acsiel Alliance Electronique

2025
ACSIELWEBINAIRE

en partenariat avec
YOLE Group
KEYSIGHT

6G : Enjeux technologiques, industriels et géopolitiques

07 OCT.
17h-18h

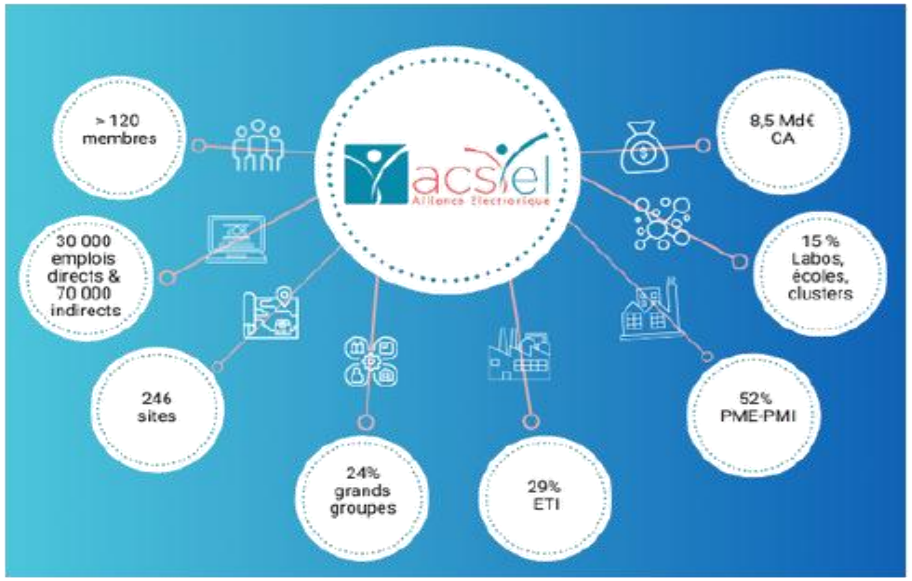
ACSIEL

ACSIEL Alliance Électronique est l'organisation professionnelle des acteurs industriels de la chaîne de valeur de la filière électronique en France.
De la recherche académique et l'innovation au test et mesure en passant par la fabrication de composants et de semi-conducteurs et d'équipements pour l'industrie électronique, ACSIEL est un écosystème intégré et cohérent, accélérateur de l'électronique française.

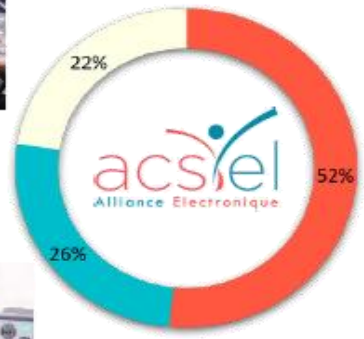
Par son positionnement, ACSIEL s'adresse aux donneurs d'ordres, aux pouvoirs publics et aux institutionnels, échange avec l'ensemble des acteurs de l'écosystème de l'électronique, crée et promeut les conditions du développement de l'activité, des métiers et des emplois.

Chiffres clés

Fabricants
Concepteurs
Développeurs
Importateurs
Chercheurs



Equipements & Services



Composants

Test & Mesure

https://acsiel.fr/

PRÉSENTATION DES INTERVENANTS

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Sales Specialist for the Wireless Industry
KEYSIGHT TECHNOLOGIES

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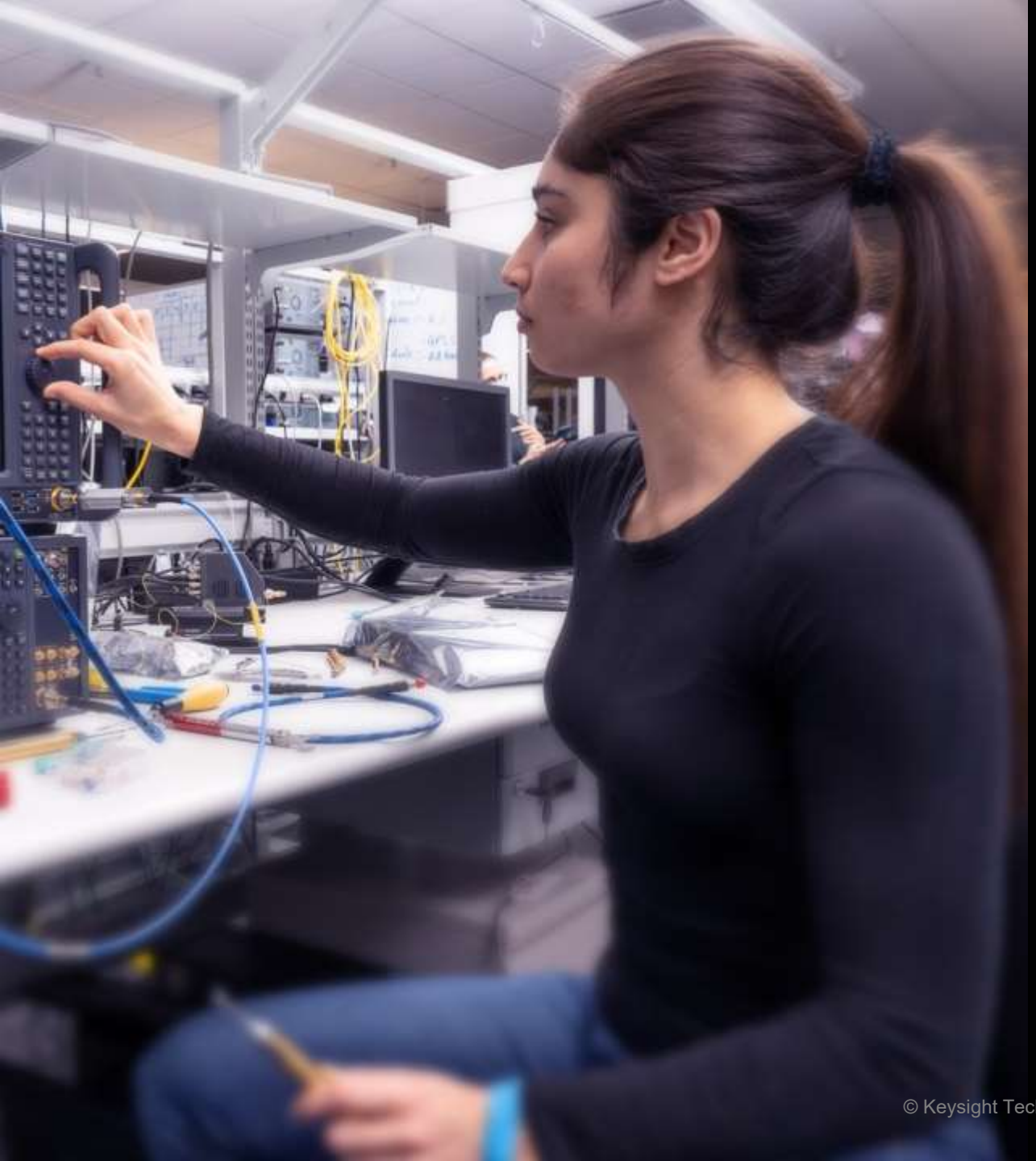
YOLE Group

KEYSIGHT

6G: Enjeux technologiques, industriels & géopolitiques

Renaud DUVERNE
Wireless Sales Specialist
Keysight Technologies



AGENDA

Introduction & Contexte

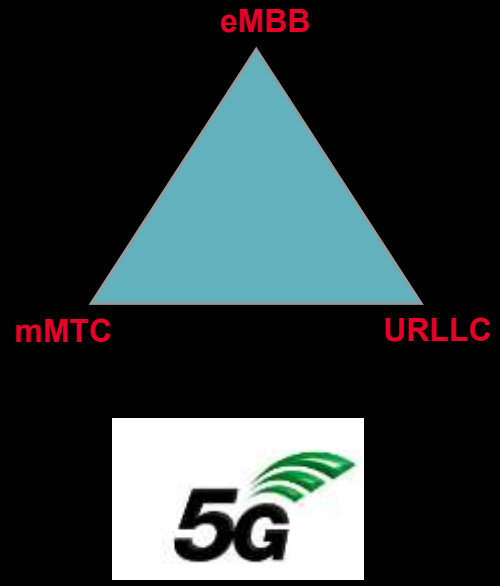
- Status de la 5G. Pourquoi la 6G?
- Timeline 5G/6G, evolution vers 5G Advanced puis 6G
- La 5G NTN et le New Space

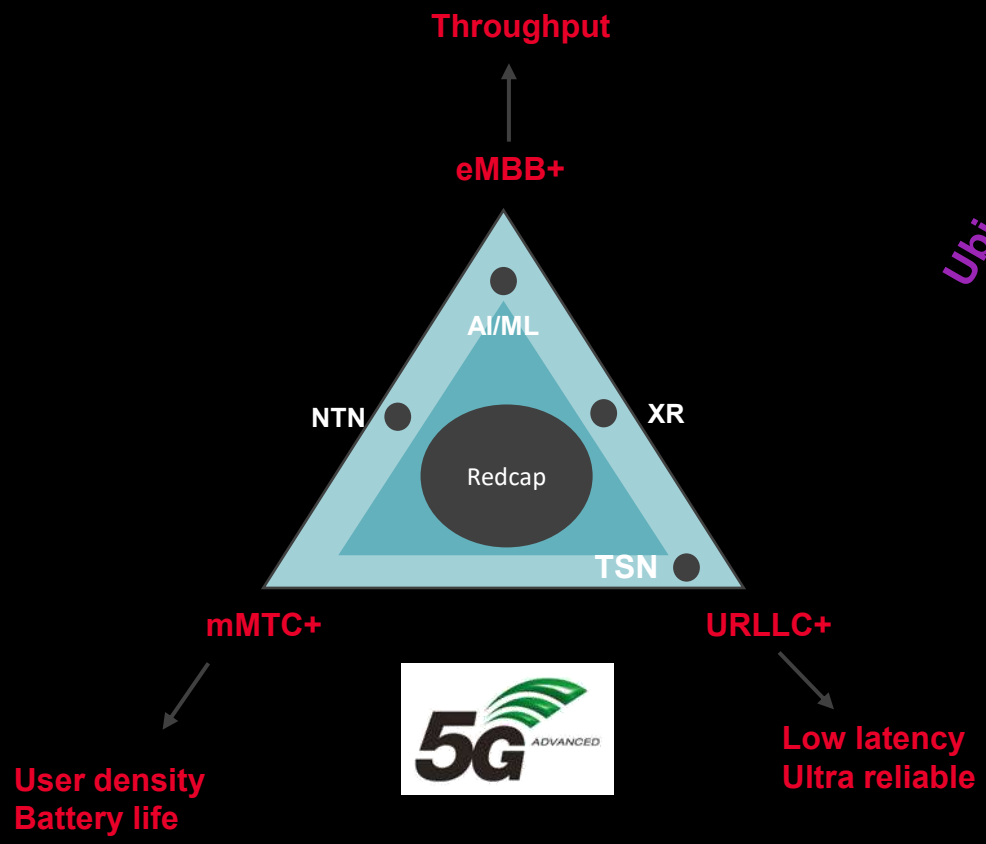
Vision 6G

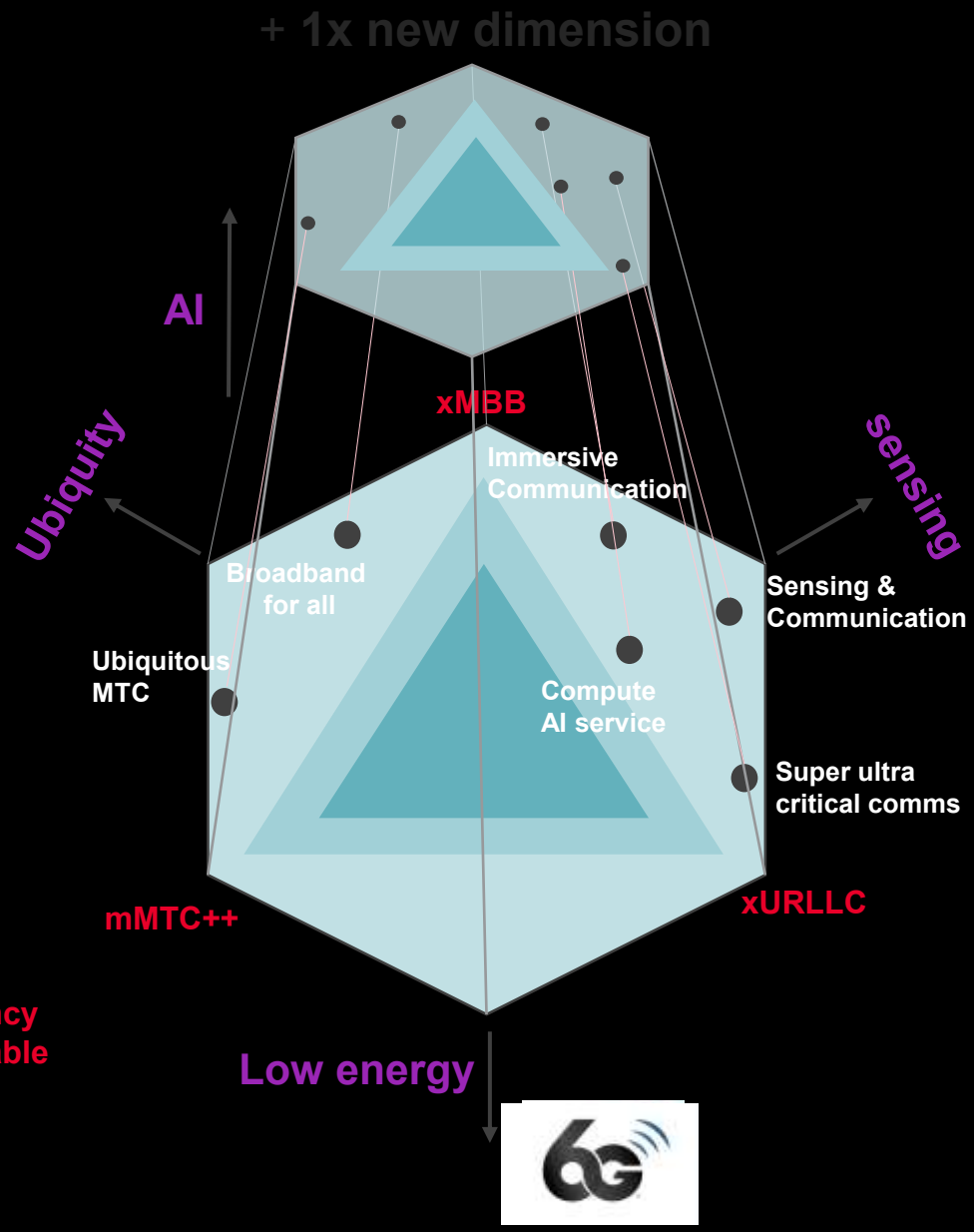
- Cas d’usage et applications
- Capacite et besoins, spectre sequential
- Exigences techniques, defis

6G Use Case Diagram

3x new vectors , 1x new dimension



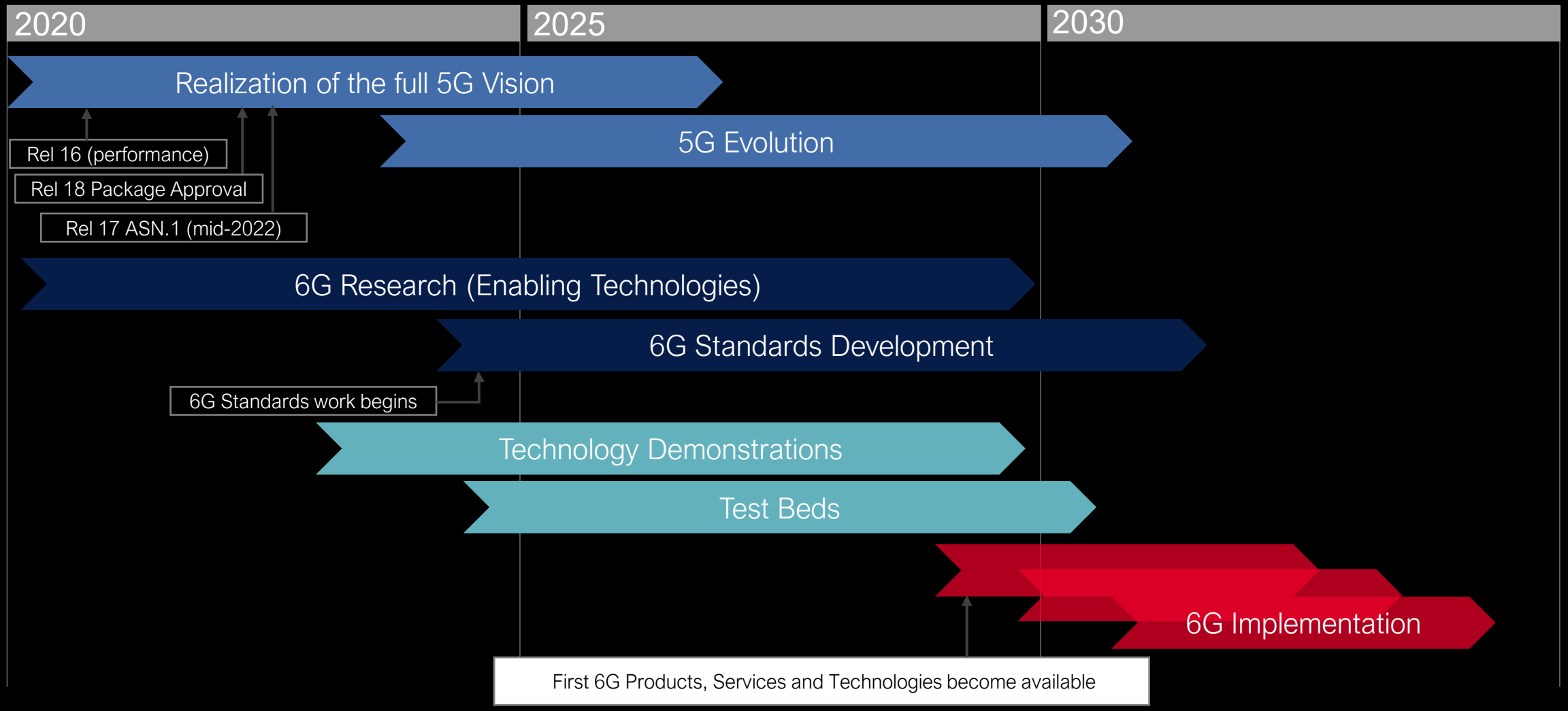




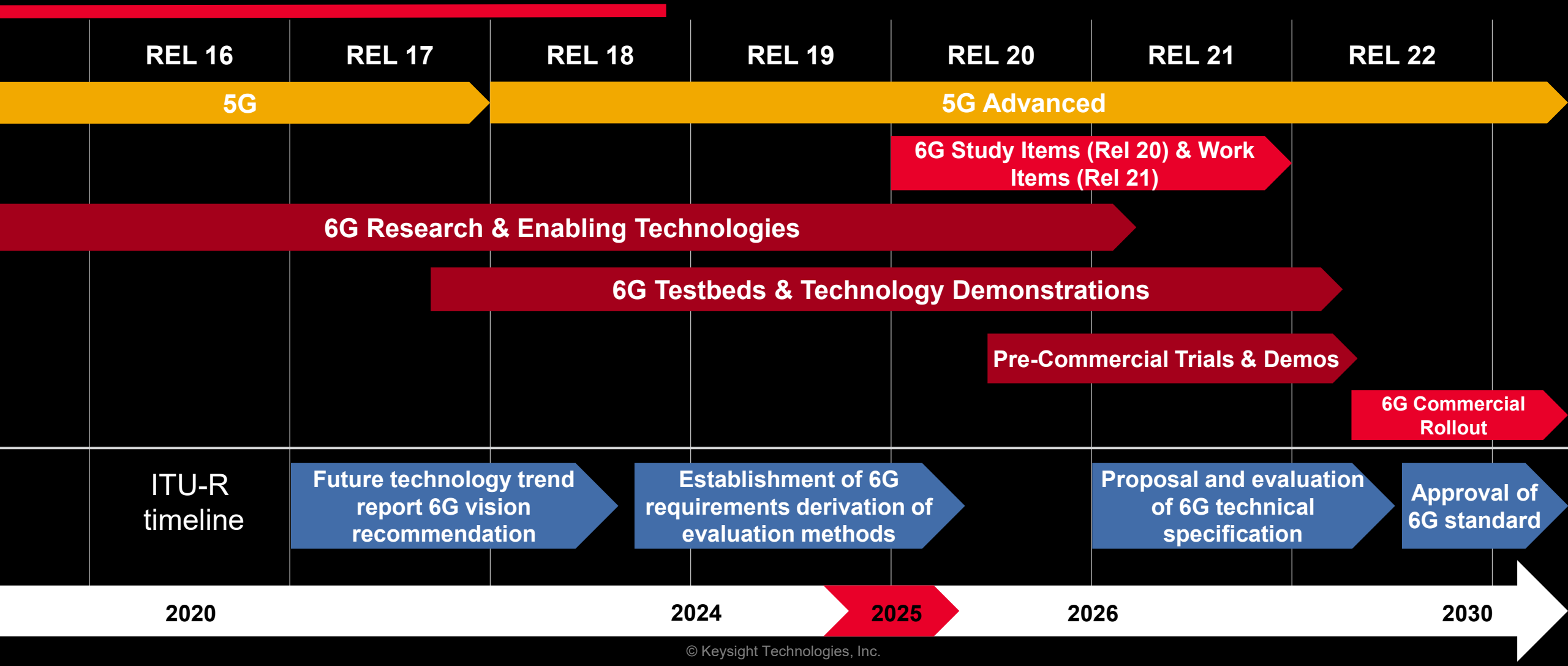
3x vectors
- Tput, UR/LL, Battery life

3x new vectors
- Ubiquity, LE, Sensing

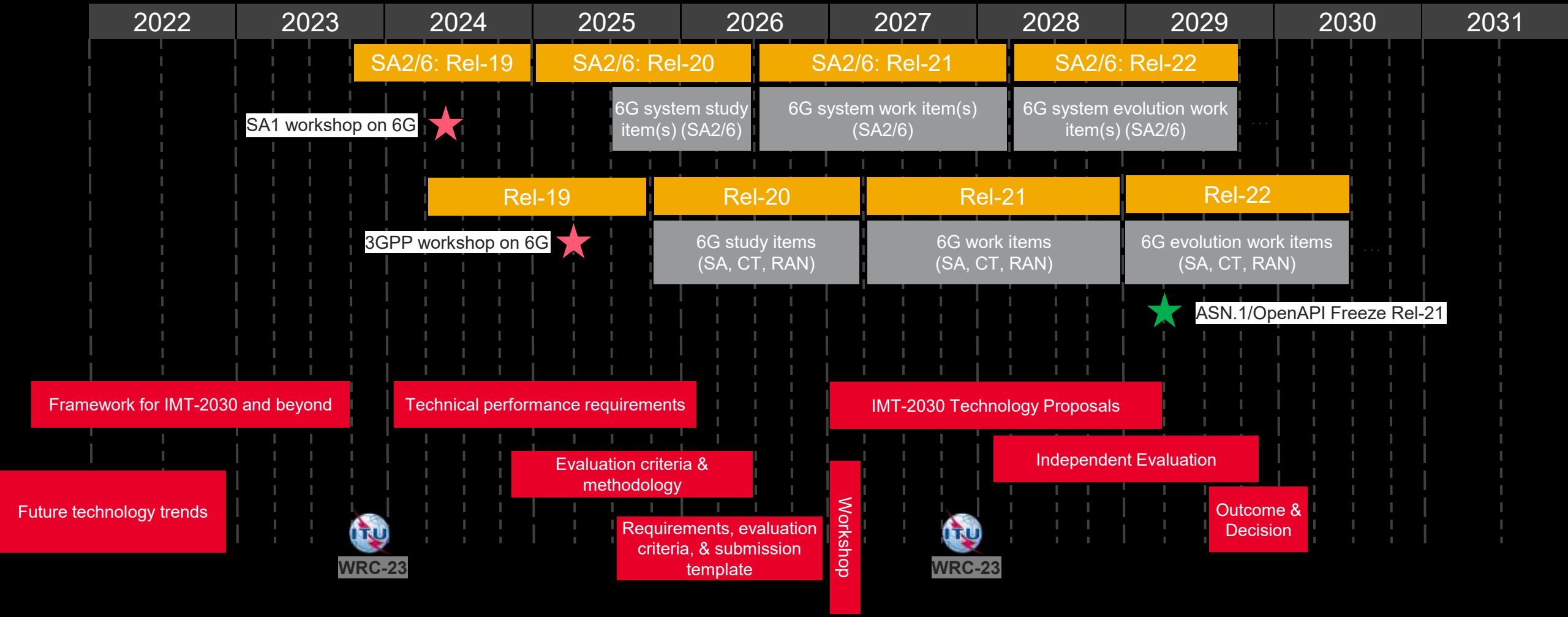
5G Towards 6G Timeline



3GPP and ITU-R Timeline for 6G



6G Detailed Timeline



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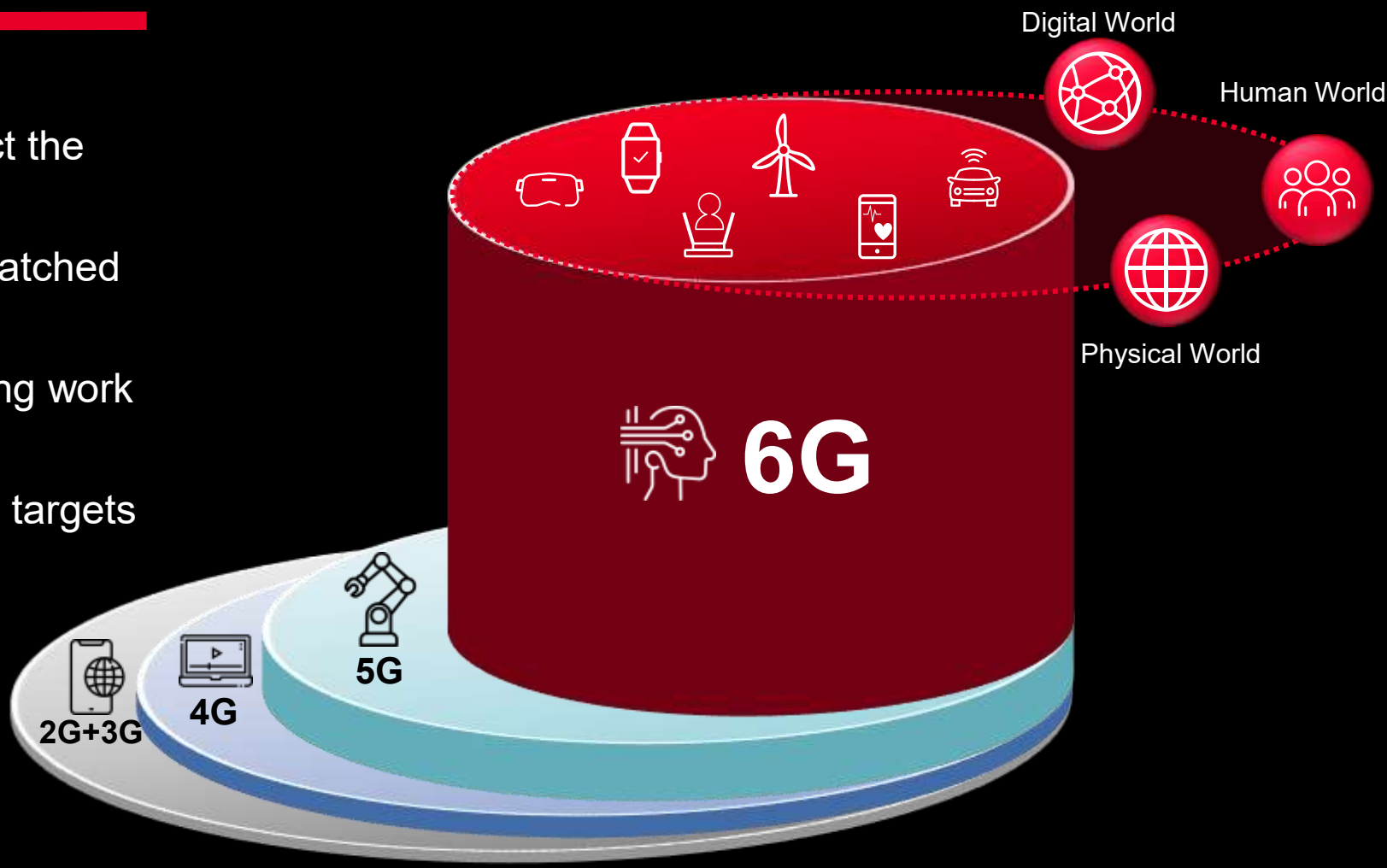
6G Vision

- Create a new approach to connect the digital and physical worlds
- Leverage massive data from unmatched number of devices
- Use intelligence to make everything work in unprecedented ways
- All while striving to meet Net Zero targets

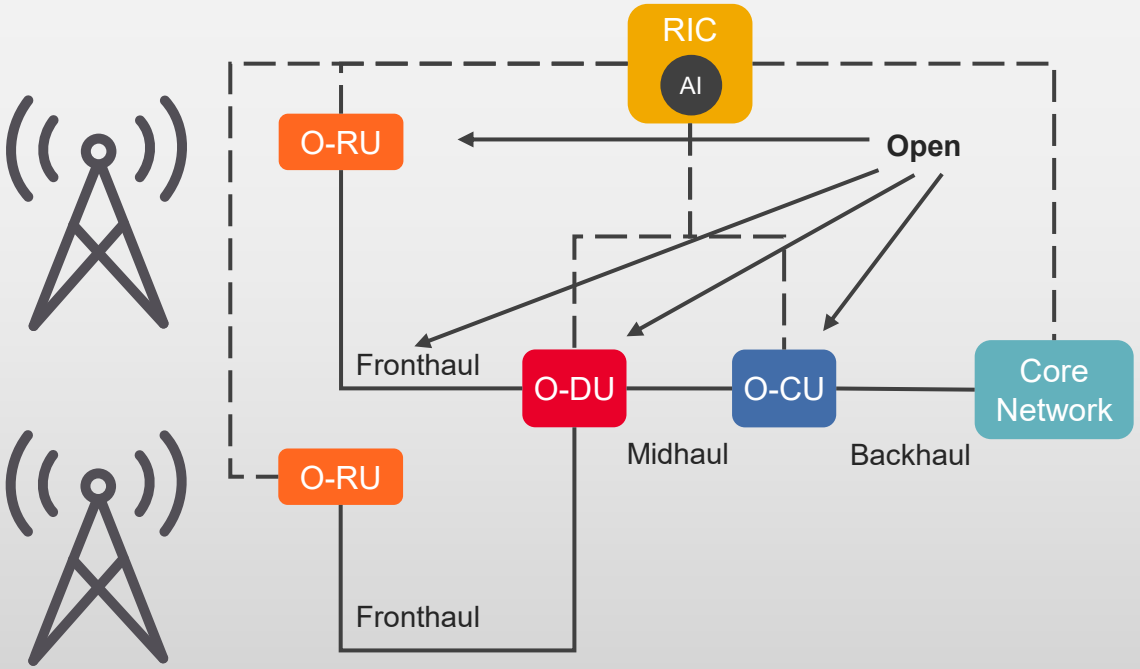


Pioneer New Network Topologies

Iterate on 5G Network Architectures to Define the Future 6G Network

New Network Architectures

Virtualization example



D-RAN
Distributed

C-RAN/Cloud RAN
Centralized

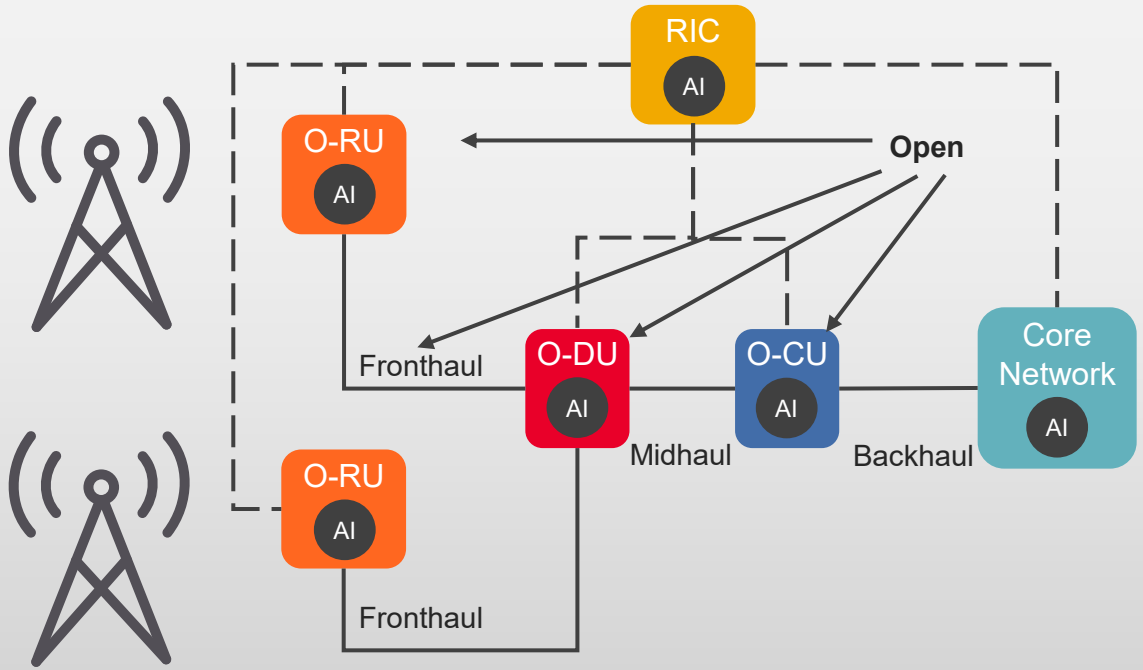
vRAN
Centralized and Virtual

Open RAN
Centralized, Virtual and Open

New Network Architectures

Virtualization example

The 6G RAN will be highly disaggregated, virtual, with pervasive native AI



D-RAN
Distributed

C-RAN/Cloud RAN
Centralized

vRAN
Centralized and Virtual

Open RAN
Centralized, Virtual and Open

6G RAN
Decentralized, Virtual and Open

New Network Topologies

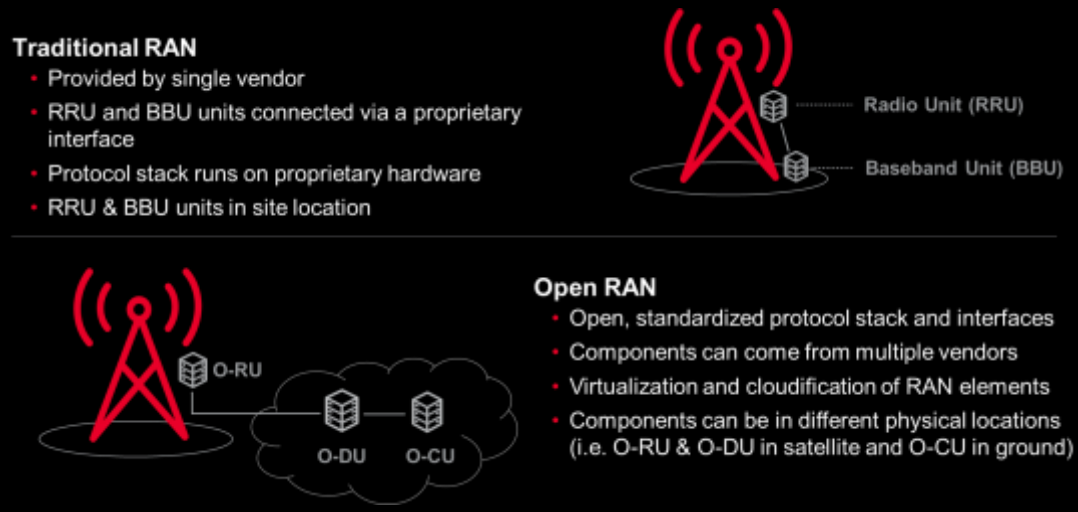
6G will depend on open, scalable, and virtualized networks. To overcome coverage challenges and deliver high data rates widely, new topologies like Open RAN and non-terrestrial networks (NTNs) will be essential for expanding access.

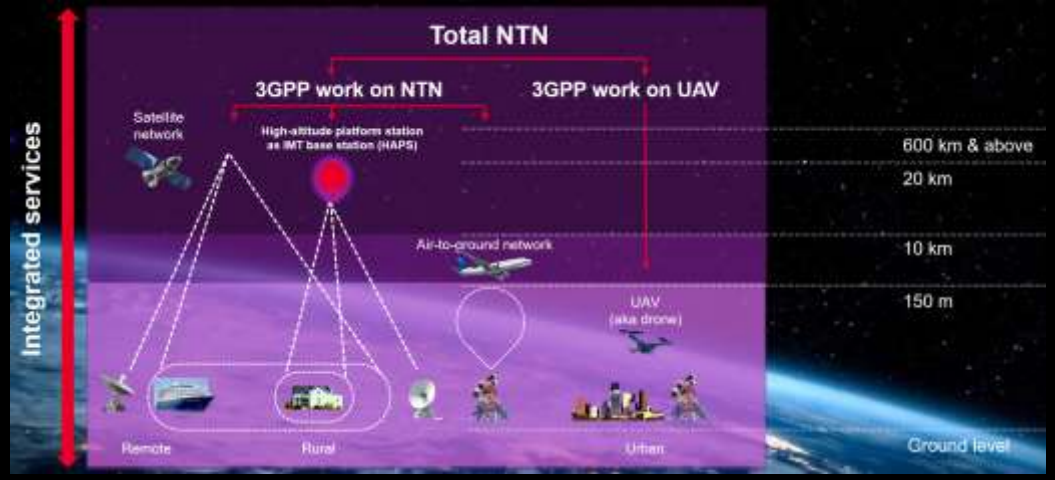
Benefits

- Open, standardized protocol stack and interfaces
- Virtualization and cloudification of RAN elements
- Connectivity in areas lacking terrestrial coverage
- Avoids costly terrestrial deployments

Challenges

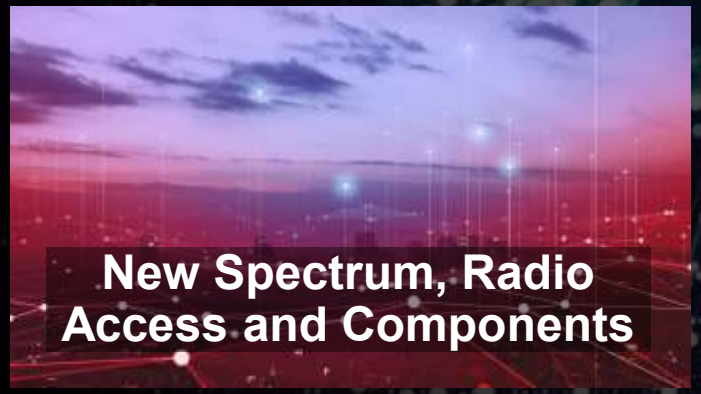
- Complex integration and Standardization challenges
- Quality of service and user experience
- Co-existence between new network topologies and legacy ones





6G Use Cases

6G Key Technologies and Applications



Unlock New Spectrum, Radio Access and Components Technologies

Satisfy demand for high speed and data throughput with the help of new frequency technology and novel component design

6G Will Use New Spectrum

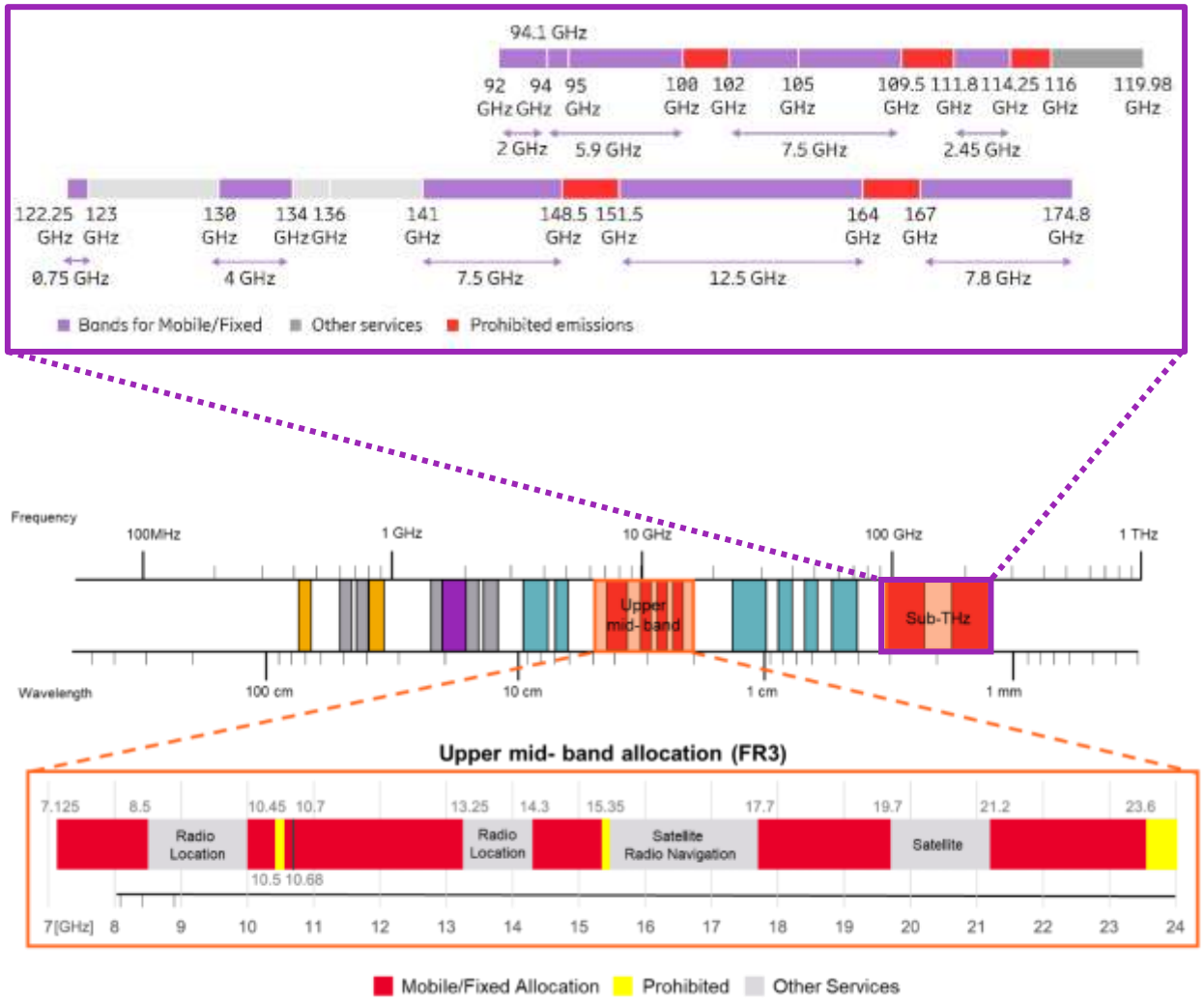
Exploitation of new spectrum bands, including FR3 and sub-THz frequencies, to enable ultra-high data rates and support emerging 6G applications.

Benefits

- Very High Data Rates and Ultra-Low Latency
- High Spatial Resolution
- Support for Advanced Applications
- Compact Antennas

Challenges

- High/Severe Propagation Loss
- Limited Coverage
- Beam Alignment and Tracking
- Interference Management



Advanced Radio Access for 6G

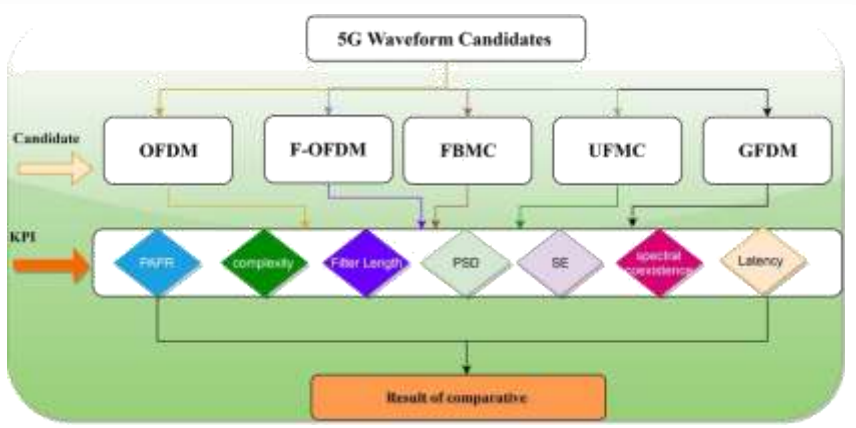
Advanced radio access technologies, such as full duplex, new waveforms, and AI-driven dynamic spectrum sharing, to maximize spectral efficiency and network flexibility.

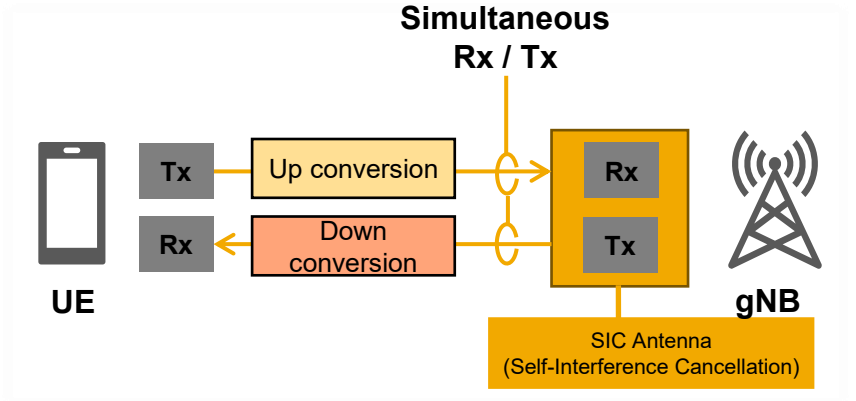
Benefits

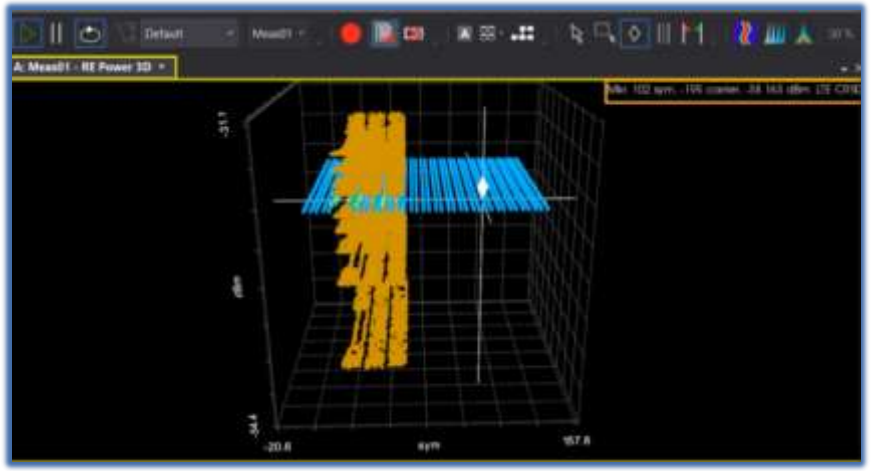
- Higher throughput and reduced latency
- Improved spectral and energy efficiency
- Increased resilience (interference, doppler etc.)
- Scale spectrum use to meet user demand

Challenges

- Potential full redesign
- Increased costs for vendors and operators
- Complex interference management
- QoS and SLA assurance







Innovative 6G Components

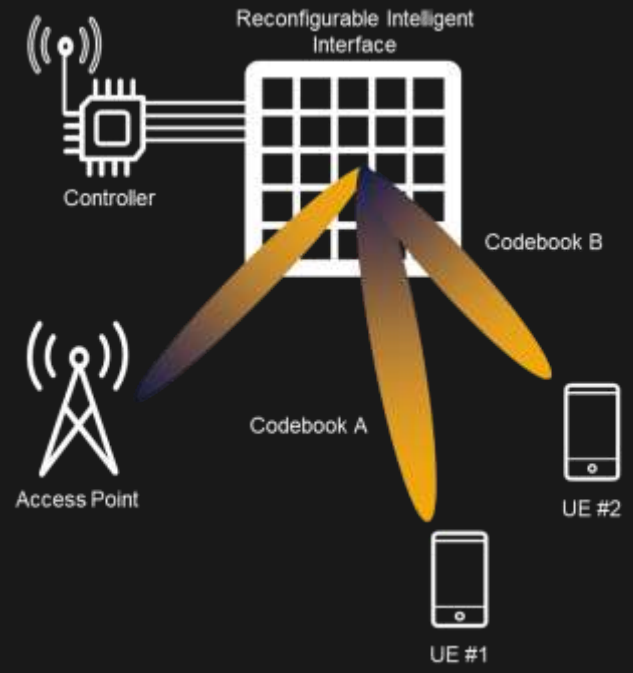
Innovative hardware components, including reconfigurable intelligent surfaces (RIS), energy-efficient transceivers, and integrated sensing-communication modules, to support scalable and sustainable 6G deployment.

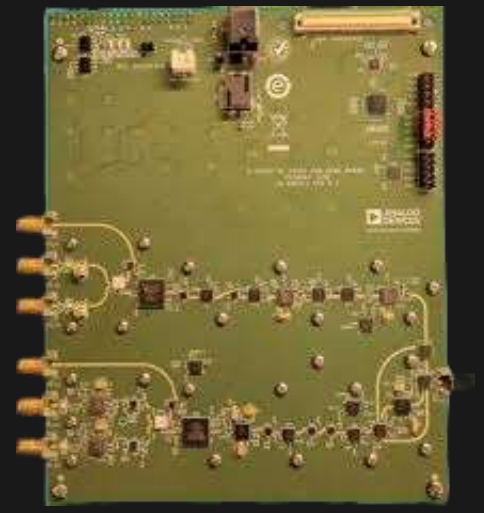
Benefits

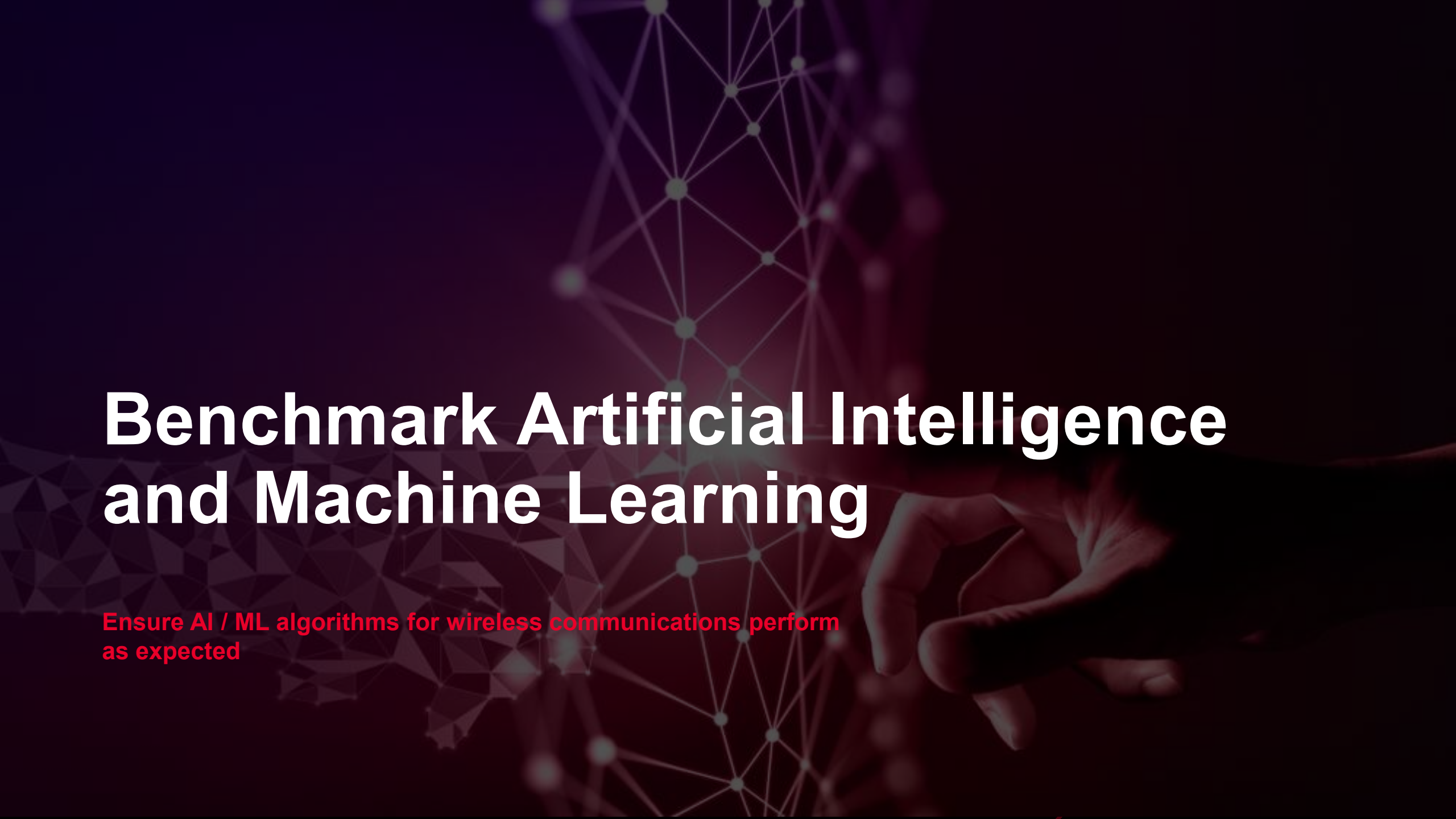
- Enhanced Coverage and Signal Quality
- Energy Efficiency
- Scalability
- Reduced Infrastructure Footprint

Challenges

- Complex Design and Manufacturing
- High Initial Costs
- Integration with Legacy Systems
- Control and Coordination Complexity
- Standardization and Interoperability



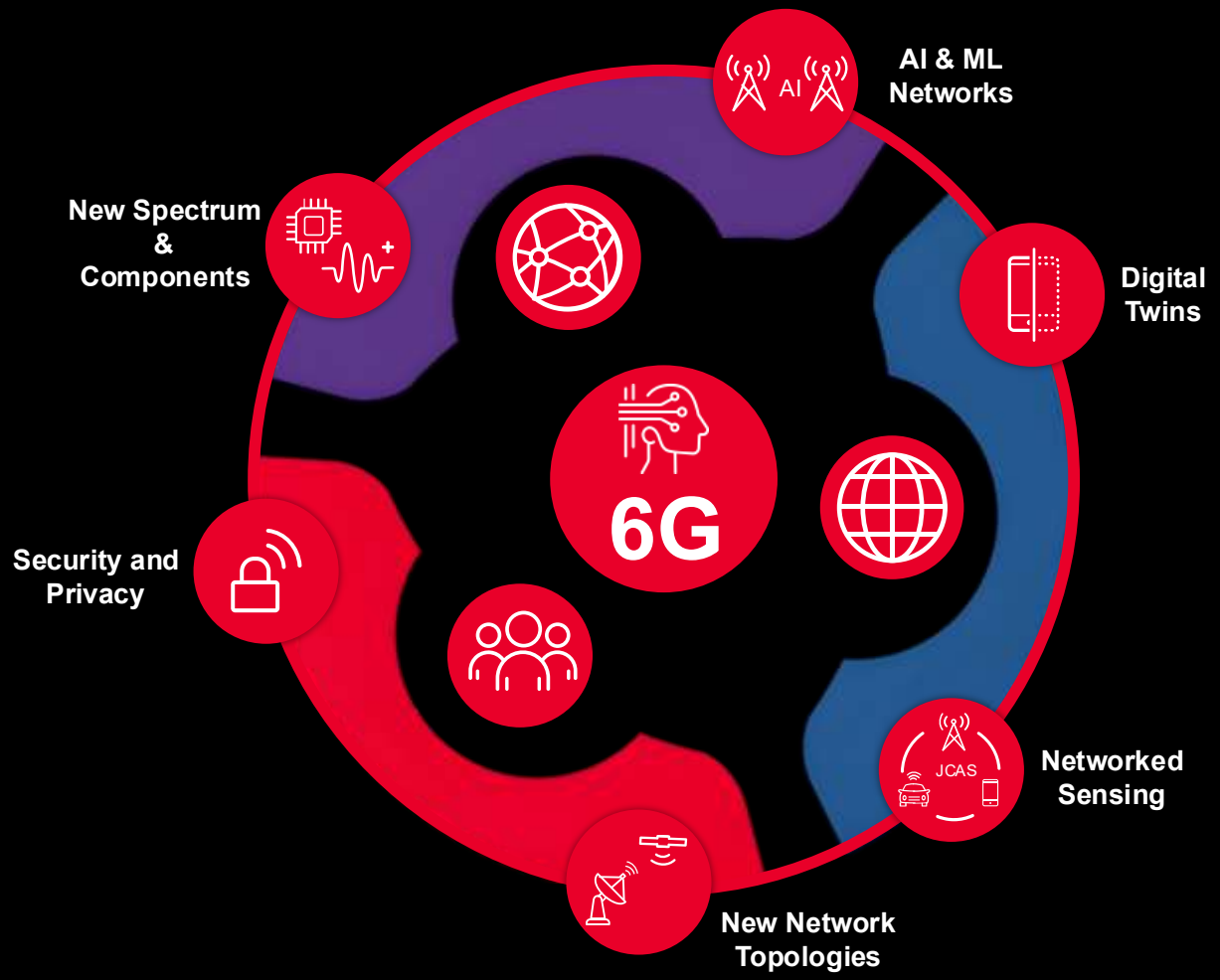




Benchmark Artificial Intelligence and Machine Learning

Ensure AI / ML algorithms for wireless communications perform as expected

6G Key Technologies and How AI impact Them



AI will speed up design cycles for complex circuits by improving data handling, simulations, and digital compliance

AI will improve network performances by learning from historical data and adapting to changing conditions

Digital twins provide a sandbox for experimentation and a source of synthetic data used for AI/ML algorithm training

AI boosts JCAS systems by using deep learning to filter noise, detect patterns, and extract useful information

AI and ML solutions are can effectively discern patterns within dynamic, multi-dimensional data, providing superior performance

AI can implement advanced encryption techniques and privacy-preserving algorithms to protect user data

KEYSIGHT

AI will Transform the Air Interface

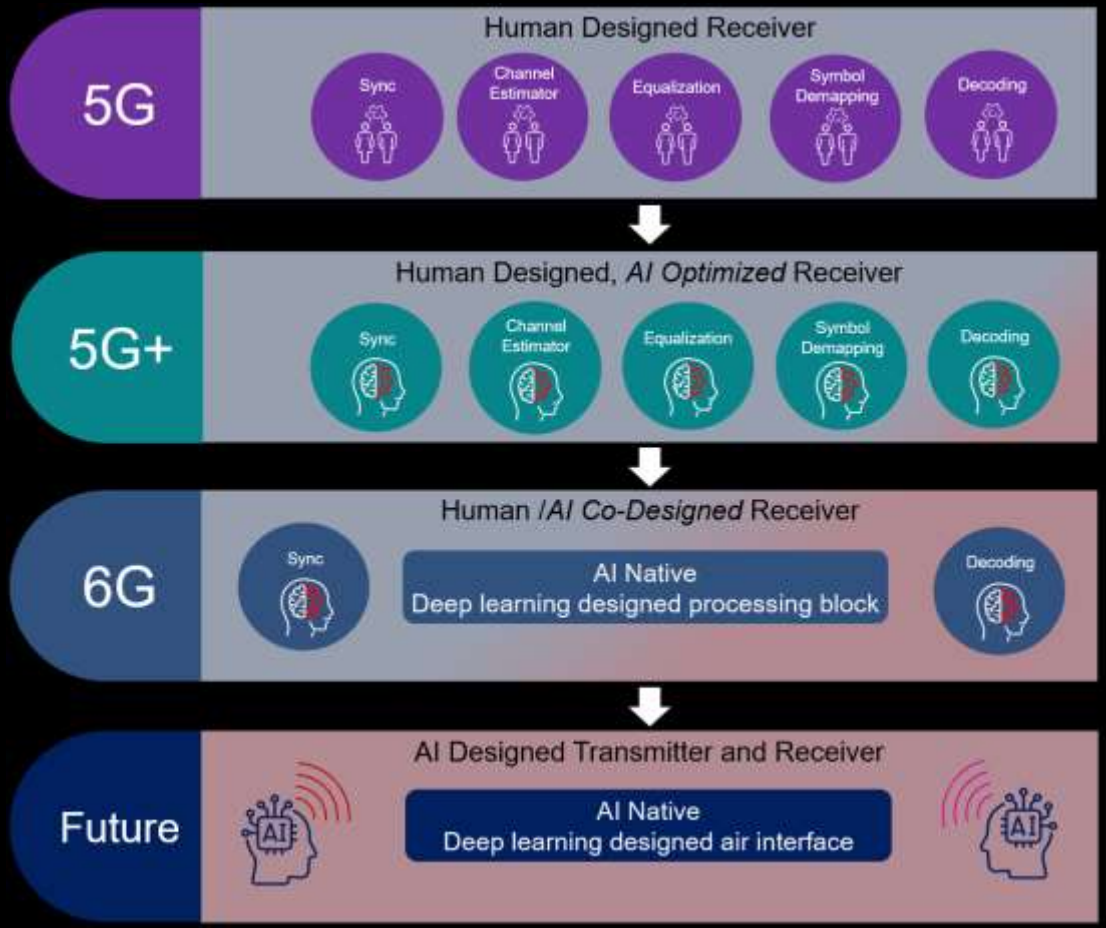
AI/ML will revolutionize wireless communications by optimizing transmitter and receiver components in new and innovative ways.

Benefits

- Solve problems better than existing algorithms
- Make intelligent decisions across multiple dimensions
- Solve problems which are currently unmanageable

Challenges

- AI / ML Algorithms must be pressure tested to deliver consistent results
- Generating data sets for training and validating algorithm performance are major hurdles for the industry



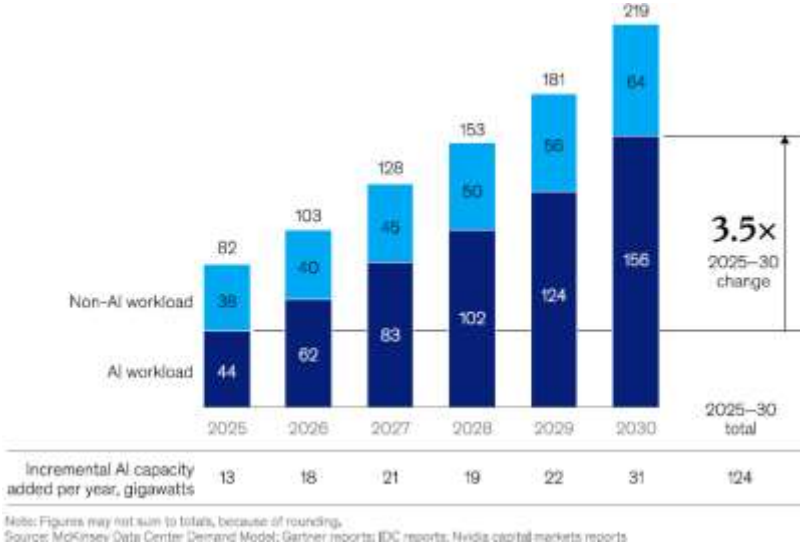
Data Center Evolution in the Age of AI

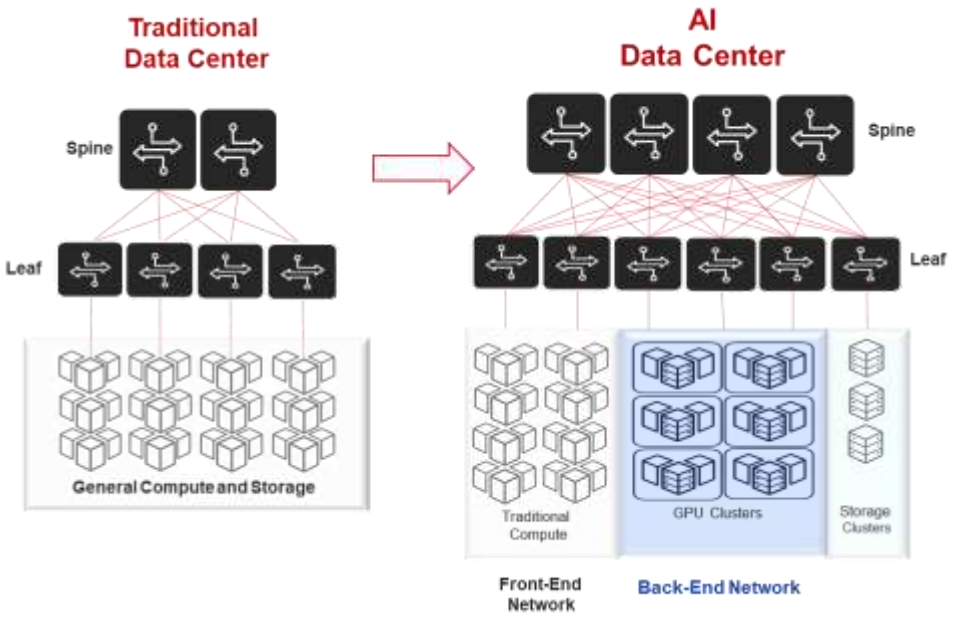
Benefits

- Automated traffic management - dynamically allocates resources to reduce congestion and latency
- Predictive maintenance - minimizes downtime by identifying potential failures before they occur
- Energy efficiency - optimizes power usage across network components, reducing operational costs and environmental impact

Challenges

- High networking bandwidth for AI/ML workloads
- Cost to test different network design and parameters
- GPU Availability
- Unique test engineering skillset for AI networks
- Time-to-market to validate AI Clusters





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AI Lifecycle Management

AI lifecycle management is the end-to-end process of building, deploying, and maintaining AI systems to ensure ongoing relevance and performance.

Benefits

- Automation & Efficiency: Speeds up repetitive tasks across the AI pipeline
- Scalability: Enables deployment and management of models at scale.
- Monitoring & Governance: Supports continuous performance tracking and compliance.

Challenges

- Data Quality: Poor or biased data can undermine model performance.
- Model Drift: Deployed models may degrade over time without proper monitoring.
- Tool Integration: Coordinating diverse tools and platforms can be complex.

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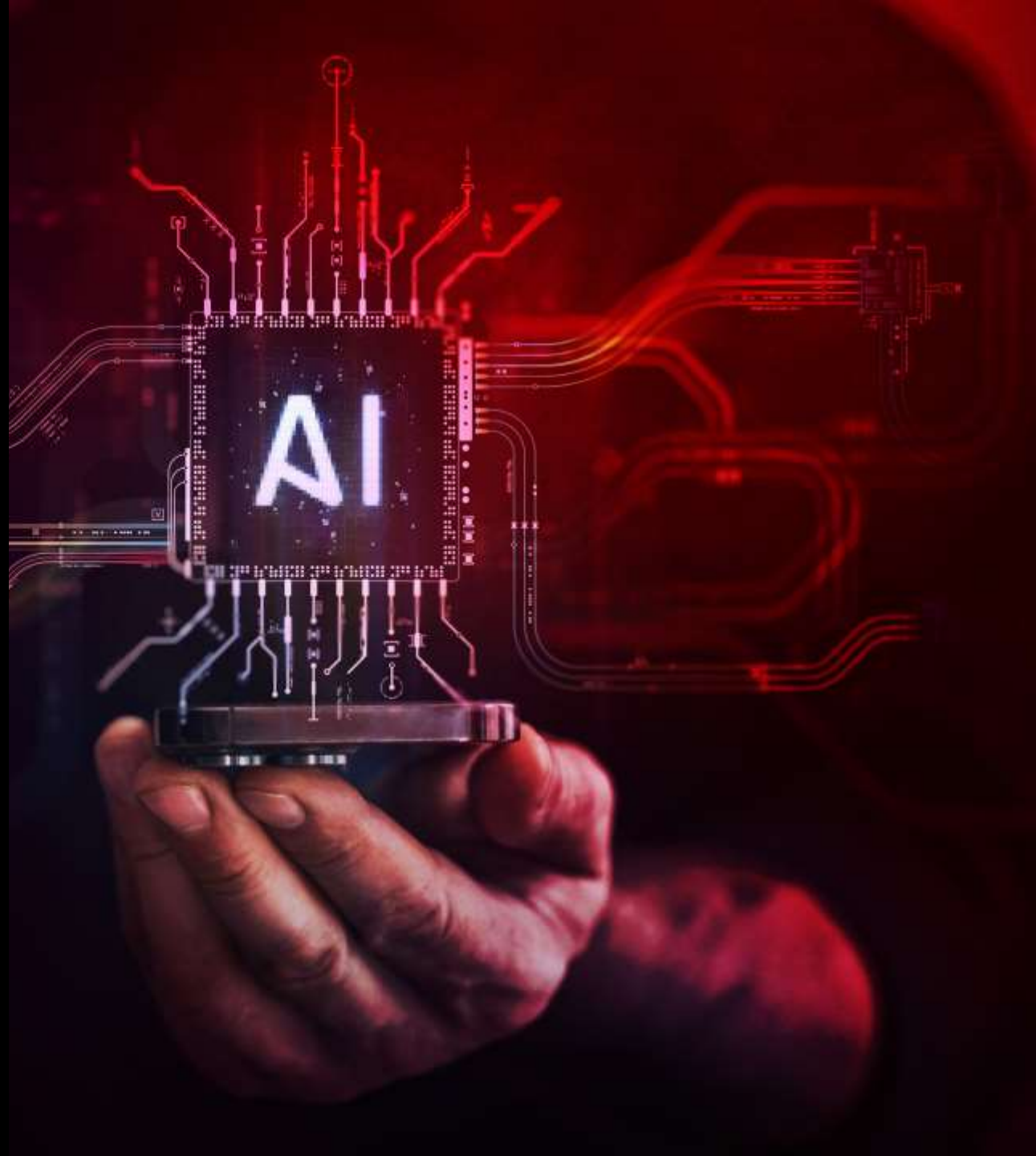


KEYSIGHT

De-risk Feature Development with Digital Twins

Leverage digital twin environments to deliver Innovation in wireless systems

Circuit and Network Digital Twins

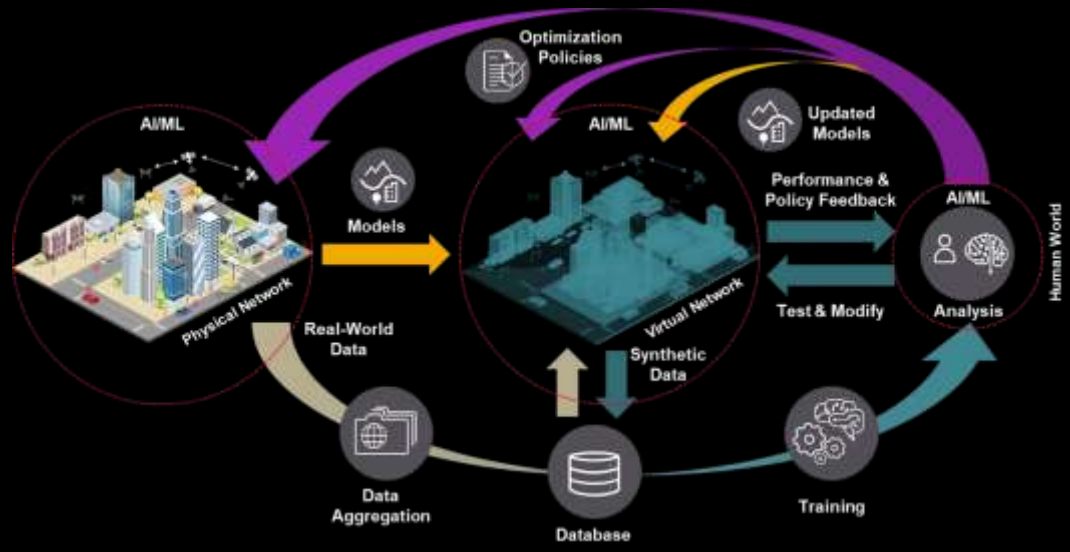
A digital twin is a real-time, virtual replica of a physical network that mirrors its infrastructure, operations, and lifecycle, enabling continuous interaction between the digital and physical environments.

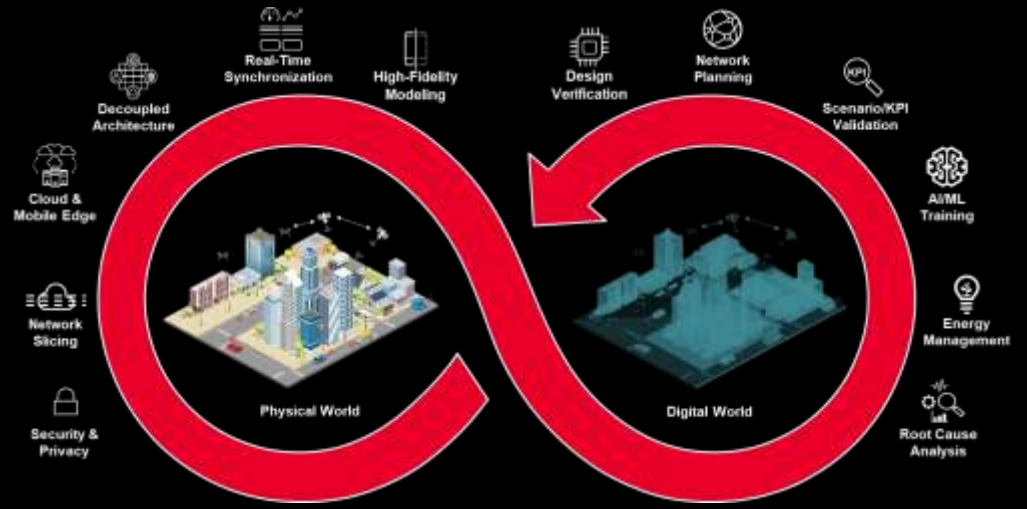
Benefits

- Enables realistic wireless system performance testing
- Reduces reliance on field testing ("test before deploy")
- Accelerates development of 5G-Advanced and 6G use cases (e.g., ISAC, UM-MIMO)

Challenges

- High computational and bandwidth demands for real-time synchronization
- Maintaining long-term accuracy of digital replicas
- Lack of standardized architectures and data formats

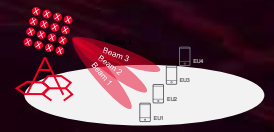




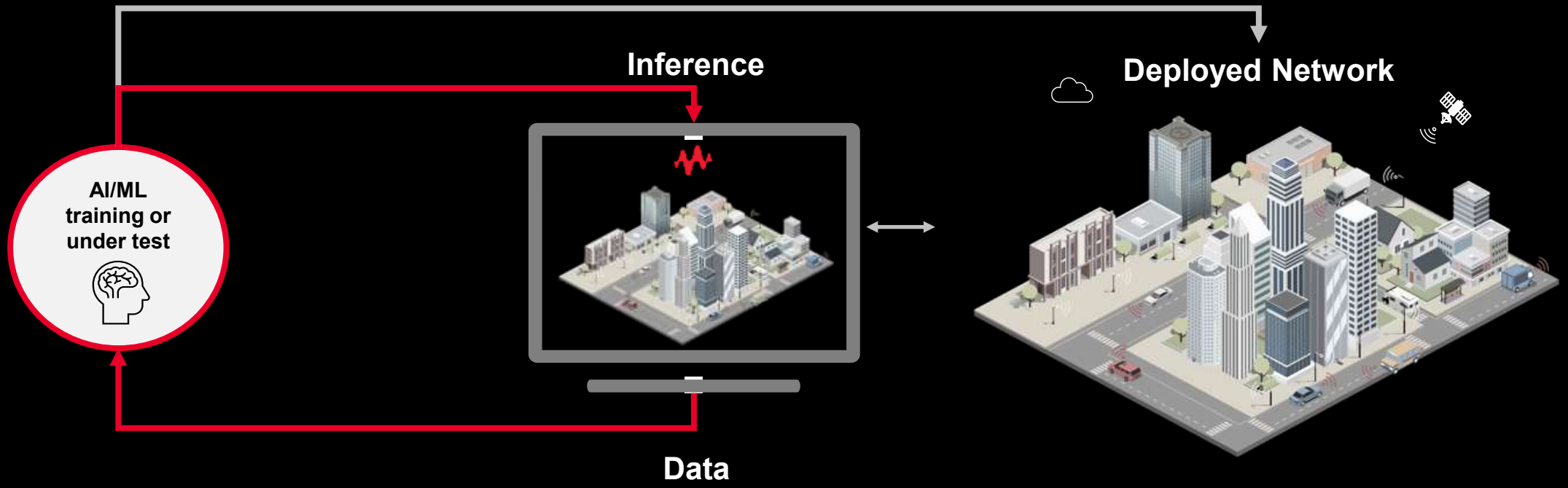
Digital Twins for Generating Adversarial Network Traffic

Use Cases

- Energy Efficiency
- 3D Positioning
- Beamforming, Multi-user MIMO



- Cyber Security



KEYSIGHT

Networked Sensing

Integrating Sensing into Communication Network

Integrating Sensing with Communication Network

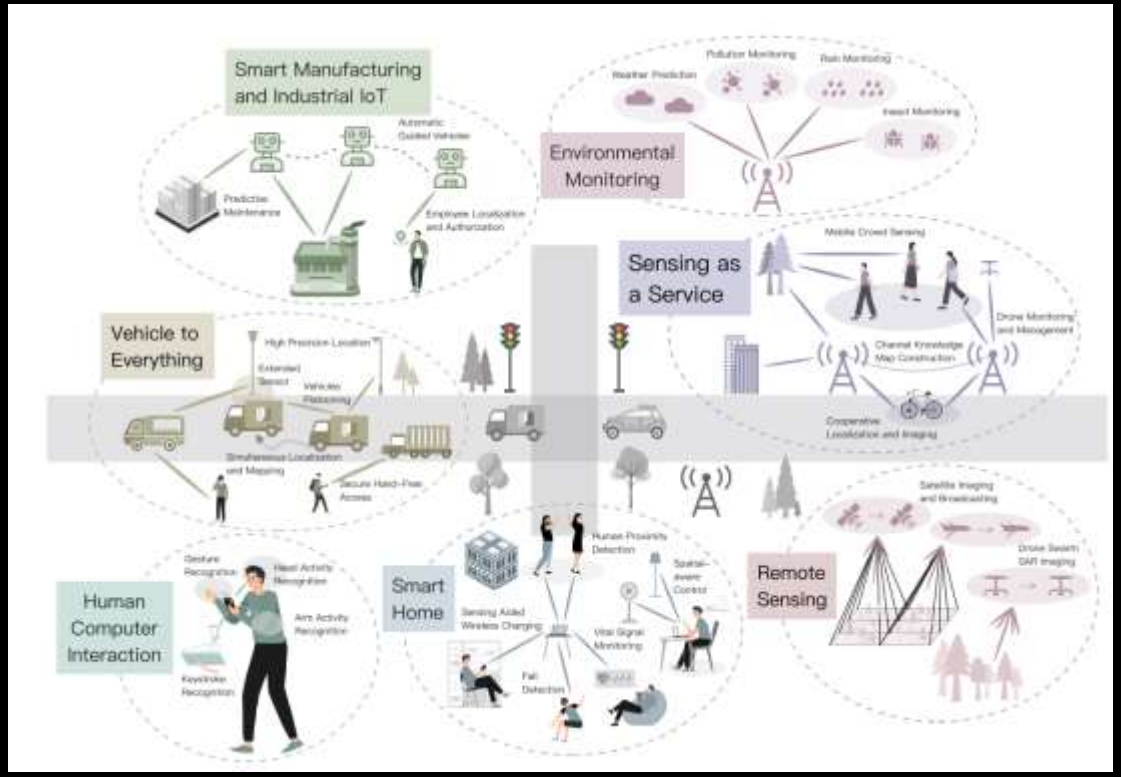
6G will include fundamental interaction between communication and sensing as a core capability. This technique is known as joint communications and sensing (JCAS).

Benefits

- Combines communication and sensing in the same frequency band, reducing spectrum congestion
- Enables real-time environmental sensing, enhancing applications like autonomous driving, smart cities, and industrial automation
- Reduces the need for separate sensing and communication hardware, lowering deployment costs

Challenges

- Balancing the conflicting requirements of communication (e.g., high data rate) and sensing (e.g., high resolution) is complex
- Requires advanced algorithms to extract sensing information without degrading communication quality
- Lack of unified frameworks and standards for integrating JCAS into existing network architectures

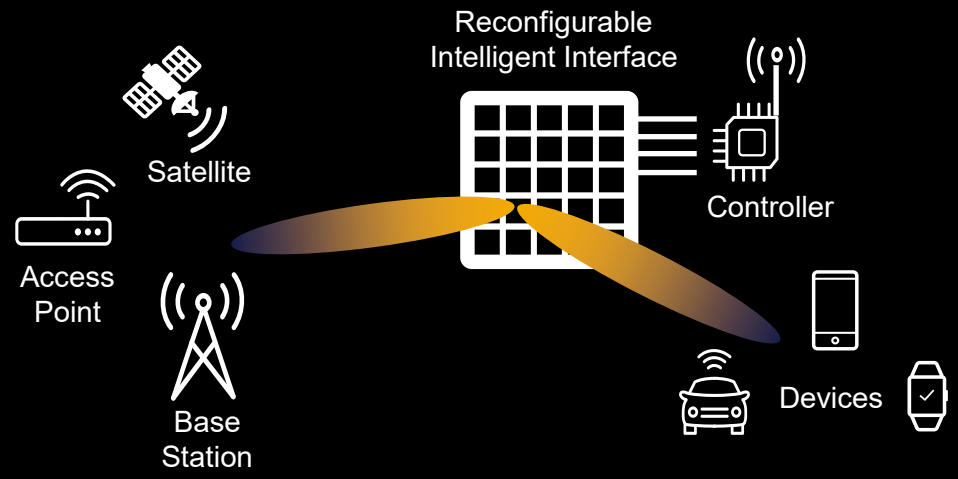


Reconfigurable Intelligent Surfaces and Ultra Massive MIMO

Dynamically control and optimize radio signals to enhance wireless communication performance

Reconfigurable Intelligent Surfaces (RIS)

RIS is a promising wireless technology for future networks. It consists of controllable unit-cells that can manipulate electromagnetic waves. These surfaces can dynamically or semi-statically adjust their response via control signals. Functions include reflection, refraction, focusing, collimation, modulation, absorption, or combinations thereof.



Benefits

- Enhances signal strength and coverage
- Minimizes interference
- Beamforming

Challenges

- Array calibration with multiple gNB locations
- Testing due to alignment issues
- Understanding network-wide implications
- Cost of RIS for mass adoption

RIS Performance Assessment Solutions

Real-World RIS Performance Testing

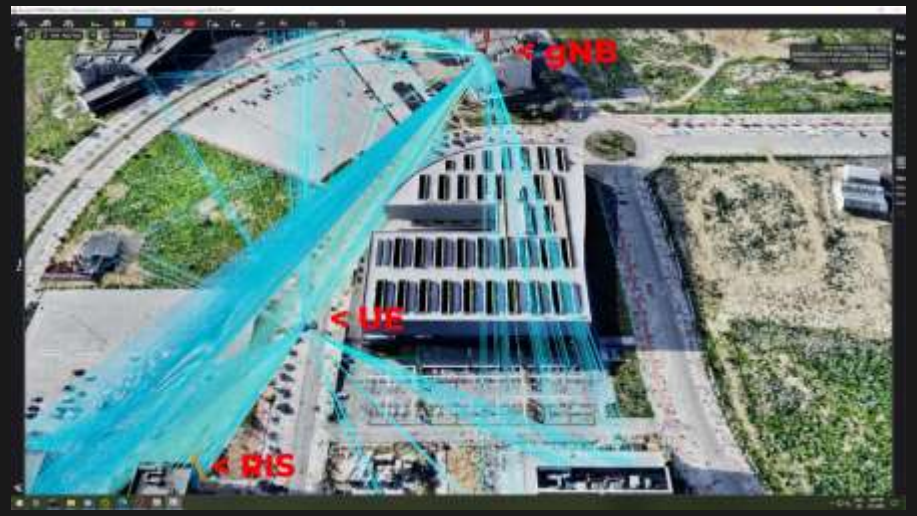
- Evaluates RIS behavior in live networks and realistic deployment scenarios.

KPI Measurement and Analysis

- Captures key performance indicators like RSRP, Throughput, Transmit Power, and SINR to assess RIS impact.

Digital Twin Integration for RIS Insights

- Feeds real-time RIS data into a digital twin for scenario validation, network planning, and AI/ML model training.



Ultra Massive MIMO (UM-MIMO)

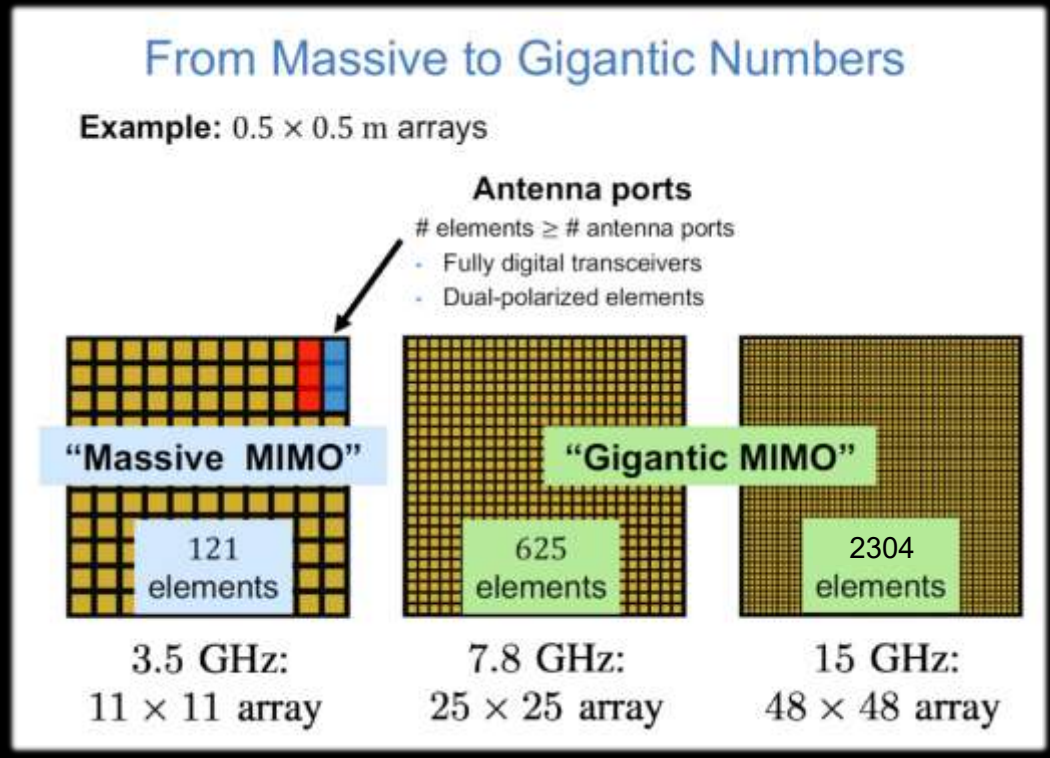
Ultra Massive MIMO refers to systems with hundreds or even thousands of antenna elements at the base station. It is a natural evolution of traditional massive MIMO, aiming to support extremely high data rates and spatial resolution.

Benefits

- Extreme spatial multiplexing: Supports a large number of simultaneous users
- High spectral efficiency: Maximizes data throughput per unit bandwidth
- Enhanced energy efficiency: Focused beams reduce power waste

Challenges

- Hardware complexity: Requires advanced RF chains, ADCs/DACs, and cooling systems
- Channel estimation overhead: Becomes more difficult with large antenna arrays
- High cost and power consumption: Especially at THz frequencies



KEYSIGHT

Ensure a Future Free of Digital Threats

Make all the network infrastructure components reliable and secure against cyberattacks to support critical service

Security and Privacy

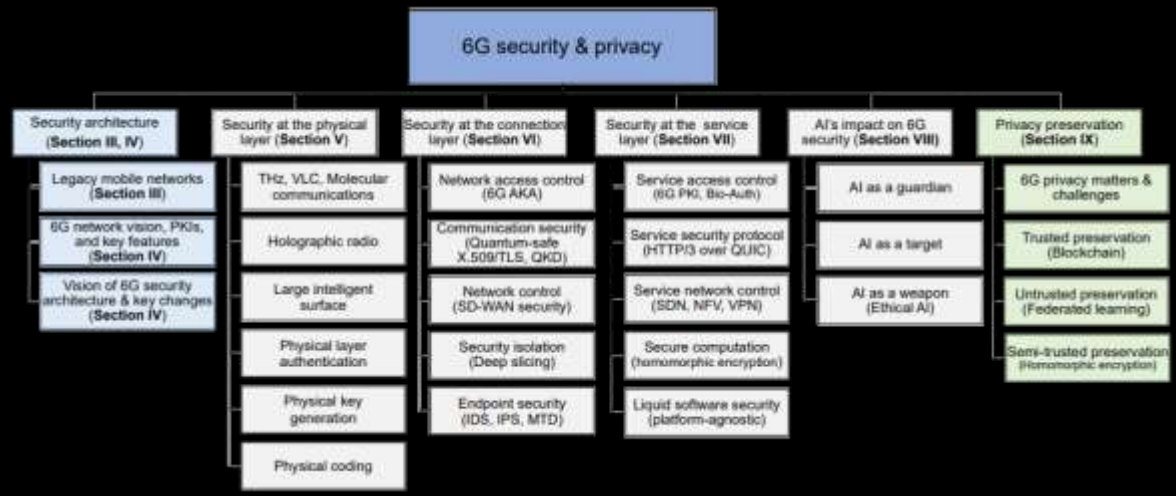
6G security and privacy aim to safeguard the massive data flows and intelligent services enabled by next-generation networks. With built-in AI and distributed architectures, 6G can offer stronger, more adaptive protection.

Benefits

- Real-time threat detection and response
- Increased data privacy
- Resilience to cyber attacks
- Vehicular comms security for autonomous driving

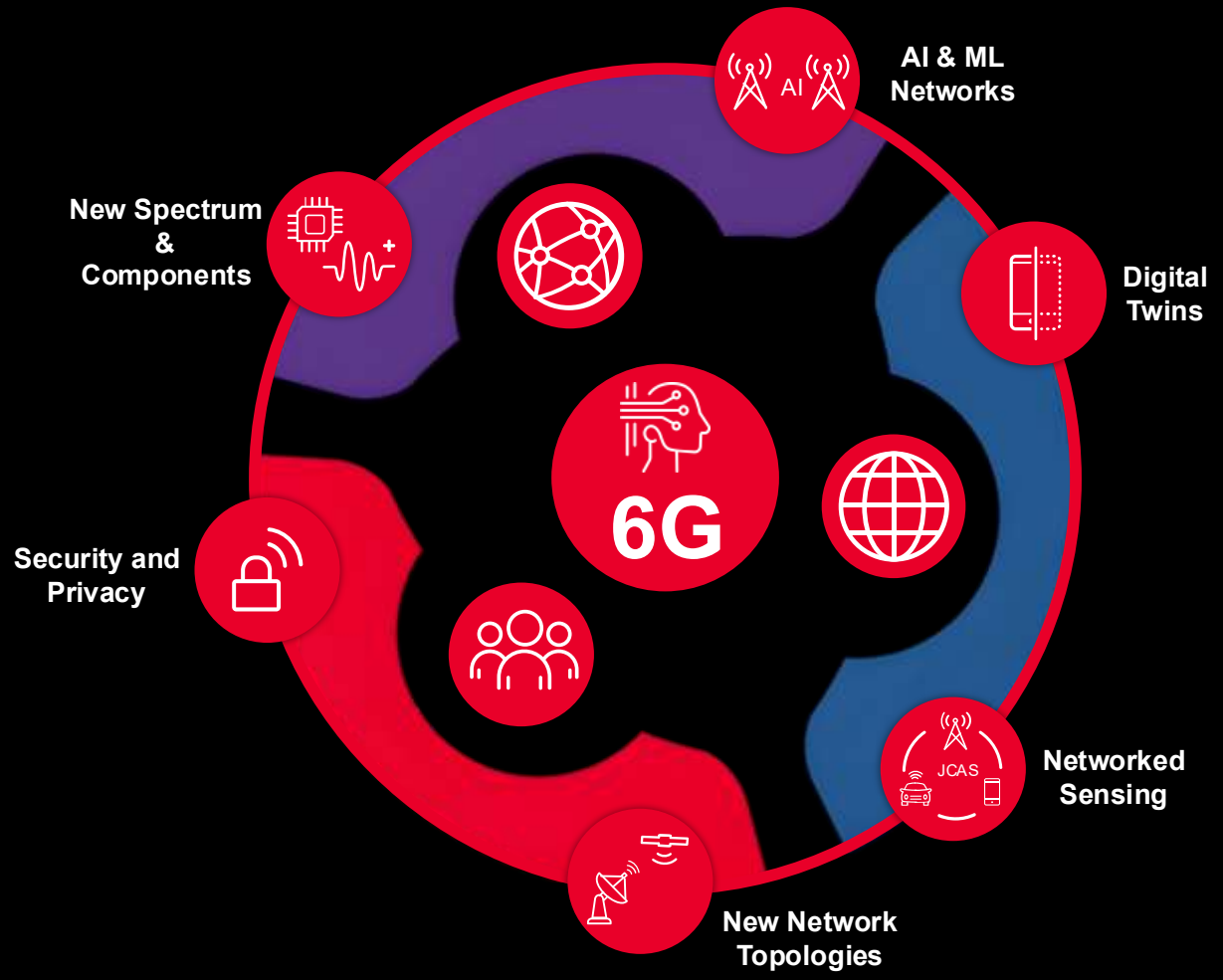
Challenges

- Radically expanded attack surface (e.g. FR3 physical layer security, new LLS split, AI…)
- Extreme device density
- Mission-critical applications

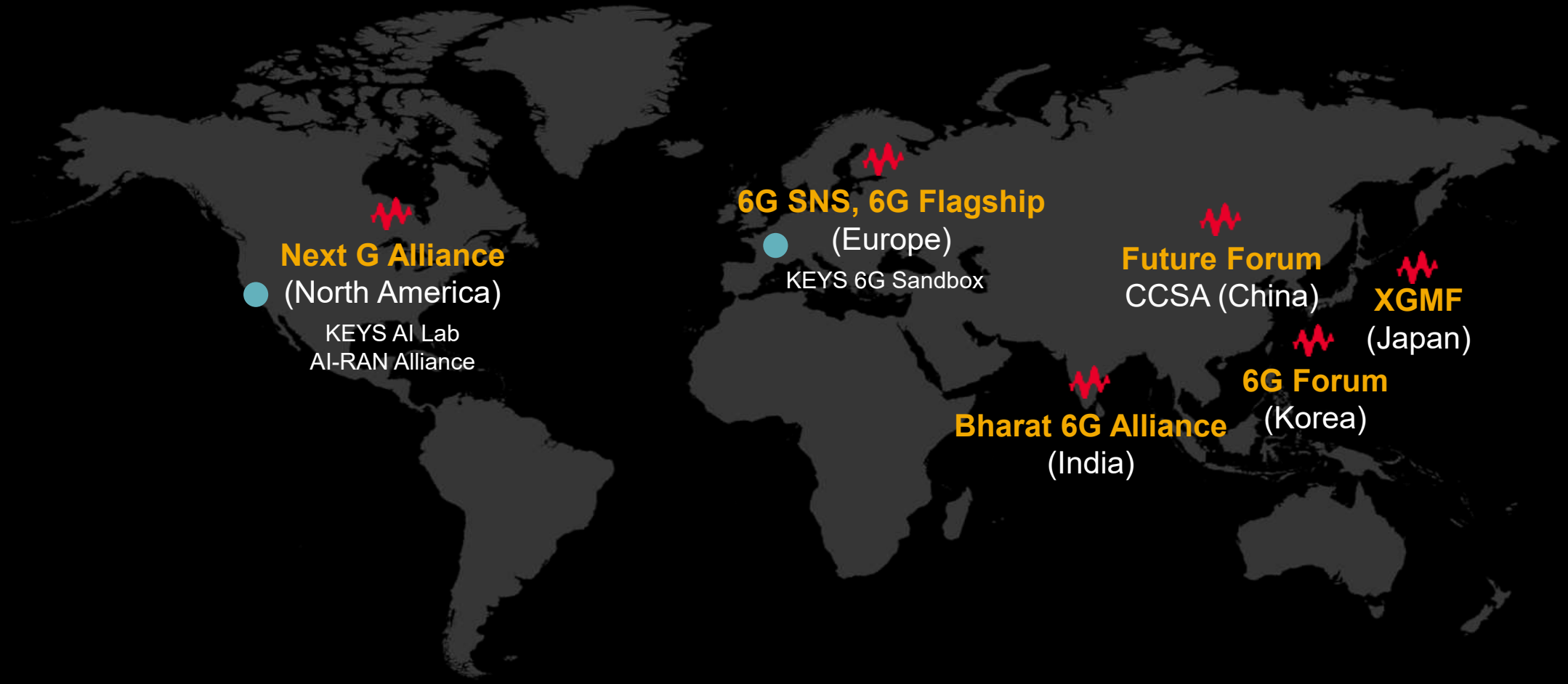


Keysight Accelerates 6G Research

Accelerate the pace of 6G research with Keysight's expertise in measurement science and state-of-the-art RF and cellular testing capabilities

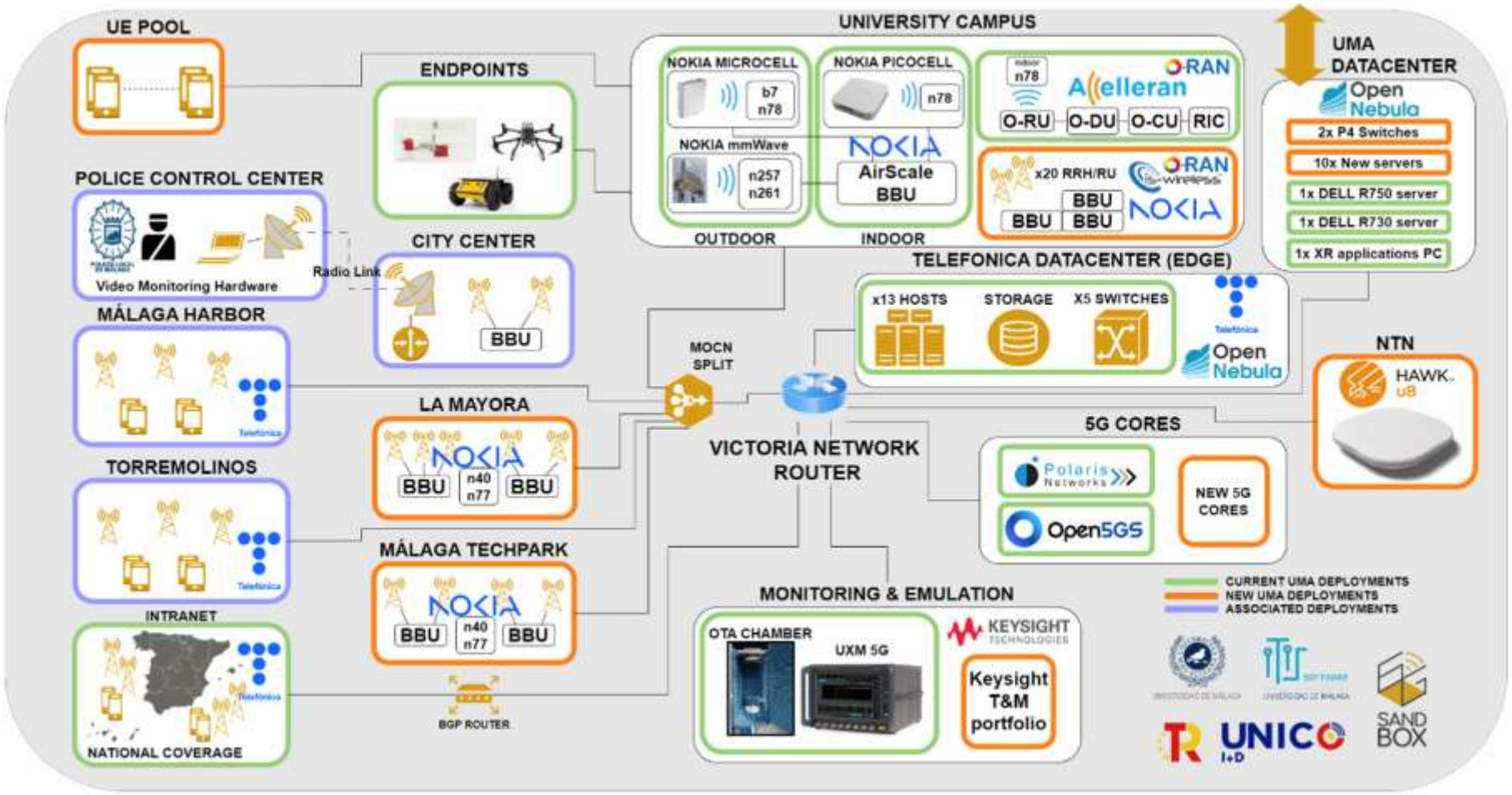


Keysight Collaborating with Global Alliances

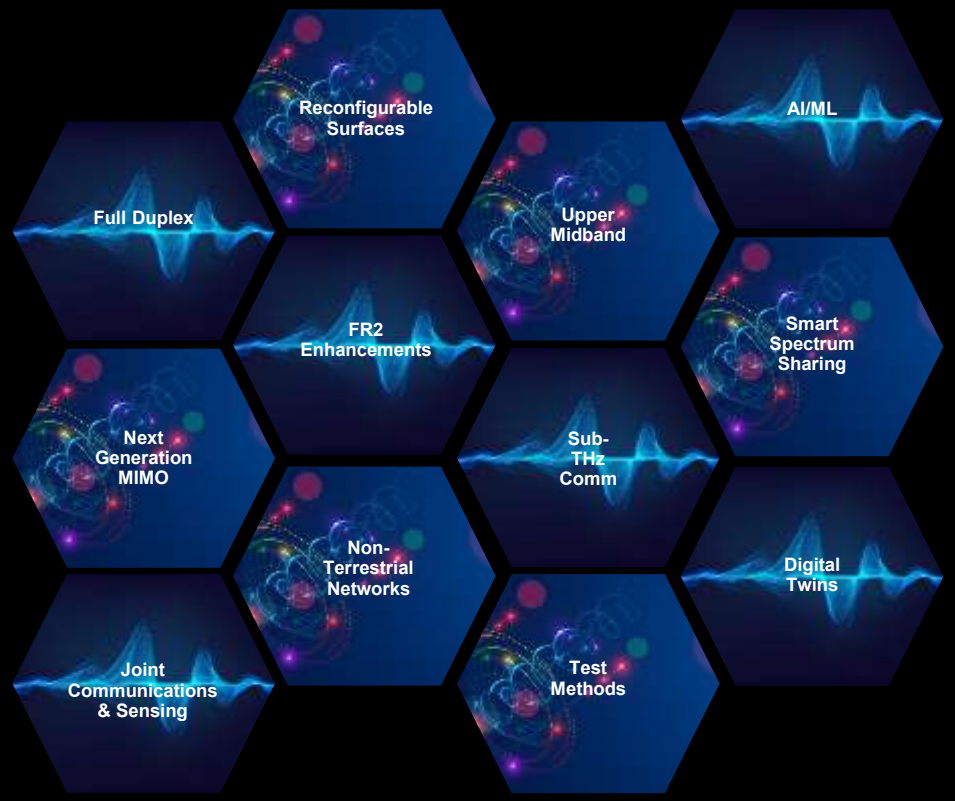


Driving 6G vision and technology, collaborating with global industry groups

Malaga Platform Overview



In Summary



- Significant technological challenges exist in realizing the vision of 6G
- Much work needed in academia, industry and policymaking to make it happen
- The outcome however will be a completely transformed communication network

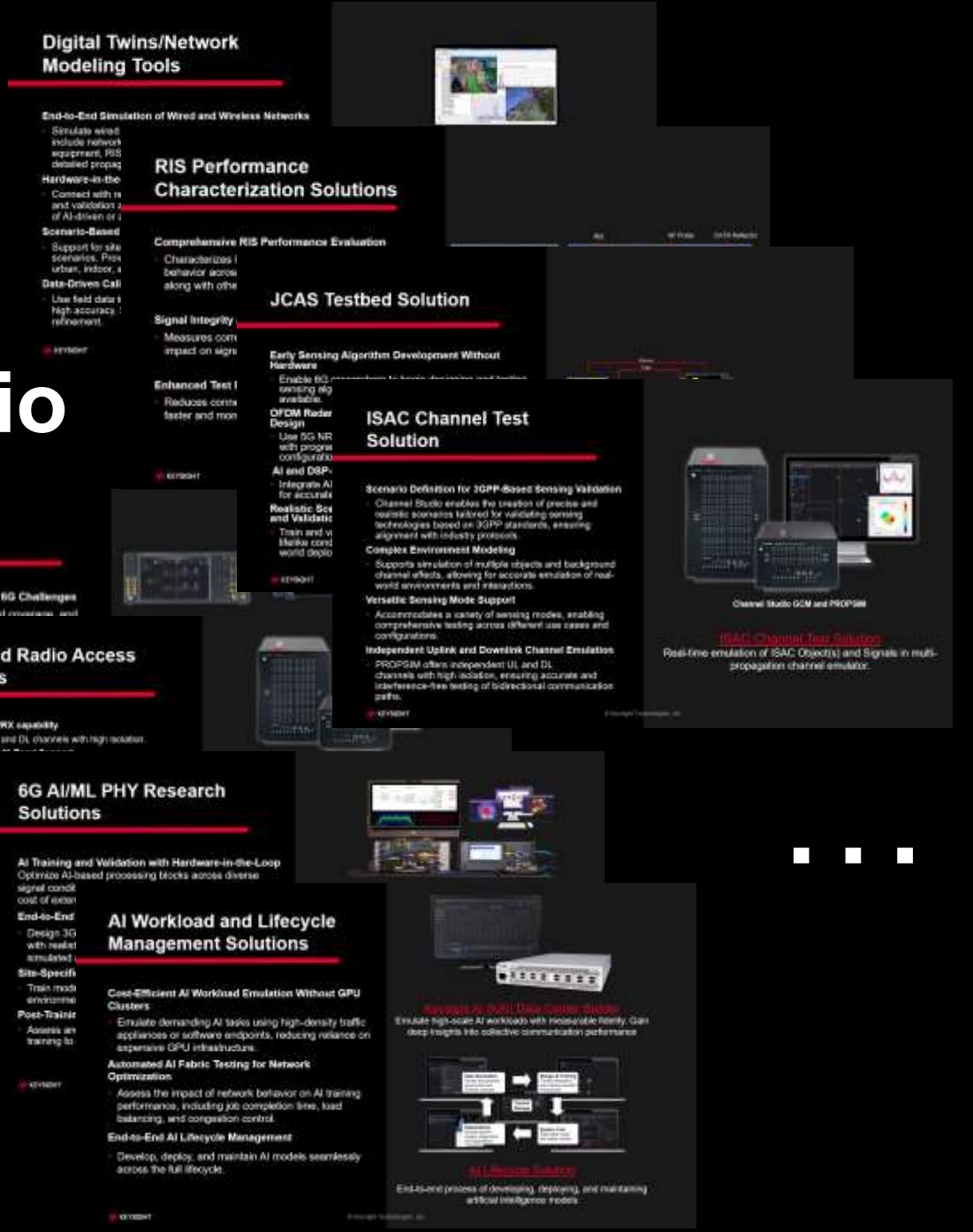
Keysight 6G Solution Portfolio

- Test today to secure tomorrow's comms

- Journée Technique Keysight à l'IEMN

le 18 novembre 2025 – Villeneuve-d'Ascq

iemn



KEYSIGHT

Start your 6G journey with Keysight's experts there to guide you.

KEYSIGHT

6G : Enjeux technologiques, industriels et géopolitiques

ACSIEL
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07/10/2025

YOLE Group

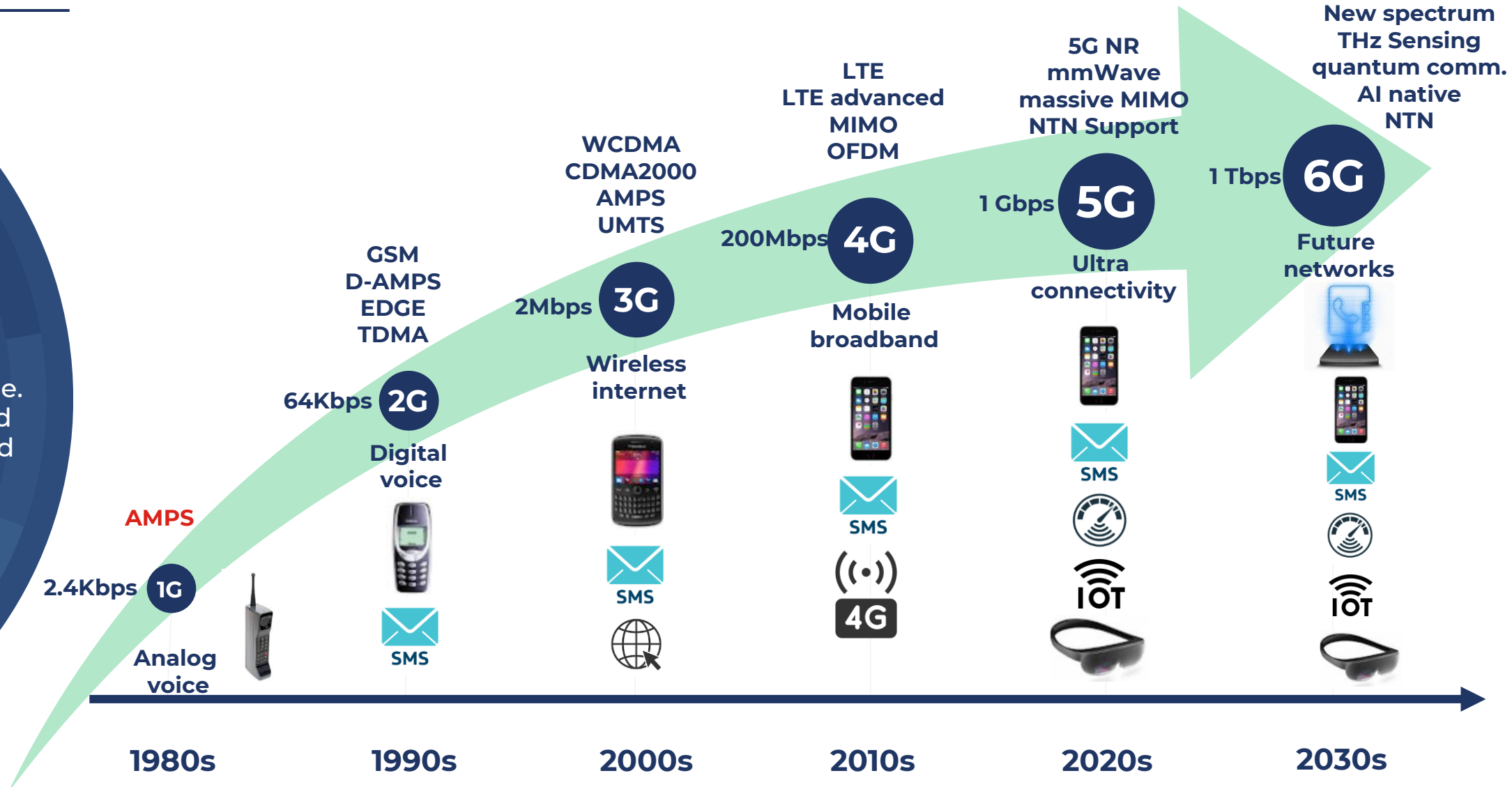
TABLE OF CONTENTS

5G Market Status

MOBILE NETWORK EVOLUTION

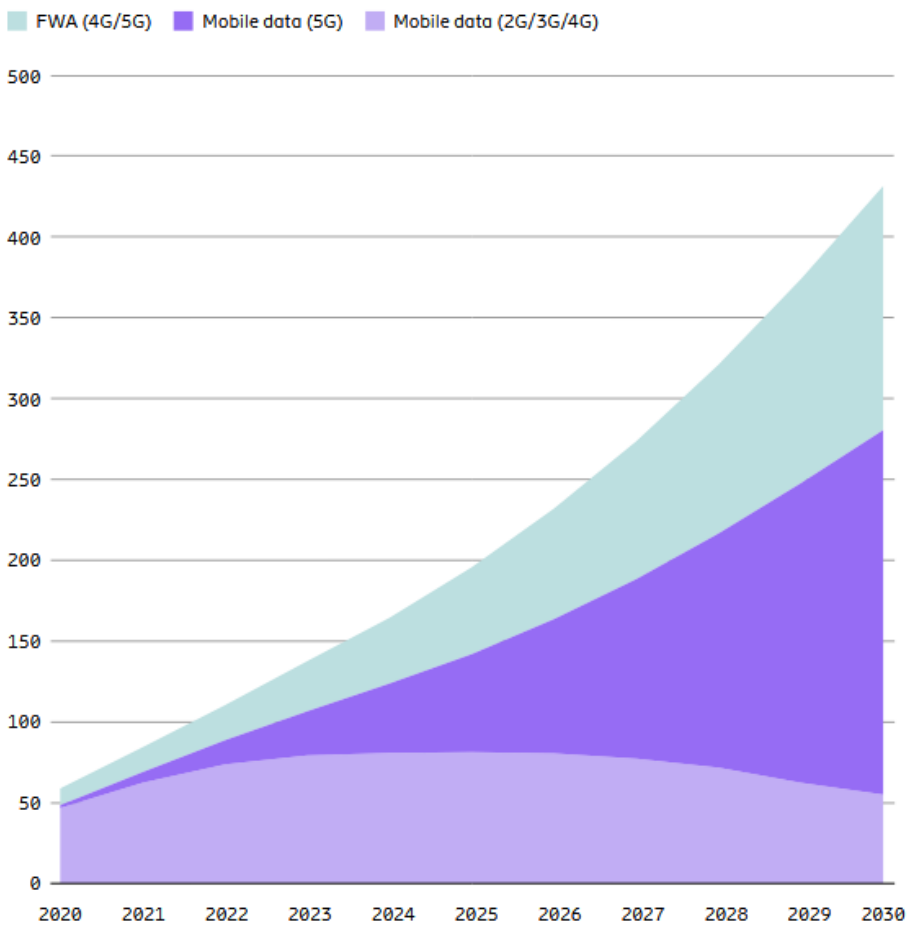
Towards 6G standardization

Mobile networks change platform every decade. 5G advanced is the second wave of 5G innovations.



GLOBAL MOBILE DATA TRAFFIC

Exponential growth continues in global mobile data traffic

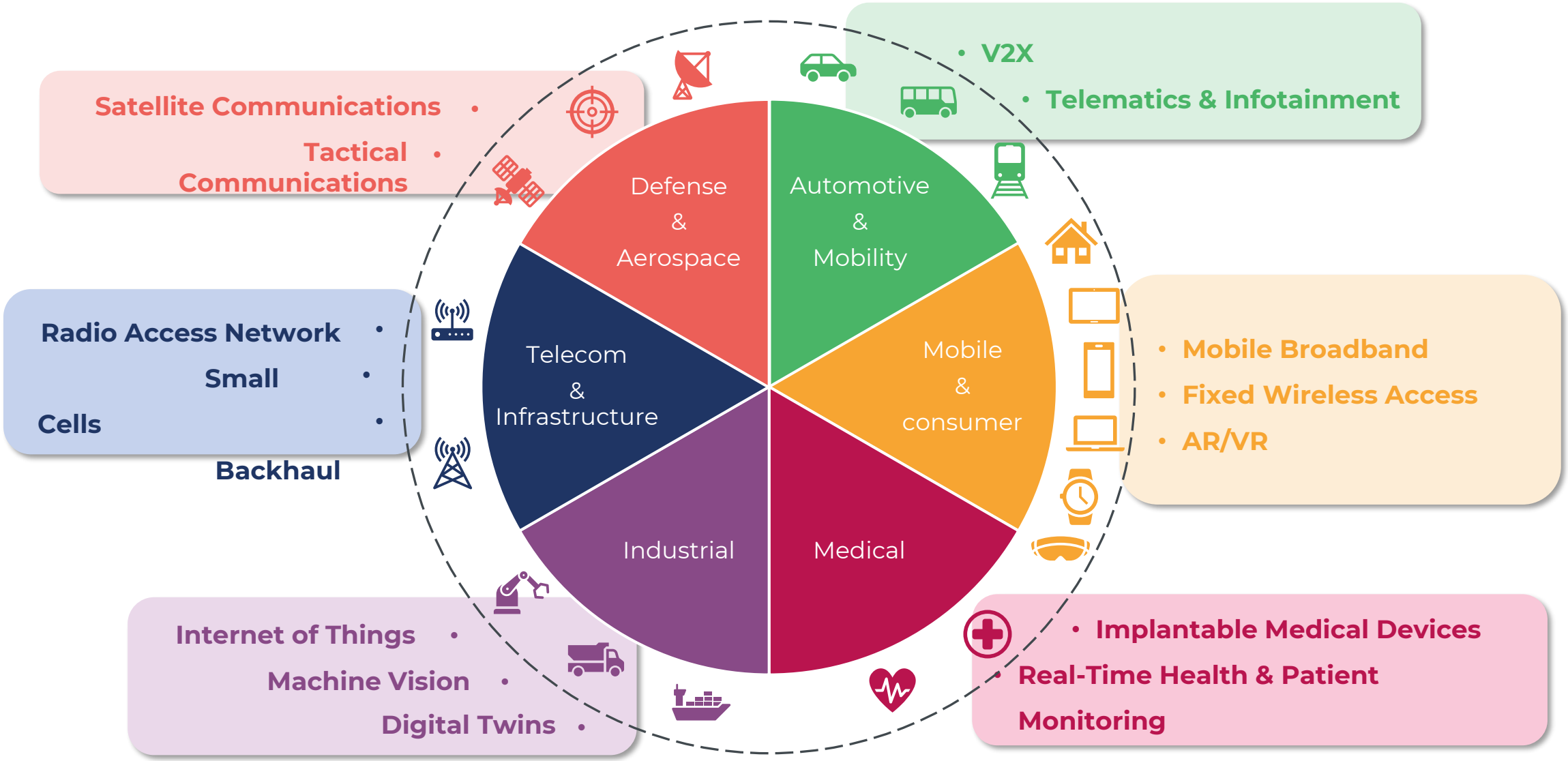


Global mobile network data traffic (EB per month)
source: Ericsson Mobility Report, June 2025

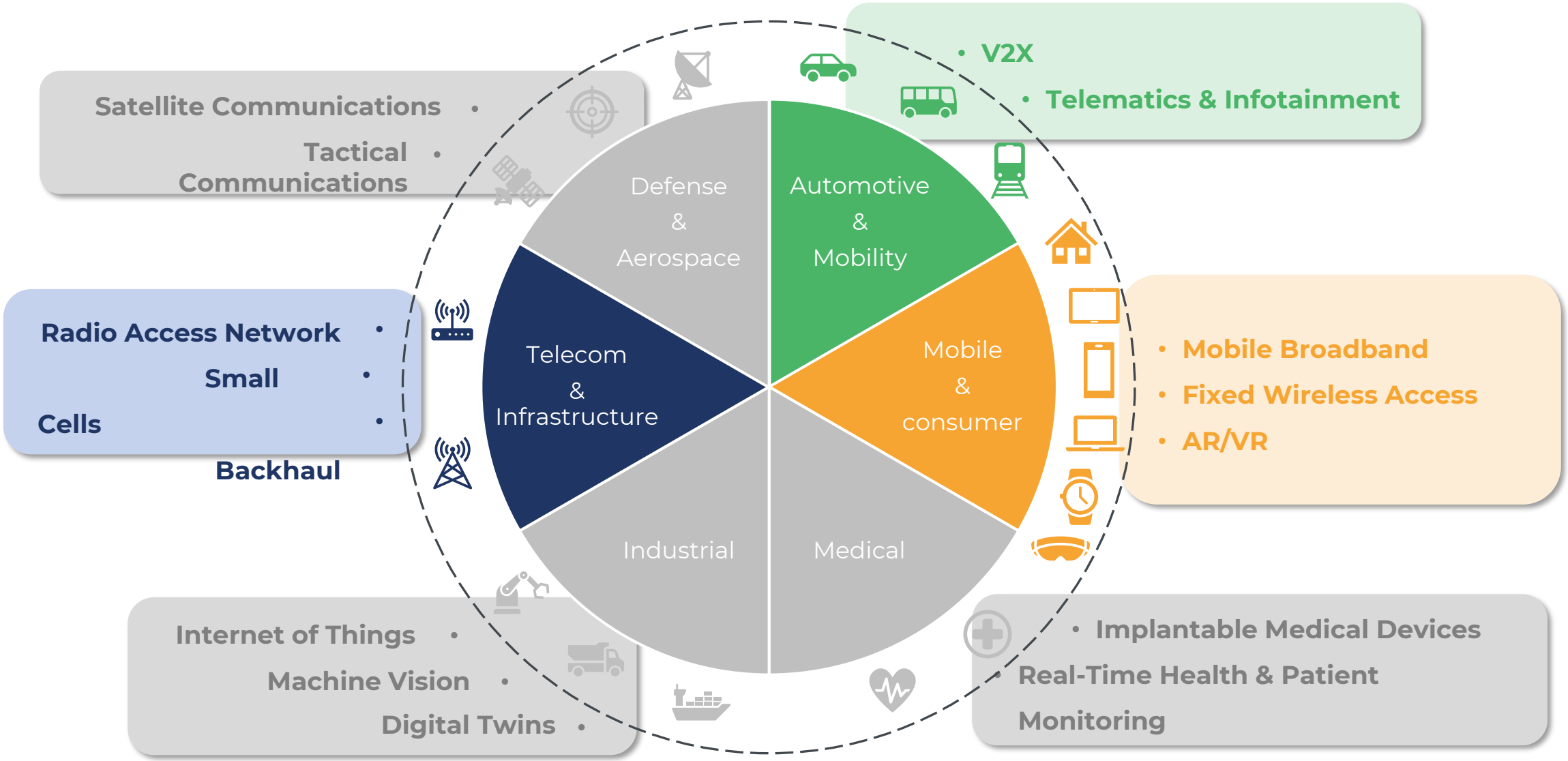
- Mobile data traffic keeps experiencing exponential growth, projected to continue over the next five years.
  - Data-intensive content on smartphones and expansion of device capabilities worldwide.
  - Increased adoption of FWA and expected rise in AR/VR use-cases.
- 5G address this increased data traffic, meeting efficiency requirements and increasing radio network capacity.
- 6G will address new use cases and systems.

5G networks, smartphones, and device-count
source: Qualcomm

5G/6G MARKET, USE CASES AND APPLICATIONS

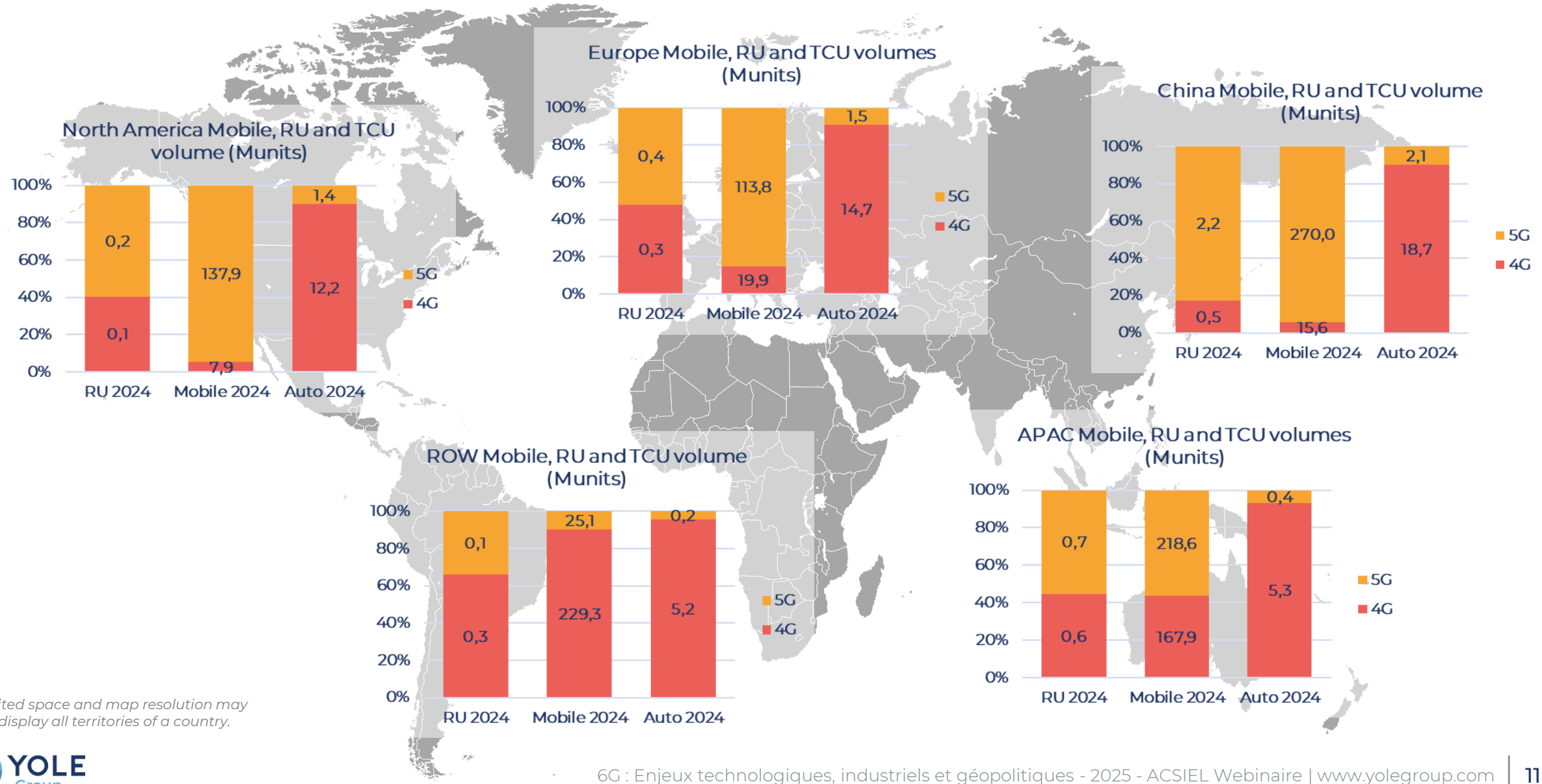


5G/6G MARKET, USE CASES AND APPLICATIONS



4G/5G ROLLOUT – 2024 STATUS

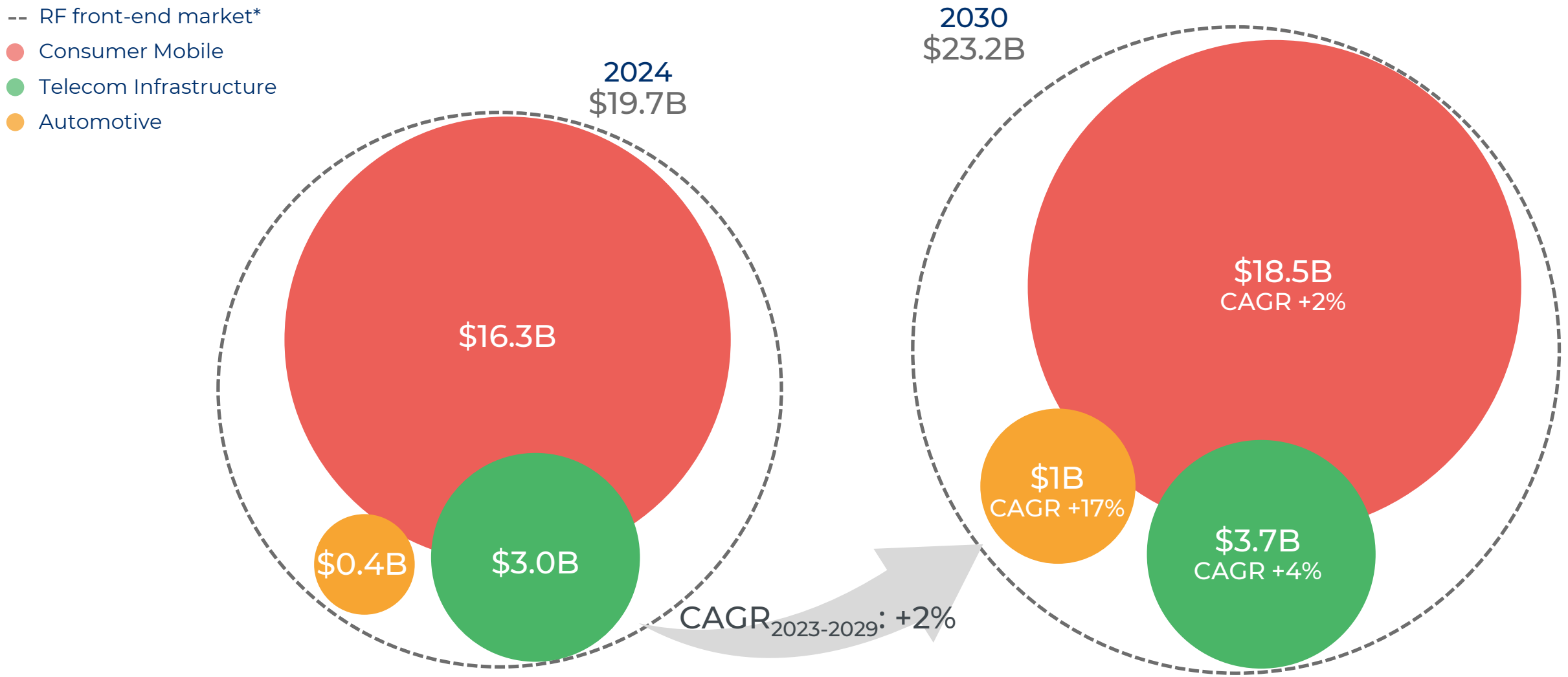
1.2B smartphones, 5.3M radio units, 55M TCU



Limited space and map resolution may not display all territories of a country.

RF FRONT-END DEVICES – MARKET REVENUES

By market: Consumer Mobile, Telecom Infrastructure & Automotive



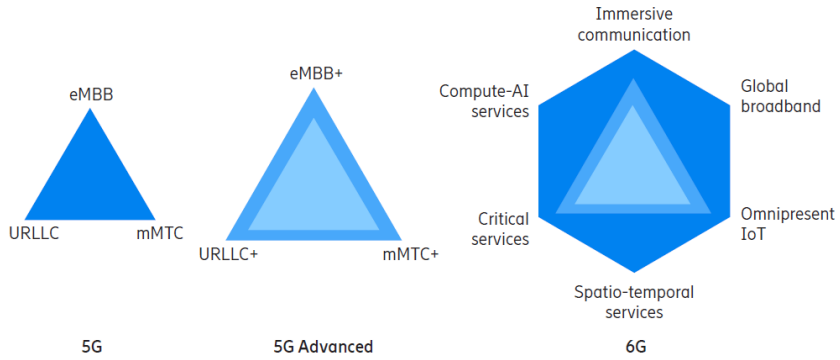
** Consumer Mobile, Telecom Infrastructure & Automotive*

6G Vision

6G CONCEPT

Applications and Use-cases

- Fully digitally connected world.
- First 6G specifications in 2029, in 3GPP's Release 21.
- 6G Network will support communication, sensing, and AI.
- Built on many concepts and technologies introduced with 5G (Rel 19 and Rel 20).
- 6G aims to improve user experience (data rate, NTN coverage, power saving) and add value to operators.
- New 6G Network will provide a broad range of new services/use cases.

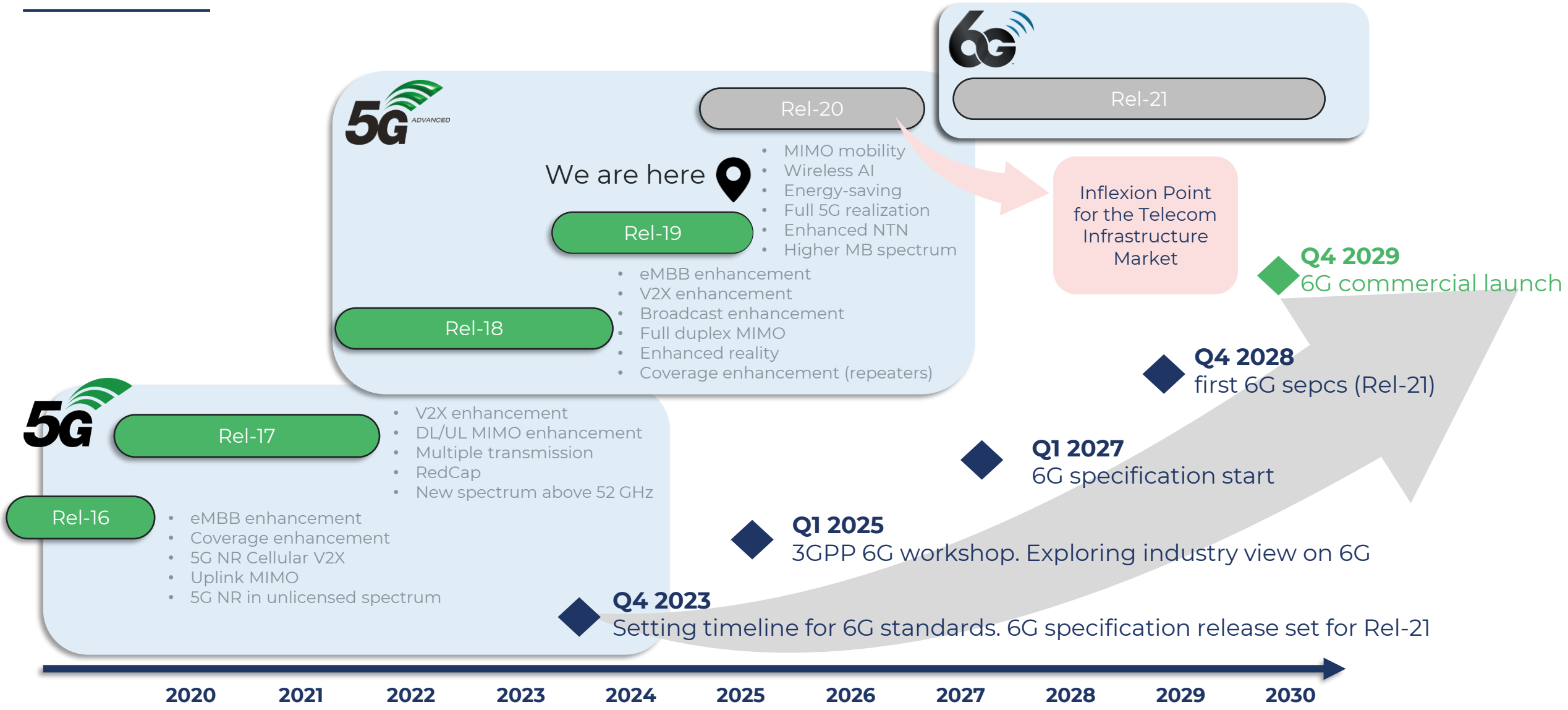


Source: Ericsson white paper

Applications	Use-cases
Holographic telepresence	Virtual meetings, live concerts, sports events, theater performances, and educational lectures
Advanced augmented reality (AR), virtual reality (VR), and extended reality (XR)	Remote surgeries, lifelike training simulations, virtual try-ons and shopping experiences, Metaverse, virtual workspaces.
Smart cities and massive IoT	Real-time traffic management, environmental monitoring, energy management.
Automated mobility and autonomous vehicles	Autonomous driving and V2X, delivery, surveillance, emergency response drones and unmanned aerial vehicles (UAVs), mobility-as-a-service (MaaS).
Tactile internet	Haptic feedback, industrial automation, telepresence.
High-resolution imaging and sensing	Healthcare diagnostics: security and surveillance, environmental monitoring.
Sustainable and green technologies	Smart agriculture, energy management, waste management.
Personalized healthcare and remote monitoring	Remote patient monitoring, precision medicine, telemedicine.
Brain-computer interfaces (BCIs)	Healthcare, augmented cognition (intuitive interaction with devices or software), entertainment, and gaming.
Quantum communication and computing integration	Secure communication with quantum key distribution (QKD), quantum cloud computing, data processing.

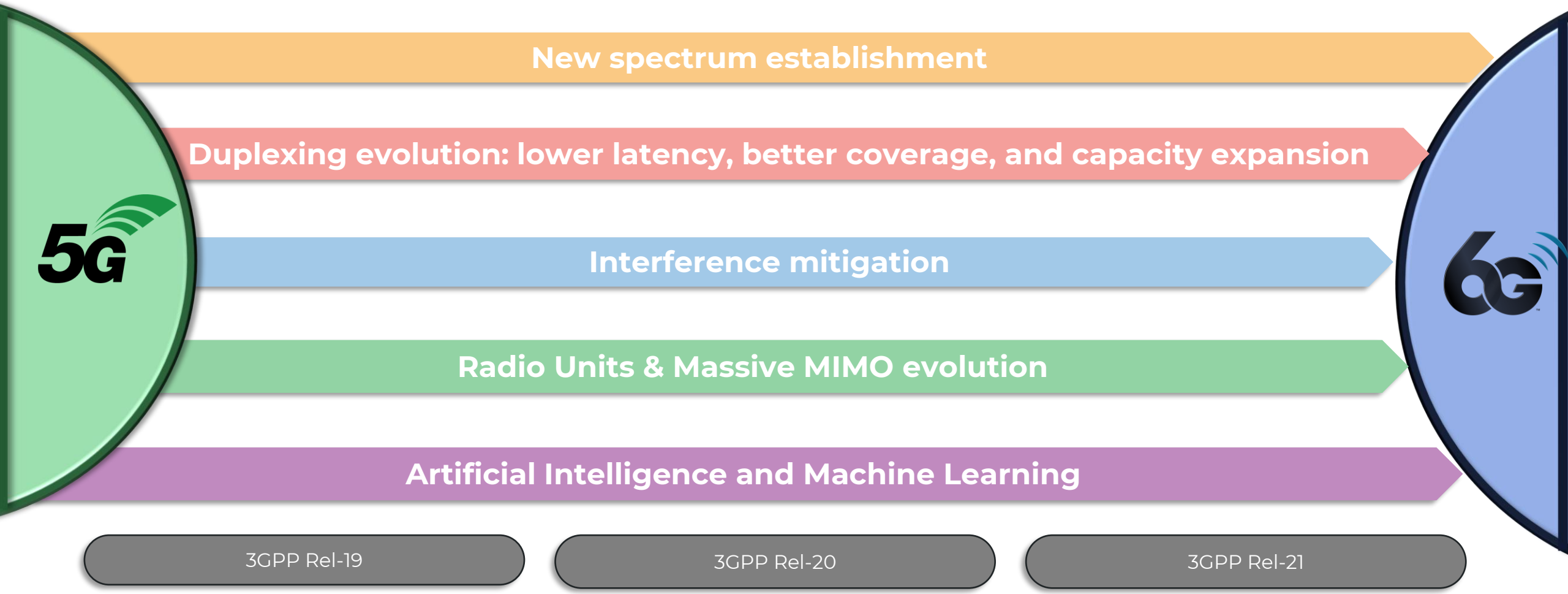
5G-ADVANCED AND 6G: 3GPP TIMELINE

We are in 5G's second phase



5G ADVANCED AND 6G

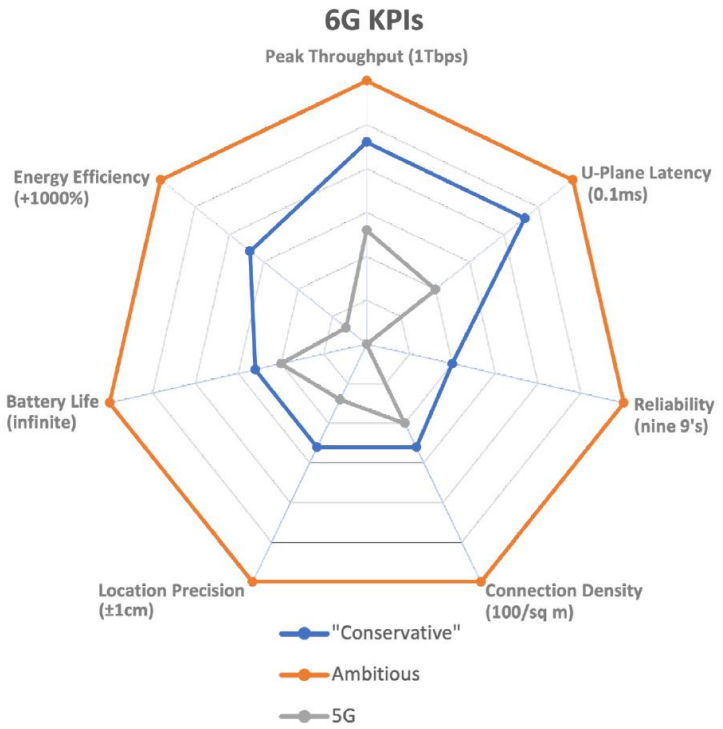
3GPP Release 19 and 20, building blocks for 6G



6G AMBITION
Capabilities & requirements

6G aims to improve network performance by 10 - 100x by increasing peak data rates, energy and spectral efficiency, reliability, and latency. Actual capacities might not reach expectations but will still surpass 5G performance.

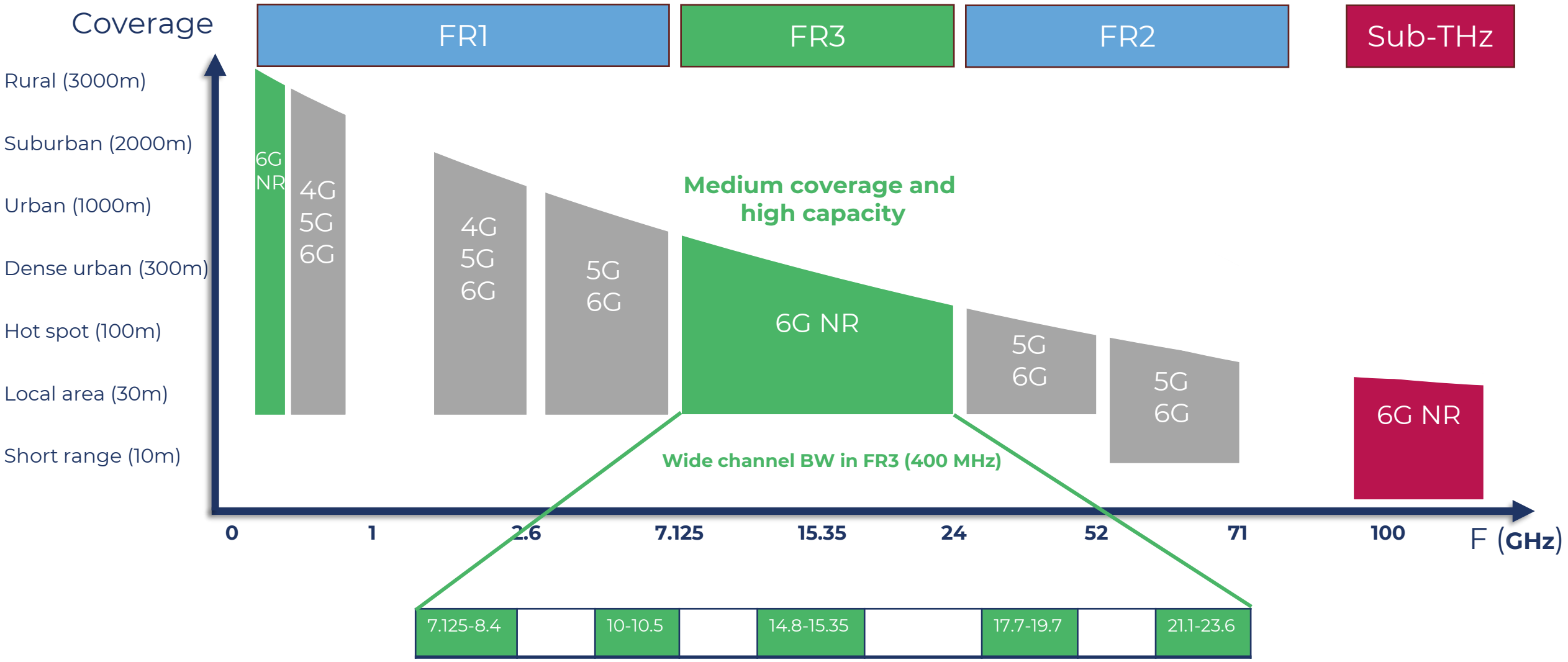
Capabilities & requirements	
Ultra-high data rates Peak data rates up to 1 Tb/s	Advanced modulation schemes, wider bandwidths, new spectrum allocations in the FR3 and in Terahertz (THz) range.
Ultra-low latency 1 millisecond or sub-millisecond for near-instantaneous communication	New network architectures, edge computing, optimized routing protocols to minimize delays, enhanced backhaul solutions.
Massive connectivity up to 10 million connected devices per square kilometer	Efficient management of spectrum resources, advanced network slicing, and AI-driven network orchestration.
High energy efficiency Reduce power consumption per bit of data transmitted	Development of energy-efficient hardware, green communication technologies, and AI-driven power management.
High mobility support Maintain performance and connectivity for devices moving at speeds up to 1,000 km/h	Advanced MIMO, enhanced beamforming techniques, robust handover mechanisms, and dynamic spectrum allocation.
New spectrum bands FR3 and THz frequencies for ultra high-speed data transmission and sensing applications	New materials, devices, and antennas for high output power, low SNR, and minimal loss and interference.
3D connectivity Seamless connectivity for air & ground	Advanced satellite communication and aerial network nodes.



source: Next-Generation Wireless: A Guide to the Fundamentals of 6G – Keysight 2024

6G'S DEDICATED SPECTRUM

FR3 will be the main spectrum for 6G use cases



Impact on Semiconductors, Technology Roadmap for Infrastructure and Mobile

RADIO ACCESS NETWORK

Massive MIMO evolution in radio units

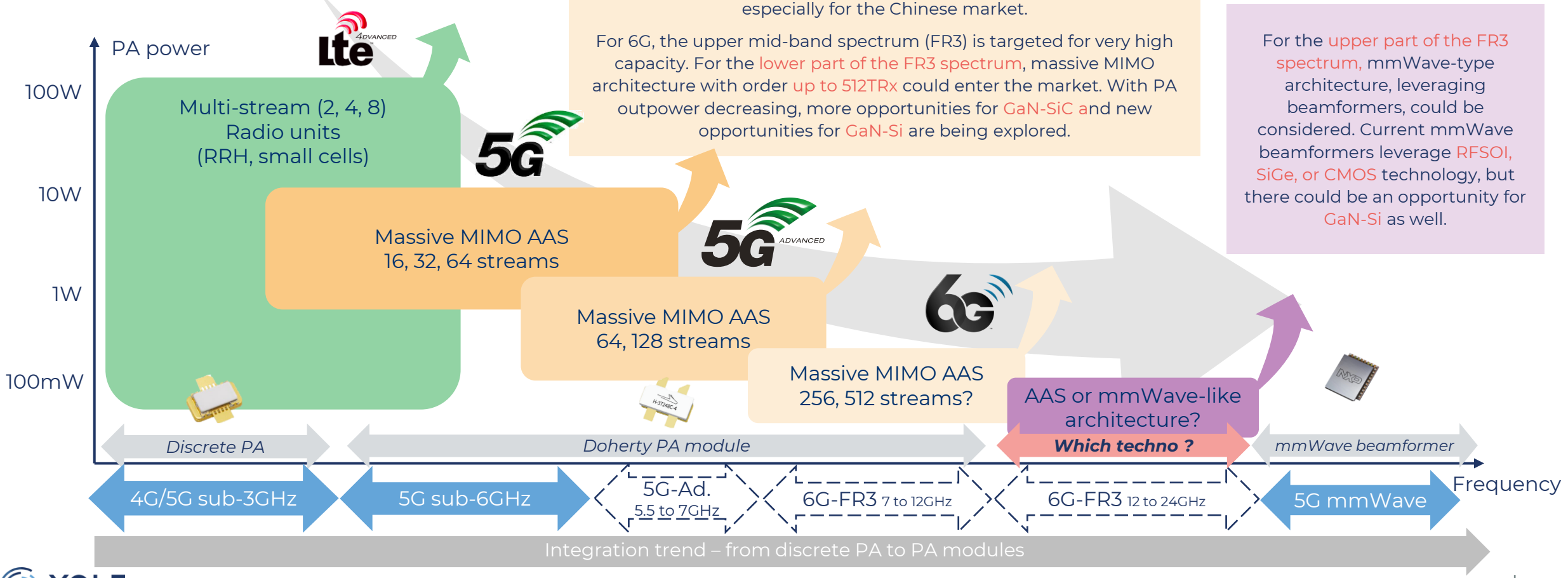
Radio remote head (RRH) adoption is currently driven by network modernization. New-generation RRH, supported by GaN or the latest LDMOS technology, provides better efficiency in more compact RU, saving OpEx for MNOs.

5G AAS adoption is currently slowing down, since the 5G network has already been widely deployed in the main market.

5G advanced is expected to open a new spectrum beyond 6GHz. This frequency could bring higher-order massive MIMO up to 128T128R, especially for the Chinese market.

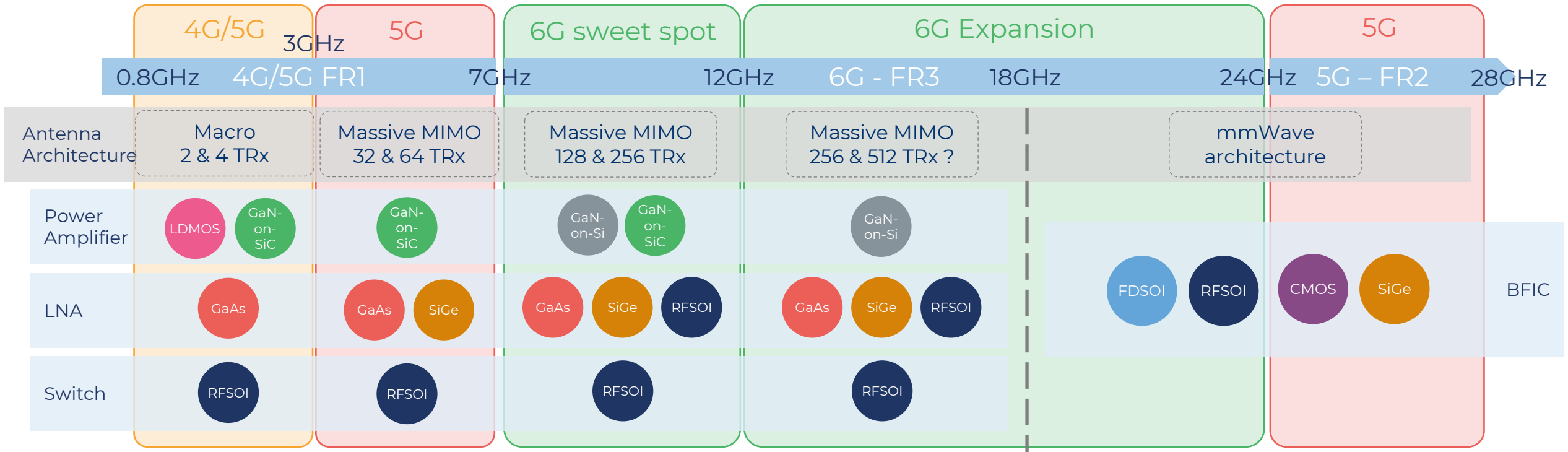
For 6G, the upper mid-band spectrum (FR3) is targeted for very high capacity. For the lower part of the FR3 spectrum, massive MIMO architecture with order up to 512TRx could enter the market. With PA outpower decreasing, more opportunities for GaN-SiC and new opportunities for GaN-Si are being explored.

For the upper part of the FR3 spectrum, mmWave-type architecture, leveraging beamformers, could be considered. Current mmWave beamformers leverage RFSOI, SiGe, or CMOS technology, but there could be an opportunity for GaN-Si as well.



RADIO ACCESS NETWORK

What Semiconductor to address 6G communications

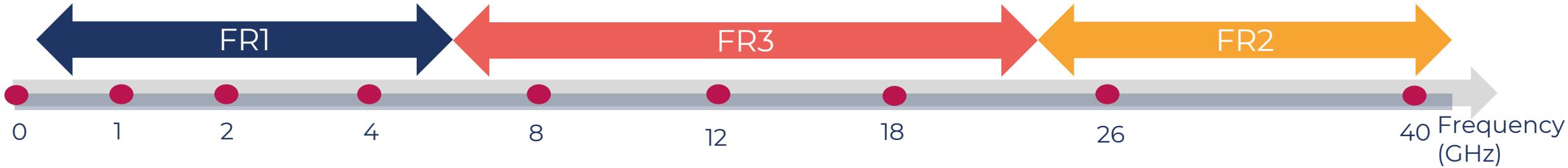


- Increased number of devices, cost pressure, need for efficiency
- Lower output power per RF Chain.
- Need for integration, global trend from discrete to modules.

- Low output power per RF Chain.
- High need for integration

MOBILE - PA TECHNOLOGIES FROM 5G TO 6G

What is the position of GaN/Si?



FR1: Sub-7GHz

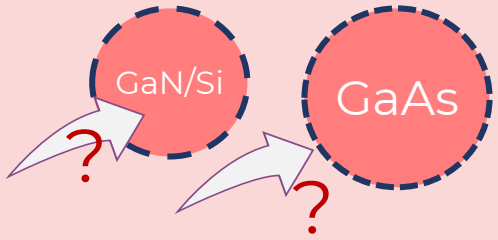
- Major PA Systems are GaAs-based
- GaN-on-Si has been investigated over the past few years by some players, but the technology was not ready. The focus now is on preparing for FR3.

GaAs

Established

FR3: 7-24GHz

- GaAs faces challenges in addressing the high frequencies
- Various technologies are competing.
- GaN-on-Si is a potential solution offering high PAE and wide bandwidth.



FR2: mmWave bands 24-50GHz

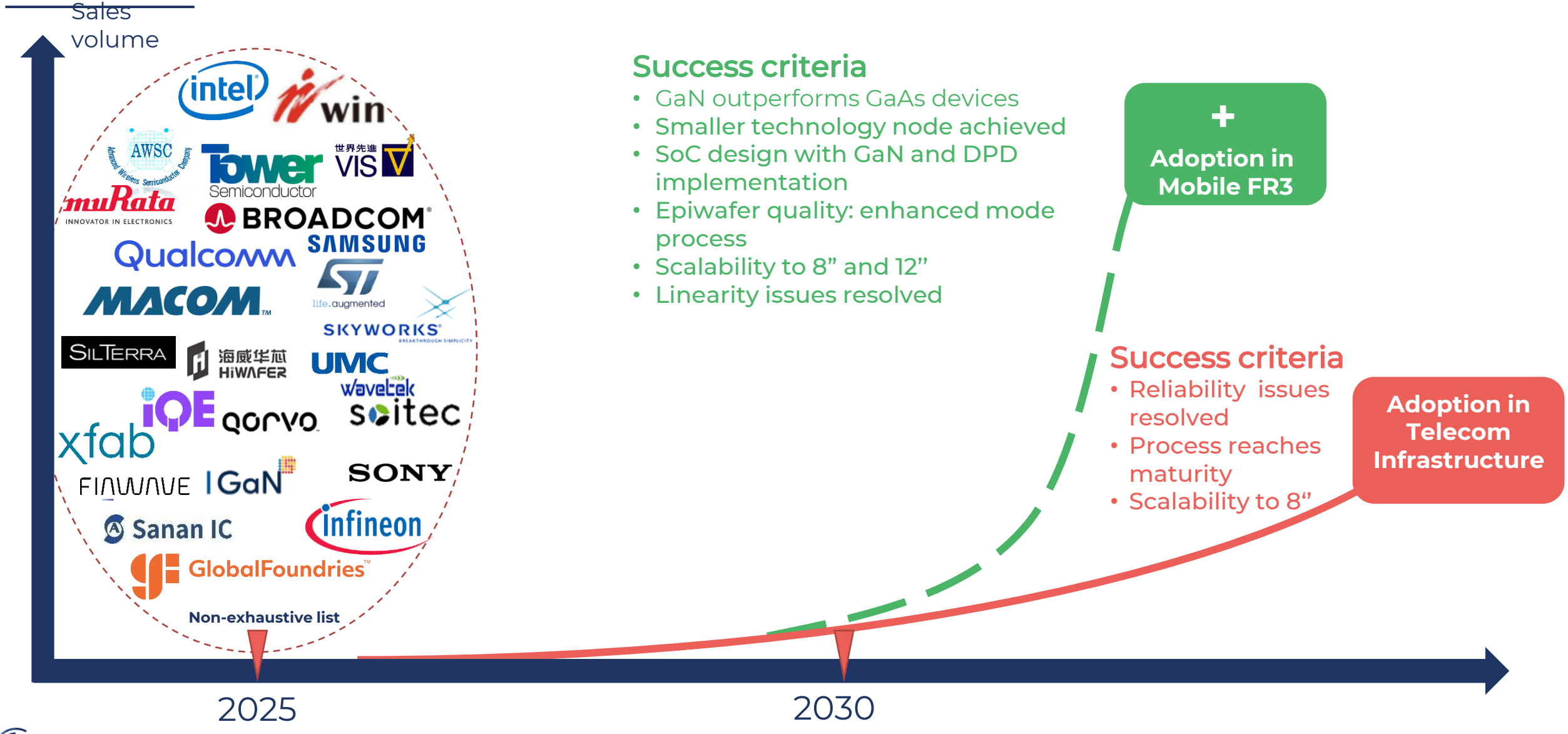
- FD-SOI and CMOS technologies have already achieved mmWave PA specifications with MMIC devices using phased arrays, enabling up to 20dBi gain.
- GaN-on-Si PAs face challenges such as:
  - Linearity
  - Integration
  - Power supply
- It is unlikely that GaN PAs will enter this market.

CMOS FD-SOI

Established

MOBILE AND RADIO ACCESS NETWORK

Several scenarios exist for GaN-on-Silicon



BEYOND 5G: 5G ADVANCED AND 6G

What technologies will address THz communication?

- GaN and LDMOS are the main technologies for PA at sub-6 GHz.
- Many challenges to address the 6G THz range
  - limited transmit output power,
  - low efficiency
  - high noise figure in reception.
  - System integration and packaging.
- SiGe, InP, and CMOS can deliver enough output power at THz frequencies.
- InP seems to be the best candidate for amplifier designs

LDMOS

2G

CMOS

LDMOS

GaAs

3G

GaAs

CMOS

LDMOS

SiGe

GaAs

GaN

Lte

Lte 4DVANCED

GaAs

Infrastructure

Sub-6GHz:

LDMOS

GaN

GaAs

mmWave:

SOI

CMOS

SiGe

5G ADVANCED

5G

Sub-6GHz:

GaAs

mmWave:

CMOS

SiGe

SOI

InP?

SOI?

SiGe?

CMOS?

High mobility
Low turn-on voltage
Higher thermal conductivity than GaAs

Benefits

Limited 6" volume
High cost
Complex integration
Immature supply chain

Constraints

InP

6G

THz which techno?

GaN-on-Si?

InP?

SOI?

SiGe?

GaAs?

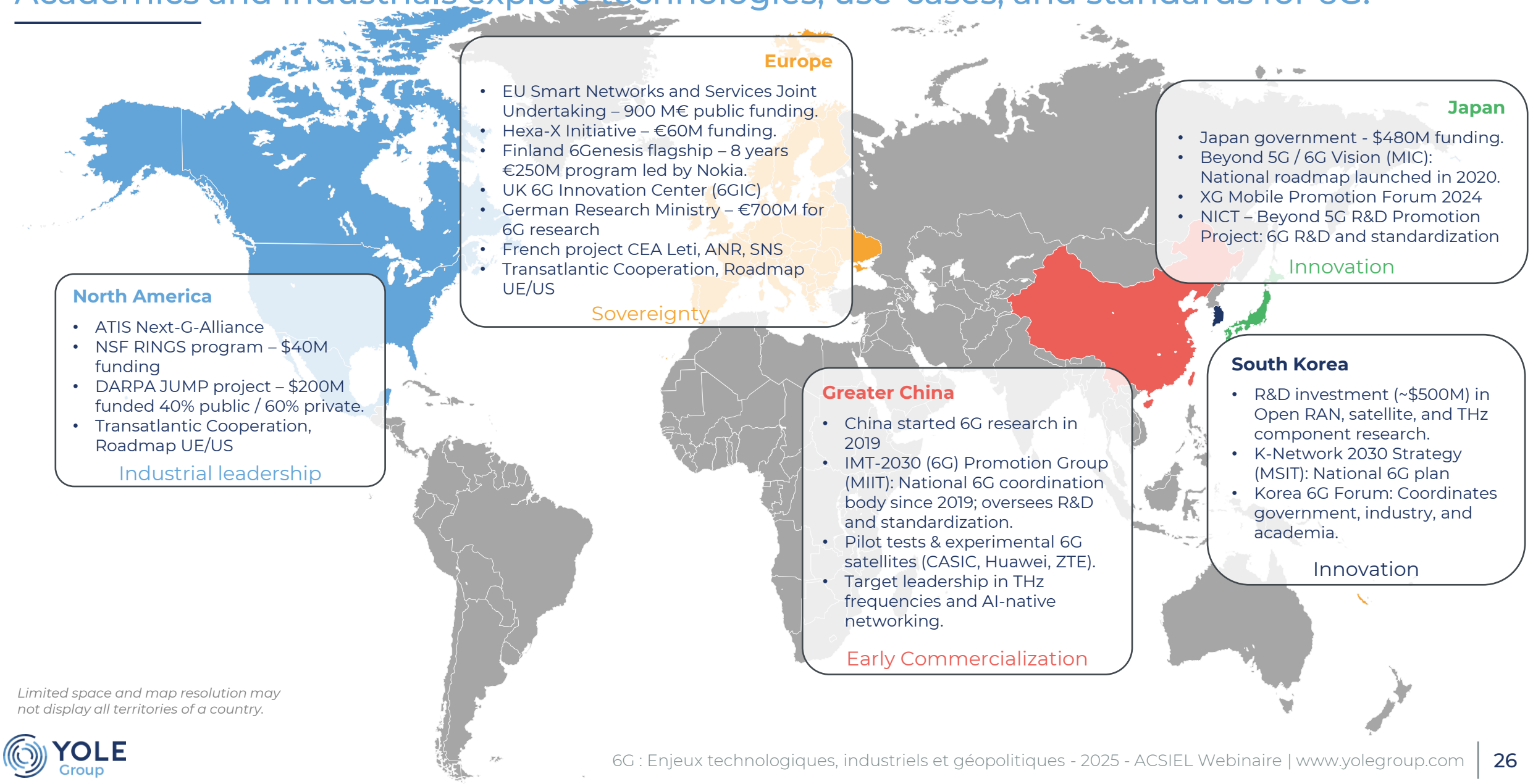
- GaAs is the main technology for 5G sub-6GHz power amplifiers.
- mmWave moves towards FD-SOI.
- High-frequency performance of InP HBT and InP HEMTs but:
  - High cost,
  - Limited volume support from the supply chain
  - complex integration.

Mobile & Consumer / Automotive

Ecosystem

6G REGIONAL INITIATIVES AND INVESTMENT

Academics and Industrials explore technologies, use-cases, and standards for 6G.



Europe

- EU Smart Networks and Services Joint Undertaking – 900 M€ public funding.
- Hexa-X Initiative – €60M funding.
- Finland 6Genesis flagship – 8 years €250M program led by Nokia.
- UK 6G Innovation Center (6GIC)
- German Research Ministry – €700M for 6G research
- French project CEA Leti, ANR, SNS
- Transatlantic Cooperation, Roadmap UE/US

Sovereignty

Japan

- Japan government - $480M funding.
- Beyond 5G / 6G Vision (MIC): National roadmap launched in 2020.
- XG Mobile Promotion Forum 2024
- NICT – Beyond 5G R&D Promotion Project: 6G R&D and standardization

Innovation

North America

- ATIS Next-G-Alliance
- NSF RINGS program – $40M funding
- DARPA JUMP project – $200M funded 40% public / 60% private.
- Transatlantic Cooperation, Roadmap UE/US

Industrial leadership

Greater China

- China started 6G research in 2019
- IMT-2030 (6G) Promotion Group (MIIT): National 6G coordination body since 2019; oversees R&D and standardization.
- Pilot tests & experimental 6G satellites (CASIC, Huawei, ZTE).
- Target leadership in THz frequencies and AI-native networking.

Early Commercialization

South Korea

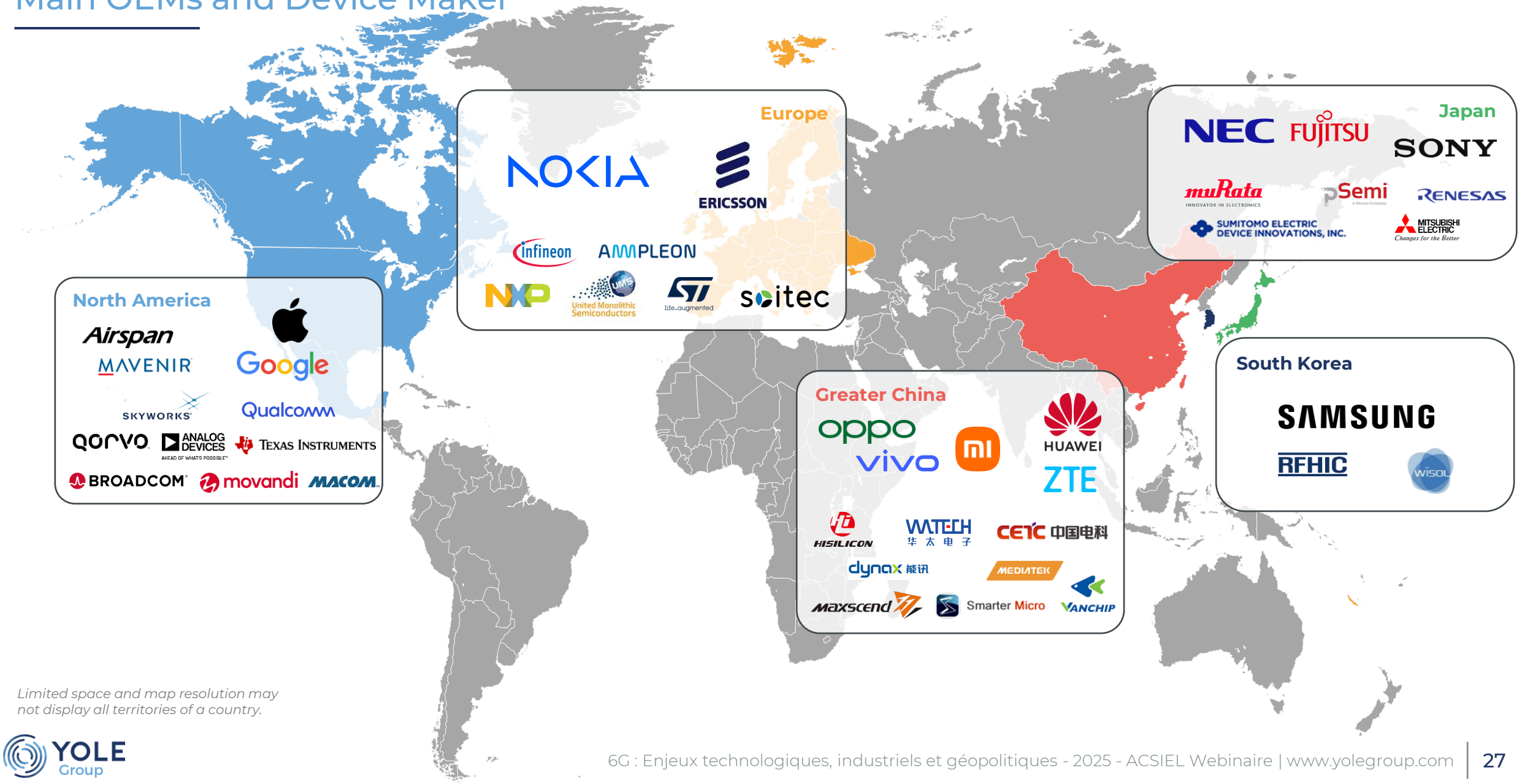
- R&D investment (~$500M) in Open RAN, satellite, and THz component research.
- K-Network 2030 Strategy (MSIT): National 6G plan
- Korea 6G Forum: Coordinates government, industry, and academia.

Innovation

Limited space and map resolution may not display all territories of a country.

5G/6G ECOSYSTEM – RADIO ACCESS NETWORK & MOBILE

Main OEMs and Device Maker



Limited space and map resolution may not display all territories of a country.

Outlook

CONCLUSION

- Global mobile data traffic keeps increasing due to more connected systems (Mobile, AR/VR, FWA, IoT) and more data-consuming applications requiring more capacity.
- 6G standardization will follow 5G Advanced (Release 18–20), with first specs in late 2028 (Rel-21) and commercial launch expected around 2029–2030.
- 6G will enables new applications and improve user experience.
- 6G targets 10–100 times improvement over 5G (1 Tb/s peak rate, sub-millisecond latency, 10 millions devices/km^2,energy efficiency and 3D connectivity).
- 6G Dedicated Spectrum:
    - The new FR3 band (7–24 GHz) will be central for 6G, bridging sub-6 GHz and mmWave ranges.
    - Higher frequencies (100 GHz+) in Sub-THz spectrum will enable sensing applications.
- Radio Access Network Evolution:
    - 6G will leverage massive MIMO to 128, 256 and 512 T/R channels depending on frequencies.
    - Lower power, cost pressure, efficiency and integration needs.
- 6G's Impact on Semiconductors:
    - GaN-on-SiC / GaN-on-Si for high-power and efficiency
    - SiGe, FD-SOI, CMOS for mmWave integration.
    - THz communications: InP shows best performance (low noise, high output power), but scalability and efficiency remain challenging.
- Global 6G Initiatives: Major government funding and R&D programs worldwide. Competition and Collaboration across regions.

YOLE GROUP RELATED PRODUCTS

Reports

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Status of the RF industry 2025

Status of the Radar Industry 2024

Wi-Fi and Short-Range Connectivity for Consumer 2025

RF Front-End Module Comparison 2025 - Wi-Fi & Bluetooth

RF Front-End Module for Mobile 2025

Radio Access Network 2025

Coming Soon

RF for Satcom 2024 - Focus on LEO

RF Front-End Module Comparison 2024 – 5G NR/sub-6GHz

THANK YOU