



6G Forum's View on IMT-2030 Use Cases

2024. 06. 19. (Wed)

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6G Forum



Establishment



A system to secure Global 6G Leadership

In line with the K-Network 2030 strategy of the Ministry of Science and ICT (May 30, 2023)





- A public-private cooperation system to build an industrial ecosystem foundation
 - To proactively set 6G strategies in respond to the rapidly changing technological advancement to secure global leadership
 - To promote international cooperation with global 5G/6G-related organizations and support leadership in international standardization.
 - To put efforts in the identification of new services to accelerate the convergence across various industries with 5G/6G

After 10 years of successful 5G Forum activities since its inception on May. 30, 2013.

Vision & Target



> Support in expanding 5G into verticals & achieving global leadership in 6G

5G Evolution

B5G/6G Revolution

5G Expansion into Verticals (~Y2026)

Achieving Global 6G Leadership (~Y2030)



Global Cooperation System Set-up for 6G World Best Communication Support for 6G







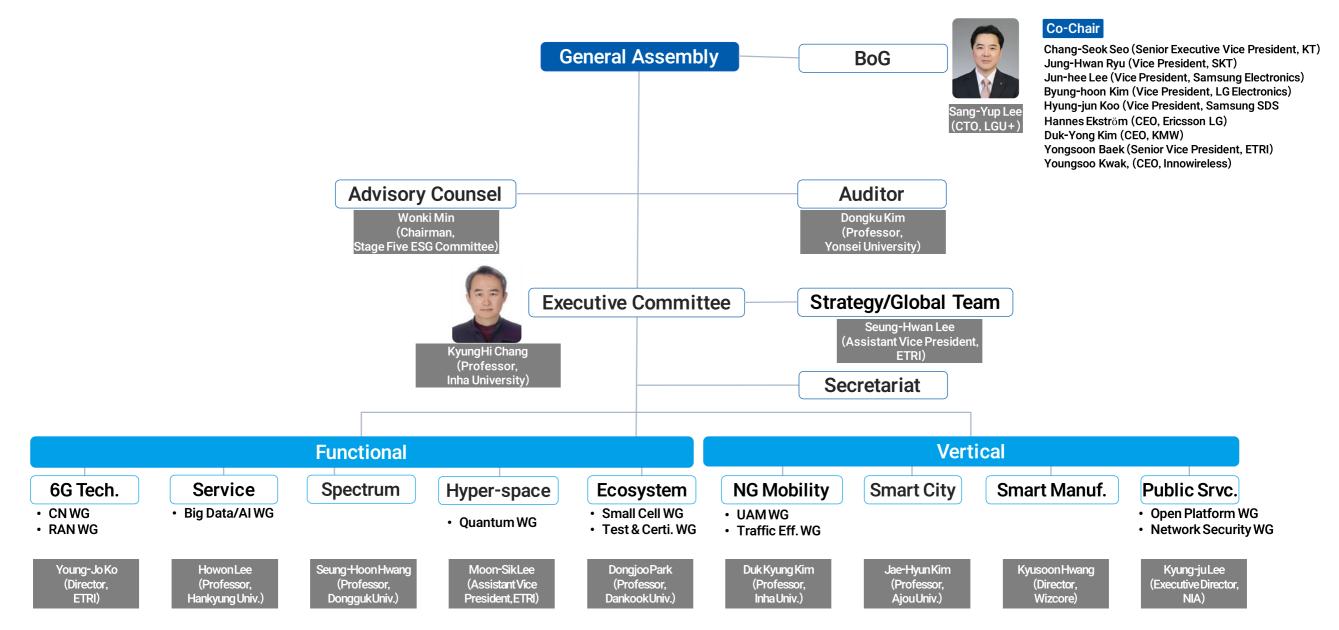
Experience and Lessons from 5G Commercialization

→ Support Government, Research Institutes, Academies & Industries to Accelerate Innovation in 6G

Organization



> Advisory, Executive, 9 Technical Committees (10 WGs) + 2 Teams



Members



> Domestic Telcos, Vendors, Solution Providers, SMEs, Gov. Agencies & Global Companies (Total 47 companies)



Activities by Number



USA: 5G Americas, Next G Alliance

China: IMT-2020, IMT-2030

• Japan: 5GMF

• Taiwan: 5G Alliance-CHT Pilot Team

• EU: 5G PPP, UK 5G IN, WWRF 5G ACIA, 5G AA, 6G-IA, one6G

• Turkiye : 5GTR

Indonesia: i5G Forum

India: TSDSI

• Malaysia : MTSFB

GSMA

Global Coop. (MoU +)

- Executive Committee
- Advisory Committee
- · Strategy/International Collaboration Team
- 9 Technical Committees
- 9 Working Groups (WGs)

Committee/WG Meetings

(Year Av.)

· Global 5G Events: 10

• 5G Vertical Summit: 8

Regional Workshops: 7

• 6G Global Events: 4

• 5G Open Symposiums: 9



Promotion



Member Companies

LGU+(Chair Company), SKT, Ericsson LG, KMW, ETRI.

White Paper / Issue Report

- White Paper: 46
- ✓ 5G and its ecosystem, smart factories, autonomous driving, smart cities, disaster safety, dedicated networks, small cells, fronthaul, OpenRAN, UAM, converged services, etc.
- Issue Report: 16
- √ wireless technology and frequency trends, V2X, vertical service standard trends, dedicated networks, network power efficiency, enterprise 5G wireless trends, etc.
- 6G Report: 6G Vision, 6G FTT

Projects & Policy Supports

- Projects
- √ TTA ICT Standardization Forum Support Program: 10 years
- √ Study on 5G Smart City Convergence Technologies.
- √ Study on 5G Smart Factories and Convergence Services.
- √ Study on Open 5G Fronthaul and Small Cell Technologies.
- ✓ Study on 5G Private Networks and 5G + Convergence Services



- √ 5G/5G + Strategy and Working Committees
- ✓ Support for 5G Convergence Service Pilot Projects
- √ 6G R&D Strategy Committee
- ✓ Advisory Activities on C-ITS Technology and Demo



• Chairs : 10

KT, Samsung Electronics, LG Electronics.

Innowireless, Samsung SDS

• SMEs: 23 • Gov.: 7 • Global : 7

6G Vision & Use Cases



6G Vision



> Advancing Human Happiness, Prosperity, and Sustainability through 6G Technology

CLEAN & SAFE SOCIETY



SUSTAINABLE SOCIETY



Social Vision

FAIR & TRANSPARENT SOCIETY



Delivery of Truly Immersive Experience Distributed Infrastructure for Connected Intelligence Real-time Interaction between Physical and Digital Worlds

Technical Vision

FUTURE 6G SOCIETY

PERSON • HOUSEHOLD • CITY • COUNTRY • EXTENDED SPACE













EDUCATION

Provisioning equal educational opportunities

LABOR

Resolving the solidification of the working classes

HEALTH & WELFARE

Bridging the medical gap between classes

TRANSPORT

Relieving traffic congestion & concentration

CULTURE & ARTS

Bridging the gap in cultural consumption level

SAFETY

Coping with human-made and natural disasters

Three Drivers of 6G





Role of Government

- K-Network 2030 ('23.02)
- 6G Core Technology R&D Program ('21~'25)
- 6G Commercialization Technology R&D Program ('24~'28)

Technological Advancement

- Coverage and network topology beyond cellular
- New spectrum and antenna, and new radio technologies
- Native Al for Connected Intelligence





Societal Requirement

- Clean and safe society
- Sustainable society
- Fair and transparent society

Usage Scenarios



> The usage scenarios from ITU-R's Framework of IMT-2030

Extension from 5G usage scenarios

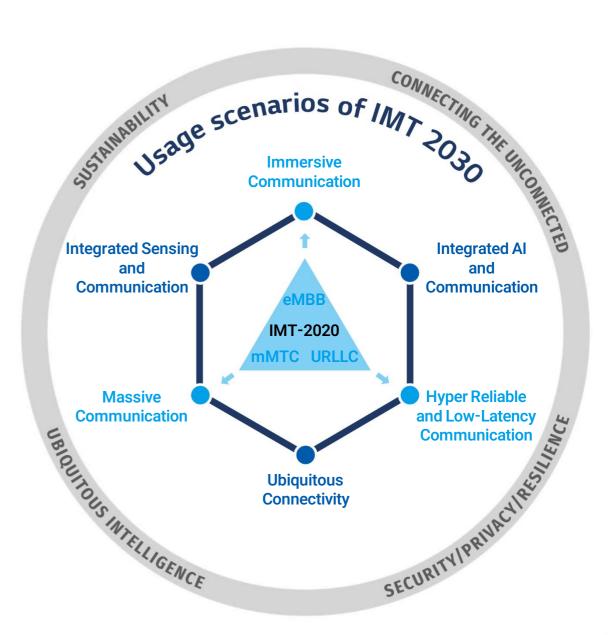
- **■** eMBB → Immersive Communication
- URLLC → HRLLC (Hyper Reliable and Low-Latency Communication)
- mMTC → Massive Communication

New usage scenarios

- Ubiquitous Connectivity
- Integrated Al and Communication
- **▶** Integrated Sensing and Communication

4 overarching aspects: design Principles for scenarios

- Sustainability
- Connecting the unconnected
- Ubiquitous intelligence
- Security, Privacy, Resilience



Immersive Communication



> Extension of the eMBB for rich and interactive immersive experience

Use Cases

- Telepresence & Holographic communications
 - ✓ Remote collaboration, education
 - ✓ Social interaction
- Remote multi-sensory telepresence
- Hyper-realistic metaverse
 - ✓ Immersive gaming and entertainment
 - ✓ Industrial training & maintenance
- Remote healthcare telesurgery



- Enhanced spectrum efficiency
- Higher data rates
- High reliability
- Low latency



Massive Communication



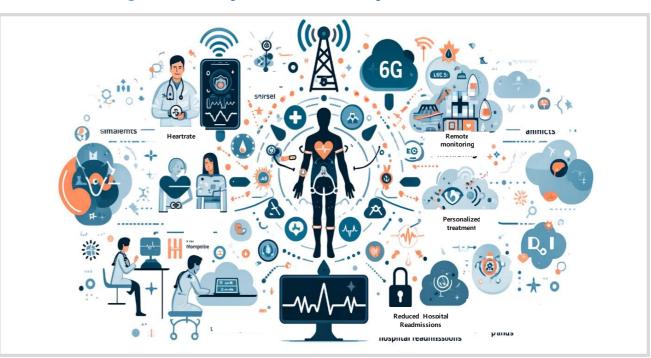
> Extension of the mMTC to support connectivity of a huge number of devices

Use Cases

- Massive Internet of Things
 - ✓ Industrial automation and monitoring
 - ✓ Smart cities and infrastructure
 - ✓ Precision Agriculture
 - ✓ Smart manufacturing and logistics
- Metaverse
- Ubiquitous personal connectivity



- High connection density
- Low power consumption
- Mobility
- Extended coverage
- High security and reliability



Hyper Reliable & Low-Latency Communication



> Extending the boundary of URLLC by covering more stringent requirements on reliability and latency

Use Cases

- Industry and automation
 - ✓ Collaborative robots (Cobots)
 - ✓ Precision manufacturing
- Healthcare
 - ✓ Tele-surgery
 - ✓ Remote diagnostics and monitoring
- Fully autonomous driving
- XR and Tactile Internet



- Enhanced reliability
- Enhanced low latency
- Precise positioning
- Connection density



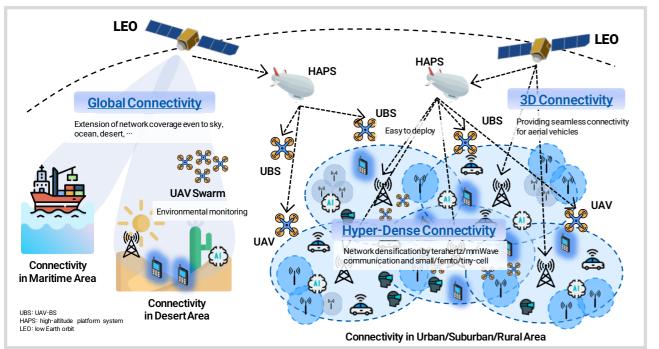
Ubiquitous Connectivity



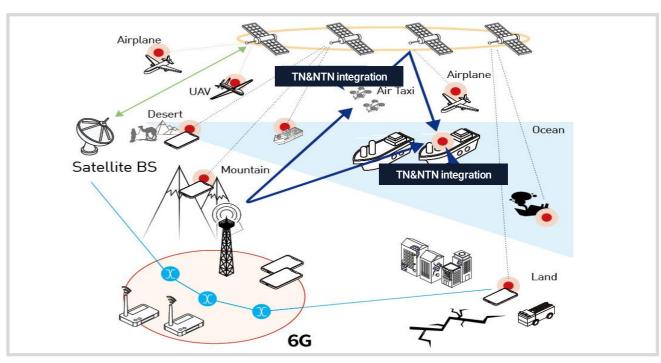
> To enhance connectivity to bridge the digital divide

Use Cases

- Global Internet connectivity
 - ✓ Remote and underserved areas
 - ✓ Seamless rural coverage smart agriculture, education, ···
- ✓ Aerial node connectivity, e.g., UAM, etc.
- IoT networks
 - ✓ Smart cities
 - ✓ Environmental monitoring, etc.



- TN & NTN Integration
- New spectrum and frequency bands
- RIS
- AI/ML



Integrated AI and Communication



> To support distributed computing and AI (especially LLM) applications

Use Cases

- Autonomous collaboration between connected Al robots (smart city, manufacturing plant, rescue missions, etc.)
- Offloading of heavy computation operations across devices and networks
- 6G-assisted automated driving





- High area traffic capacity
- Low latency and high reliability
- Capabilities related to the integration of Al and compute functionalities in 6G
- ✓ Data acquisition, processing, model training, sharing, etc.





Integrated Sensing and Communication



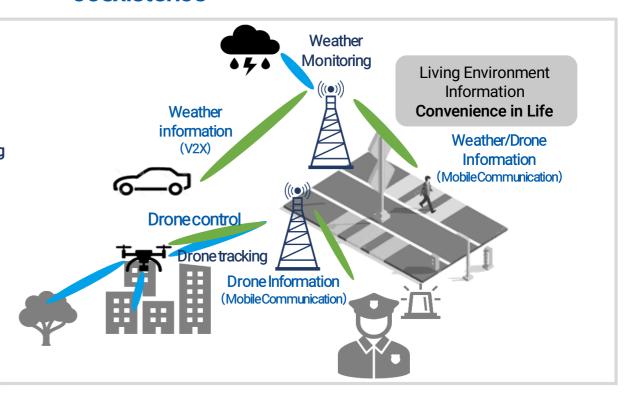
> To offer new possibilities for smart applications, enabling enhanced sensing capabilities, efficient resource utilization

Use Cases

- 6G-assisted navigation
- Environmental monitoring (e.g. rain/pollution detection)
- Object detection and tracking
- Motion monitoring

Communication Beam Sensing Beam (Autonomous Car) Road information Traffic **Collision Avoidance Emergency braking** Road condition detection **Obstacles** detection Road information (V2X) Environmental Imaging Road information Convenience in Driving 11

- Sensing-enabled communications
- Data fusion for distributed sensing
- Multi-modal sensing
- Intelligent sensing and communication coexistence

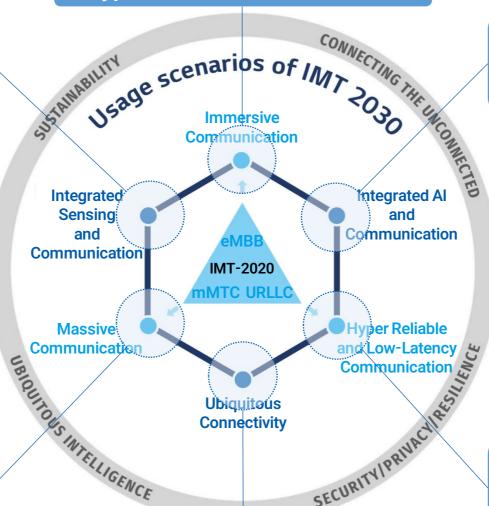


6G Day-1 Use Cases



- 6G-assisted navigation
- Environmental monitoring

Hyper-realistic metaverse



- Autonomous collaboration between connected AI robots
- Automated driving

- Smart cities
- Transportation, Agriculture
- Supply Chain Management

- Non-terrestrial networks
- Air mobility, e.g., UAM
- IoT networks, e.g., smart city

- Industrial control and operation
- Fully autonomous driving
- Remote tele-surgery

6G Regional Specific Use Case



Korea's rapid entry into a super-aging society (the elderly over 65 : >30% in 2035, >43% in 2050) persistently low birth rate, the lack of caregivers, etc.

Increased need to pursue welfare and safety for the elderly

→ Realization of the elderly care services by combining Sensing, AI, Robot mobility with Communications

6G Sensing

 Health & Behaviors monitoring



6G AI & robot mobility

- Connected Al robots
- Al/LLM-based health diagnosis/prescription

6G Day-1 R&D in Korea



R&D Direction in Korea



> To overcome the limitations of 5G reflecting the future technology trends



6G Commercialization Technology R&D Program launched (USD327m, 2024-2028)

6G Day-1 R&D Direction in Korea



> 11 strategic technologies across 4 sectors

4 Sectors	11 Strategic Technologies
01 RAN	① E-MIMO systems
	② E-MIMO base station component
	3 6G upper mid-band terminal component
	4 6G coverage expansion
Mobile Core Network	Mobile core network architecture and framework
	⑥ AI-Native mobile core network automation/optimization
03 Wired Network	
	9 6G networking transmission component
04 System	10 End-to-end service performance assurance framework
	10 6G system supporting AI-Native application services
Sustainability (

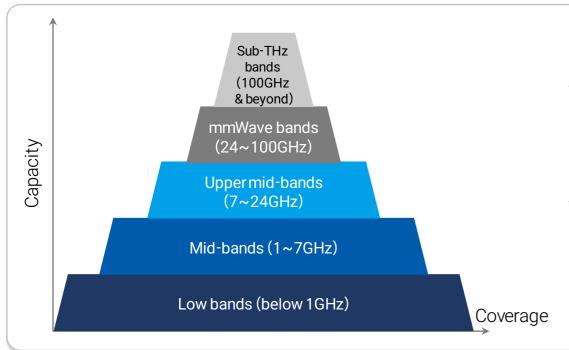
6G Spectrum



> A layered approach, from low band to high band, to support diverse usage scenarios

Mobile
Communication
Integrated into
the whole industry

- ▶ High Band (mmWave + Sub-THz) → Sensing & Ultra Capacity
- **□** Upper Mid-Band (7-24GHz) → Coverage & Extreme Capacity
- Mid Band (1-7GHz) → Coverage & Capacity
- **D** Low Band (below 1GHz) → Extended Coverage

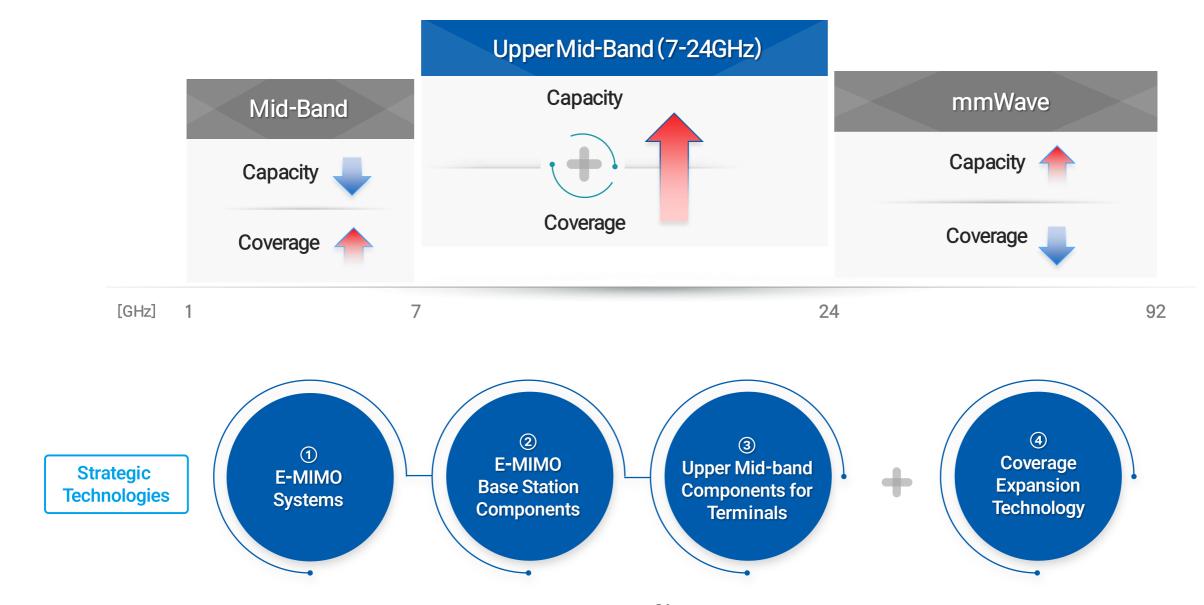


- ► KOREA 6G Candidate Upper Mid band | 7.125 ~ 8.4, 12.75 ~ 13.25, 14.8 ~ 15.35GHz
- ▶ APT view | 7.125 ~ 15.35GHz for IMT spectrum in WRC-23
- ▶ Wider Channel Bandwidth | 400MHz in the Upper Mid Band
- Spectrum Technology
 - 4G: Carrier Aggregation
 - 5G: Dual Connectivity
 - 6G: Advanced Duplex

Upper-mid Band Spectrum (7-24 GHz)



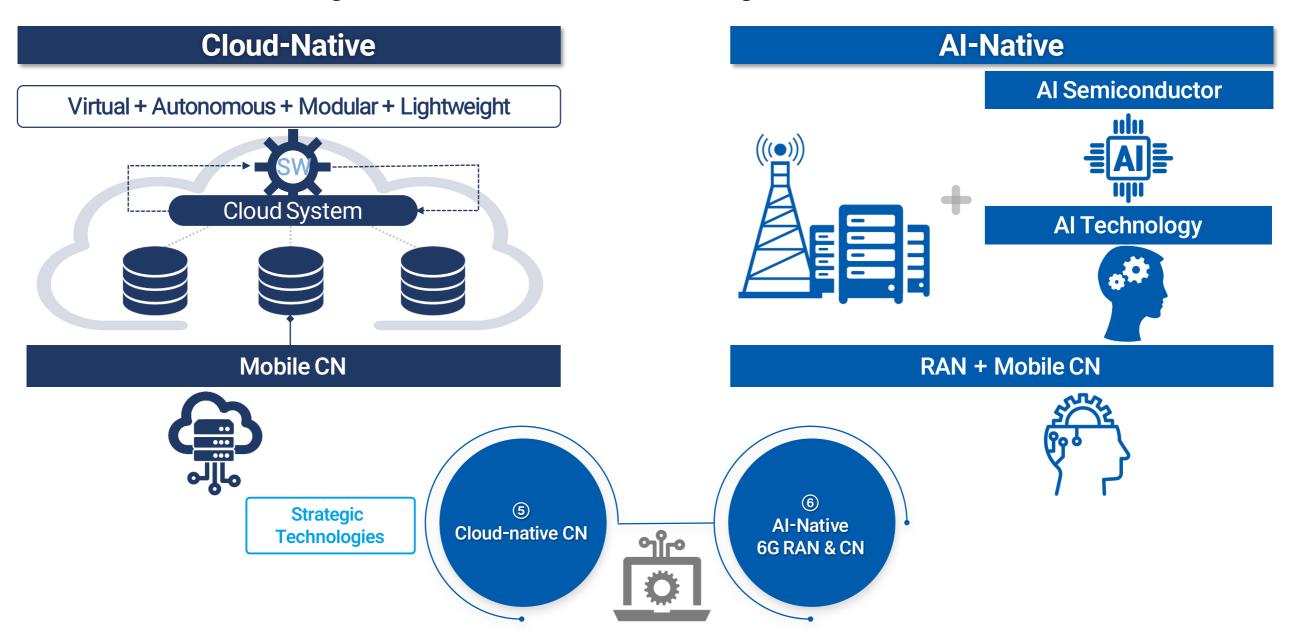
> Extreme MIMO and coverage expansion (RIS, NCR, advanced duplex, etc.) technologies in Upper-mid band



Cloud-native & Al-native Mobile Network



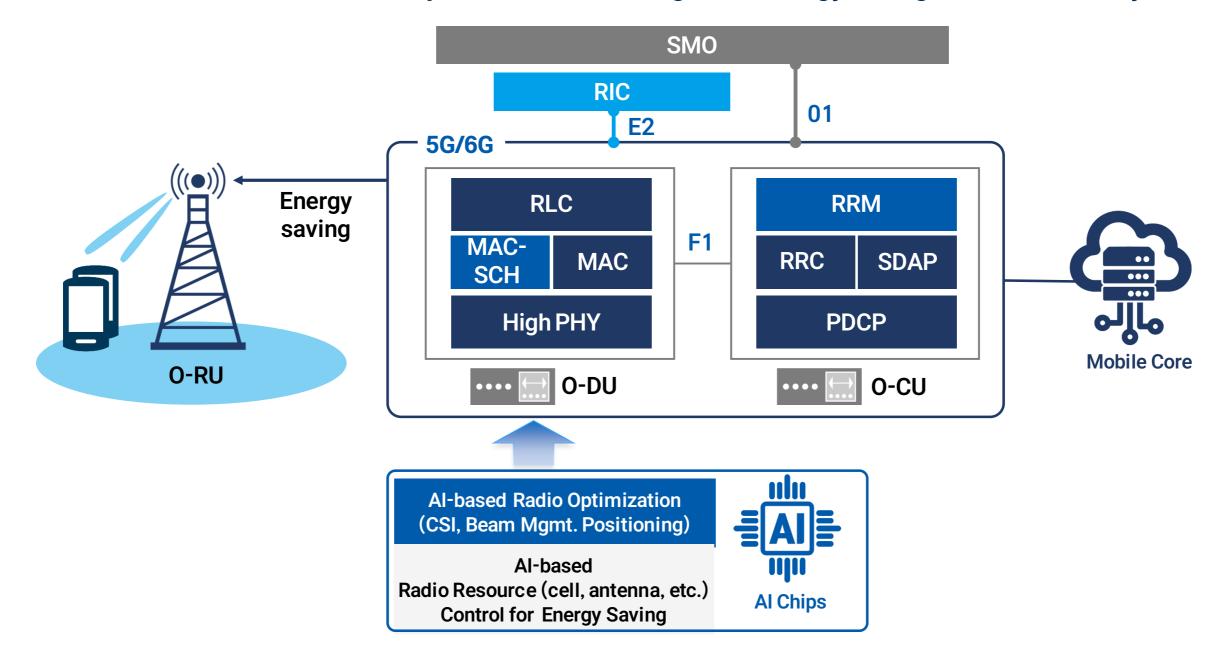
> Cloud-Native CN Technologies, Al-Native RAN & CN Technologies



Al-based Energy Efficient Network



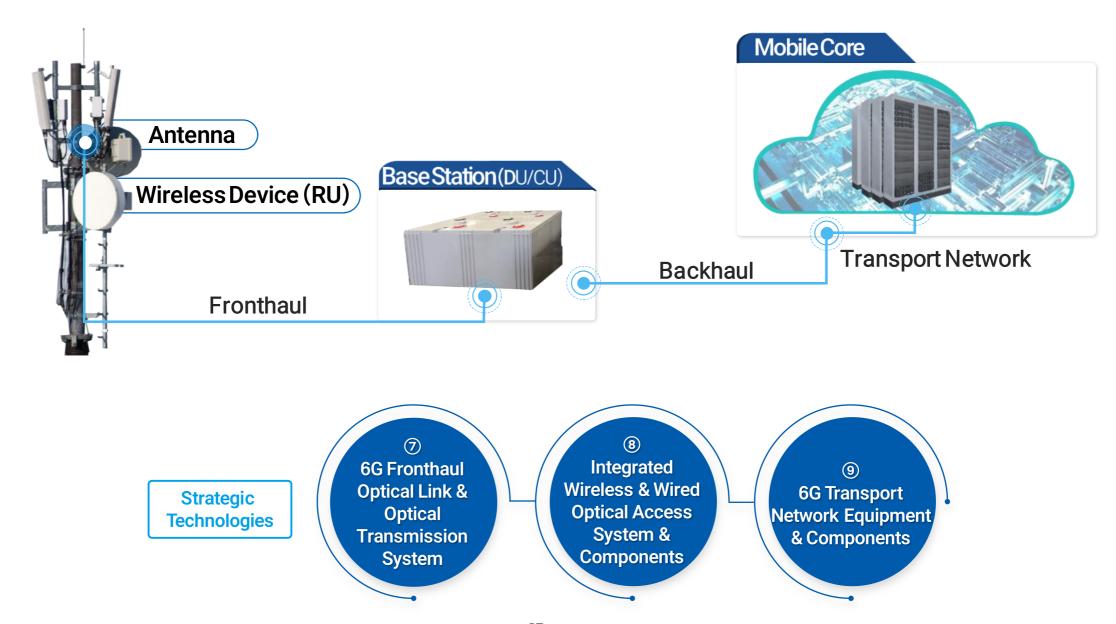
> Al-based radio resource control and optimization technologies for energy saving & radio efficiency enhancement



Wired Network



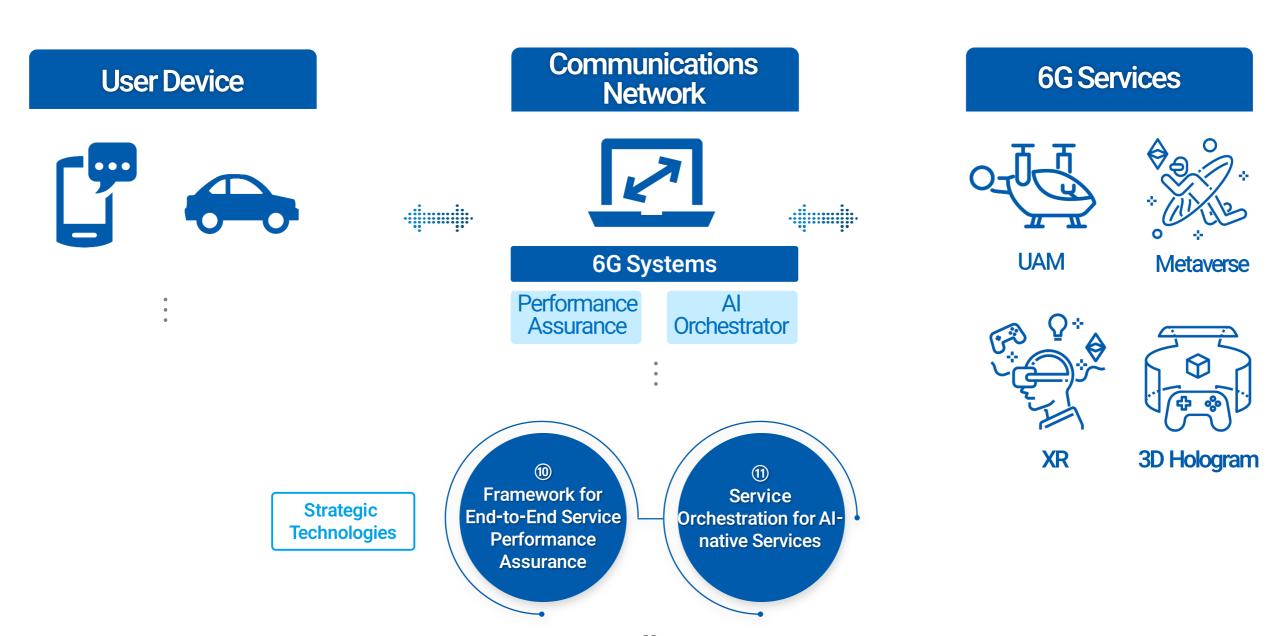
> Ultra-high Speed/Capacity Optical Transmission System & Component Technologies for 6G Front/Backhaul



Systems



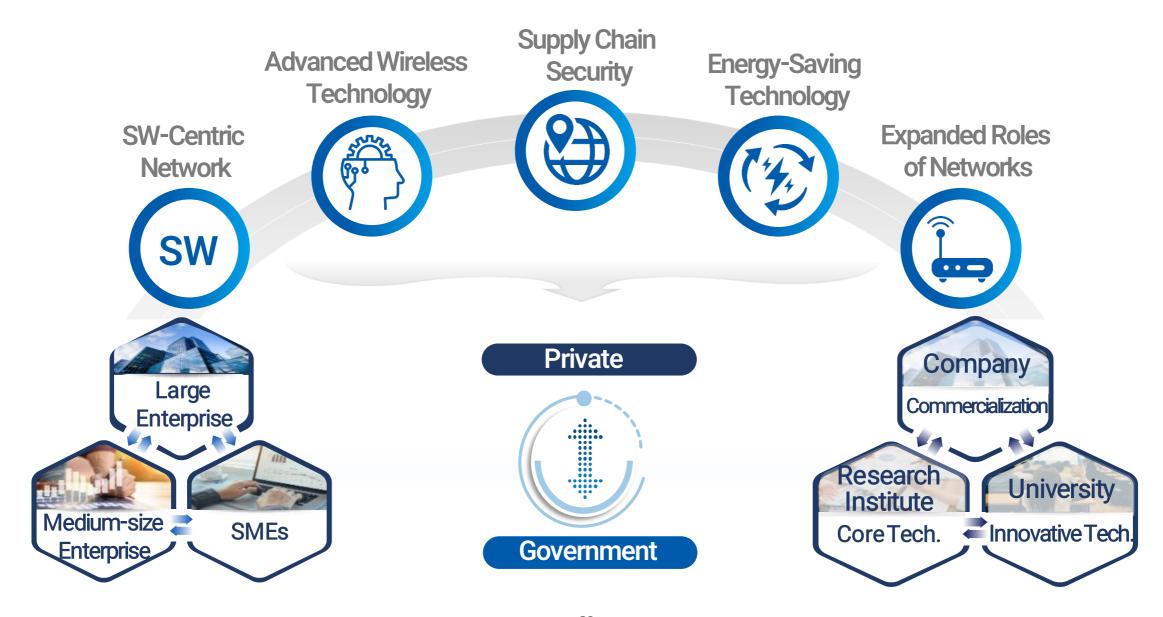
> System technologies to ensure end-to-end performance assurance of diverse 6G services



Pre-6G Vision Fest 2026



> Demo of 47 core technologies in 11 strategic technology areas to secure the initiative in 6G commercialization



Takeaway



To realize 6G vision of advancing Human Happiness, Prosperity, and Sustainability through 6G technologies.

6G Forum

- ✓ coordinates 3 drivers (Societal Need-Pull, Technology-Push, and Policy-Lead) for 6G.
- ✓ identifies use cases that can be applied to various industries, reflecting regional characteristics.
- ✓ will actively pursue ongoing activities such as supporting 3GPP and ITU standardization, publishing technical white papers, and seeking global collaboration so that we can ensure the safe landing of 6G technologies.



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