

Spectrum policy for private networks

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Nokia

The Nokia logo is centered within a large, stylized circular graphic. The graphic consists of two concentric circles: an outer white ring and an inner teal circle. The background of the slide features a gradient from teal at the top to magenta at the bottom.

NOKIA

Proven success for enterprise and partners for both technology and industry specific know-how

We are a global leader in private wireless

760+

Private wireless customers

176

Energy



158

Manufacturing & supply chain



124

Transport




98+

Other industries



204

Government & cities



As of July 2024

With partners for the entire ecosystem

Industrial partner	AIRBUS KOMATSU OMRON BELDEN rexroth SIEMENS RA Rockwell Automation MIR <small>A Bosch Company</small> <small>Networks</small> <small>A BETTER WAY</small>
System integrator	boldyn accenture kyndryl NTT <small>Networks</small> altran Atos Infosys DXC <small>an Capgemini</small> <small>TECHNOLOGY</small>
3 rd party private wireless core	athonet cisco Druid <small>a Hewlett Packard Enterprise company</small>
Hyperscaler / Webscaler	aws Hewlett Packard Enterprise IBM <small>Google Cloud</small> DELL Technologies
Service provider	T verizon Telefonica Jio BT vodafone Telia orange



Spectrum policy for private networks

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Standards and regulatory, 450 MHz Alliance

Regulation, standards and spectrum, EUTC

Spectrum Group, EMEA (Verticals), GSA

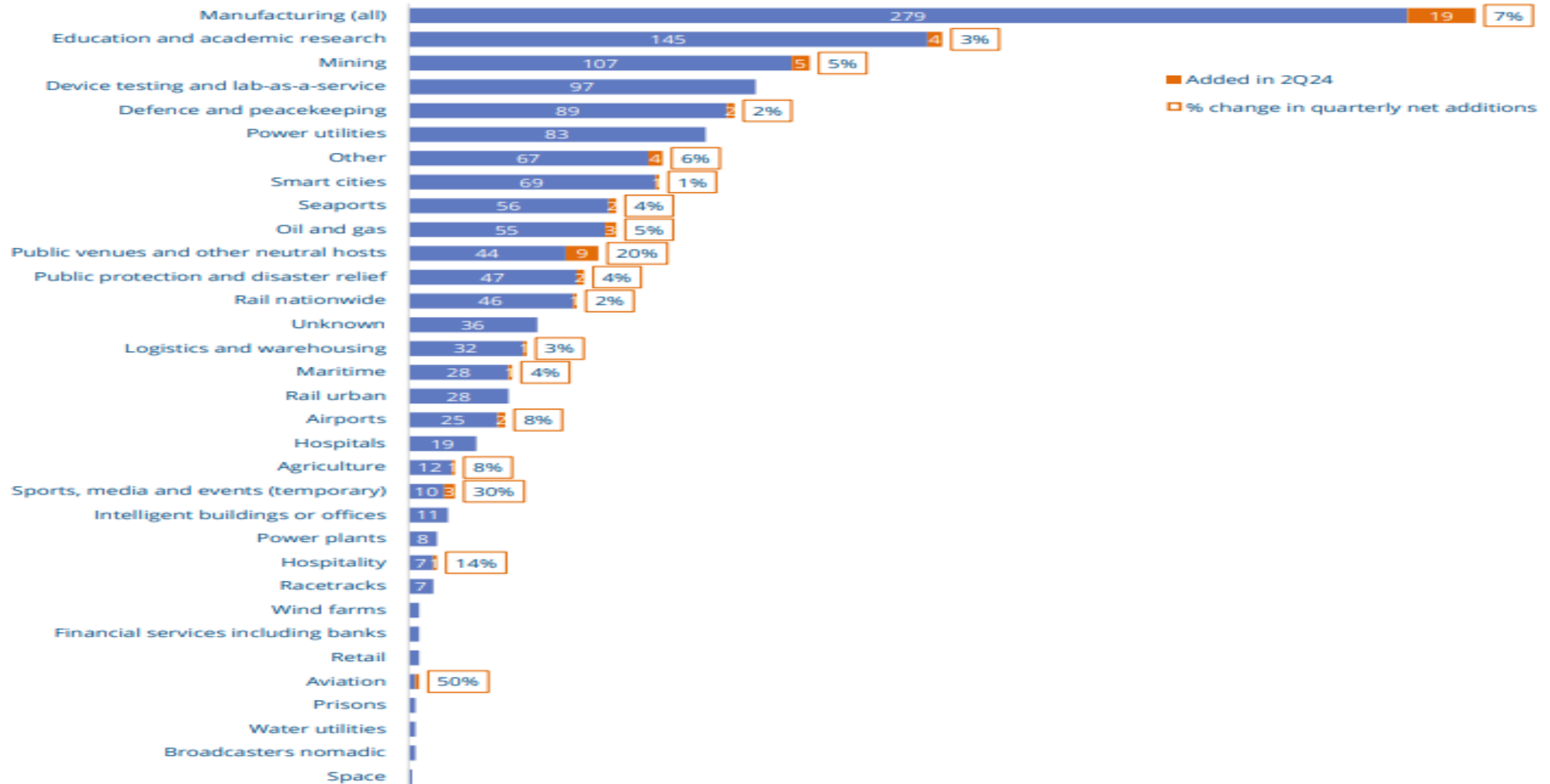
Spectrum task force, CCBG, TCCA

The Nokia logo is displayed in white, uppercase letters within a large, stylized circular graphic on the right side of the slide. The graphic consists of two concentric circles: an outer white ring and an inner teal circle. The background of the slide features a gradient from teal at the top to magenta at the bottom.

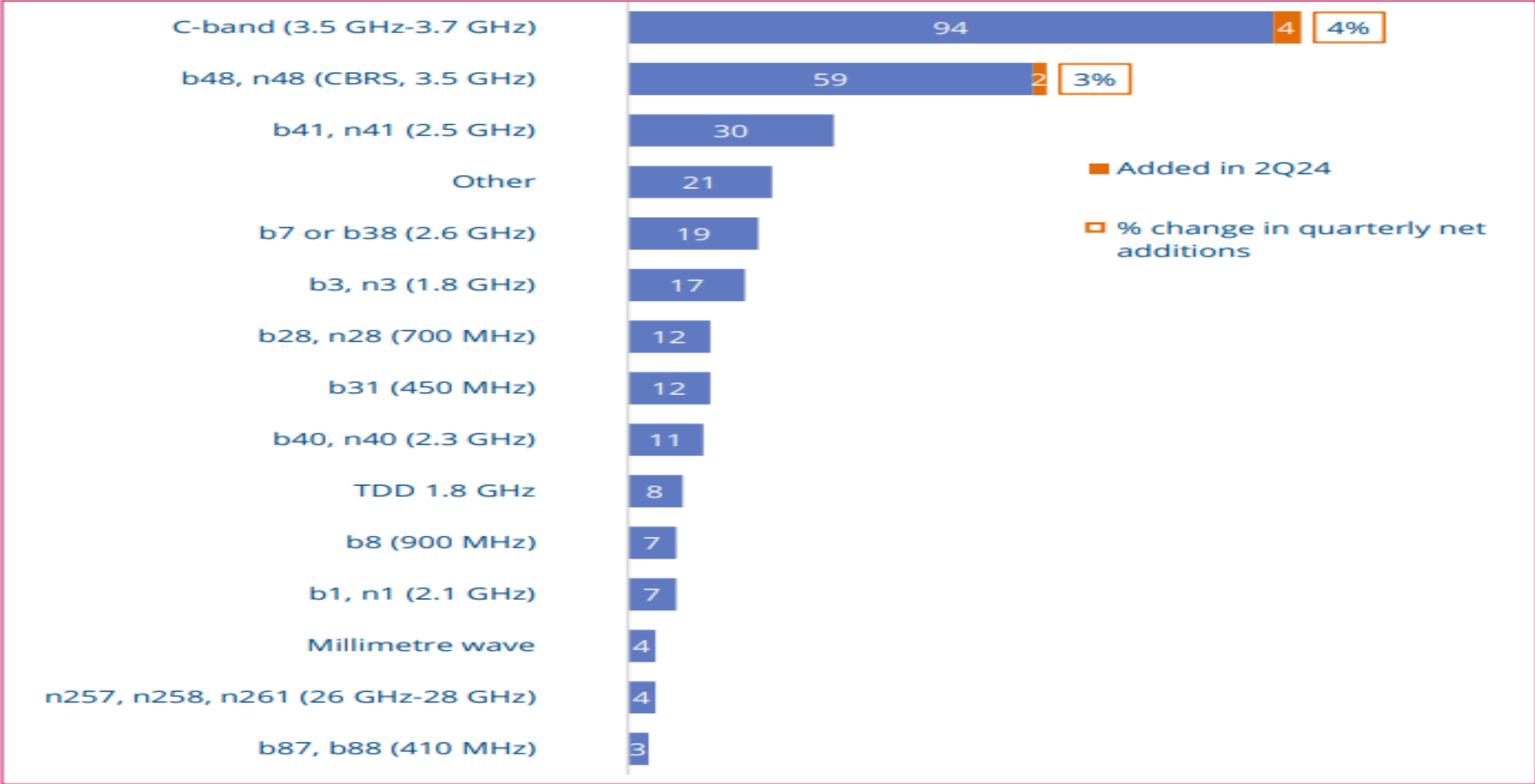
Private networks market development challenges



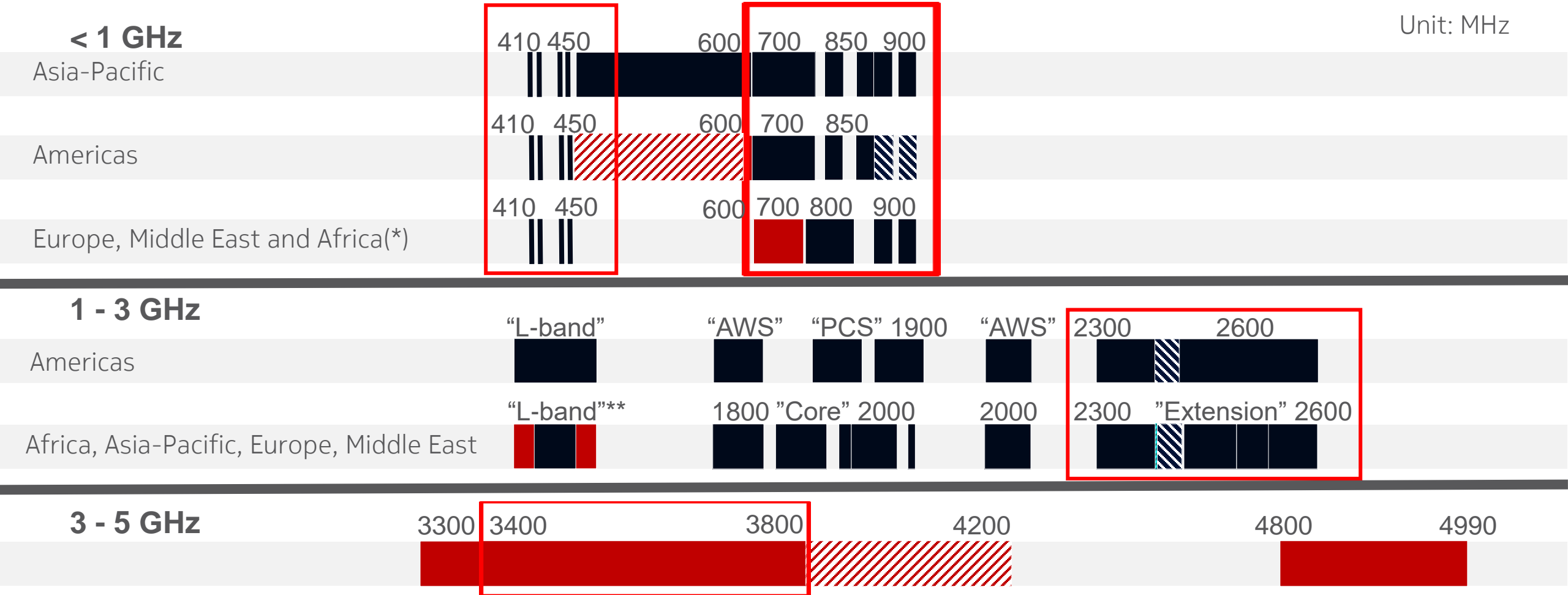
GSA September 2024 report : Private mobile networks by sector



GSA September 2024 report : Private mobile networks spectrum used



Spectrum used for current private networks



(*) The band 850 MHz is used in some countries in MENA

(**) The L-band is envisaged for SDL

■ IMT identification in the ITU-R Radio Regulations (WRC-15)

▨ Implemented / discussed at national / regional level

■ IMT identification in the ITU-R Radio Regulations (before WRC-15)

▨ No IMT identification

Reasons for a dedicated private network

Coverage

Security

Availability

Life Cycle

Reasons for a dedicated private network

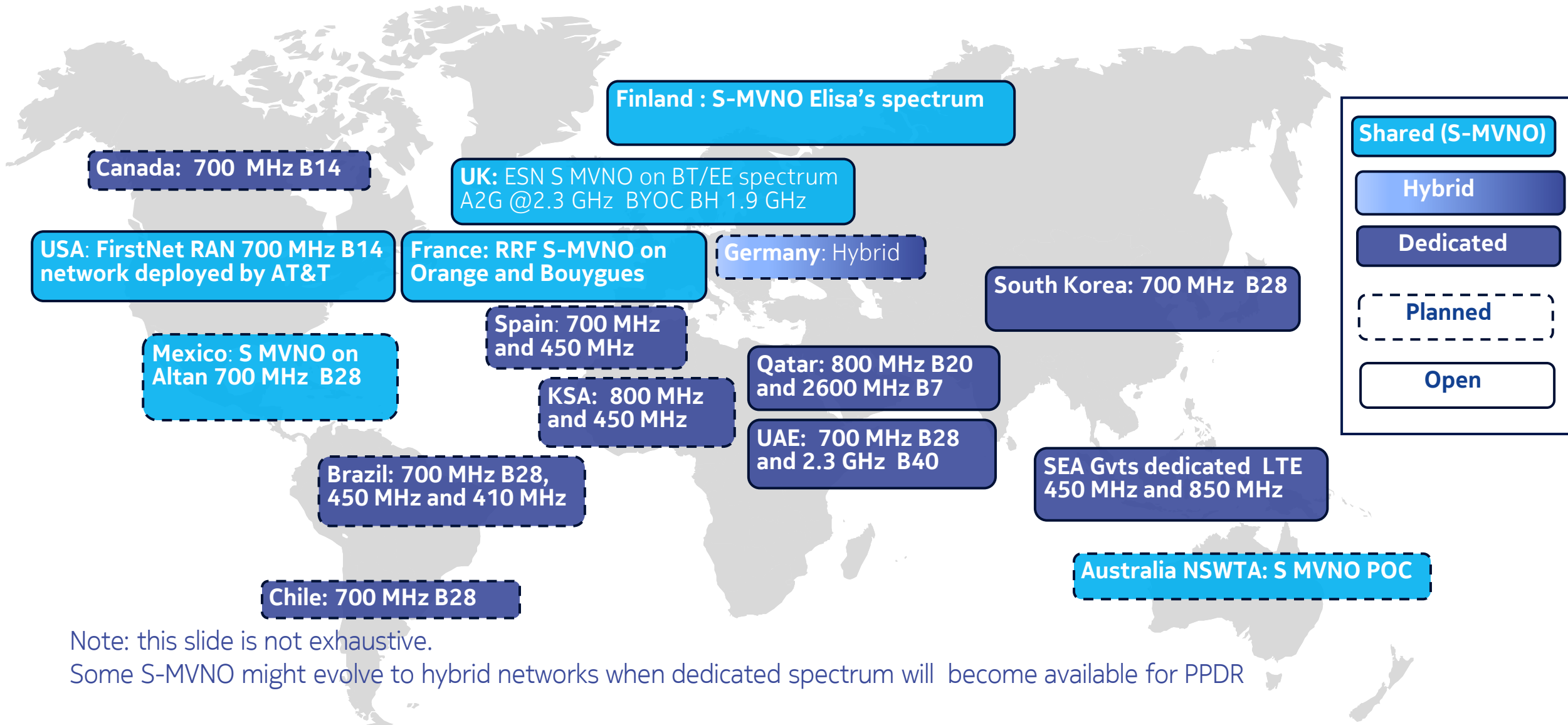
Coverage - Geographic

Security - Intranet

Availability – 99.999%

Life Cycle - Control

Worldwide status of critical communications network deployments





1.2°



Global warming
current level



1.5°



Global warming limit



67%



Share of all emission
reductions requiring
advanced digital technologies

Share of industry-specific
emission reductions requiring
advanced digital technologies

90%
of energy

23%
of manufacturing

67%
of transport



90%

Share of cost-effective
decarbonization levers requiring
advanced digital technologies



Increased regulatory pressure

Mitigate global warming

Reduce carbon emissions



In 6 Years to EU 2030 - Digital Connectivity
A combinatorial growth in Energy Communications

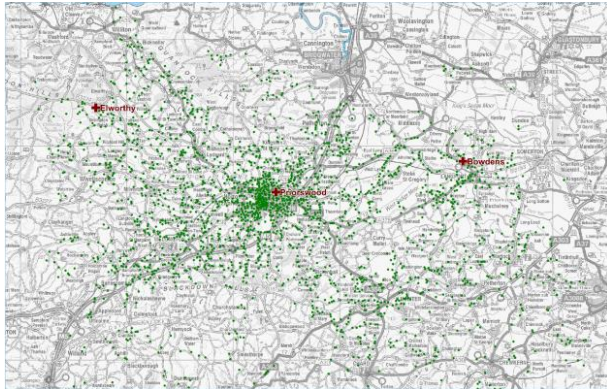
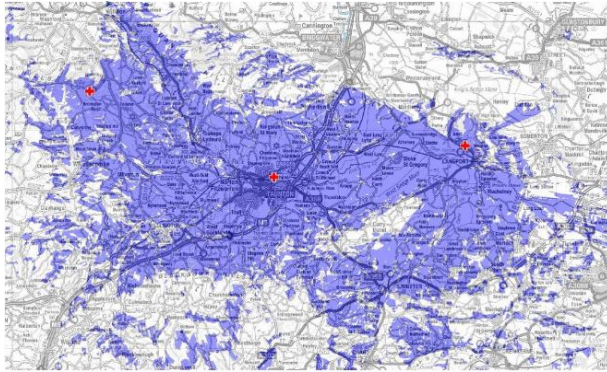
Distributed energy resources connected at distribution level – a massive increase

<https://powerbarometer.eurelectric.org/home-2022/>

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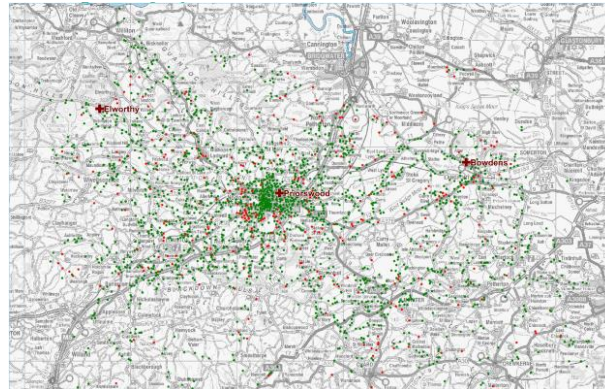
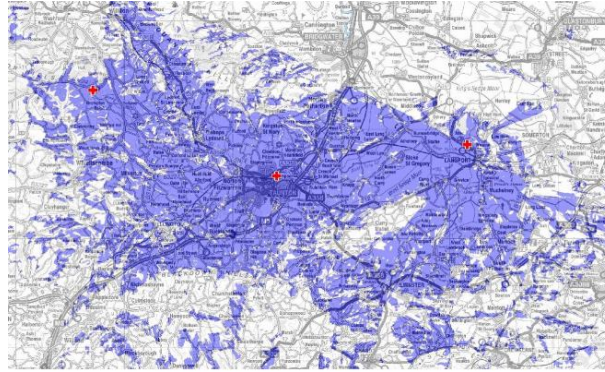
Comparison of need for coverage and/or capacity

410 MHz and 450 MHz



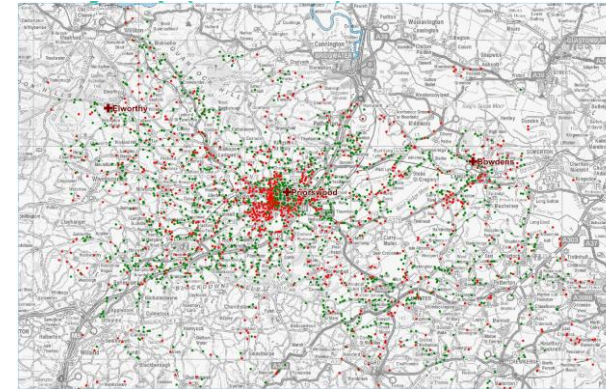
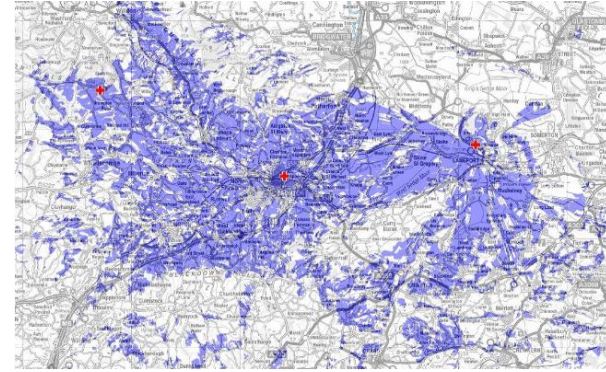
100% connected

700 MHz and 800 MHz



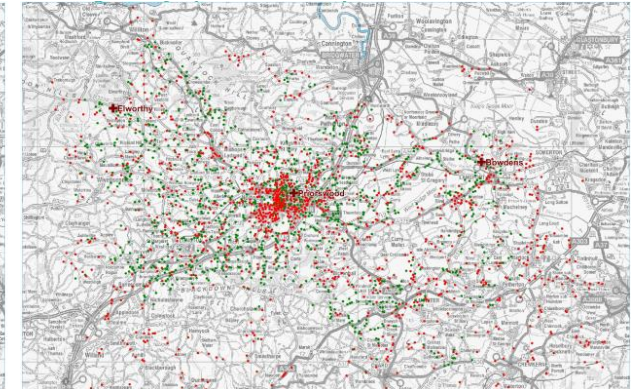
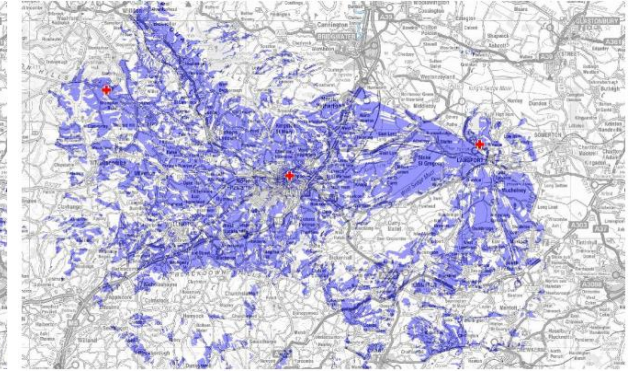
**91,3% connected
2.5-3 x eNB**

2300 MHz and 2600 MHz



**58,7% connected
12-15 x eNB**

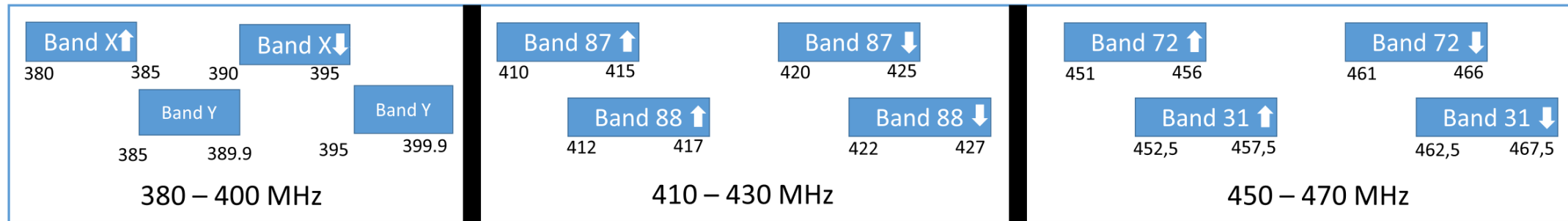
3800 MHz to 4200 MHz



**45,6% connected
20-25 x eNB**

Focus on bands currently are the 450 MHz & 410 MHz

Working on development of 3GPP Bands for 380 MHz



Roadmap towards a new or updated 3GPP standard:

- 1 Submit a Work Item to 3GPP RAN Plenary
- 2 Formalise equipment standards ETSI and ECC
- 3 Spectrum assignments by national administrations



Typically 3 – 5 years

On the Roadmap: 5G for the existing 450 MHz and 410 MHz bands and new 4G/5G Bands for 380 – 400 MHz

Spectrum used for current and future private networks

Unit: MHz

< 1 GHz

Asia-Pacific



Americas



Europe, Middle East and Africa(*)



1 - 3 GHz

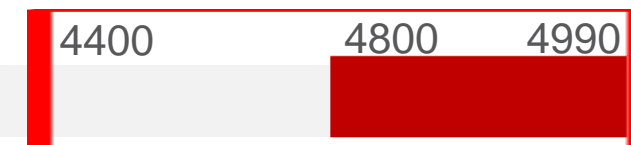
Americas



Africa, Asia-Pacific, Europe, Middle East



3 - 5 GHz



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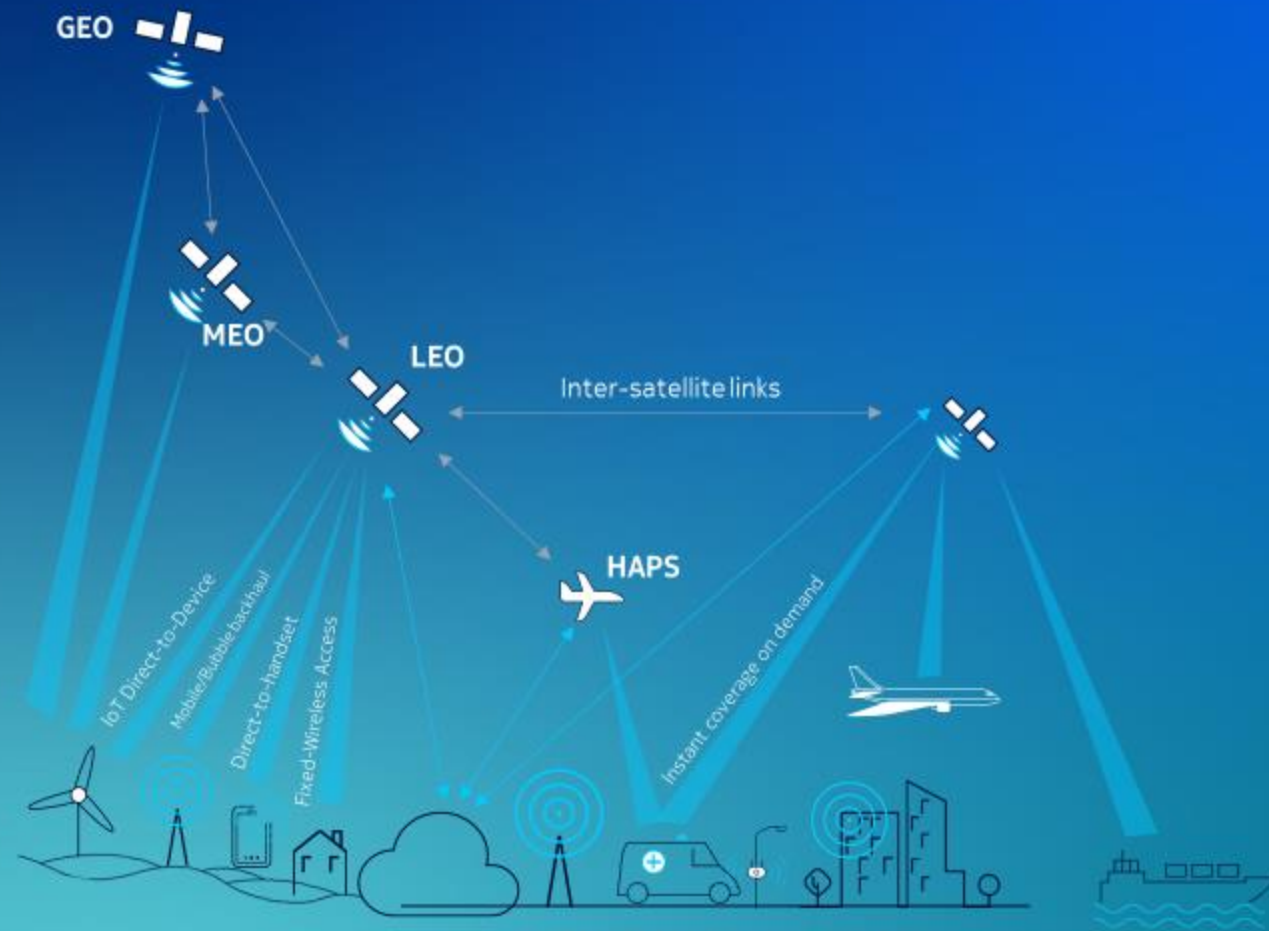
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Terrestrial and Non-Terrestrial Networks Convergence



Complementary Strengths



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Thank you

Any questions?

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