IEEE 5G Summit

IMT-2020: Standards and Spectrum for 5G

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ITU Overview

Committed to connecting the world

193 Member States
673 Sector Members
168 Associates
108 Academia

ITU-T

Telecommunication standardization - network and service aspects

ITU-D

Promote and assist the extension of ICTs to all the world's inhabitants - narrowing the digital divide

ITU-R

Global radio spectrum management and radiocommunication standardization

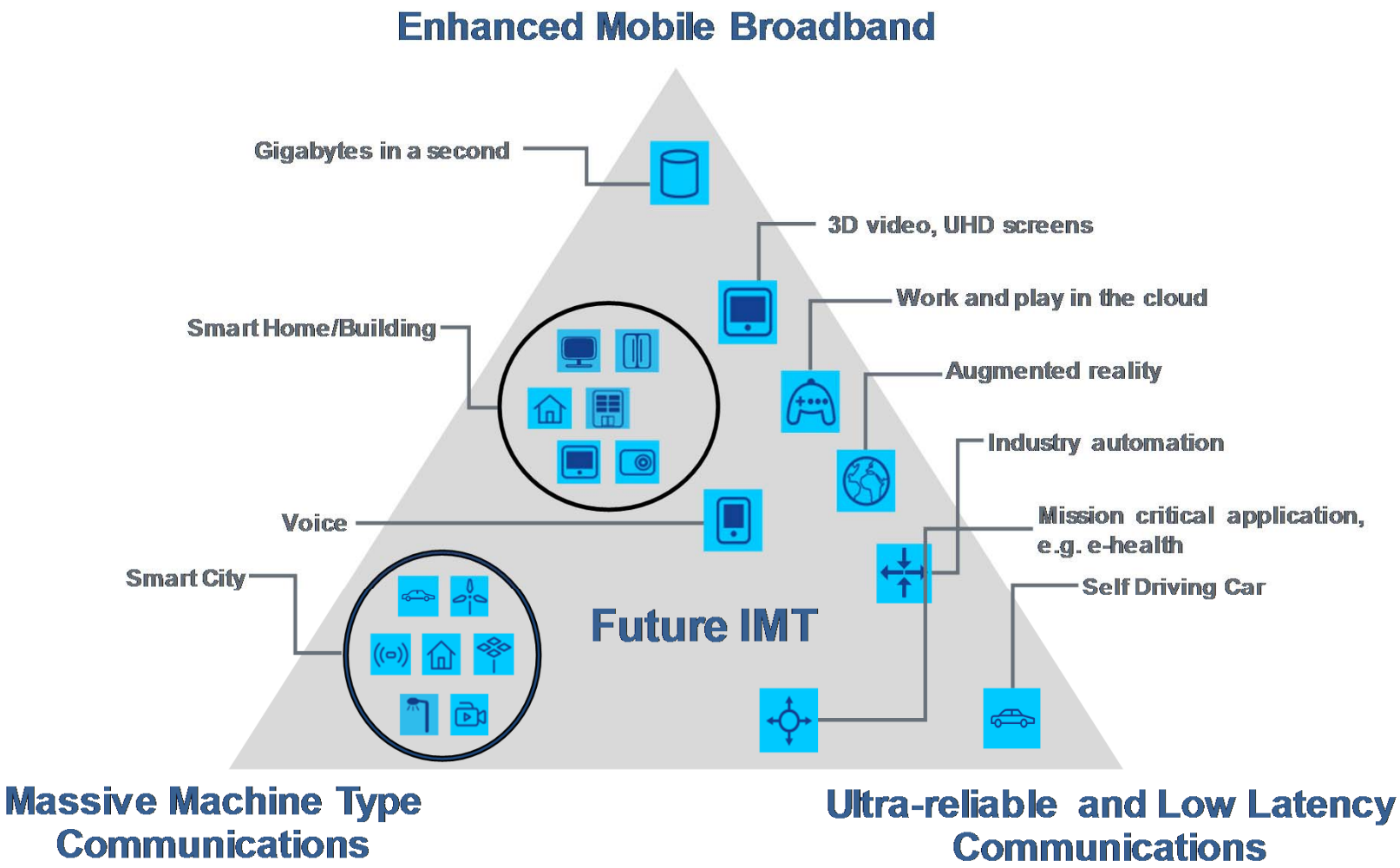
IMT-2000, IMT-Advanced, IMT-2020

- All 3G and 4G mobile broadband systems are based on the ITU's IMT standards.
- ITU established the detailed specifications for **IMT-2000** and the first 3G deployments commenced around the year 2000.
- In January 2012, ITU defined the next big leap forward with 4G wireless cellular technology – **IMT-Advanced** – and this is now being progressively deployed worldwide.
- The detailed investigation of the key elements of **IMT-2020** is already well underway, once again using the highly successful partnership ITU-R has with the mobile broadband industry and the wide range of stakeholders in the 5G community.
- IMT provides the global platform on which to build the next generations of mobile broadband connectivity

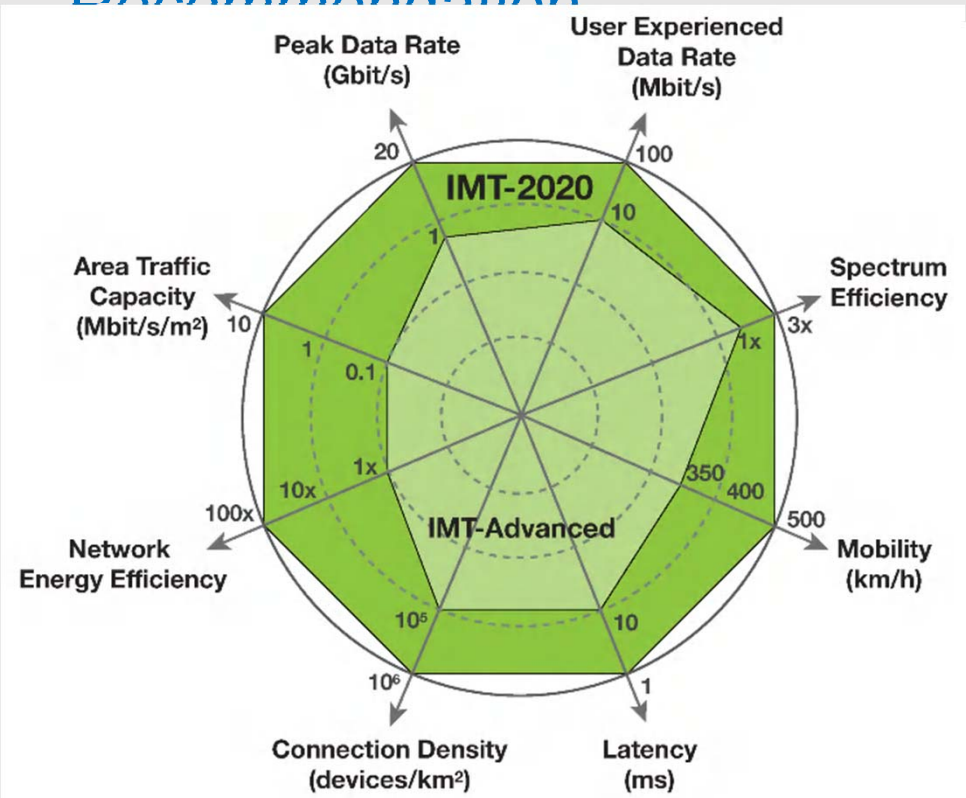
Global collaboration

- The detailed technical specifications for ITU's IMT standards are developed in close collaboration with the leading national, regional and international radio standards development organizations and partnerships
- The involvement of ITU Member States, equipment providers, network operators, industry fora and academia in this process enables these harmonized standards to be implemented on a worldwide basis
- Globally harmonized standards enable global roaming and provide massive economies of scale – resulting in lower cost services and equipment usable everywhere

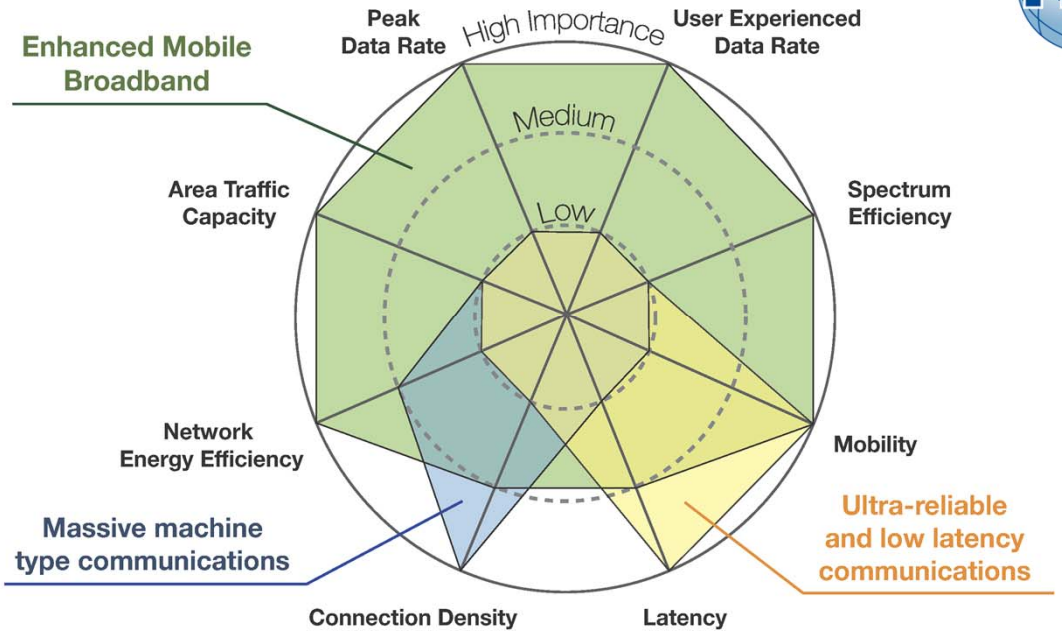
5G usage scenarios



5G Capability Perspectives from the ITU-R IMT-2020 Vision Recommendation



Enhancement of key capabilities from IMT-Advanced to IMT-2020



The importance of key capabilities in different usage scenarios

The values in the figures above are targets for research and investigation for IMT-2020 and may be revised in the light of future studies. Further information is available in the IMT-2020 Vision Recommendation (Recommendation ITU-R M.2083)

IMT-2020 Standardization Process – Where we are and what is ahead

- Development Plan
- Market/Services View
- Technology/ Research Kick Off
- Vision & Framework
- Name IMT-2020
- < 6 GHz Spectrum View
- > 6 GHz Technical View
- Process Optimization

2012-2015

- Spectrum/Band Arrangements (post WRC-15)
- Technical Performance Requirements
- Evaluation Criteria
- Invitation for Proposals
- Sharing Study Parameters (IMT-WRC-19)
- Sharing Studies (WRC-19)

2016-2017

- Proposals
- Evaluation
- Consensus Building
- CPM Report (IMT-WRC-19)
- Sharing Study Reports (WRC-19)

2018-2019

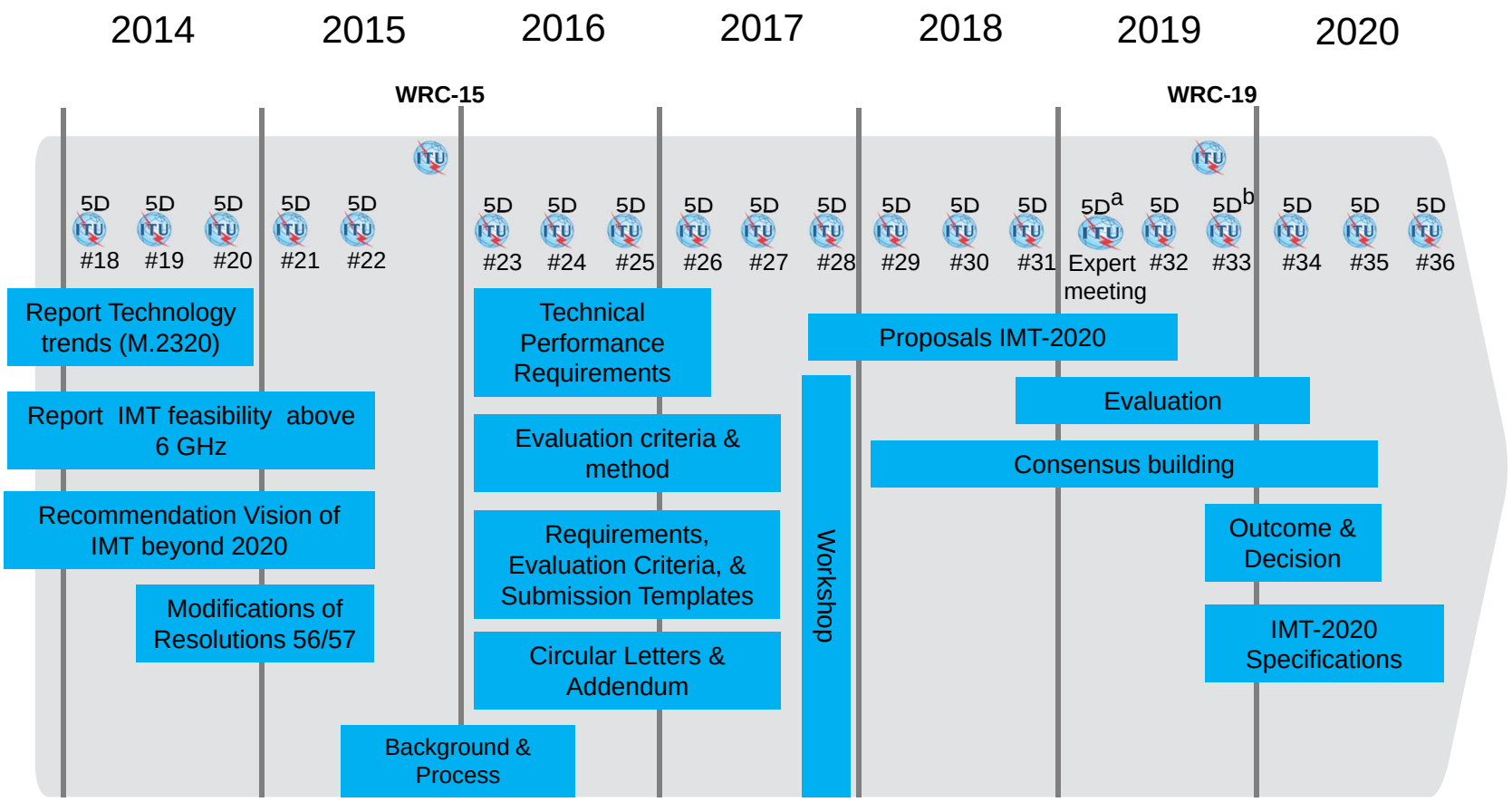
- Spectrum/Band Arrangements (WRC-19 related)
- Decision & Radio Framework
- Detailed IMT-2020 Radio Interface Specifications
- Future Enhancement/ Update Plan & Process

2019-2020

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

Defining the technologies

Detailed Timeline & Process For IMT-2020 in ITU-R



(a) – if needed focus meeting towards WRC-19 (non-Technology), (b) – focus meeting on Evaluation (Technology)

Note: While not expected to change, details may be adjusted if warranted.

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 AI 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

31 March 2017 — 13 September 2018

New spectrum: bands under study for WRC-19

Existing mobile allocation	No global mobile 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	

Integration of satellite systems into IMT-2020

- Satellites systems can provide high capacity and instantaneous connection to any place within their wide coverage area. They are less vulnerable to physical attacks and natural disasters than terrestrial systems and the terminals can be rapidly deployed.

- Both geostationary and non-geostationary satellite systems have specific benefits for integration of satellite-based solutions into 5G networks, such as providing:

  - high speed backhaul connectivity to multiple sites on land, at sea or in the air, with the ability to multicast the same content across large areas

  - high speed, multicast-enabled, communications direct to the home, office, plane, train or vessel as a complement to existing terrestrial connectivity where available

  - efficient backhauling of aggregated IoT traffic from multiple sites on land, at sea or in the air

- Satellite systems can thus help to provide scalable and efficient 5G network solutions globally, integrated with terrestrial mobile networks, thereby helping to accelerate the commercially viable deployment of 5G in developed as well as developing countries.

Summary

- The scope of IMT-2020 is much broader than previous generations of mobile broadband communication systems.
- Use cases foreseen include enhancement of the traditional mobile broadband scenarios as well as ultra-reliable and low latency communications and massive machine-type communications.
- The ITU's work in developing the specifications for IMT-2020, in close collaboration with the all 5G stakeholders, is now well underway, along with the associated spectrum management and spectrum identification aspects.
- IMT-2020 will be a cornerstone for all of the activities related to attaining the goals in the 2030 Agenda for Sustainable Development.

Thank you!

Additional information

Useful links

- **IMT-2020 home page**

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

- **ITU-R Working Party 5D "IMT Systems"**

http://www.itu.int/go/ITU-R/wp5d

- **Task Group 5-1 "WRC-19 agenda item 1.13"**

http://www.itu.int/go/ITU-R/tg5-1

- **ITU-R Recommendations (M-series)**

http://www.itu.int/ITU-R/go/rec-m

- **ITU-R Reports(M-series)**

http://www.itu.int/ITU-R/go/rep-m