Welcome to Ericsson EuroLab

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Ericsson at a glance

Enabling the full value of connectivity for service providers

Business areas:

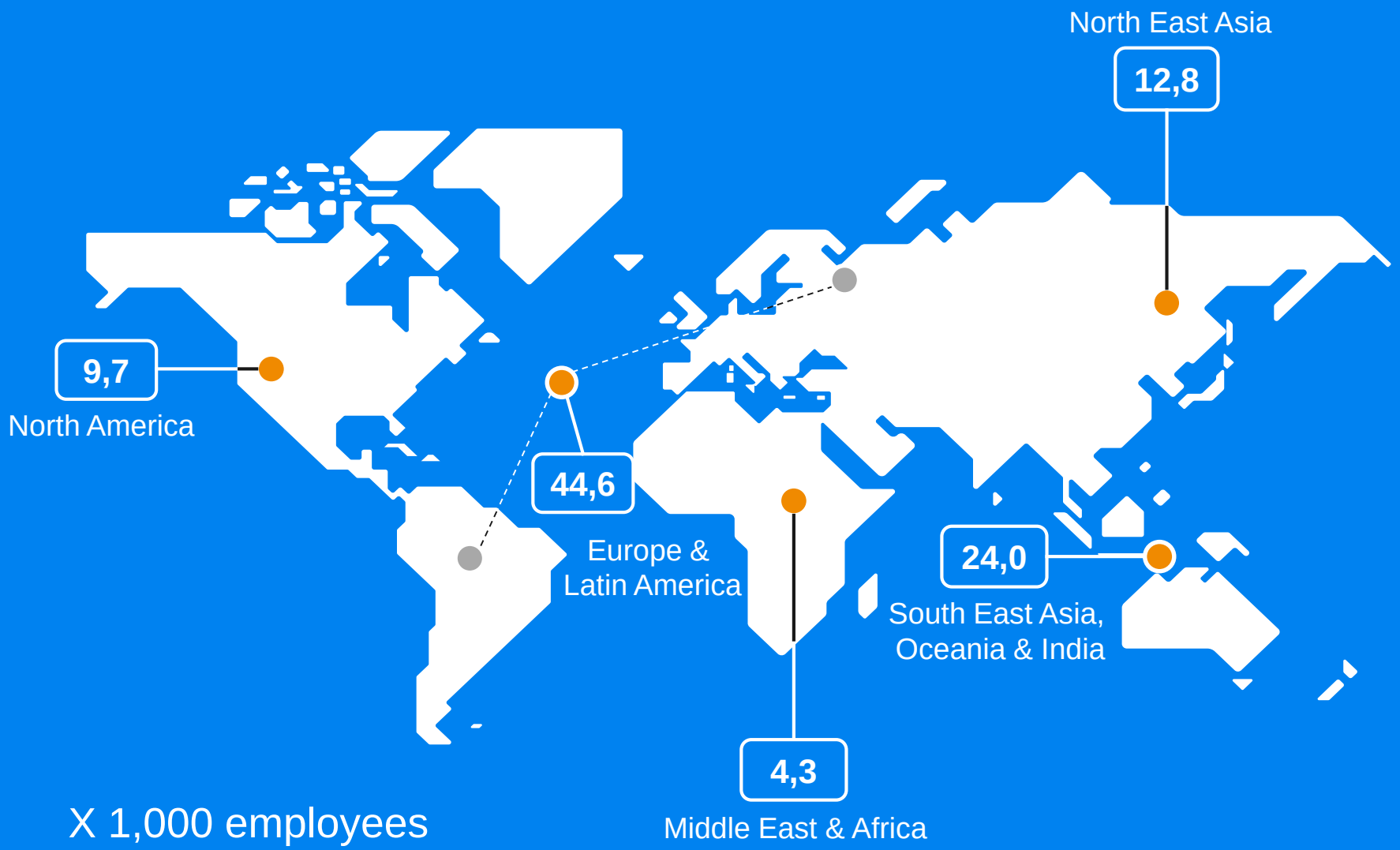
— Networks
— Digital services
— Managed services
— Technology and emerging business

By the numbers:

— 180+ countries
— 210.8 SEK billion in Net sales
— 95,300 employees
— 49,000 patents

Image: Ericsson headquarters, Kista, Sweden

Global presence



X 1,000 employees

95,300
employees worldwide

50,00
of our employees are
Service professionals
0

24,80
of our employees are
working in the R&D sector
0

Ericsson in Germany

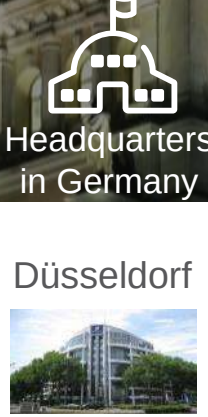
Presence in Germany
For over 60 years

Employees
2,700 (1,000 in R&D)

Research & Development
ICT Development Centre Eurolab Herzogenrath (Aachen)

Locations
13

Headquarters in Germany
Düsseldorf



Core business segments in Germany:

- Mobile broadband
- Managed services
- Core & Cloud solutions
- System integration
- OSS and BSS











ICT Development Center Eurolab Aachen

2020

Ericsson Eurolab

Over 25 Years of Research and Development in Germany

Foundation	Employees	Patents per Year	Nationalities
1991	500	80-100	45+

Portfolio: **4G/5G** Networks | Private Networks | **IOT** Accelerator

Segments: **CSP** | **Industry 4.0** | **ITS** | **Energy**

Ericsson Eurolab near Aachen is a strategic location for Ericsson's global efforts in Research and Development

July 2015: Opening of the Ericsson Cloud Lab
September 2015: 5G for Germany Program started
June 2016: Opening of the 5G Innovation Facility & Ericsson Garage Eurolab
March 2018: Opening of the IoT Business Lab
September 2019: Opening of the Center of Excellence for Industry 4.0

Eurolab co-creation platforms

Incubation – Collaboration – Business Development

Data Center Eurolab

Ericsson Garage

RWTH Aachen Campus

DigiHub Aachen Start-up incubation

IOT Business Lab

5G Connected Mobility

Manufacturing Engagements

Industry 4.0 Reference Factory

- Ericsson operating 2.6 GHz LTE network in the factory
- POC's for IOT services like
  - SLA supervision
  - Asset condition monitoring …
- SIEMENS POC for PLC in the cloud

e.GO Start-up Factory

- e.GO is currently building a new factory for electrical vehicle assembly (20.000 cars /year)
- Production start March 2018
- Ericsson opportunity to enable unwired factory

Fraunhofer Production Techn.

- Ericsson 5G system installation in October 2017
- Ultra Low Latency use case for BLISK production
- Target: Networked Adaptive Production

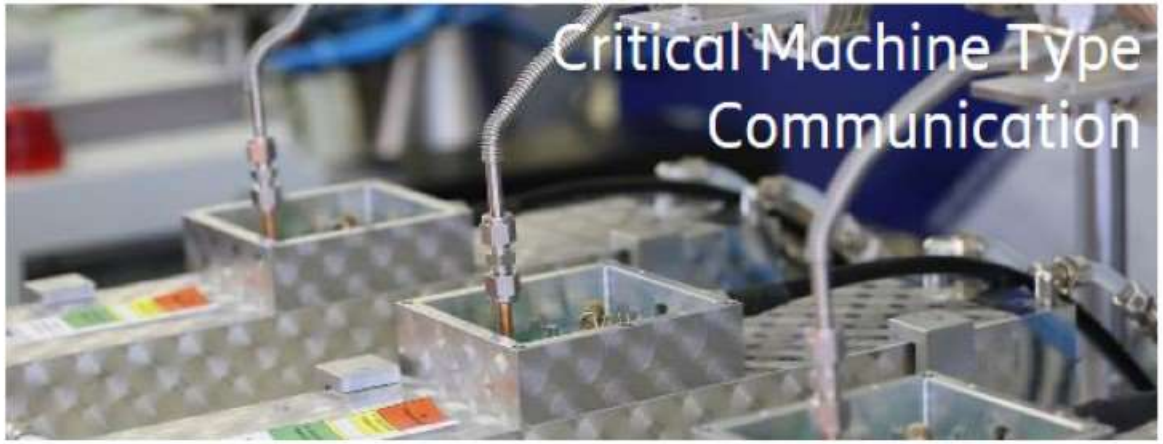
Ericsson 5G overview

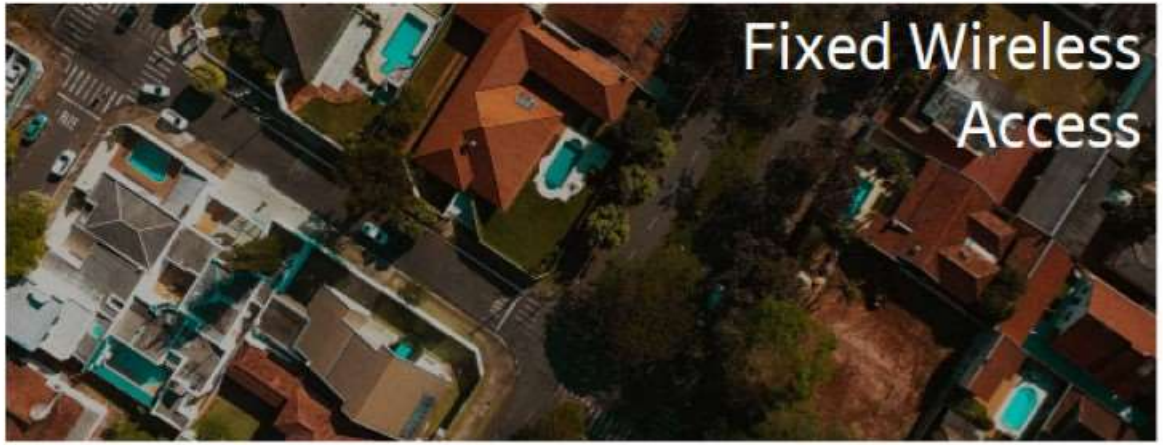
Content

5G addressing operator pain points

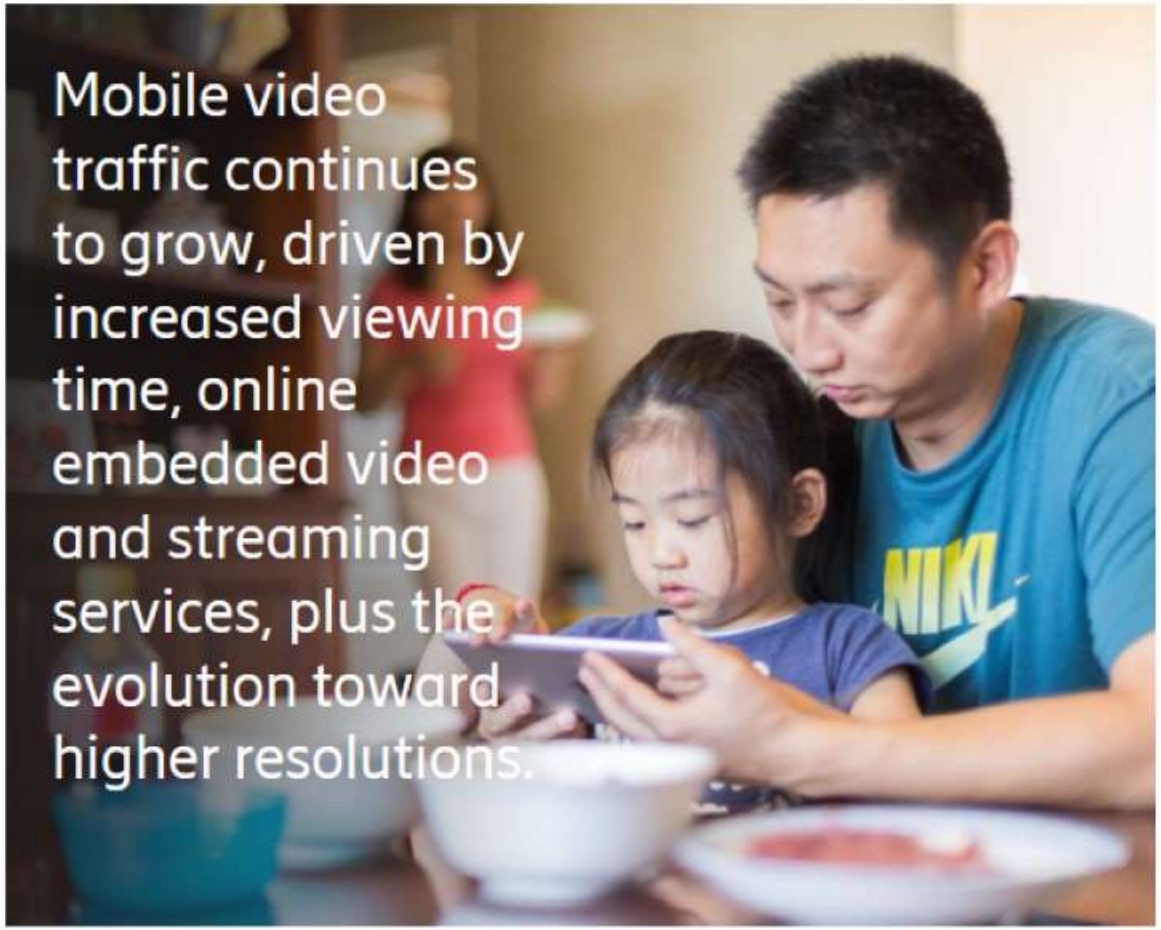
Pain points	5G benefits
Data traffic growth	Lower cost per GB to 1/10
OPEX and operational inefficiencies	Automation for efficiency and experience
No revenue growth	5G enables new growth

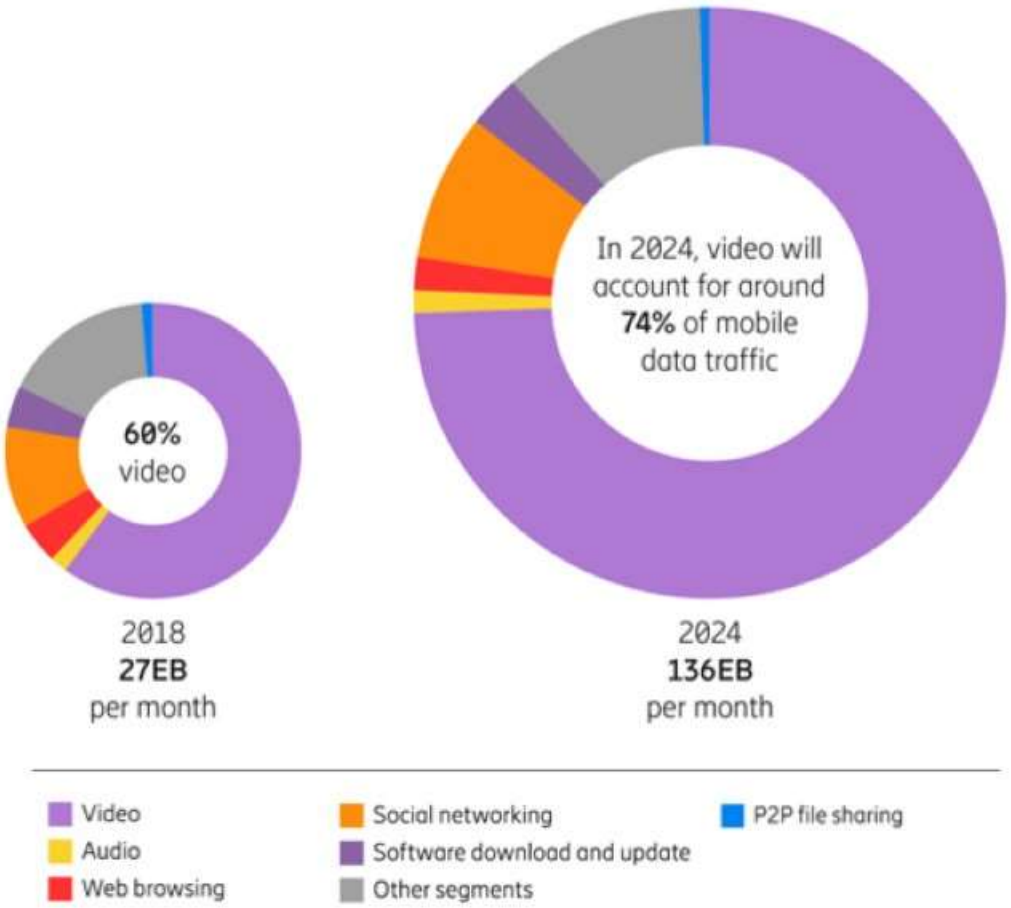
Enhanced MBB – The first use case of 5G



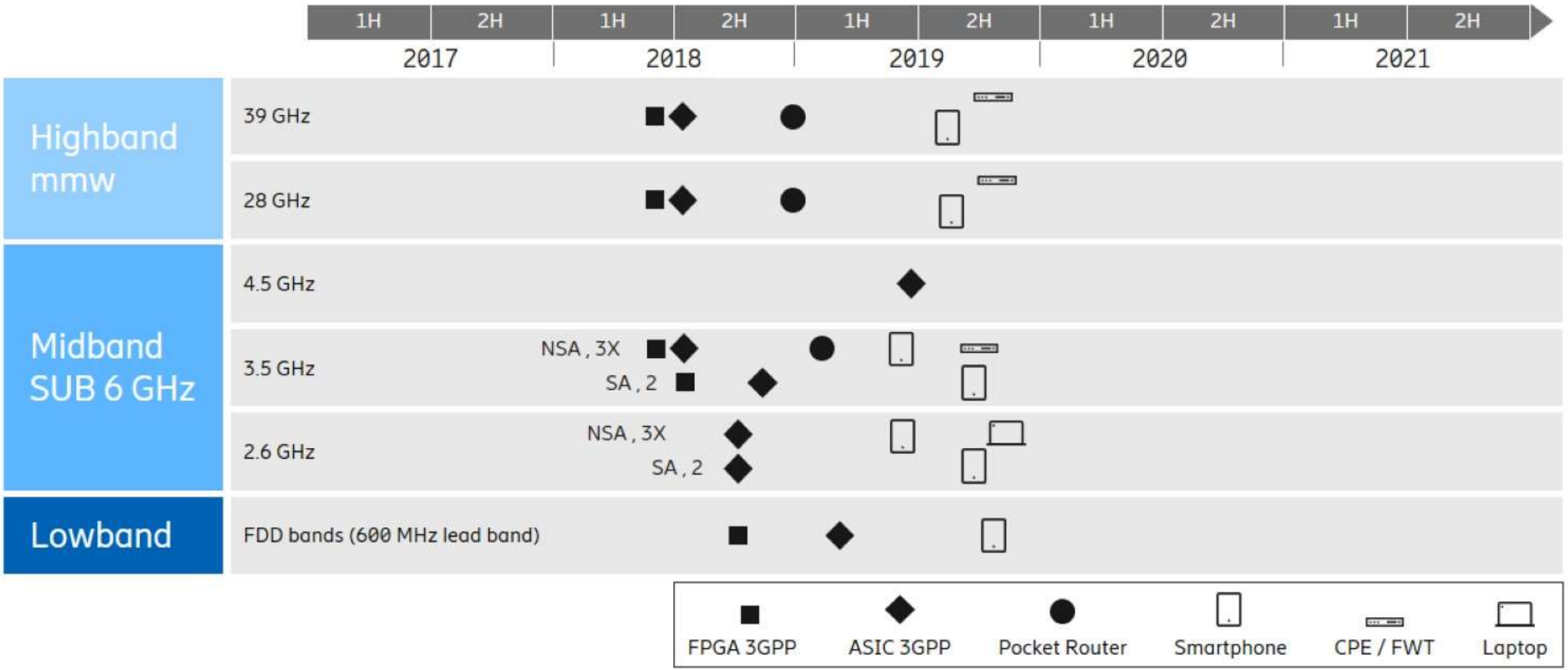


Mobile data traffic by application category

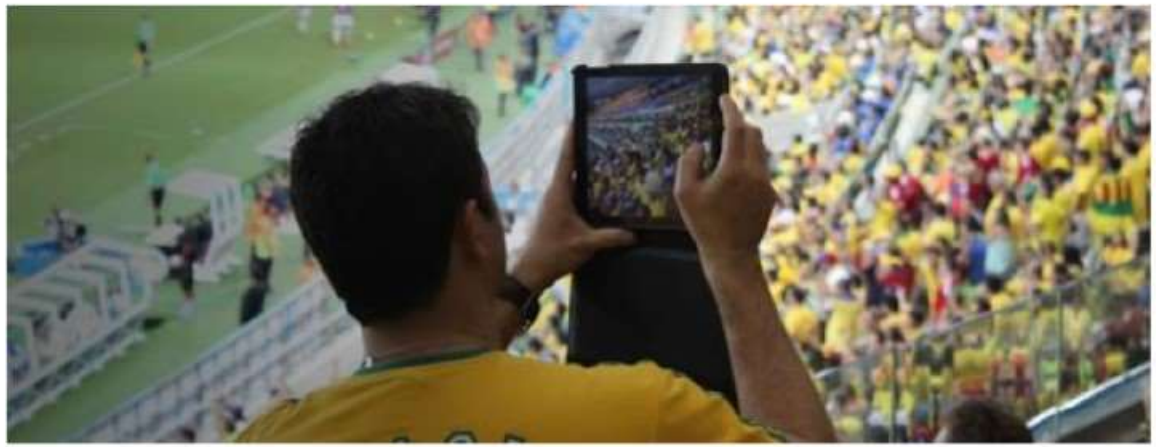




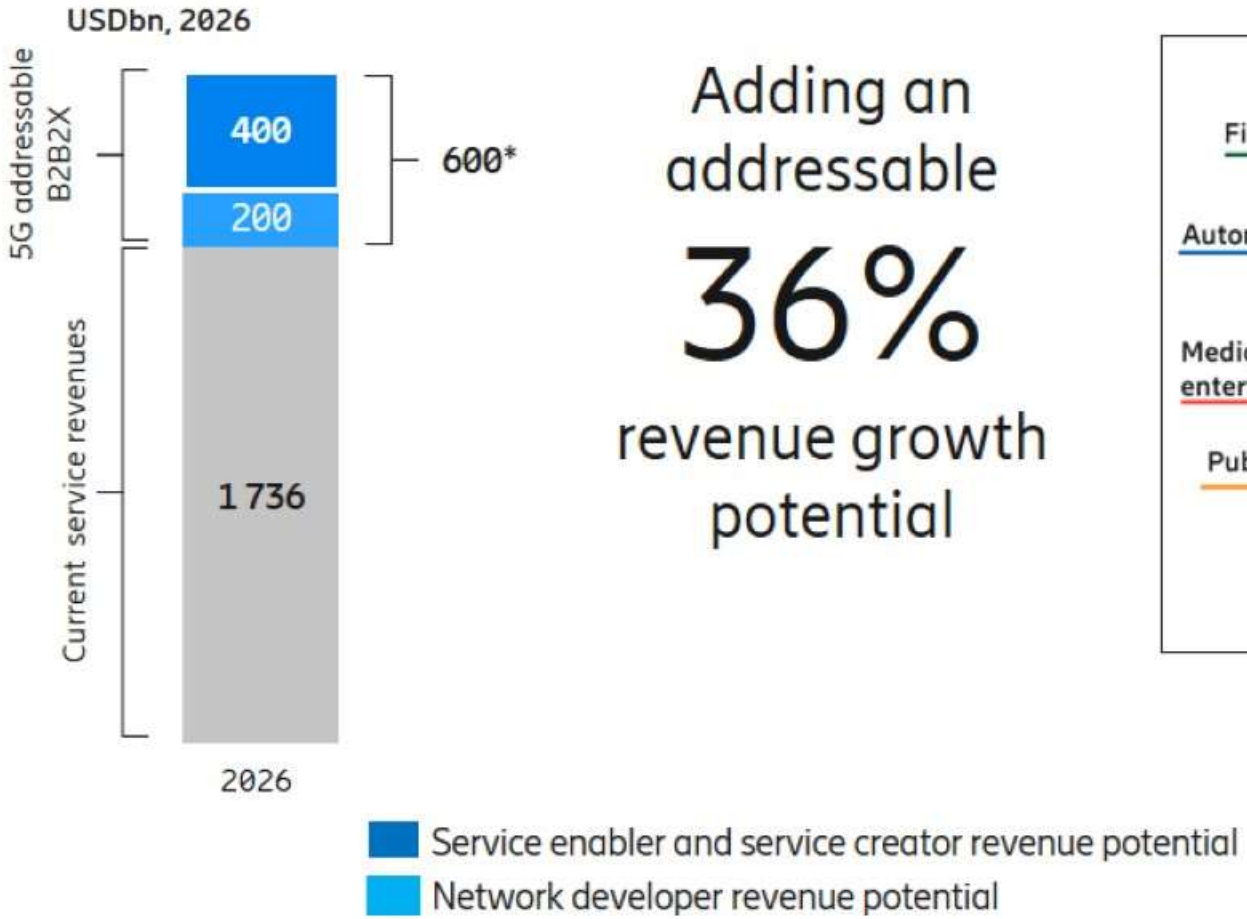
5G device roadmap



5G-IoT use cases



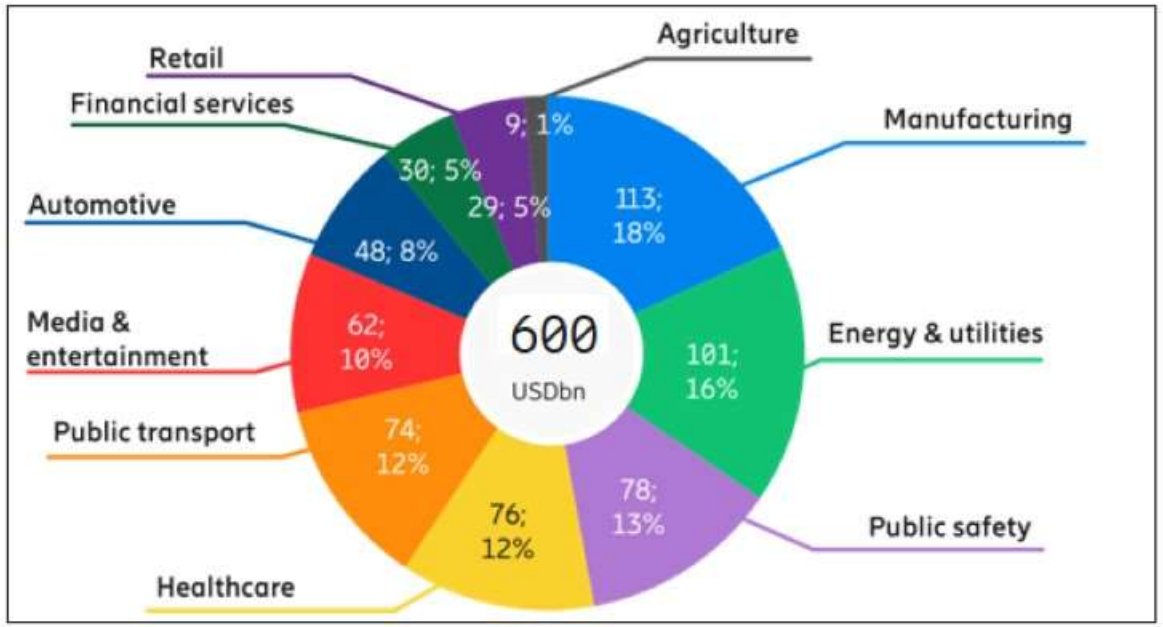
5G revenue potential for operators addressing industry digitalization



Adding an addressable

36%

revenue growth potential



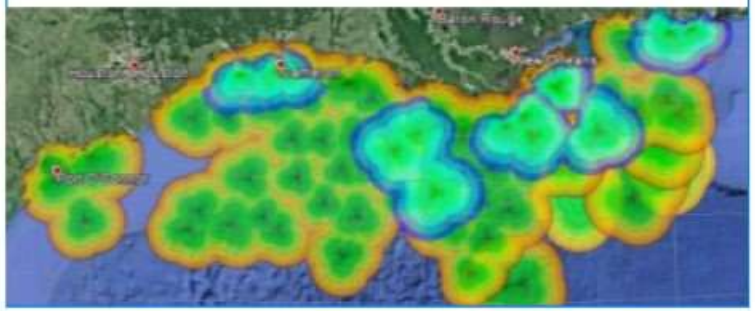
Note: *5G Business Potential figures were rounded.

Private networks – Ericsson references

Oil & Gas

Tampnet, Gulf of Mexico

- LTE-based MBB services to the offshore oil & gas industry
- Plans to have 60+ base stations operational by the end of 2018 covering 98% of all manned offshore assets in the Gulf area
- Transport based on microwave and redundant fibre



Mining

Roy Hill mine

- Ericsson & Telstra deploy LTE NW in Australian mine
- Enable smart mining-related tasks for open pits or underground areas
- Flexible and efficient coverage
- Health & ambient monitoring, remote operation of mining machinery

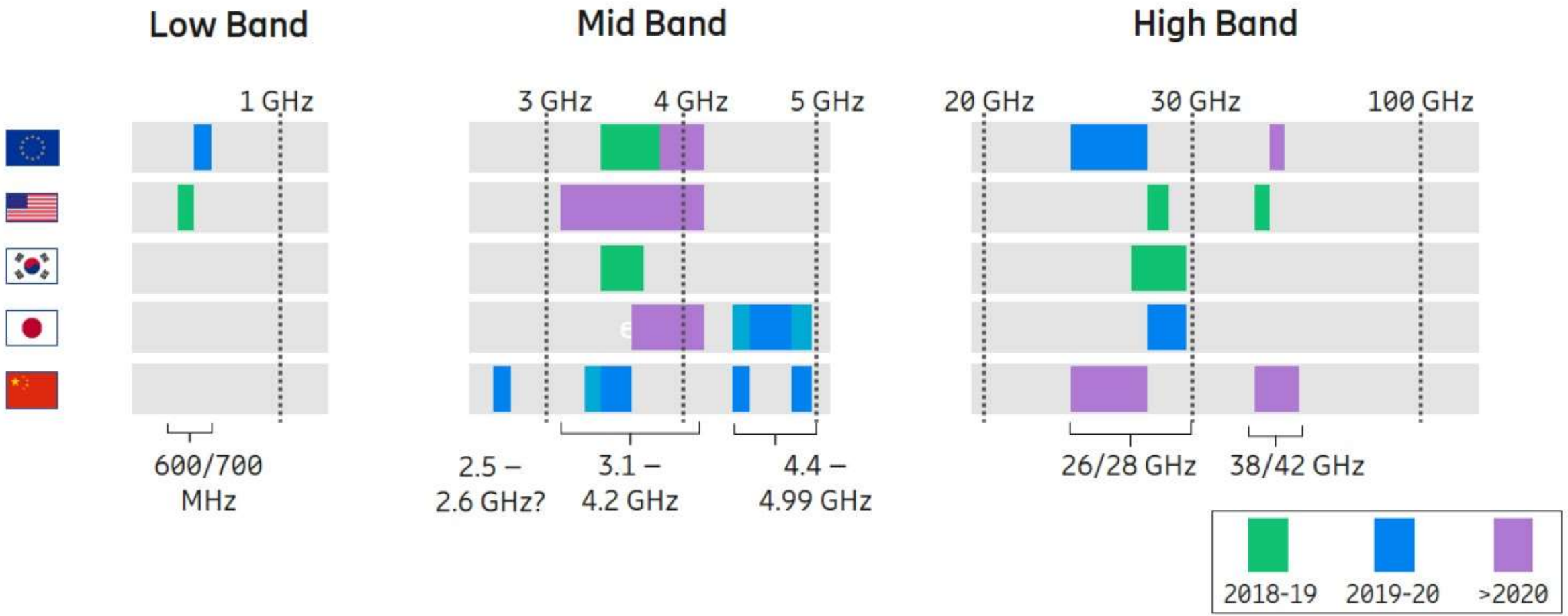
Manufacturing

Industries 4.0 reference factory, FIR-RWTH Aachen

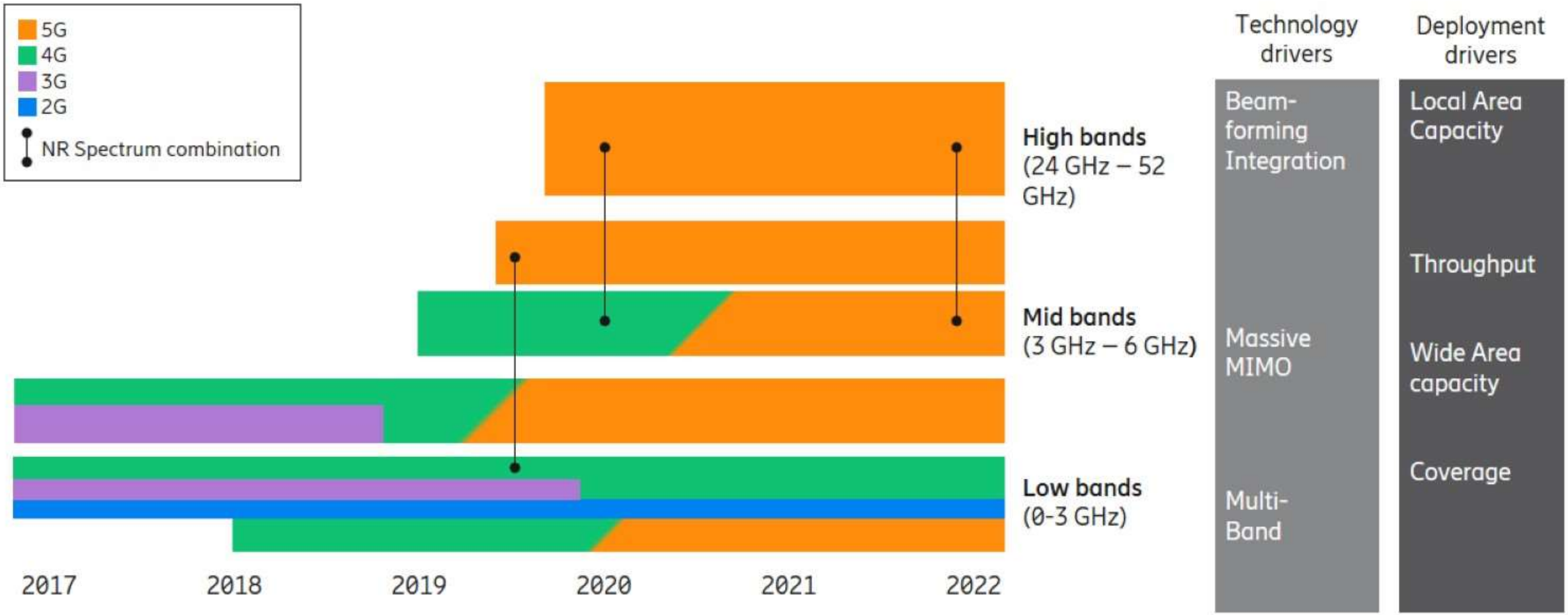
- Connected to Ericsson's 5G E2E Trial network
- Environment to test the digital transformation of industries
- Includes ULL radio and PLC in the cloud

Content

5G Spectrum


Low Band
Mid Band
High Band
1 GHz
3 GHz
4 GHz
5 GHz
20 GHz
30 GHz
100 GHz
600/700 MHz
2.5 – 2.6 GHz?
3.1 – 4.2 GHz
4.4 – 4.99 GHz
26/28 GHz
38/42 GHz
2018-19
2019-20
>2020

Spectrum usage overview

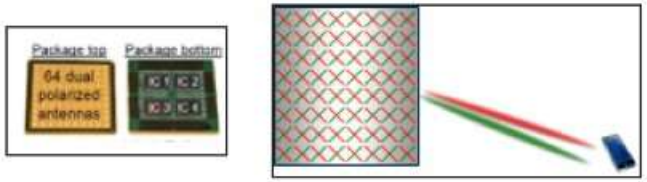


Key radio technologies for 5G

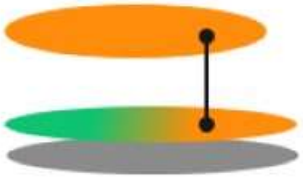
Higher frequencies & shorter wave length

Wider carriers

Advanced Antenna Technologies

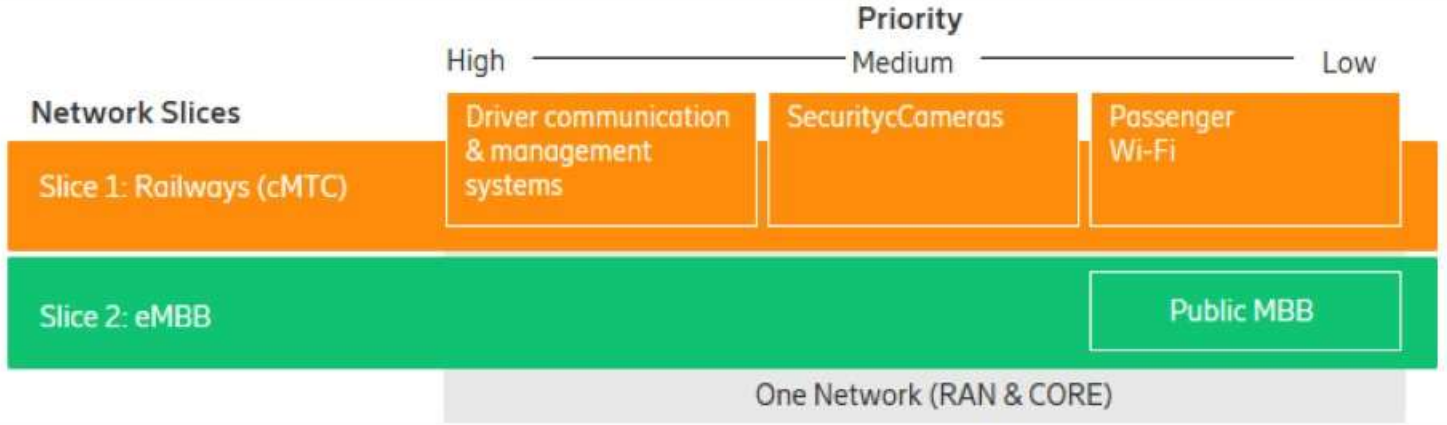


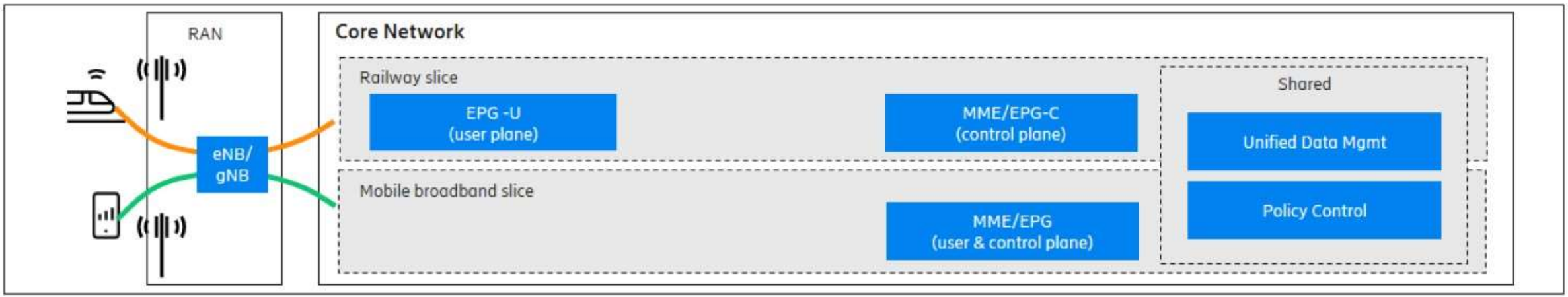
Leverage of installed base



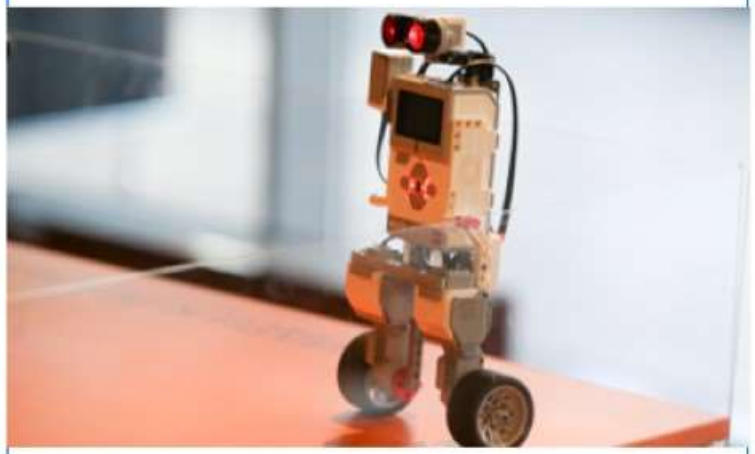
Architecture evolution

Example
– Network Slicing for railways





5G use cases enabled by Network Slicing – Examples

Interactive gaming	Robot control	Connected vehicle
		

Dedicated QoS for services with low latency and high reliability needs

IoT success in Industry digital transformation

Source: EMO Rev A

Business Case IoT Factory

Customer: China Mobile and Nanjing Ericsson Panda Communication Company, China [New revenue streams]

The challenge
Large volume of high-precision screwdrivers which require manual scheduling and routine maintenance.

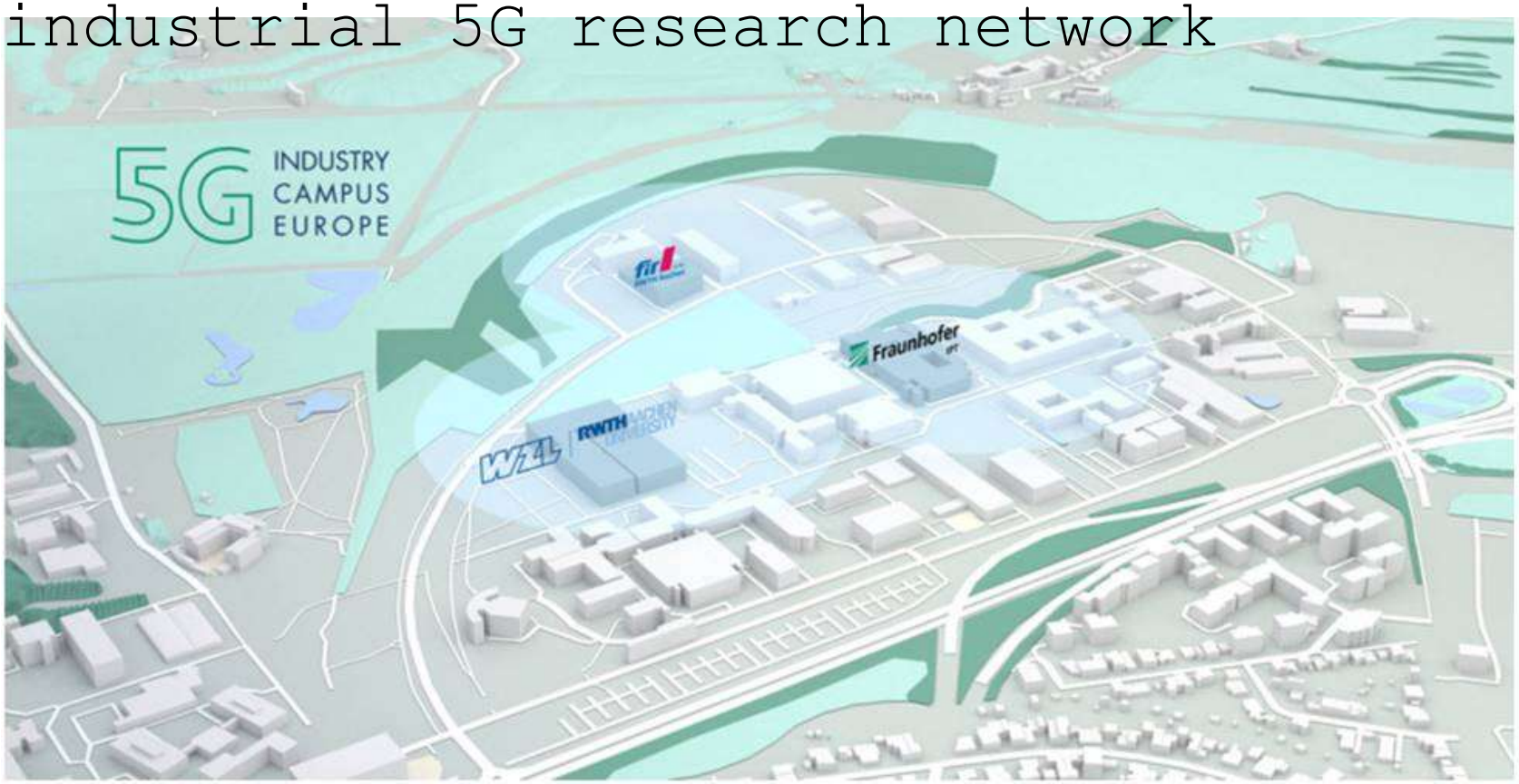
The solution
Factory automation by applying the latest cellular IoT technology to improve efficiency and operational savings.

The result

- Complete phase out of manual tracking
- 50% in manual work reduction
- Breakeven reached in less than 6 months and a 210% return on investment in the first year

5G Industry Campus Europe

Fraunhofer IPT and Ericsson run Europe's largest industrial 5G research network



Objective:

Collaborative exploration of application areas of the new mobile radio technology 5G in the production field

5G connectivity:

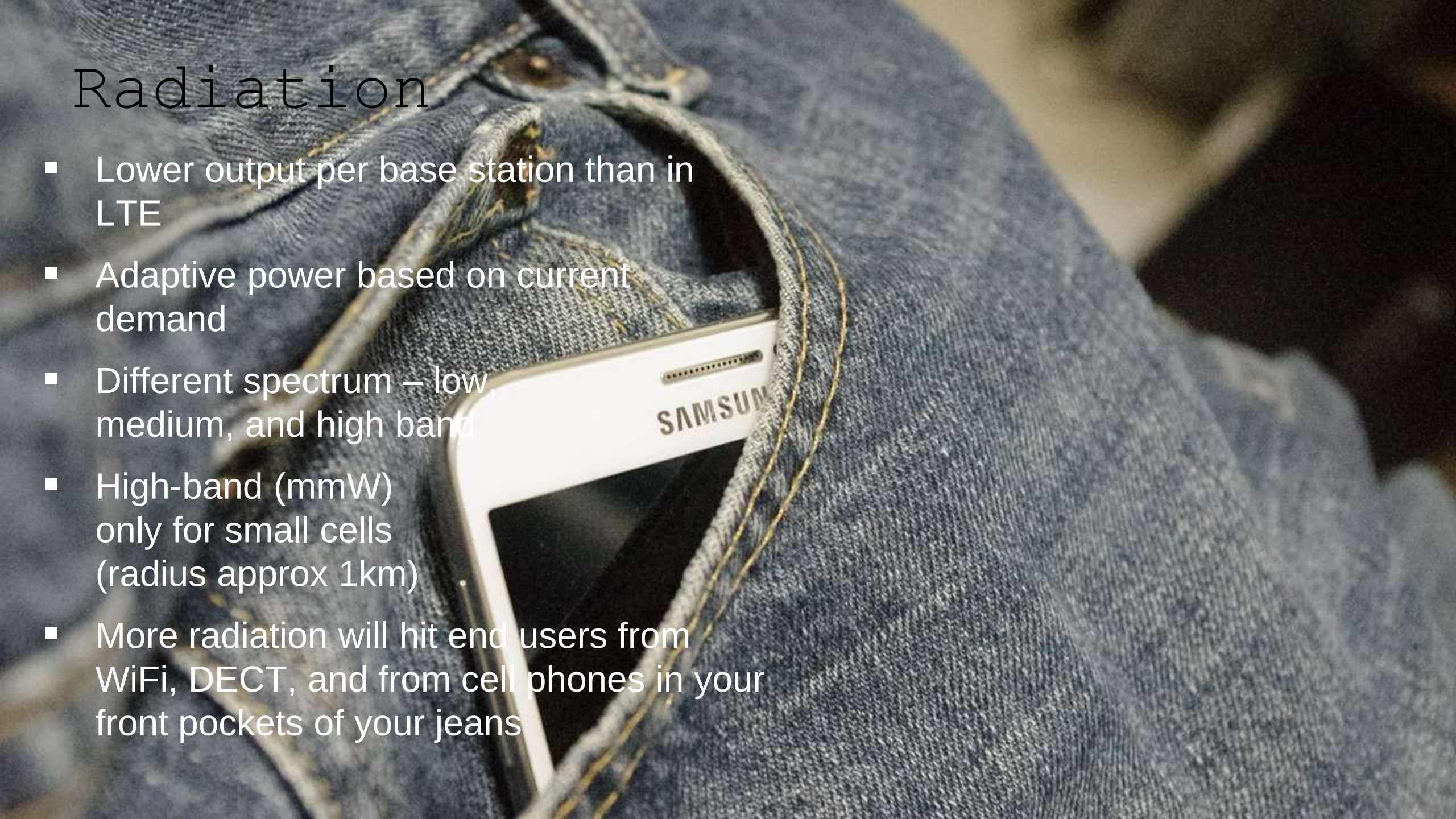
Ericsson is selected as technology partner and 5G network supplier

5G Industry Campus Europe is located in the area of the RWTH Aachen Campus Melaten, Germany

Content

Radiation

- Lower output per base station than in LTE
- Adaptive power based on current demand
- Different spectrum – low, medium, and high band
- High-band (mmW) only for small cells (radius approx 1km)
- More radiation will hit end users from WiFi, DECT, and from cell phones in your front pockets of your jeans



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