IMT-2030

CONNECTIVITY, INTELLIGENCE, SUSTAINABILITY AND SECURITY

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WWRF HUDDLE 2025

Brief History of ITU

Founded as the **International Telegraph Union** by 20 nations

1865

1906

International Radiotelegraph Convention

(1st Radio Regulations)

International Telecommunication Union

name came into effect

1 Jan 1934

1947

ITU became UN Agency

Specialized for ICTs

IMT-2030 (6G)

Framework and Capabilities

IMT-2030 (6G) – OVERALL FRAMEWORK
ITU-R WP 5D

Completion of the initial phase for the development of IMT-2030

- Report ITU-R **M.2516 - Future Technology Trends**
- Report ITU-R **M.2541** - Feasibility of **IMT >100 GHz**
- **Recommendation ITU-R M.2160**
  -- "Framework and overall objectives of the future development of IMT for 2030 and beyond"
  - ➢ *WP 5D* is defining relevant requirements and evaluation criteria for potential radio interface technologies (RIT) for IMT-2030

ITUPublications
Recommendations

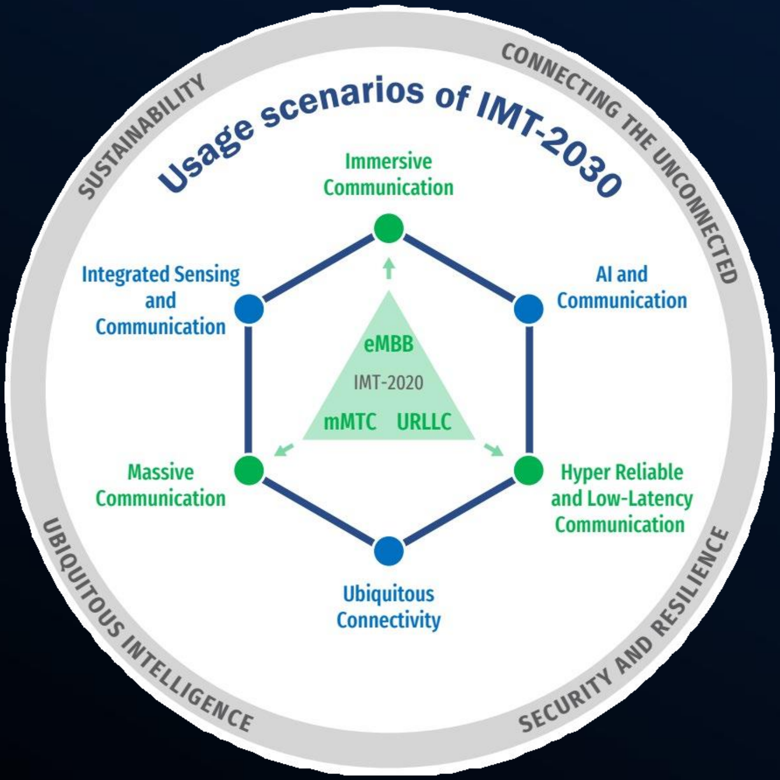
International Telecommunication Union
Radiocommunication Sector

Recommendation ITU-R M.2160-0
(11/2023)

M Series: Mobile, radiodetermination, amateur and related satellite services

Framework and overall objectives of the future development of IMT for 2030 and beyond

ITU-R M.2160 - Usage scenarios for IMT-2030



So called "Wheel diagram", Recommendation ITU-R M.2160

6 Usage Scenarios

Extension from IMT-2020 (5G)

- eMBB ➡ Immersive Communication
- mMTC ➡ Massive Communication
- URLLC ➡ HRLLC (Hyper Reliable & Low-Latency Communication)

New: Ubiquitous Connectivity

AI and Communication

Integrated Sensing and Communication

4 Overarching aspects

act as design principles commonly applicable to all usage scenarios

- Sustainability
- Connecting the unconnected
- Ubiquitous intelligence
- Security / Resilience

ITU-R M.2160 – Usage Scenarios

Immersive Communication
- XR telepresence, holograms, multi-sensory video/ audio
- Requires high data rates, low latency, and synchronization
- Supports interaction in real/ virtual environments

Hyper reliable and low-latency Communication (HRLLC)
- Critical for industrial automation, telemedicine, emergency services
- Demands ultra-reliability, low latency, and precise timing

Massive Communication
- Connects billions of IoT devices (e.g., agriculture, smart cities)
- Requires high connection density, low power, wide coverage

Ubiquitous Connectivity
- Expands coverage in rural/remote areas
- Supports both IoT and mobile broadband for digital inclusion

AI & Communication
- Enables intelligent applications (e.g., autonomous driving, digital twins, medical assistance applications)
  Requires low latency, high reliability, and distributed computing

Integrated Sensing & Communication
- Supports navigation, activity detection, movement tracking, environmental monitoring
- Needs precise positioning and advanced sensing capabilities

ITU-R M.2160 – Overarching Aspects

Sustainability

- Minimize environmental impact:
  boost energy/resource efficiency
  reduce GHG emissions, focus on zero-waste, zero-emission ("innovate to zero") approaches
- Promote circular economy:
  extend equipment lifetime, reuse/repair/recycle
- Advance social sustainability:
  affordable access, efficient deployments, enabling greener industries via digital transformation

Ubiquitous Intelligence

- Embed AI/ML across networks for automation, optimization, intelligent design and adaptive communication
- Support autonomous systems: self-monitoring, self-organization, self-optimization and self-healing
- Enhance radio interface & MAC algorithms
  for better performance, radio resource management, distributed computing, ultra-dense radio network deployments …
- Provide AI-enabling infrastructure
  for AI-native air interface, the convergence of communication and computing, digital twins and other AI models/applications

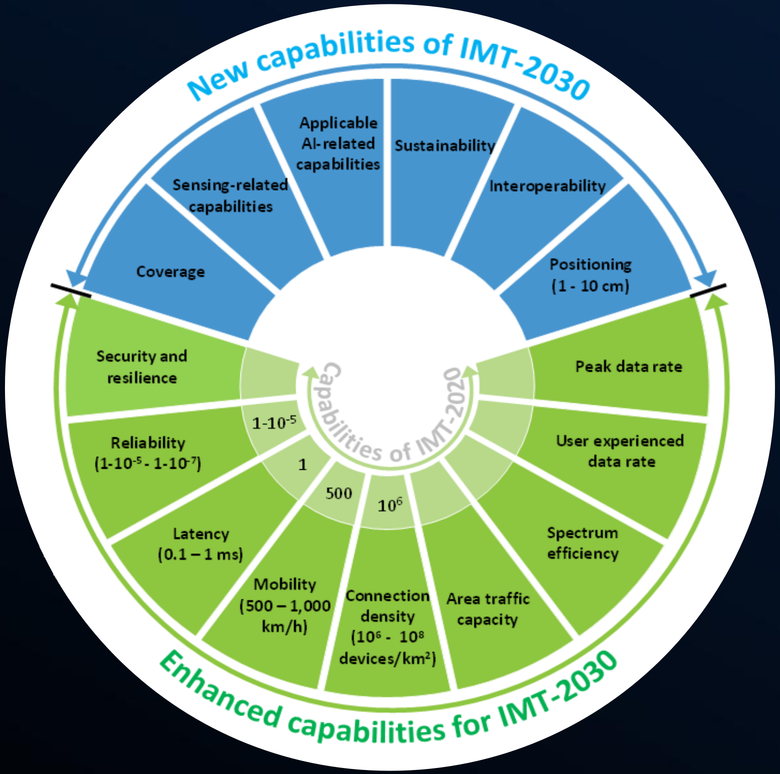
Connecting The Unconnected

- Extend coverage to rural, remote, underserved, unconnected and sparsely populated areas.
- Bridge the digital divide with universal, high-quality mobile broadband
- Achieve global coverage via multi-layer terrestrial & non-terrestrial networks (satellite, HIBS, UAS).
- Ubiquitous connectivity delivering wide-range services for humans, machines, IoT, mobile broadband and critical infrastructure in smart environments

Security And Resilience

- Safeguard confidentiality, integrity, and availability of data and signalling
- Protect networks, devices, and systems from cyberattacks (hacking, DDoS, man-in-the-middle).
- Ensure operations continue during/after natural or man-made disturbances (e.g. power loss, disasters)
- Address expanded attack surfaces, new AI/quantum threats, and risks across all system layers.

ITU-R M.2160 - Capabilities of IMT-2030



So called "Palette diagram", Recommendation ITU-R M.2160

IMT-2030 Framework Recommendation identifies **15 capabilities** for 6G technology

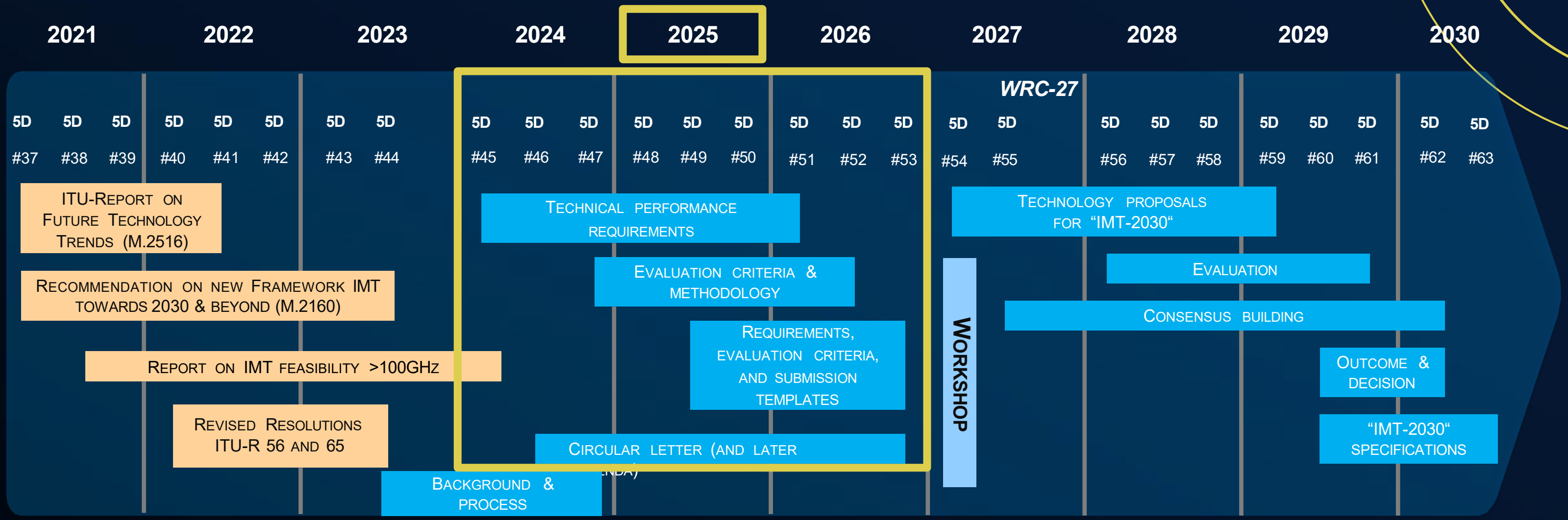
- **9** derived from existing **5G** systems

The range of values given for capabilities are estimated targets for research and investigation of IMT-2030

- All values in the range have equal priority in research and investigation
- For each usage scenario, a single or multiple values within the range would be developed in future in other ITU-R Recommendations/Reports

IMT-2030 is also expected to help **address the need for increased environmental, social and economic sustainability,** as well as support the goals of the **Paris Agreement of the United Nations Framework Convention on Climate Change**

IMT-2030 (6G) - Standardization Timeline
ITU-R WP 5D



Note 1: WP 5D #59 will additionally organize a workshop involving the Proponents and registered Independent Evaluation Groups (IEGs) to support the evaluation process
Note 2: While not expected to change, details may be adjusted if warranted. Content of deliverables to be defined by responsible WP 5D groups

Framework ⇨ **Requirements and Evaluation criteria** ⇨ **Evaluation and Consensus building** ⇨ **Specification** ⇨ **Approval**

ITU-R M.2160 – Frequency Bands For IMT-2030 And Beyond

Multiple frequency ranges would be needed to meet the capacity and coverage requirements of IMT systems and to serve the emerging services and applications

Key Frequency Categories

- **Low Bands (<1 GHz):**
  Nationwide coverage, deep indoor access, bridging digital divide
- **Mid Bands:**
  Balance of coverage & capacity
- **High Bands (mmWave, THz):**
  New use cases and applications with high data rate and low latency, which will benefit from large contiguous bandwidths of tens of GHz support data-heavy applications like holographic vision, future XR, capacity backhaul

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New frequency bands for IMT
WRC-27 – Agenda item 1.7

Consider the **identification for IMT** (terrestrial component) in the following frequency bands:

Region 1	Region 2	Region 3
4 400-4 800 MHz		4 400-4 800 MHz
7 125-7 250 MHz 7 750-8 400 MHz	7 125-8 400 MHz	7 125-8 400 MHz
14.8-15.35 GHz	14.8-15.35 GHz	14.8-15.35 GHz

- *__WP 5D__ is conducting sharing and compatibility studies and tackling the issue of assessing potential interference from incumbent services into IMT*

WRC-27

Review and Revise RR

Ongoing Work: Join the Effort In ITU-R

Sharing and Compatibility Studies

- Called upon by WRC-27 Agenda Items
- In response to ITU-R Questions or Resolutions

Development of Reports, Recommendations and Handbooks

- As a result of the WRC-27 process
- In response to ITU-R Questions or Resolutions
- Development of international standards and specifications

Development of Working Documents and CPM Text

- Compilation of Working documents
- Early stages of CPM Text

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Join the ITU

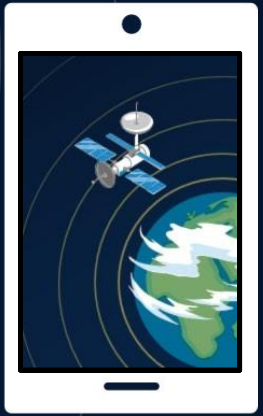
194

Member States

1000+

Industry Companies
Universities, Research Institutions
International and Regional Organizations

ITU-R
RADIOCOMMUNICATION SECTOR



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