



TRAFICOM

Finnish Transport and Communications Agency

Use cases and applications driving demand for future spectrum

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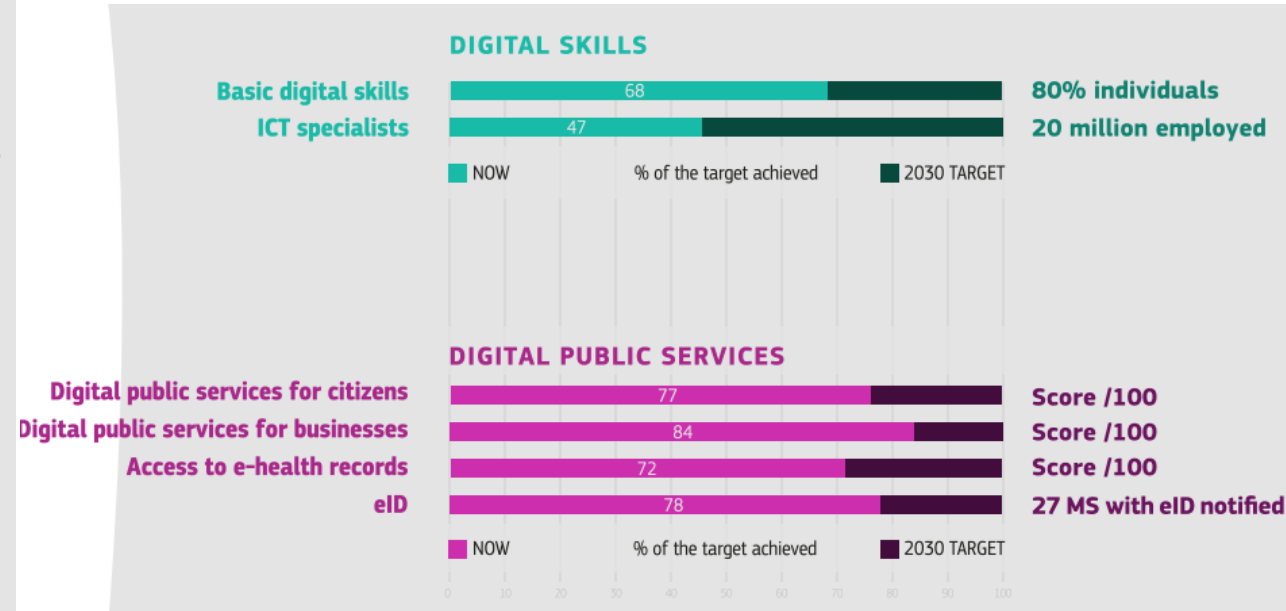
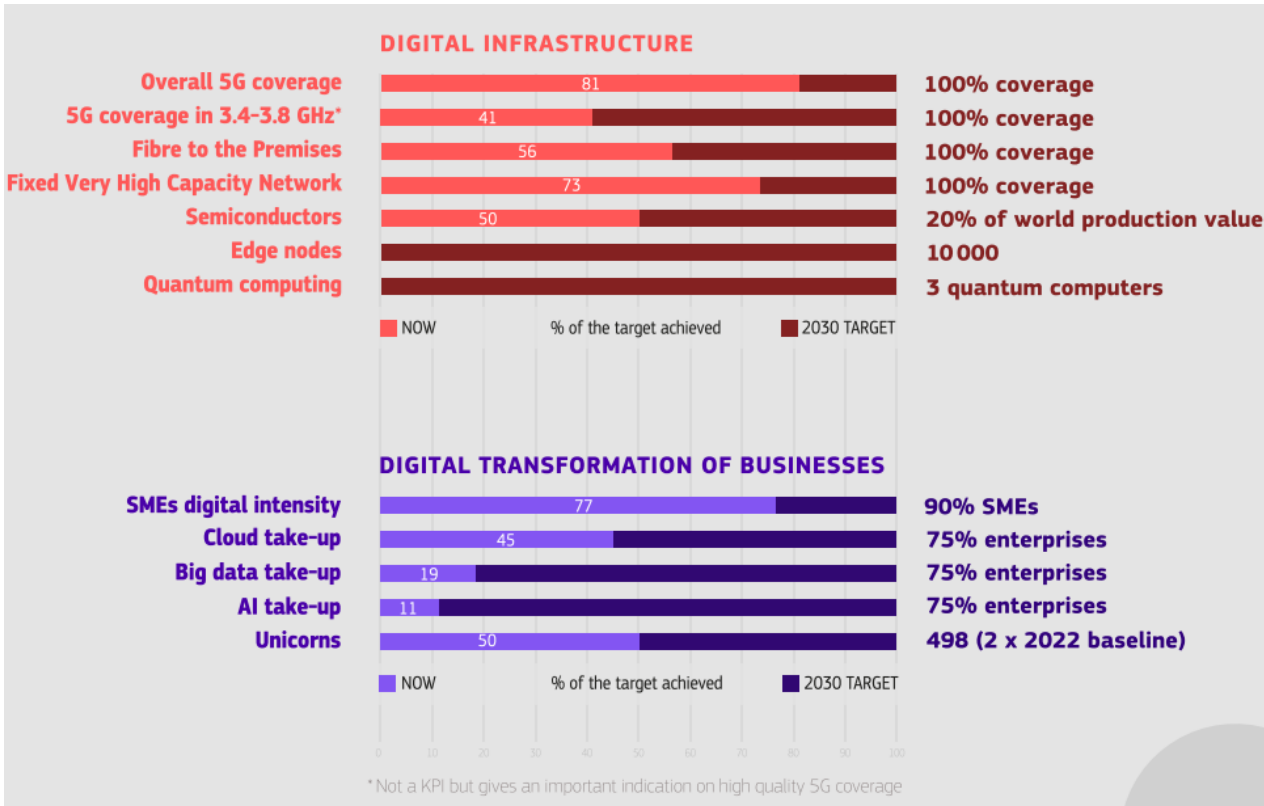
UK Spectrum Policy Forum

14.3.2024

Intro: Where are we today?



EU Digital Decade targets for 2030 (report 2023)



Spectrum for mobile networks in Finland today

- ▶ Three operators with nationwide coverage
 - ▶ > 99% of population with 2G & 4G
 - ▶ ~ 90% of households with fast 5G (100 Mbit/s)
 - ▶ 3G switch-off 2023-2024 in mainland Finland
 - ▶ 2G until end of 2029 in mainland Finland
- ▶ Technology neutrality
 - ▶ All bands can be used for all generations
 - ▶ 5G now in 700 MHz, 3.5 GHz and 26 GHz, later in other bands
- ▶ New spectrum quickly into use without fiscal goals: cheaper to build, easier to plan, less congestion, more capacity
- ▶ Unlimited data, inexpensive prices, developed networks, good coverage



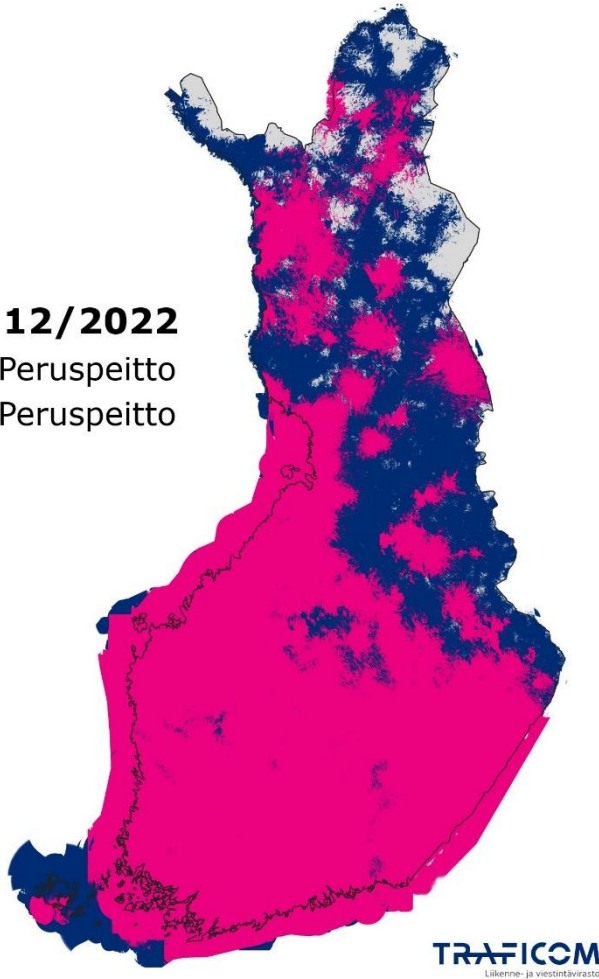
Basic coverage 12/2022:

4G: 99,9 % of households and 94 % of land area

5G: 98 % of households and 64 % of land area

Tilanne 12/2022

4G Peruspeitto
5G Peruspeitto



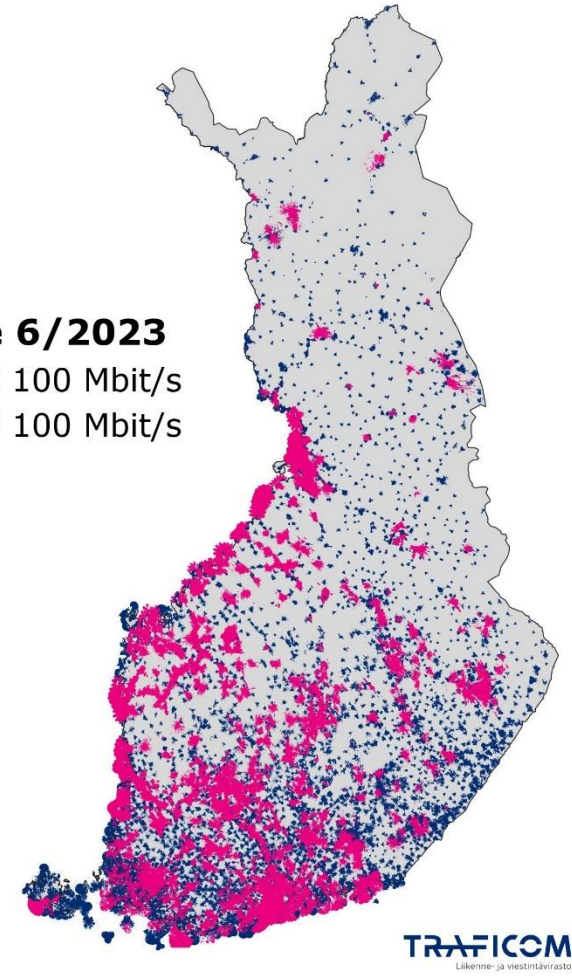
100 Mbit/s 6/2023:

4G: 95 % of households and 21 % of land area

5G: 89 % of households and 13 % of land area

Tilanne 6/2023

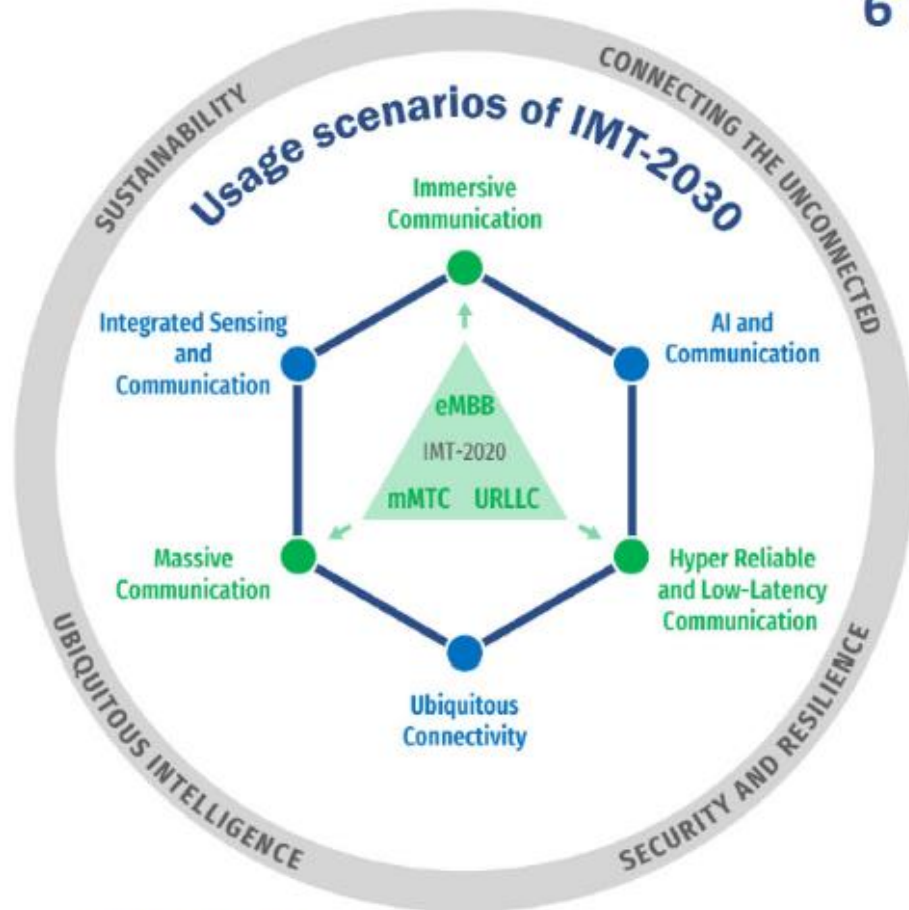
4G 100 Mbit/s
5G 100 Mbit/s



Towards 6G



Usage scenarios for IMT-2030



So called "Wheel diagram"

6 Usage scenarios

Extension from IMT-2020 (5G)

eMBB → Immersive Communication

mMTC → Massive Communication

URLLC → HURLLC (Hyper Reliable & Low-Latency Communication)

New

Ubiquitous Connectivity

AI and Communication

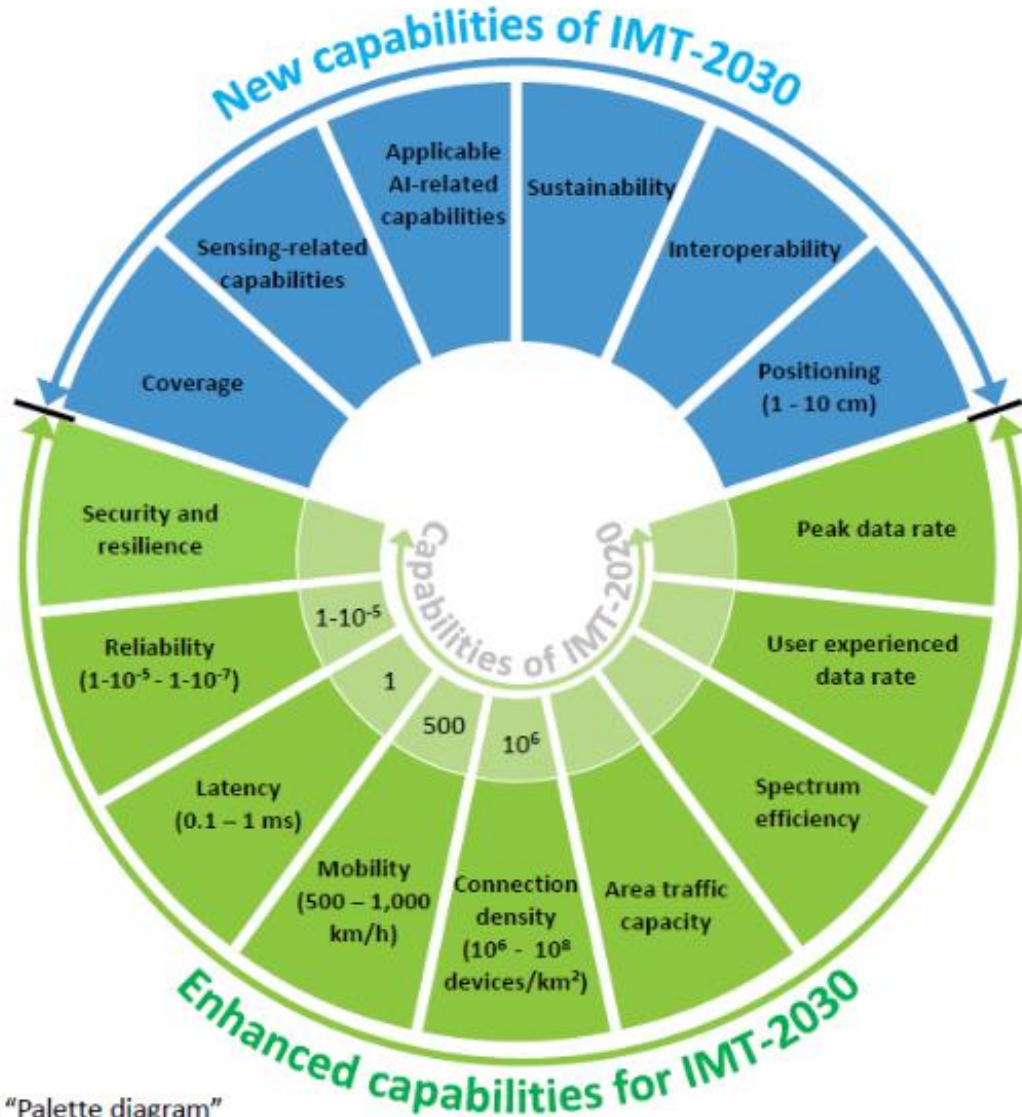
Integrated Sensing and Communication

4 Overarching aspects:

act as design principles commonly applicable to all usage scenarios

Sustainability, Connecting the unconnected,
Ubiquitous intelligence, Security/resilience

Capabilities of IMT-2030



The range of values given for capabilities are estimated targets for research and investigation of IMT-2030.

All values in the range have equal priority in research and investigation.

For each usage scenario, a single or multiple values within the range would be developed in future in other ITU-R Recommendations/Reports.

First RSPG opinion on 6G development (1/2)

- ▶ 5G implementation is ongoing in the primary and pioneer bands identified for 5G
- ▶ Need for new solutions for more dynamic and shared use of spectrum is expected to increase with the uptake of 6G
- ▶ Increasing needs for spectrum for verticals and local networks. Common European approaches beneficial
- ▶ Additional capacity needs for mobile networks may arise on the national level during this decade.
- ▶ License exempt or light-licensed spectrum for offloading some of the 6G traffic and to provide private and personal networks, predictable QoS typically not guaranteed
- ▶ Non-terrestrial networks to support 6G development, could become an important additional connectivity layer

First RSPG opinion on 6G development (2/2)

- ▶ Further work by RSPG: early recognition of spectrum needs, so that the initial launch and operation of 6G networks/services can start in 2030.
 - ▶ based on a proper evaluation of coverage and capacity needs for 6G use cases and usage scenarios taking into account, among others, the results of projects in 6G R&D.
 - ▶ RSPG will consider in 2024 or later a 6G spectrum roadmap.
- ▶ Recommends to the European Commission, taking into account RSPG recommendations, with the help of Member States, to work towards a strategy, involving all active stakeholders (research institutes, manufacturers, MNOs, spectrum users' associations, etc.), to facilitate the timely launch of 6G services across the EU.

Possible future spectrum for mobile broadband

Work in progress

1.5 GHz
(WRC15)

3.8-4.2 GHz

40 GHz
(WRC19)

Identified for IMT

6425-7125 MHz

For further studies

490-694 MHz

7125-7250 MHz

**MSS D2D
694/698 MHz -
2.7 GHz**

7750-8400 MHz

4400-4800 MHz

14.8-15.35 GHz

Related Radio Spectrum Policy Group work plans

6G strategic vision

- Draft Report on 6G strategic vision: November 2024.
- Final Report on 6G strategic vision: February 2025
- 6G spectrum roadmap in 2026

Long-term vision for the **upper 6 GHz** band

- Draft Opinion for Public consultation: February 2025
- Final Opinion: June 2025

Assessment of future usage of the frequency band **470-694 MHz** within the EU

- Draft Report for public consultation: June 2025.
- Final Report: October 2025

WRC

- Report on the result of the WRC-23: June 2024.
- Interim Opinion on WRC-27: June 2025.
- Draft Final Opinion: June 2026.
- Final Opinion: October 2026

<https://radio-spectrum-policy-group.ec.europa.eu/>

Thank you!

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