5G – RADIO TECHNOLOGY RESEARCH AND CONCEPTS

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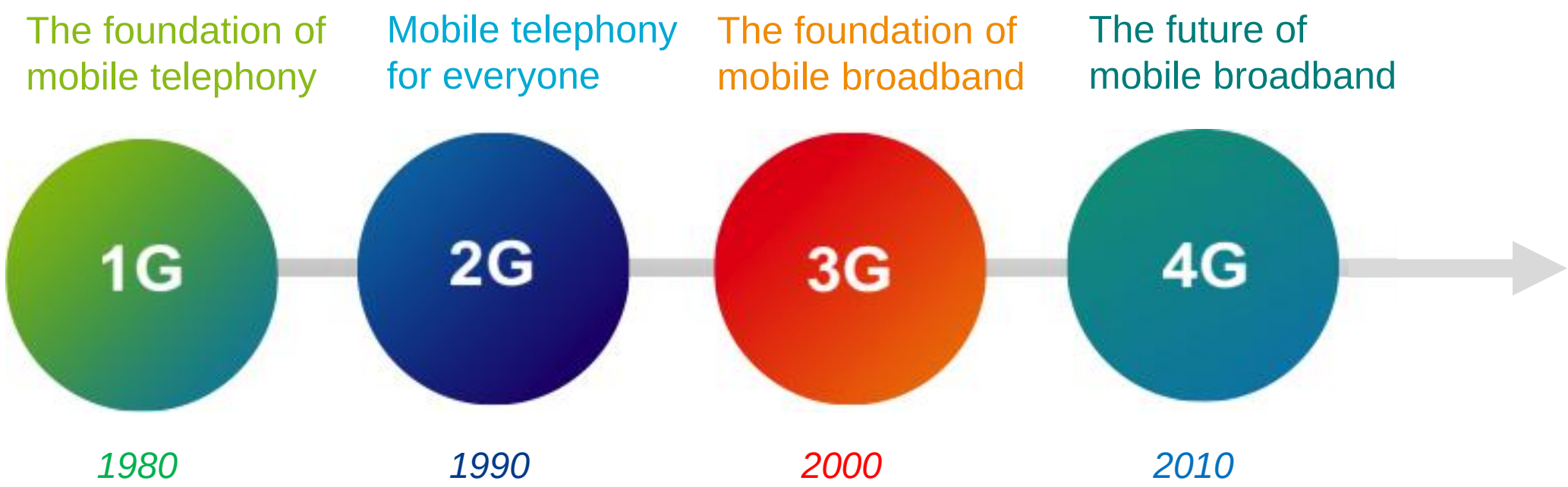
Mobilfunktagung Osnabrück, 08.05.2015

WIRELESS ACCESS GENERATIONS



Providing voice to close to 7 Billion and
Mobile Broadboand to more than 2 Billion subscribers
Increasing data rates from 10 kbps to 1 Gbps

EVERYTHING THAT CAN BENEFIT FROM BEING CONNECTED WILL BE CONNECTED

[ROBOTS]



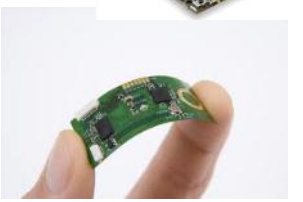




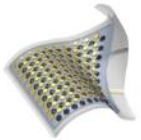
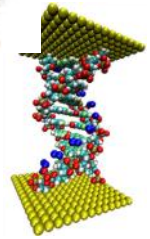

[DEVICES]









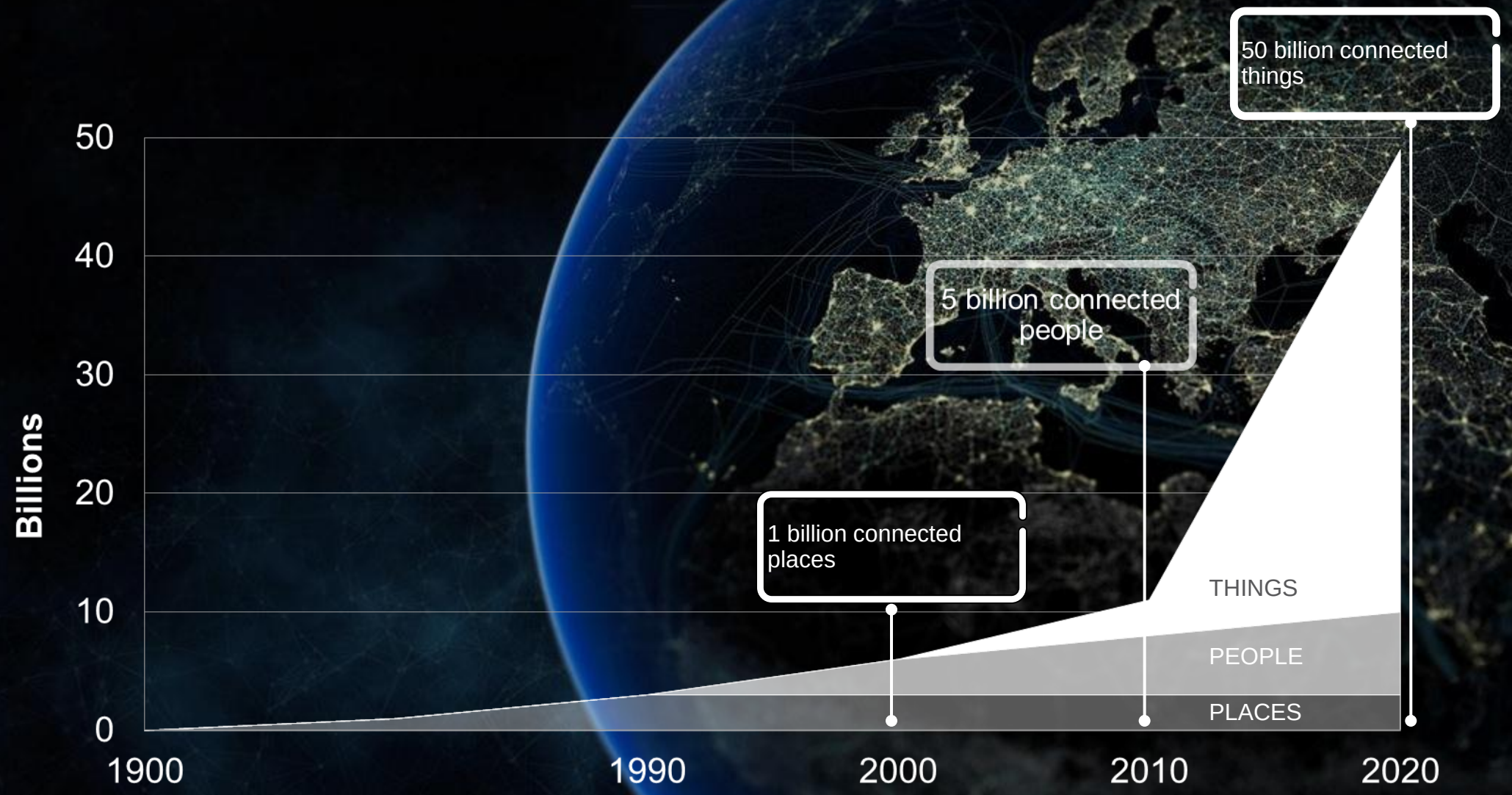




[MACHINES & VEHICLES]

[EMBEDDED]



PACE OF CHANGE

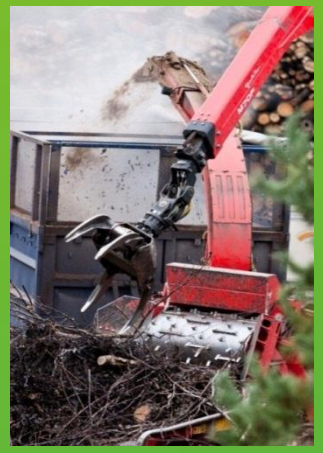


5G – BEYOND MOBILE BROADBAND

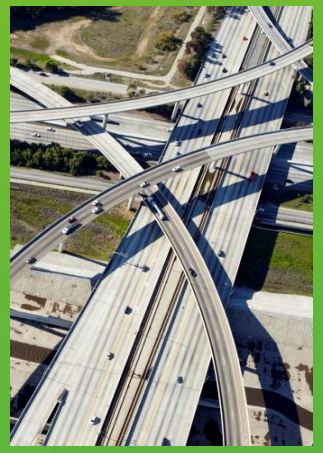
Broadband experience everywhere anytime

Mass market personalized media and gaming

Meters, sensors, “Massive MTC”



Remote controlled machines



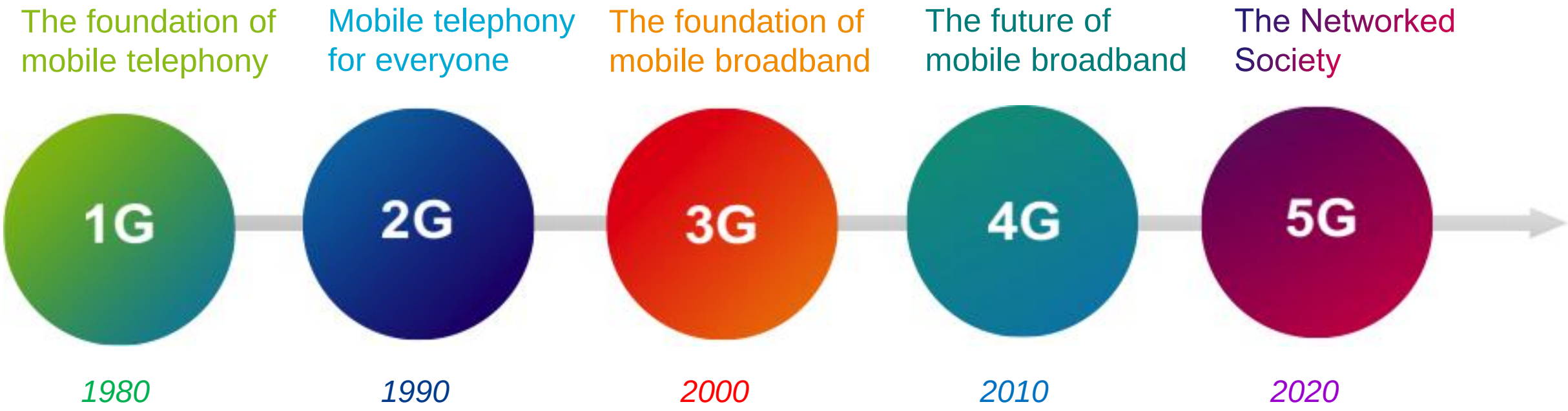
Smart Transport Infrastructure and vehicles

Human / machines interaction

And much more beyond the crystal bowl

New opportunities and flexibility for the unforeseen

WIRELESS ACCESS GENERATIONS



Providing a wireless connectivity platform for the services of the Networked Society

BUILDING 5G

One Network – Multiple Industries

Platform for 50 Billion
Possibility to address new verticals

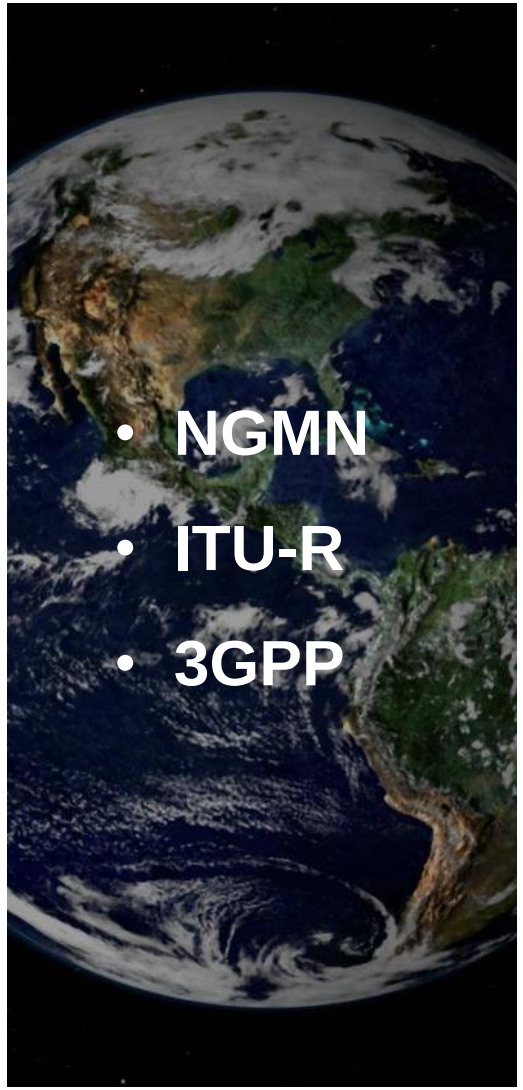
Industry Journey

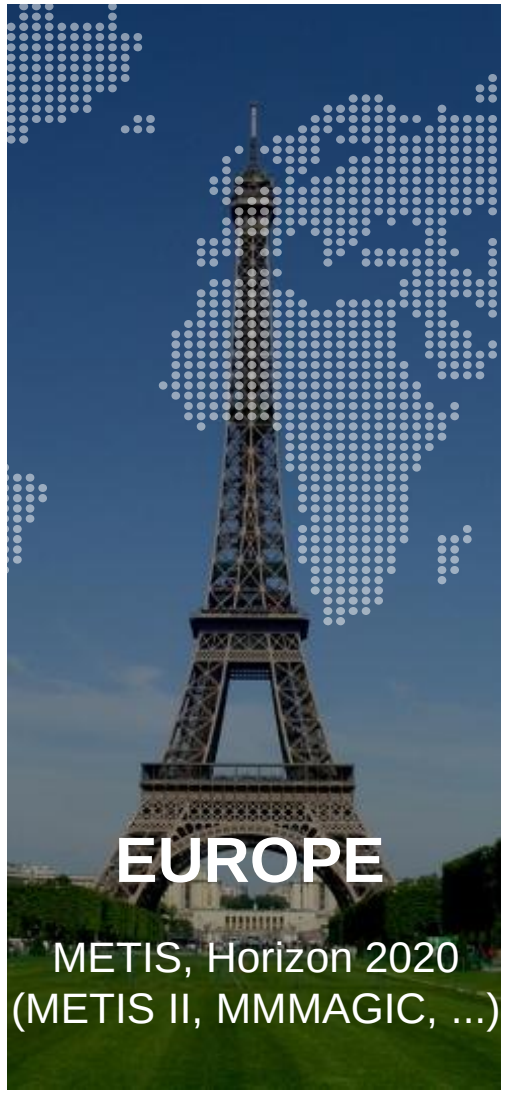
Business Models
Eco-system
Global standards and communities (ITU, 3GPP, …)

Technology Evolution

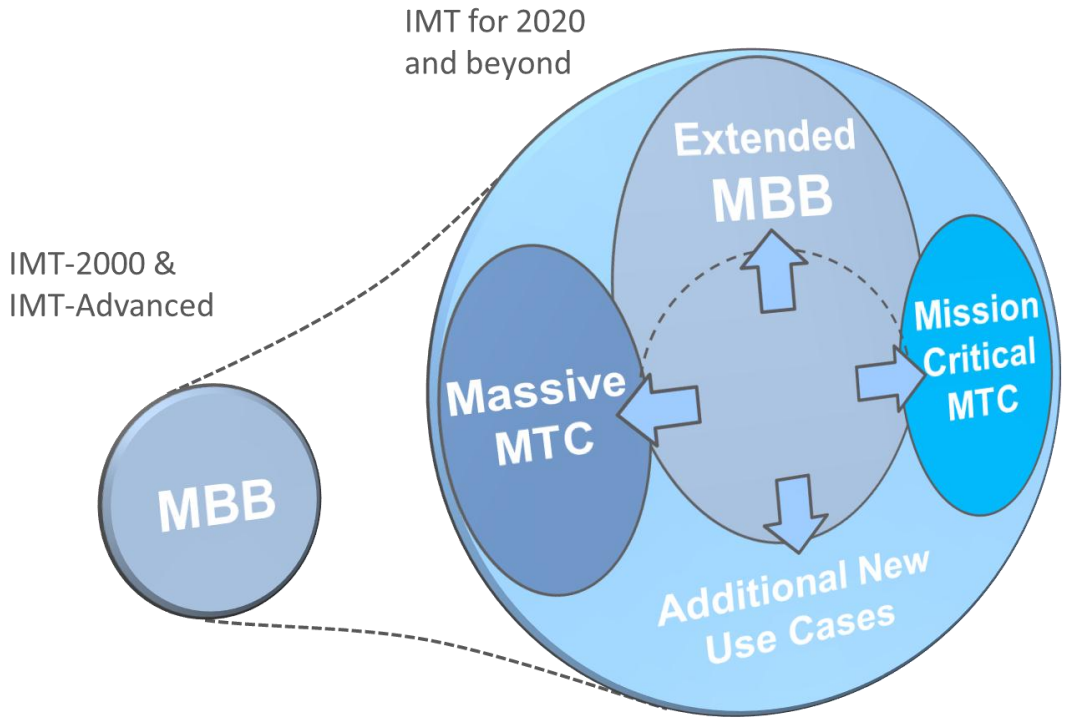
Higher frequencies
Wider bandwiths
Advanced Antennas
LTE Evolution part of 5G

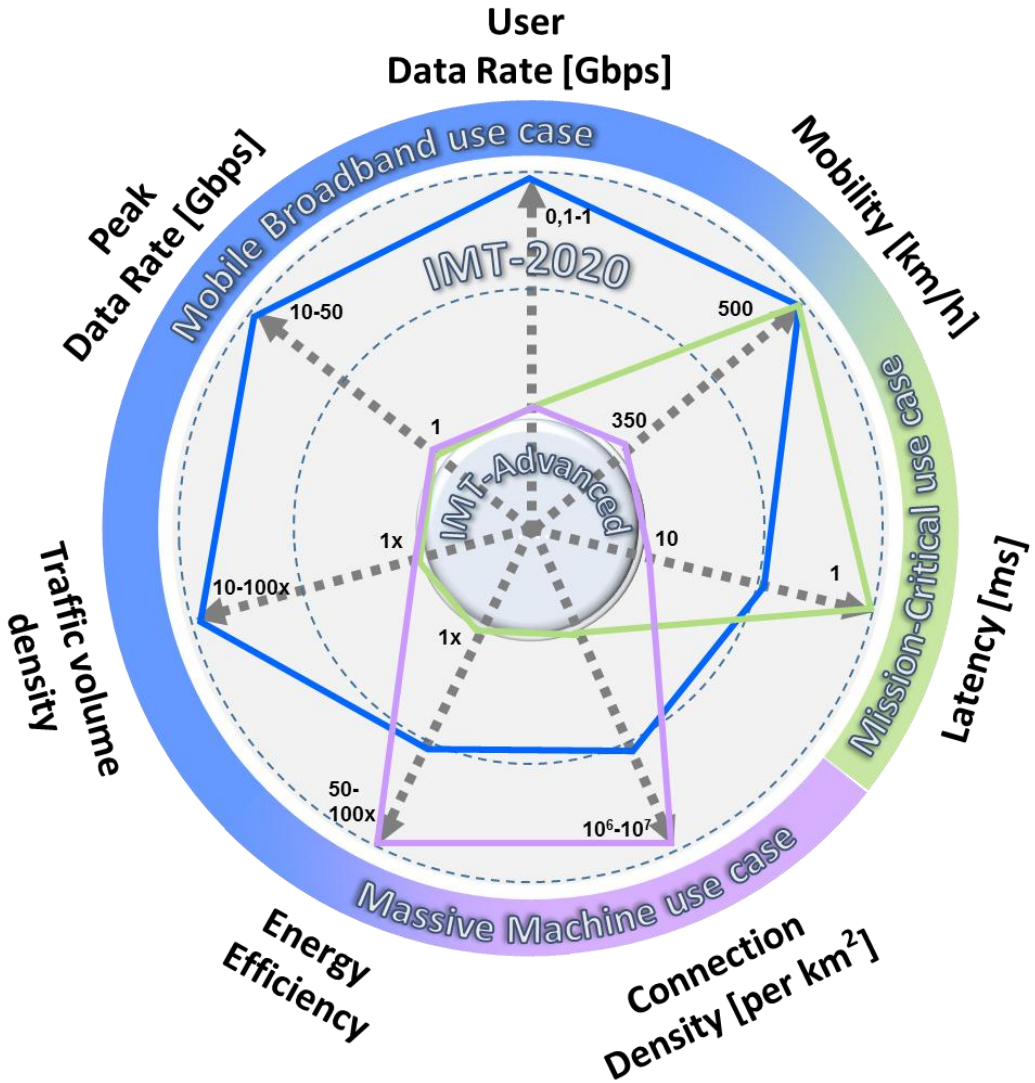
5G INITIATIVES OVERVIEW



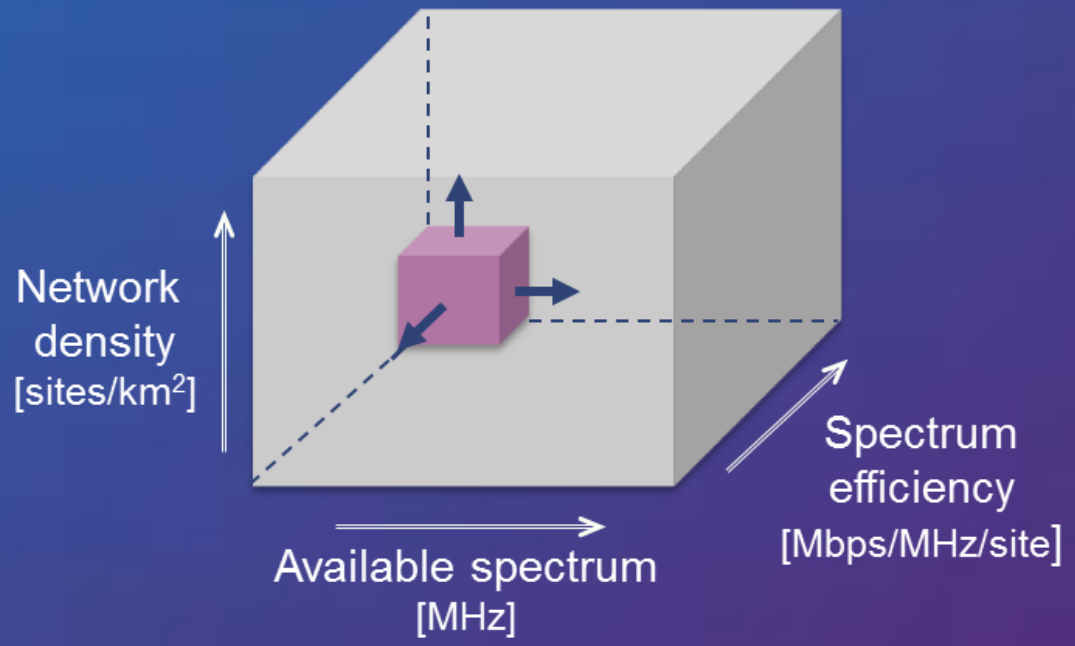


NEW USE CASES, NEW REQUIREMENTS





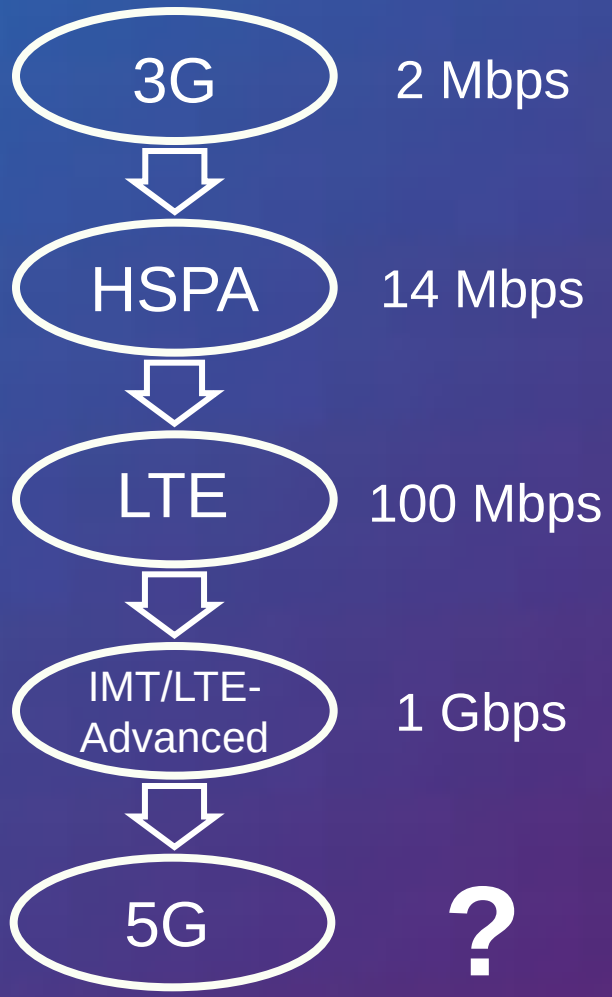
TRAFFIC CAPACITY



Traffic capacity
[Mbps/km²]

- Denser networks
- More spectrum
- Enhanced technology

DATA RATES



- More than 10 Gbps in specific scenarios
- Several 100 Mbps generally available in urban/suburban scenarios
- Multi-Mbps connectivity essentially everywhere

High data rates everywhere

5G RADIO TECHNOLOGY AREAS

Extension to higher frequencies

Complementing lower frequencies for extreme capacity and data rates in dense areas

Spectrum flexibility

Spectrum sharing

- ***Unlicensed***
- ***Shared licensed***
- ***Network sharing***

Complementing dedicated licensed spectrum

Duplex Flexibility

Multi-antenna technologies

For higher as well as lower frequencies

Beam-forming for coverage

Multi-user MIMO for capacity

Multi-site coordination

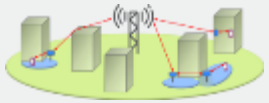
Multi-site transmission/reception

Multi-layer connectivity

Access/backhaul integration

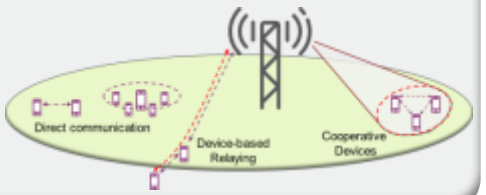
Same technology for access and backhaul

Same spectrum for access and backhaul



Device-to-device communication

Direct communication
Device-based relaying
Cooperative devices



Ultra-lean design

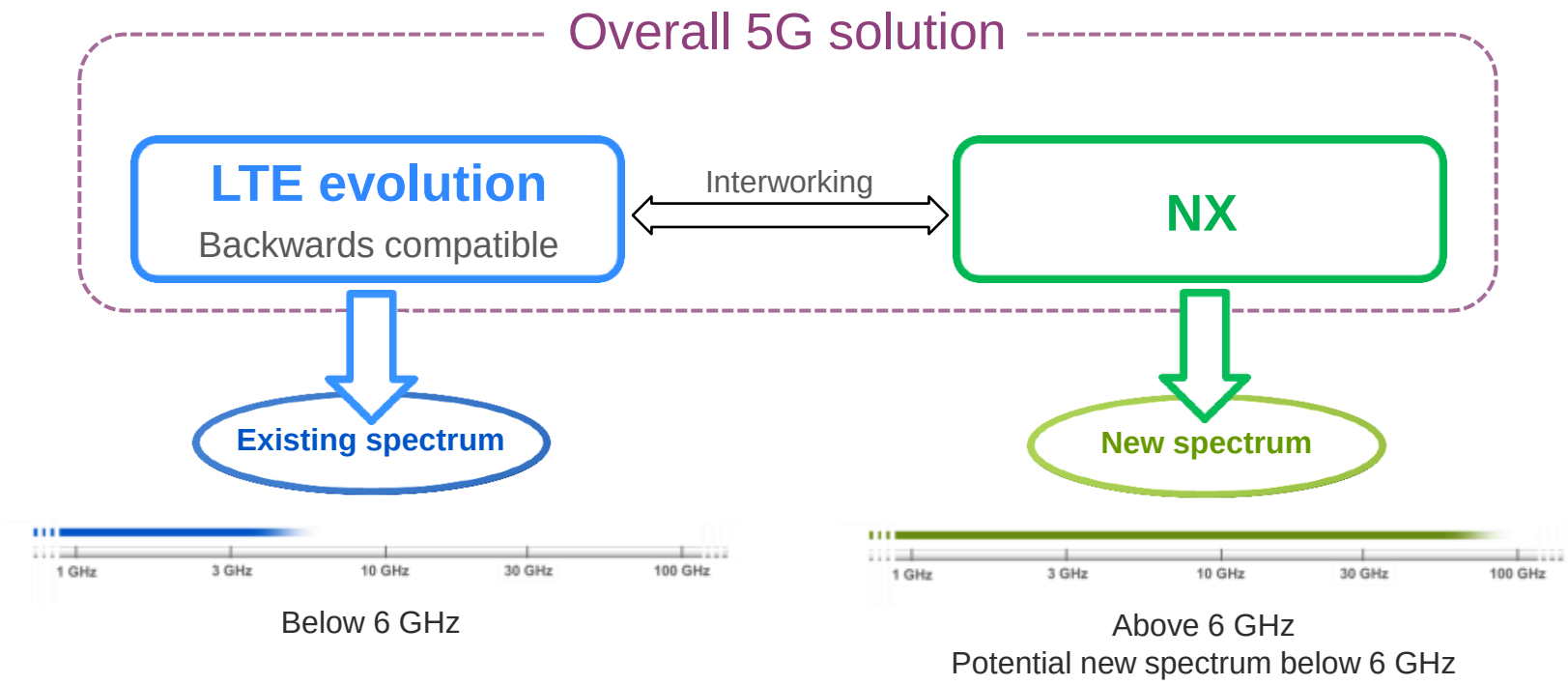
Minimize transmissions not related to user data

Separate delivery of user data and system information

Higher data rates and enhanced energy efficiency

...

Evolution of existing technology + New radio-access technology



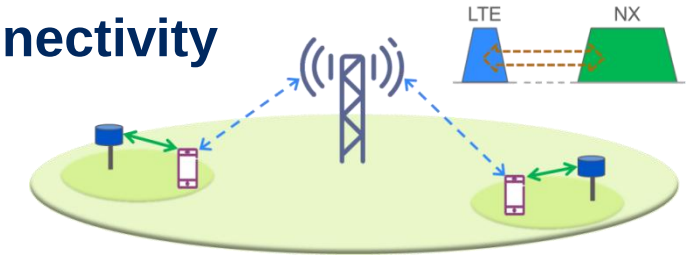
Below 6 GHz

Above 6 GHz
Potential new spectrum below 6 GHz

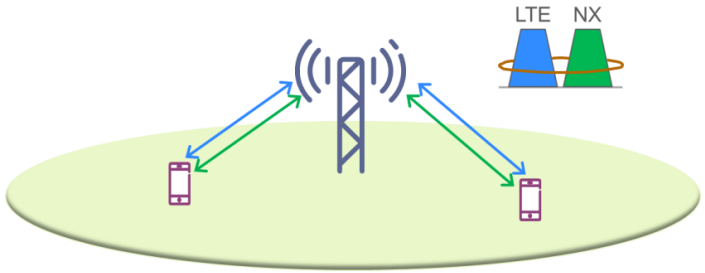
5G TECHNOLOGIES

› LTE as part of 5G overall radio solution

Dual-connectivity



User-plane aggregation



5G technology components

- Massive MIMO
- M2M range ext.
- Multi-layer/multi-site
- Self-backhaul
- Latency reductions
- Ultra lean design
- Very high BW

LTE deployment compatible

Applicable to all bands

Primarily for (but not limited to) “new” bands (from <1 GHz to >100 GHz)

Non LTE-deployment compatible

Timing decided by operator

1 GHz | 3 GHz | 10 GHz | 30 GHz | 100 GHz

LTE deployments ~2020

5G NETWORK EVOLUTION TO MEET EXPECTATIONS

Sustainability

User/industry applications

Devices

Management & Orchestration

Radio Access

Network applications

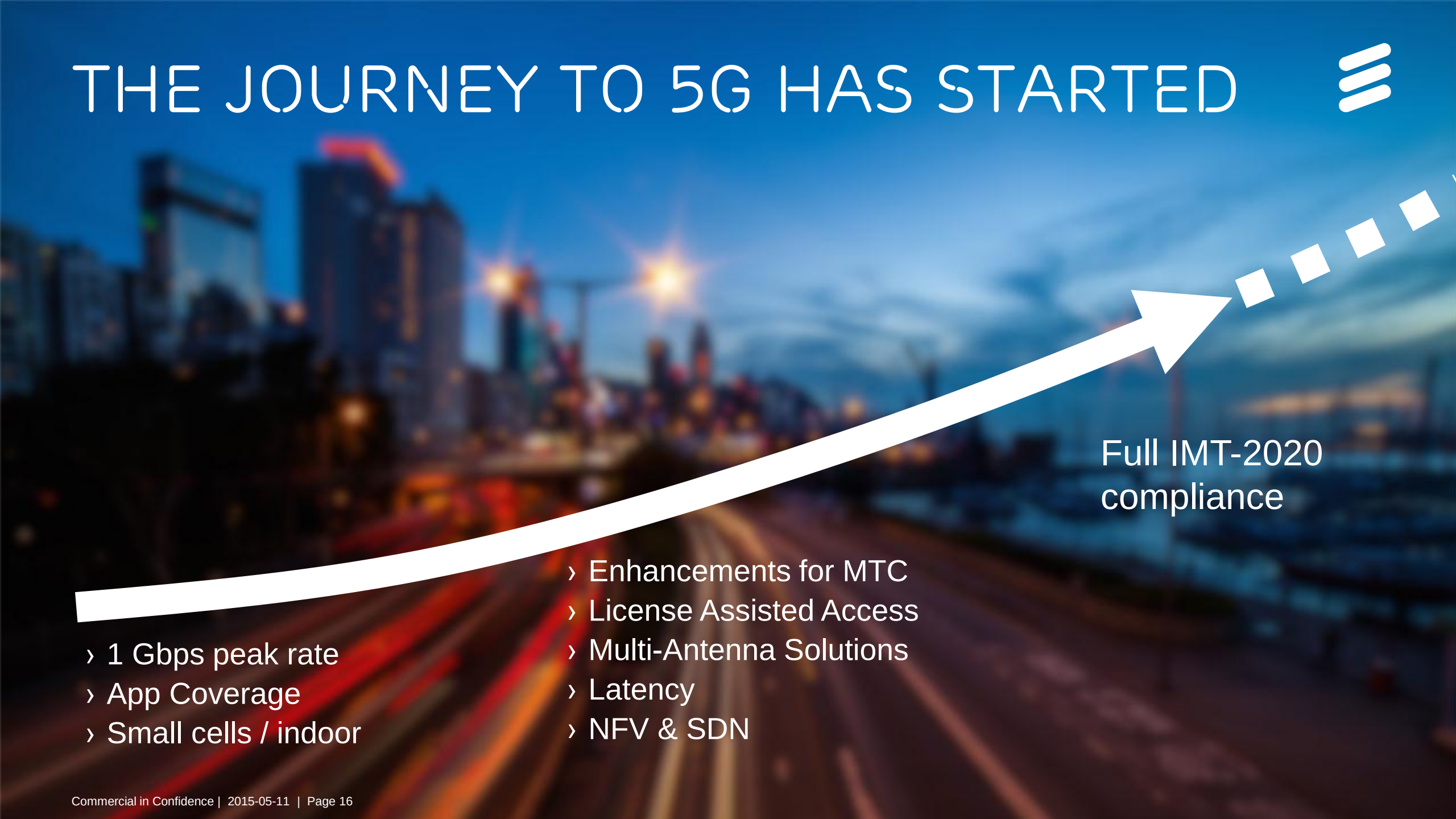
Cloud Infrastructure

IP Infrastructure

Security

Scope for 5G

THE JOURNEY TO 5G HAS STARTED

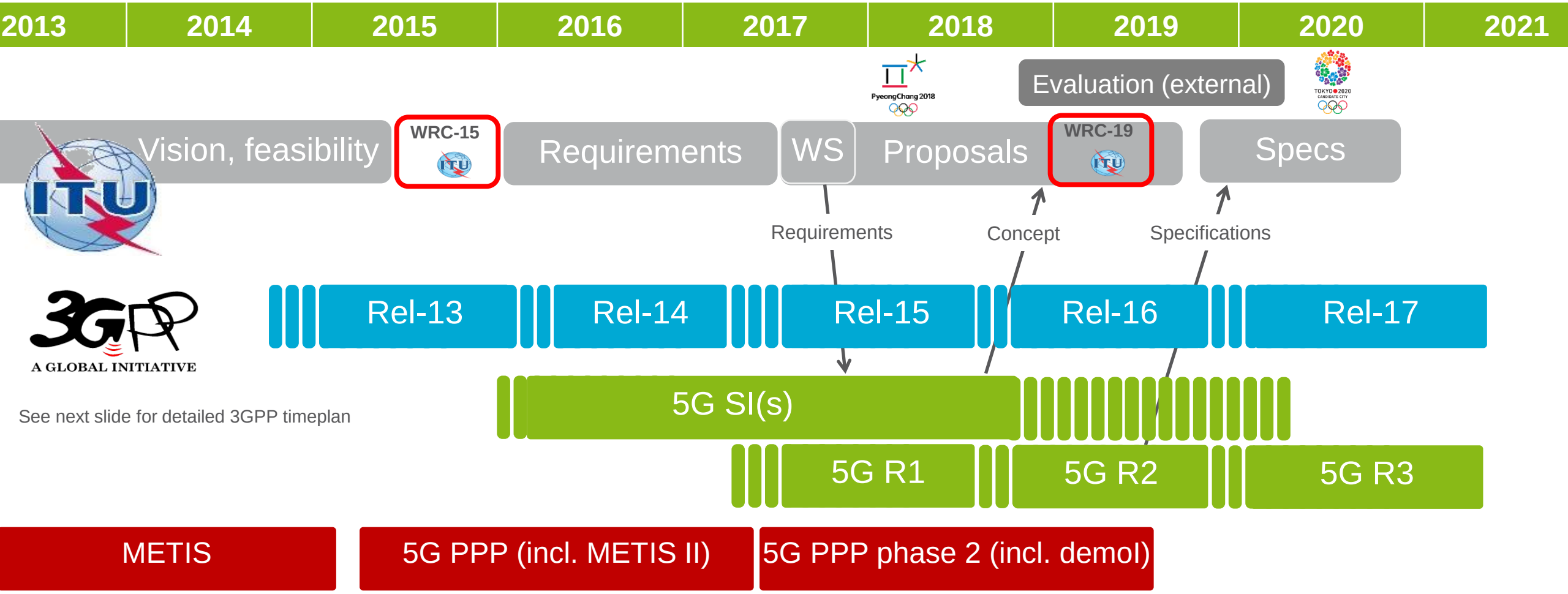


› 1 Gbps peak rate
› App Coverage
› Small cells / indoor

› Enhancements for MTC
› License Assisted Access
› Multi-Antenna Solutions
› Latency
› NFV & SDN

Full IMT-2020 compliance

CURRENT 5G TIMEPLAN



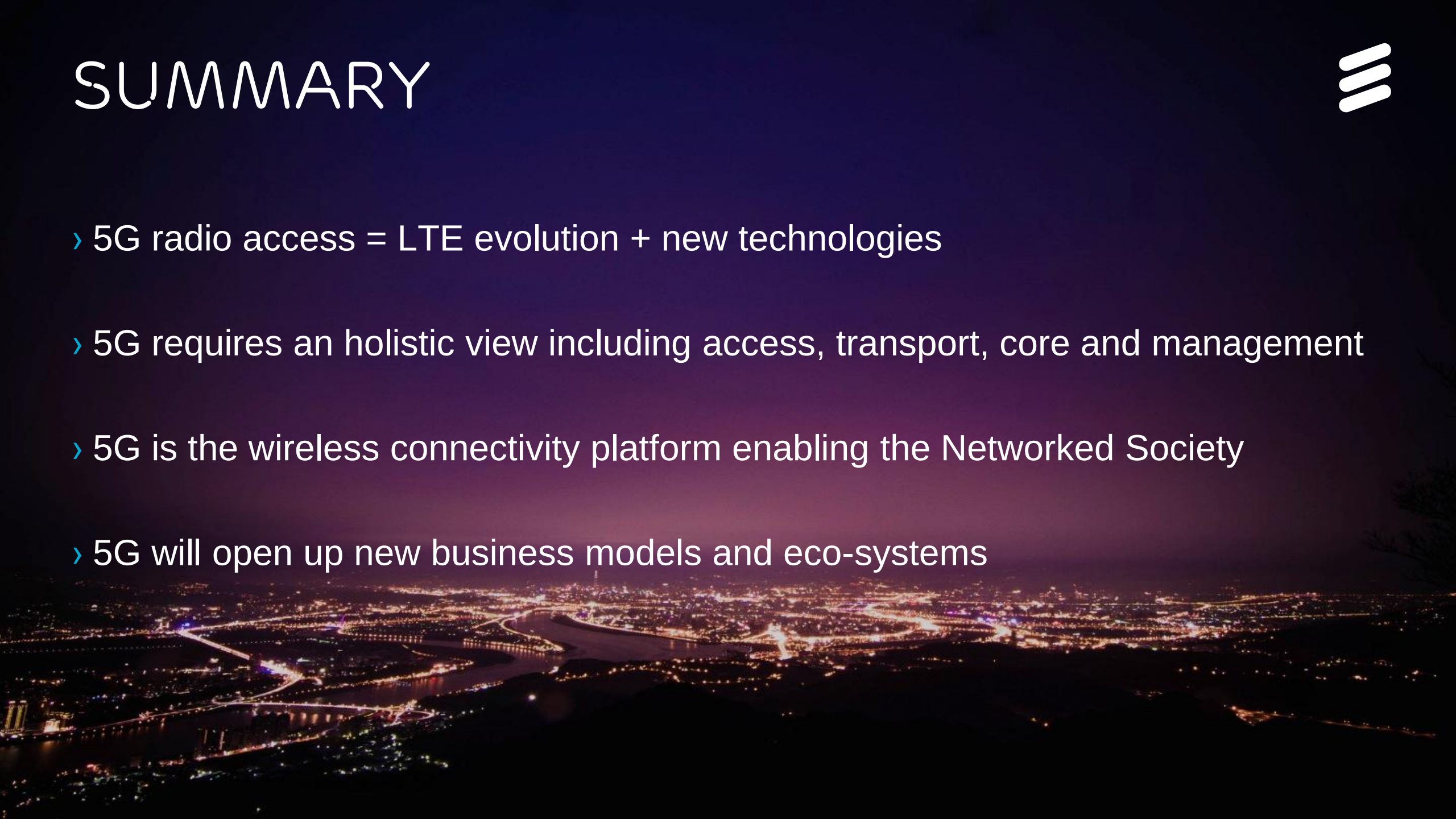
A GLOBAL INITIATIVE

See next slide for detailed 3GPP timeplan

5G RADIO TEST BED
- PHASE 1 ACHIEVEMENTS

- **Performance**
  - 5.8 Gbps
  - Multiple 4K video streams over 5G
  - Propagation measurements
- **Evolution**
  - 5G – LTE Dual Connectivity
  - 5G Multipoint Connectivity
  - Indoor and Outdoor
- **Multiple customers engagements**

SUMMARY



- 5G radio access = LTE evolution + new technologies
- 5G requires an holistic view including access, transport, core and management
- 5G is the wireless connectivity platform enabling the Networked Society
- 5G will open up new business models and eco-systems

ERICSSON