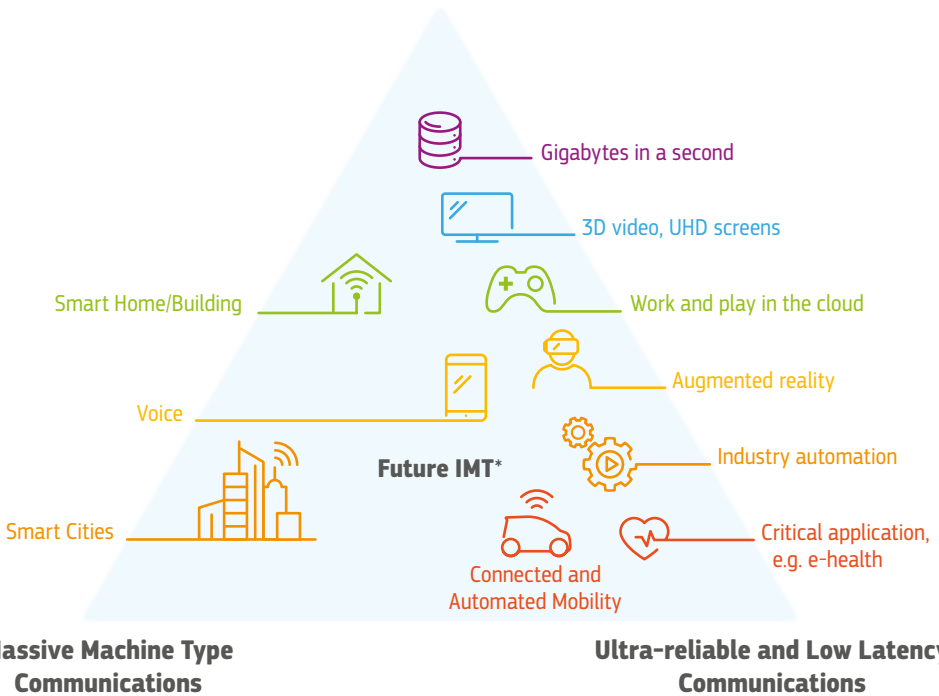# 5G

for EUROPE'S DIGITAL TRANSFORMATION

WHAT IS 5G?

- The fifth generation of mobile technologies
- A response to mobile traffic doubling every two years and the needs of emerging applications

- The capacity, performance level and security needed to meet future connectivity needs
- As well as higher speeds and data rates, integrating different technologies, especially the Internet of Things

Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Smart Home/Building

Work and play in the cloud

Augmented reality

Voice

Future IMT*

Industry automation

Smart Cities

Connected and Automated Mobility

Critical application, e.g. e-health

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

*IMT: International Mobile Telecommunications

5G FOR VERTICALS

- Enable artificial intelligence in business and other aspects of our daily lives
- Connect our communities and industries, from automated cars to wireless robots

- Excellent potential for sustainable growth and job creation across Europe
- Expected global added value of over €500 billion per year

Mobility

- Helping Connected and Automated Mobility towards zero accidents
- Multi-modal connectivity

Smart energy grids

- Highly efficient power lines with fewer outages and on a smaller scale
- Reduced environmental impact

Factories of the future

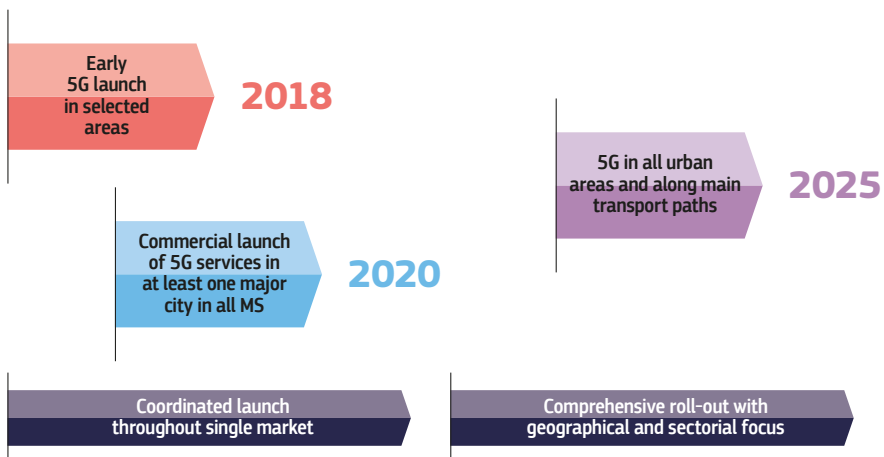- Streamlined internal processes
- Remote warehouse management

e-Health

- Remote health monitoring and smart medication
- Robot-led remote surgeries

Media & Entertainment

- Virtual reality-enhanced experience
- High-bandwidth applications on demand

5G ACTION PLAN

Early 5G launch in selected areas

2018

5G in all urban areas and along main transport paths

2025

Commercial launch of 5G services in at least one major city in all MS

2020

Coordinated launch throughout single market

Comprehensive roll-out with geographical and sectorial focus

➲ Calling on stakeholders and Member States to launch and invest in 5G

➲ Using the new investment-friendly European Electronic Communications Code ("The Code") adopted in 2018

➲ 5G for Europe: An Action Plan – COM(2016)588 [1]

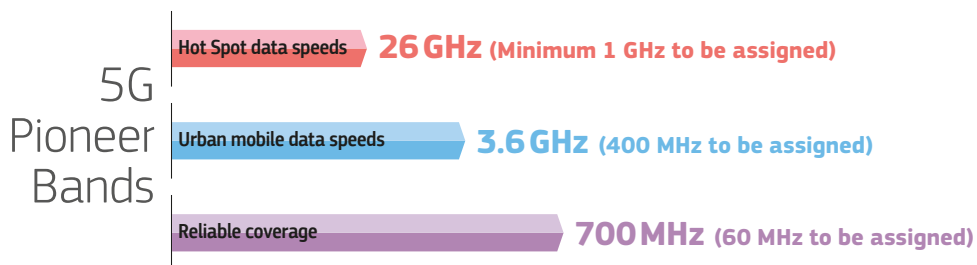1 https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan

THE CODE [2]

- Harmonised principles and peer review for coherent spectrum authorisations
- Coordinated deadlines for spectrum availability, especially for use by 5G
- Long license duration – 20 years of predictability
- EU-wide light deployment regime for small cells

5G SPECTRUM

5G Pioneer Bands

Hot Spot data speeds — **26 GHz** (Minimum 1 GHz to be assigned)

Urban mobile data speeds — **3.6 GHz** (400 MHz to be assigned)

Reliable coverage — **700 MHz** (60 MHz to be assigned)

- A roadmap delivering the 5G 'spectrum mix' for the Internet of Everything
- Usability of all 5G Pioneer Bands by end of 2020
- Make all mobile bands '5G-ready' and consider additional bands for 5G

2   Directive 2018/1972 establishing the European Electronic Communications Code (EECC)

EUROPEAN 5G OBSERVATORY

- Monitoring the progress of the 5G Action Plan
- European operators neck-and-neck with other leading world regions
- Europe world leader in 5G trial activities with more than €1 billion invested

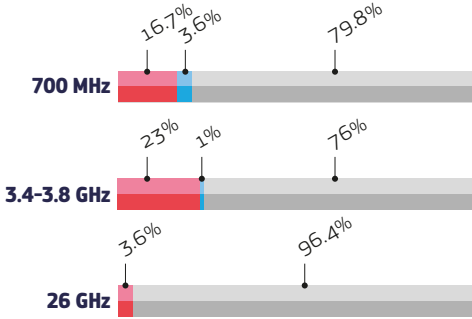- Commission launched the European 5G Observatory[3] in 2018

At the Mobile World Congress 2019 in Barcelona, all 3 awards in the 5G category went to European companies

- Investments in commercial roll-out of €60-100 billion per year need to follow
- Member States still need to take action to allow use of 5G pioneer spectrum

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3   http://5gobservatory.eu/

EU-28 SCOREBOARD (JUNE 2019)

5G
European 5G Observatory

5G PIONEER SPECTRUM

14% 5G spectrum assigned

700 MHz
16.7% 3.6% 79.8%

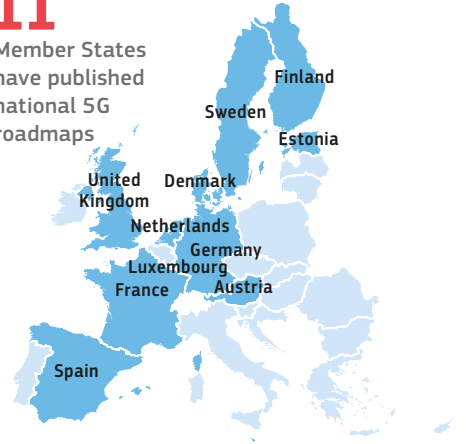**3.4-3.8 GHz**
23% 1% 76%

26 GHz
3.6% 96.4%

- 🔴 Assigned and usable in 2020
- 🔵 Assigned but not usable in 2020
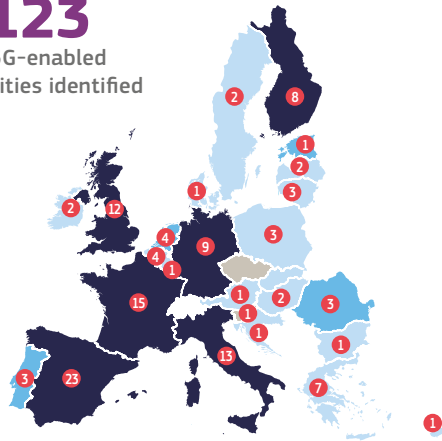- ⚪ Not assigned

5G ROADMAPS AND NATIONAL PLANS

11
Member States have published national 5G roadmaps

Finland
Sweden
Estonia
United Kingdom
Denmark
Netherlands
Germany
Luxembourg
Austria
France
Spain

5G TRIALS / 5G CITIES

153 5G trials in the 28 Member States

123
5G-enabled cities identified

Number of trials
- ⬛ More than 10
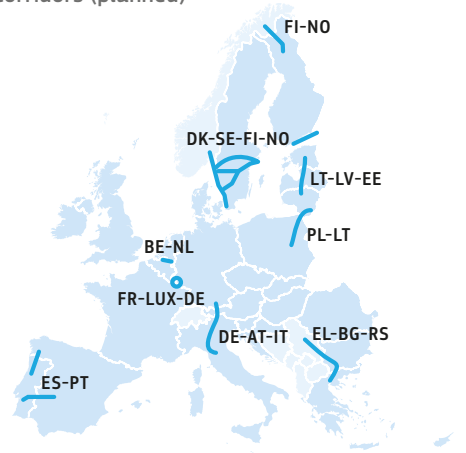- 🔵 Between 5 and 10
- 🔷 Less than 5
- ⬜ Unknown

Number of cities
- 🔴 5G-enabled cities

5G CORRIDORS

10
5G Cross-Border corridors (planned)

FI-NO
DK-SE-FI-NO
LT-LV-EE
BE-NL
PL-LT
FR-LUX-DE
DE-AT-IT
EL-BG-RS
ES-PT

5G CORRIDORS

- ➲ Vision: Pan-EU 5G corridors for Connected and Automated Mobility*
- ➲ Private investment with public funding of cross-border and "challenge" areas
- ➲ Large-scale testing using Horizon 2020 (€80 million)
- ➲ Large-scale deployment of 5G Corridors will be supported by the new Connecting Europe Facility Digital (part of total proposed budget of €3 billion)
- ➲ Blending or coordination with InvestEU and national programmes

—— Testing and pre-deployment
—— Indicative 5G corridors for CEF funding

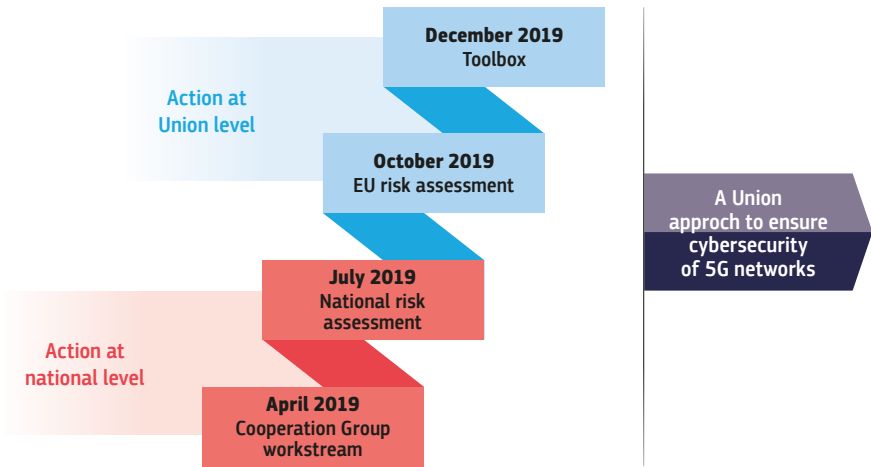* On the road to automated mobility: An EU strategy for mobility of the future COM(2018) 283

SECURITY

- 5G is a key asset for Europe to compete in the global market
- Cybersecurity is crucial for ensuring the strategic autonomy of the EU
- 5G infrastructure is interconnected and transnational by nature

- Vulnerabilities and cyber incidents in one Member State can affect the EU
- Serious consequences for critical services in case of systemic and widespread disruptions

COMMISSION RECOMMENDATION OF 26 MARCH 2019 ON CYBERSECURITY OF 5G NETWORKS C(2019) 2335 FINAL

Action at Union level

December 2019
Toolbox

October 2019
EU risk assessment

July 2019
National risk assessment

Action at national level

April 2019
Cooperation Group workstream

A Union approch to ensure cybersecurity of 5G networks

5G-PPP

- ➔ 5G Public Private Partnership[4] – 5G-PPP launched in 2013

- ➔ €700 million public investment
- ➔ Mobilising €5 billion of private investment
- ➔ Establishing Europe as leader in 5G technology
- ➔ Global cooperation enabling global 5G standards
- ➔ Building 5G ecosystems with large-scale trials

ROAD TO 6G

UNDER PREPARATION:

A NEW STRATEGIC PARTNERSHIP UNDER HORIZON EUROPE FOR COOPERATION ON BEYOND 5G AND TOWARDS 6G

- ➔ Establish a human-centric Internet reflecting our European values
- ➔ Towards connected intelligent critical infrastructures

- ➔ Develop lead markets, e.g. 5G deployment under CEF Digital
- ➔ Address Sustainable Development Goals
- ➔ Connectivity driving new value chains, e.g. for Cloud Computing and the Internet of Things

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4   https://5g-ppp.eu/

5G

5G for EUROPE'S DIGITAL TRANSFORMATION

European
Commission

5GMOBIX