study reports
- Spectrum/band arrangements (WRC-19)

2012-2015 | 2016-2017 | 2018-2019 | 2019-2020

Setting the stage for the future:
vision, spectrum, and technology views

Defining the technology
Allocate the spectrum

WRC cycle


WRC-15
Developed draft agenda for WRC -19 and preliminary draft agenda for WRC-23
CPM-1
1st Conference Preparatory Meeting (CPM) organized ITU-R preparatory studies to WRC-19
ITU-R studies
Development of technical, operational and regulatory solutions for WRC-19
CPM-2
Consolidation of study results (Geneva, 18-28.02.19)
WRC-19
Allocation/identification of bands, operational conditions, 28.10 -22.11.2019, Sharm el-Sheikh, Egypt
3.5 years
4 years

Key steps of WRC preparations

- **Agenda** – determines the scope of studies
  - Agenda has a legal notion, it is stable and important
  - **ITU-R Studies**- centre of WRC preparations. Developing spectrum needs, technical and operational characteristics including protection criteria, deployment scenarios, sharing conditions and regulatory solutions
  - To satisfy spectrum requirements of emerging applications while protecting incumbent services
  - To analyse all sharing scenarios to keep interference within acceptable limits
- **WRC** – allocates and identifies frequency bands, establishes sharing conditions
  - A treaty making Conference, decisions by Member States
  - Decisions are taken by consensus to ensure sustainability of future allocations

WRC-19 agenda item 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 (WRC-15)**

CPM19-1
Decision to establish Task Group 5/1 and ToR
Invites ITU-R SG 5 to establish TG 5/1

ITU-R SG 5
Establishes Task Group 5/1 and approves ToR
Elects Chairman

Activities under WRC-19 agenda item 1.13

Relevant ITU-R Working Parties

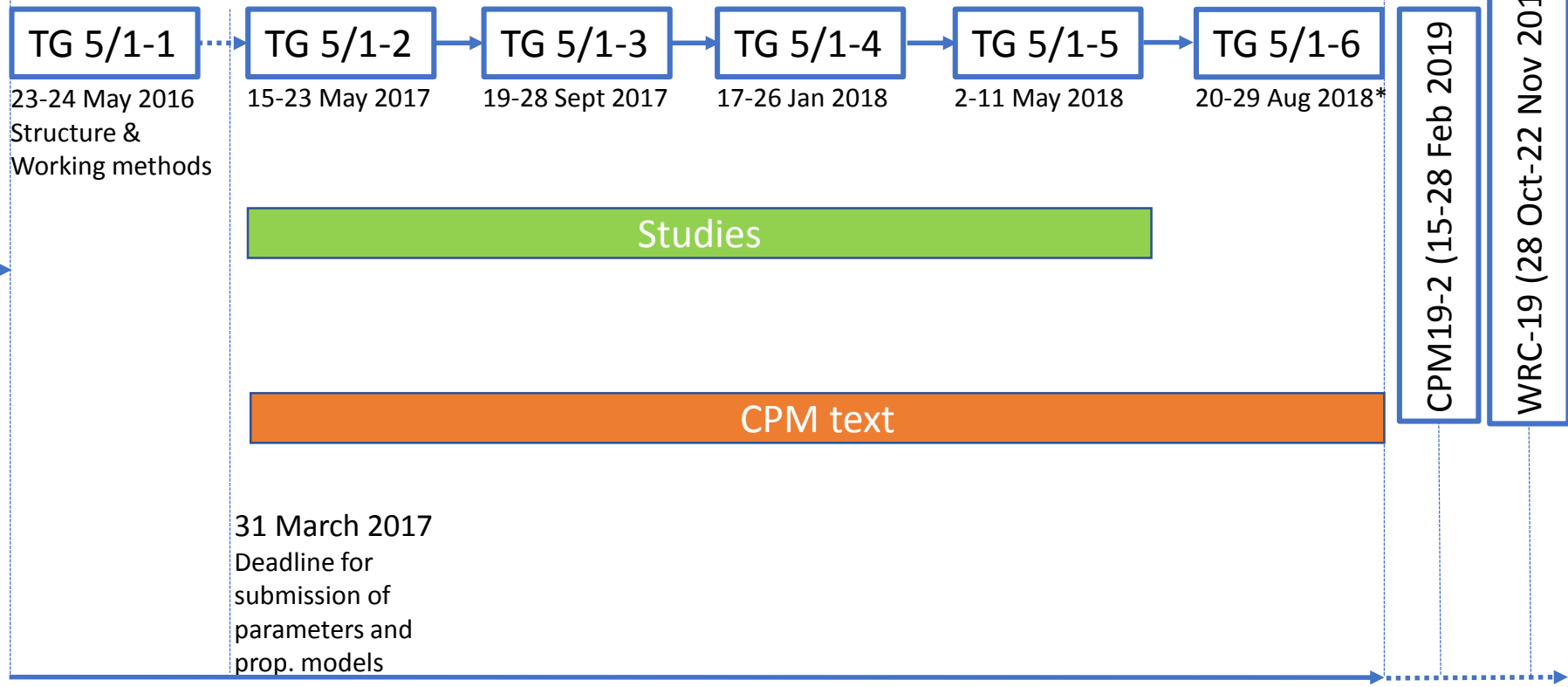
Terrestrial component of IMT:
- Spectrum needs
- Technical and operation characteristics including protection criteria
- Deployment scenarios

Existing services (also adjacent bands):
- Technical characteristics
- Protection criteria

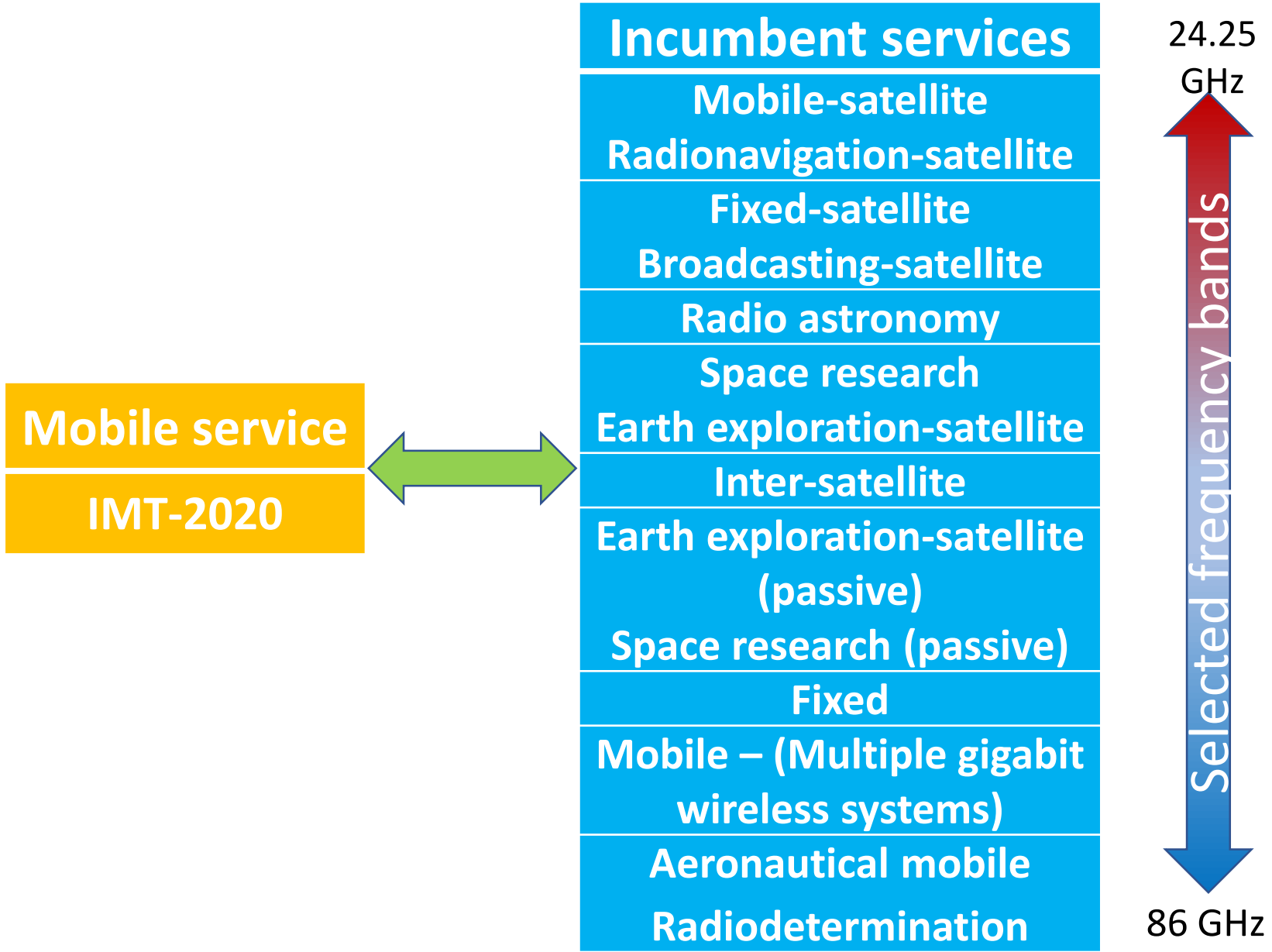
All services and relevant frequency bands:
- Propagation models for sharing studies

TG 5/1 Terms of Reference

- Conduct sharing and compatibility studies in accordance with Res. 238 (WRC-15)
- Develop draft CPM-text under WRC-19 AI 1.13



WRC-19 AI 1.13 objectives for sharing & compatibility studies



Results of ITU-R sharing & compatibility studies on WRC-19 AI 1.13

Potential spectrum for IMT-2020	Frequency range (GHz)	Sharing/Compatibility	Most limiting incumbent service
	24.25-27.5	Unwanted emission limits	EESS
	31.8-33.4*	Large separation distances	RNS
	37-40.5 & 40.5-42.5*	Unwanted emission limits	EESS
	42.5-43.5	Sharing feasible	FSS (E-to-s)
	45.5-47 & 47-47.2*	No sharing studies	-
	47.2-50.2	Unwanted emission limits	EESS
	50.4-52.6	Unwanted emission limits	EESS
	66-71	Sharing feasible	MSS (E-to-s)
	71-76	Unwanted emission limits	RLS
	81-86	Unwanted emission limits	RLS

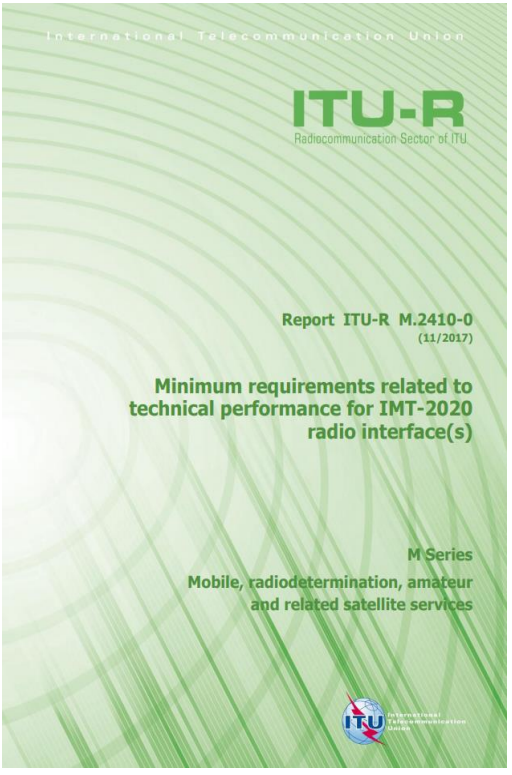
*No global mobile allocation

STANDARDIZATION

IMT-2020 standardization

- Detailed studies of IMT-2020 are conducted in ITU-R study groups, mainly WP 5D
- To date ITU developed: IMT-2020 Vision (Recommendation ITU-R M.2083) and technical requirements for its systems (Report ITU-R M.2410)
- 2018 – July 2019 -> Submission of candidate radio interface technologies for IMT-2020, their analysis by independent evaluation groups
- October 2019 -> Consolidation of assessments in ITU WP 5D, consensus building and decision
- 2020 -> Detailed specification of the IMT-2020 standard
- Entire period 2017-2020: technical and market trials of 5G technologies, that will be contributing to the development of a detailed specification for IMT-2020

http://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/default.aspx



Thank you