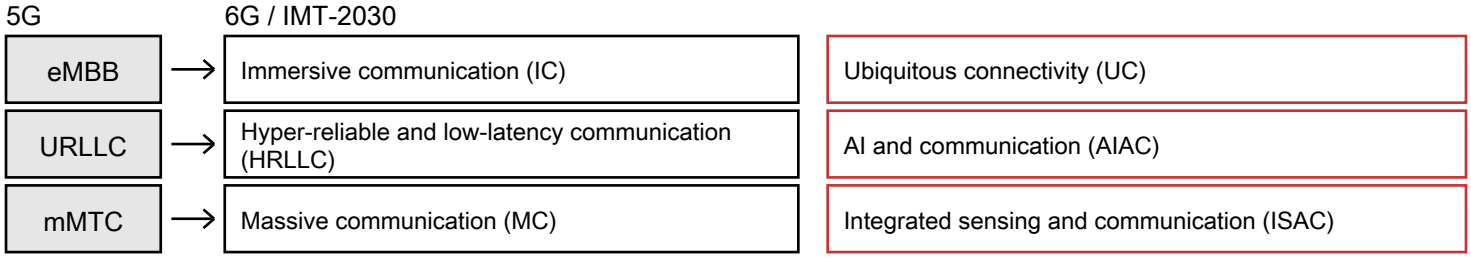
6G / IMT-2030

1. Overview

An IMT-2030 mobile communication technology that aims to improve speed, latency and reliability over 5G and expand sensing and AI support to enable immersive, intelligent services.

2. Scenarios and performance targets

a. Concept diagram



5G's eMBB, URLLC and mMTC expand into IC, HRLLC and MC, respectively. UC, AIAC and ISAC are newly identified scenarios, with no one-to-one mapping to the original three.

Common principles: sustainability; security and resilience; connecting the unconnected; ubiquitous intelligence

b. Performance visions and research targets

Vision / metric	Target / support	Meaning
High performance	Peak data rate: 50 / 100 / 200 Gbps; user-experienced data rate: 300 / 500 Mbps	High-rate transmission of large data volumes
Broad spectrum	Bands below 1 GHz to above 100 GHz considered No common bandwidth target specified	Use multiple bands and wide bandwidths
Extended coverage	Mobility 500–1,000 km/h Terrestrial / non-terrestrial interworking	Extend connectivity and support high mobility
High precision	Radio latency 0.1–1 ms; positioning error 1–10 cm	Real-time control and precise positioning
Intelligence	AI network optimization; distributed training, inference and computing	Intelligent network operation and AI support
Immersive experience	XR, holograms and multi-sensory telepresence	Support immersive media
Reliability	Successful transmission probability over the air interface $1-10^{-5}$ to $1-10^{-7}$	Deliver a specified amount of data within a deadline
Connection density	10^6–10^8 devices/km²	Connected or accessible devices per unit area

3. Key technology enablers

Category	Technology	Operation / purpose
Radio transmission	Multi-band, wideband transmission	Use multiple frequency bands and wide bandwidths to increase transmission capacity.
Radio transmission	E-MIMO and beamforming	Large antenna arrays and beam control improve spectrum efficiency and coverage.
Real-time control	Precise synchronization and proactive radio access	Accurate clock synchronization and fine-grained scheduling reduce radio latency.
Functional integration	AI-native radio networks	Integrate AI into channel estimation, resource control and network operations.
Functional integration	Integrated sensing and communication (ISAC)	Jointly design waveforms, antennas and radio resources for communication and sensing.
Functional integration	Communication-computing convergence	Coordinate edge and distributed computing with communication to optimize workload placement and resource use.
Extended connectivity	Terrestrial/non-terrestrial interworking	Connect terrestrial networks with satellites and high-altitude platforms to extend coverage.

Research targets: Scenario-specific examples from M.2160 (2023), not guaranteed commercial performance or simultaneous achievement.

Classification: Early Korean six visions differ from ITU usage scenarios. Frequency range ≠ bandwidth; radio latency ≠ end-to-end latency.

Continuity: AI and sensing technologies have also evolved in 5G.

Technology scope: These seven selected technology enablers are candidates for implementation, not a fixed official ITU list.

ITU-R M.2160-0 (2023), §§2.3–4; M.2516-0 (2022), §§5–7; ETRI (2020), p.62