



European 5G Observatory

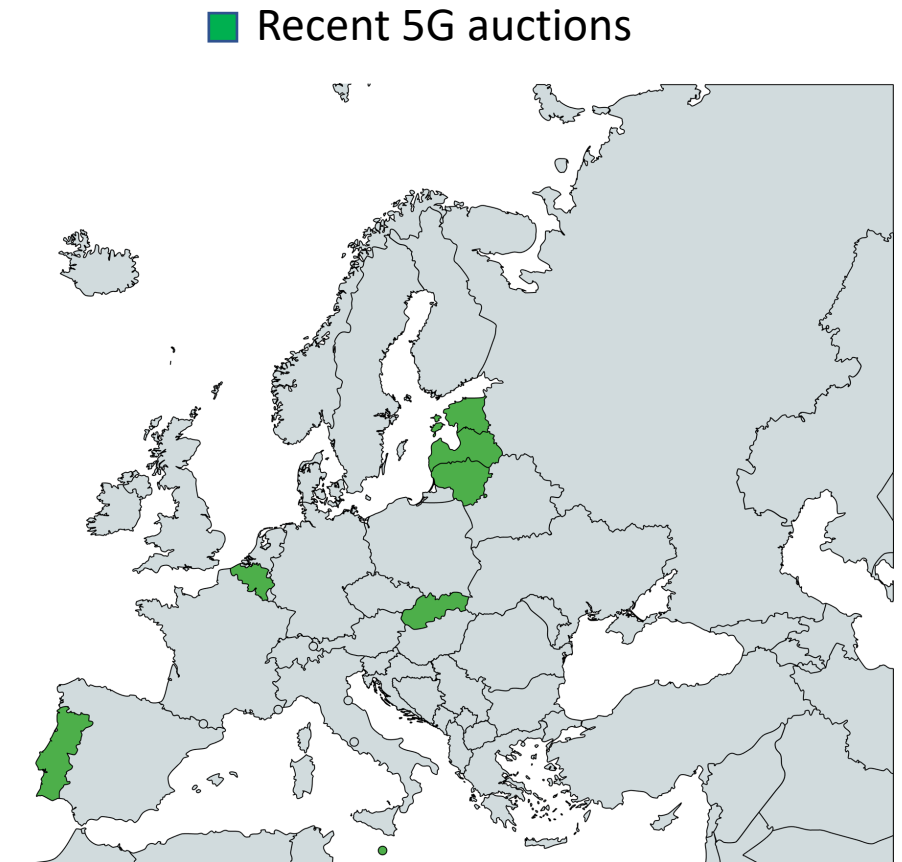
# 5G Observatory Dashboard


September 2022 – Report 17

CNECT/2021/OP/0008 European 5G Observatory, Phase III

- A plethora of pioneer band auctions took place.
- Several 26 GHz auctions planned: Portugal, Spain, Austria
- Local 5G licensing models continue to be proposed

Date	Country	Spectrum awarded
Oct. 2021	Portugal	700 MHz 900 MHz 1800 MHz 2.1 GHz 2.6 GHz 3.6 GHz
Nov. 2021	Malta	3.6 GHz
Dec. 2021	Latvia	700 MHz
May 2022	Slovakia	3.5 GHz
Jul. 2022	Belgium	700 MHz 1800 MHz 2.1 GHz 3.6 GHz
Aug. 2022	Estonia	3.6 GHz
Aug. 2022	Lithuania	700 MHz 3.6 GHz





The screenshot shows the website interface with a blue header containing the logo and navigation menu. The main content area features three news items, each with a flag image, a title, a date, and a brief summary.

- Political agreement reached on the 2030 Policy Programme: Path to the Digital Decade**  
POSTED ON AUGUST 1ST, 2022  
IN : EU DIGITAL DECADE  
NEWS IN THE EU  
The European Parliament and the Council of the EU have reached a political agreement on the programme.
- Spain announces second phase of 5G and 6G R&D fund**  
POSTED ON AUGUST 24TH, 2022  
IN : EU DIGITAL DECADE  
NEWS IN THE EU, SPAIN  
TAGS: #6G, #PUBLIC FUNDING  
The Spanish government is offering an extra €116 million euros in funding for new R&D projects.
- Italy awards more 5G infrastructure funding contracts**  
POSTED ON JULY 8TH, 2022  
IN : EU DIGITAL DECADE  
ITALY, NEWS IN THE EU  
TAGS: #PUBLIC FUNDING  
A joint venture between Italian mobile operators Vodafone and TIM has won six lots of funding with a combined value of €345 million.

- Sept 2021: European Commission launches 'Path to the Digital Decade'
  - Concrete plans to achieve previously announced targets in the Digital Decade
  - New report to monitor progress to be produced
  - Political agreement reached in July 2022.
- Both the European Commission and Member States have announced funding initiatives for 5G & 6G projects
  - 5G for Smart Communities under CEF 2
  - Recovery & Resilience fund
  - Italy: €2bn in incentives for 5G infrastructure
  - Spain: €116 million for new 5G R&D projects
  - Germany & France: €17.7m to fund joint 5G projects

- Commercial 5G now launched in all 27 Member States
- Operators are increasing coverage and investing in new technologies
  - Telefonica Germany 50% coverage (July 22)
  - Cosmote Greece 70% coverage (July 22)
  - Cyta Cyprus 100% coverage (May 22)
- Extensive trials being conducted using 5G network slicing
- 5G private network market is growing

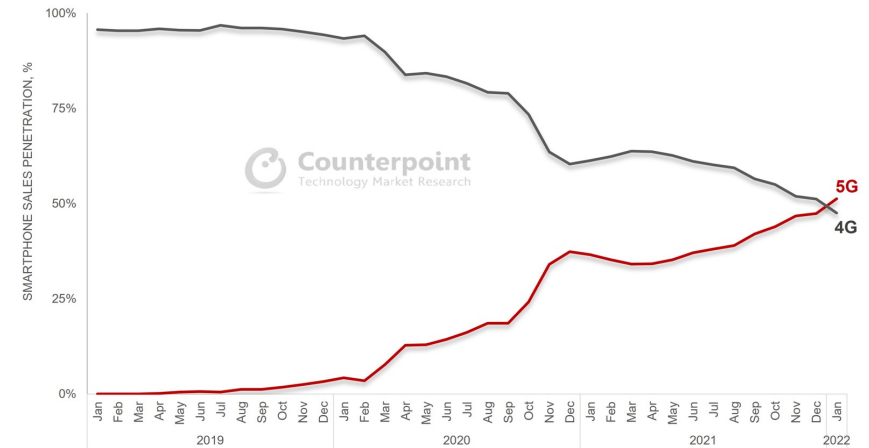


The screenshot shows the website interface with a blue header containing the European 5G Observatory logo and navigation links: ABOUT, REPORTING, EU INITIATIVES, THEMES, 5G POLICY, 5G SPECTRUM, ARCHIVE, and a search icon. The main content area features five news articles, each with a thumbnail image, a title, and a short summary.

- Vodafone Germany trials network slicing**  
 POSTED ON SEPTEMBER 7TH, 2022  
 IN : EU DIGITAL DECADE  
 GERMANY, NEWS IN THE EU  
 TAGS: #NETWORK SLICING  
 The network operator adapted the technology to use its 4G network so it can support more end-user devices.
- European operators pilot 5G holographic calls**  
 POSTED ON SEPTEMBER 21ST, 2022  
 IN : 5G TRIALS  
 NEWS IN THE EU  
 TAGS: #5G TRIAL, #HOLOGRAPHIC CALLS  
 Deutsche Telekom, Orange, Telefonica and Vodafone Group teamed up with company Matsuko for a trial to make holographic calls employing 5G and edge computing.
- Telefónica Spain pilots 5G VR for patients with multiple sclerosis**  
 POSTED ON OCTOBER 12TH, 2022  
 IN : EU DIGITAL DECADE  
 NEWS IN THE EU, SPAIN  
 TAGS: #5G VERTICALS  
 The Spanish mobile operator is working together with La Princesa hospital in Madrid to develop the pilot.
- Three Austria launches standalone 5G home broadband services**  
 POSTED ON OCTOBER 5TH, 2022  
 IN : CONNECTIVITY TOOLBOX EU DIGITAL DECADE  
 AUSTRIA, NEWS IN THE EU  
 TAGS: #FIXED WIRELESS ACCESS  
 The Austrian operator says it will use network slicing to offer 5G home broadband services in the country.
- Orange Belgium deploys Standalone 5G**  
 POSTED ON SEPTEMBER 29TH, 2022  
 IN : EU DIGITAL DECADE  
 BELGIUM, NEWS IN THE EU  
 TAGS: #5G VERTICALS, #NETWORK SLICING, #STANDALONE 5G  
 Together with partners Ericsson, Nokia and Oracle, the mobile operator is deploying a 5G Standalone core network on a cloud-native architecture.

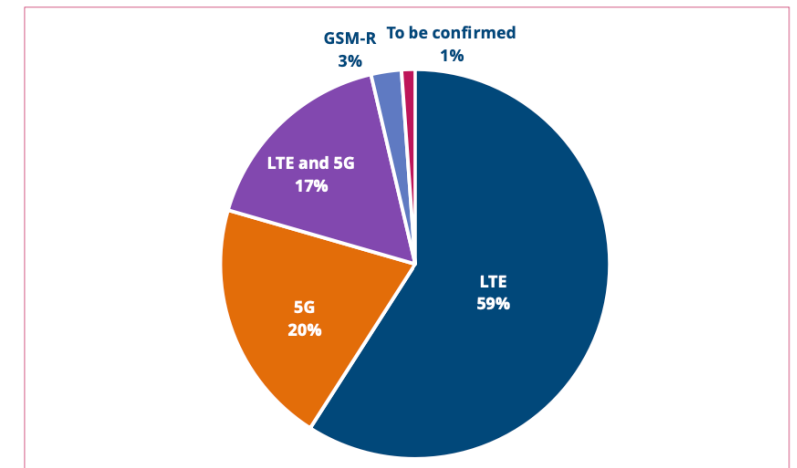
- Significant 5G spectrum auctions are still taking place internationally:
  - Brazil 700 MHz, 2.3 GHz, 3.5 GHz, 26 GHz auction (Nov 2021)
  - USA 3.45 GHz (Nov 2021) and 2.6 GHz auction (Sept 2022)
  - India multi-band auction (Aug 2022)
- 5G device support growing: According to Counterpoint research global 5G smartphone sales surpassed 4G sales for the first time in March
- GSA: 37% of private mobile network deployments use 5G
- Concerns over interference delays 5G launch in the United States
  - 5G services have now launched, but there are still restrictions near airports
  - In Europe, C-band 5G does not operate as close to the altimeter band

Global Smartphone Sales Penetration by 5G and 4G  
Jan 2019 to Jan 2022



Source: Counterpoint's Global Monthly Handset Model Sales (Sell-through) Tracker, Jan 2022

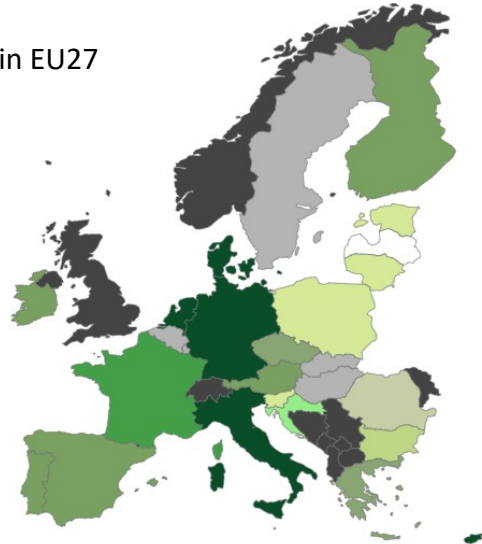
Figure 2. Deployment of private mobile networks by technology (base: 794 catalogued customers deploying private wireless networks)



Source: GSA

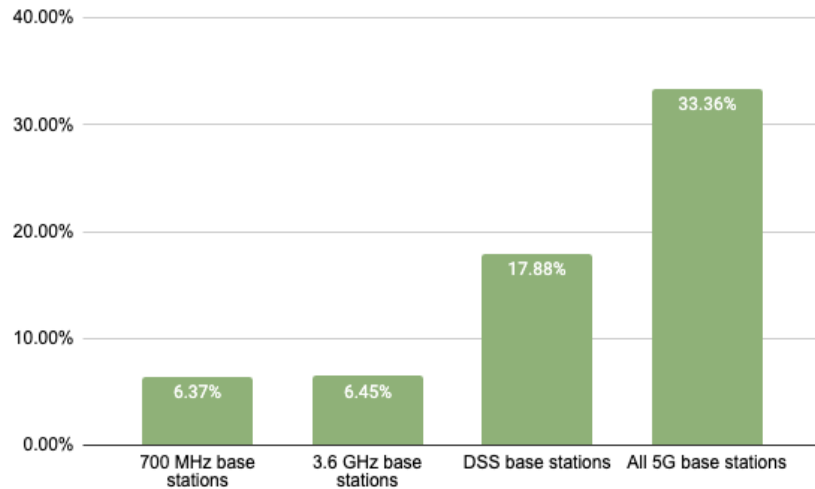
## 5G deployment & coverage

**72%** population coverage achieved in EU27  
**+23%** increase since January



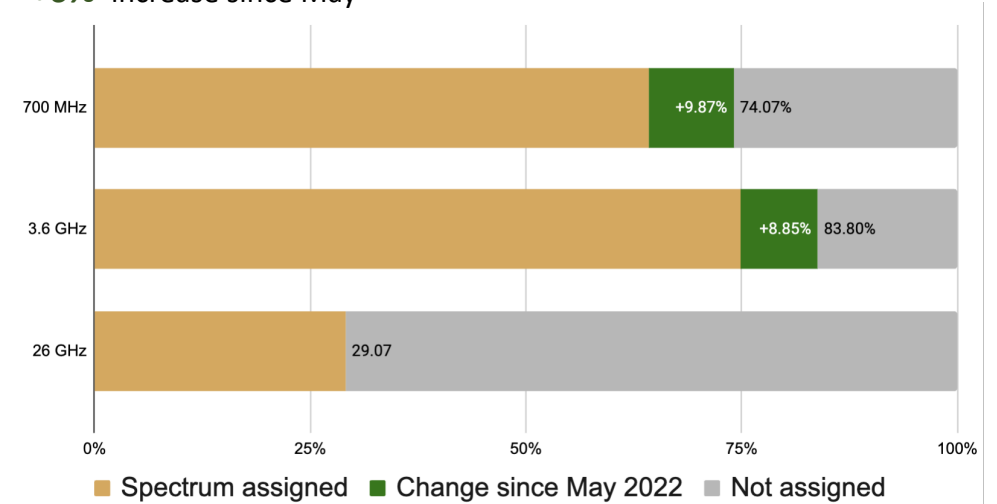
■ Non-EU country  
 Darker green indicates higher coverage

**252,920** 5G base stations total by end of 2021 in EU27  
**5G base stations** as a percentage of existing 4G base stations

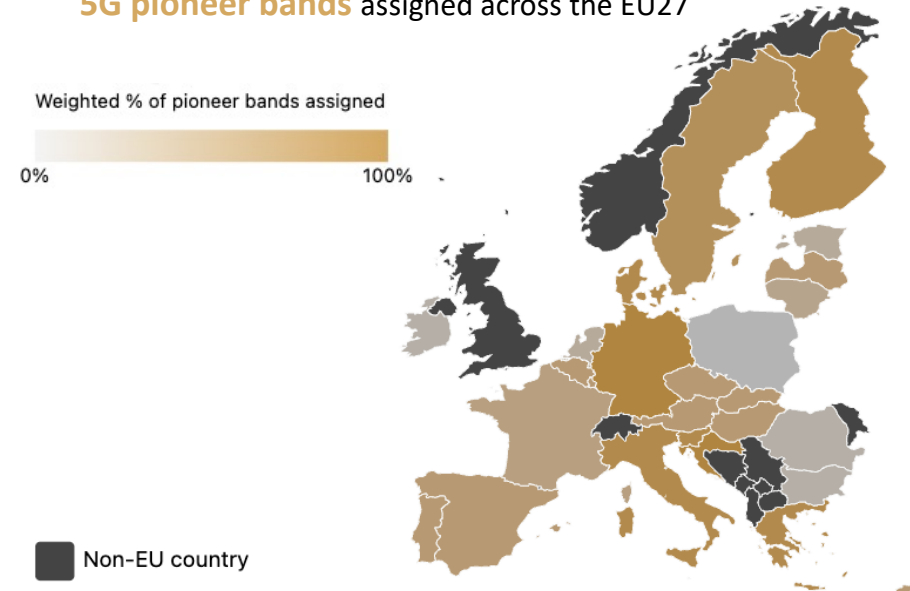


## 5G spectrum assignments

**62%** of pioneer bands assigned on average in EU27  
**+6%** increase since May








**5G pioneer bands** assigned across the EU27

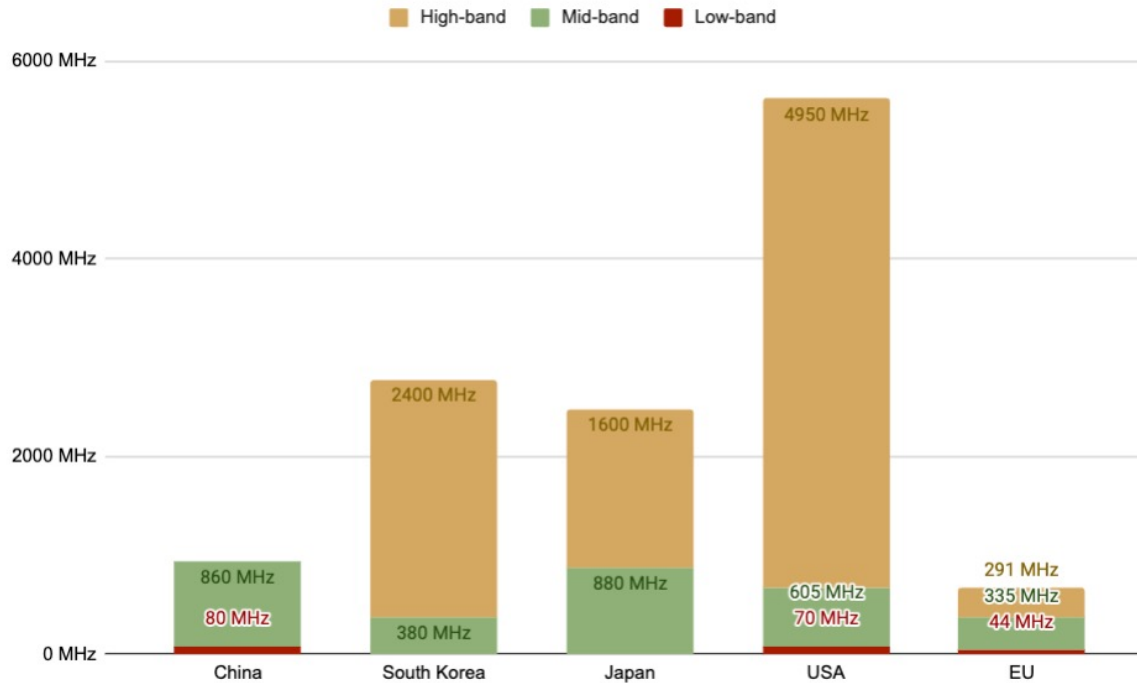


Comparison of 5G rollout in international markets

5G rollout

	China	South Korea	Japan	USA	EU
					
5G Mode	NSA/SA	NSA/SA	NSA/SA	NSA	NSA/SA
Approximate number of 5G base stations	916,000	162,000	50,000	50,000	147,308
Total country population	1,402,000,000	51,780,000	125,800,000	329,500,000	447,706,000
5G base stations per 100,000 inhabitants	65	313	40	15	33
Indicative 5G subscribers	<b>357 million</b> (source: Ericsson 2022)	<b>25 million</b> (source: Ministry of Science and ICT)	<b>14.19 million</b> (source: Japan times)	<b>79 million</b> (including Canada; source: Ericsson 2022)	<b>31 million</b> (including all of western Europe; source: Ericsson 2022)

**Assigned 5G spectrum** in international markets (EU data represents average spectrum assigned)

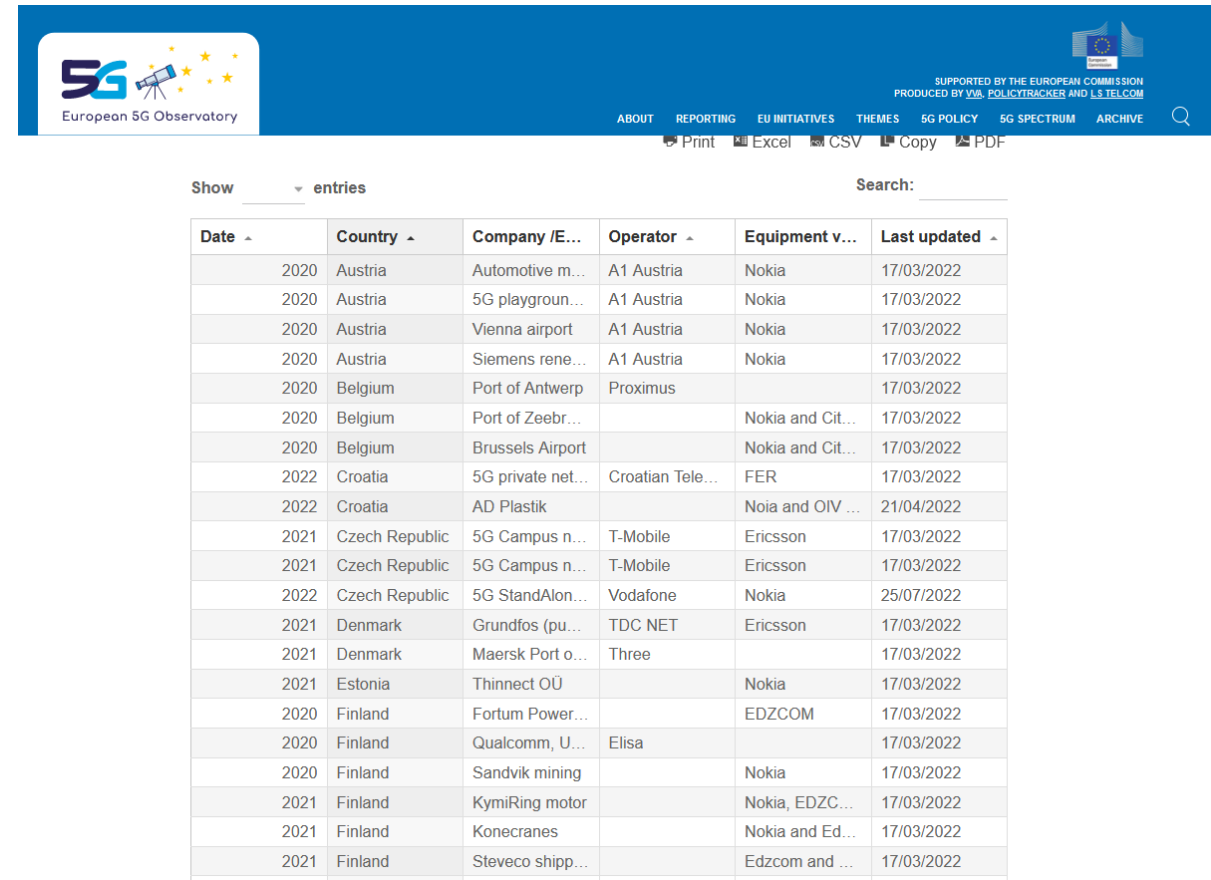


**Assigned 5G spectrum bands** in international markets

Country	Low-band (<1 GHz)	Mid-band (1 - 6 GHz)	High-band (>6 GHz)
China	700 MHz	2.6 GHz 3.6 GHz 4.9 GHz	-
South Korea	-	3.6 GHz	28 GHz
Japan	-	3.6 GHz 3.7 GHz 4 GHz 4.5 GHz	28 GHz
USA	600 MHz	2.5 GHz 3.45 - 3.55GHz 3.5 - 3.7 GHz 3.7 - 3.98 GHz	24 GHz 28 GHz 39 GHz 47 GHz
EU	700 MHz	3.6 GHz	26 GHz



- Deployment of 5G private networks has continued to increase across EU countries in the past 12 months.
- Demand for these private networks are based on the need for dedicated secure services to private enterprises such as factories, plants, large campuses, ports and airports.
- The Observatory maintains a non-exhaustive list of private 5G networks which is based on research of publicly available information.
- The Observatory team endeavour to obtain as much information on published private 5G network deployments as possible. The analysis from last quarterly report can be found on the website [here](#).
- An overview of 5G private networks featuring a searchable table (See right) of major private network projects in the EU can be found [here](#).

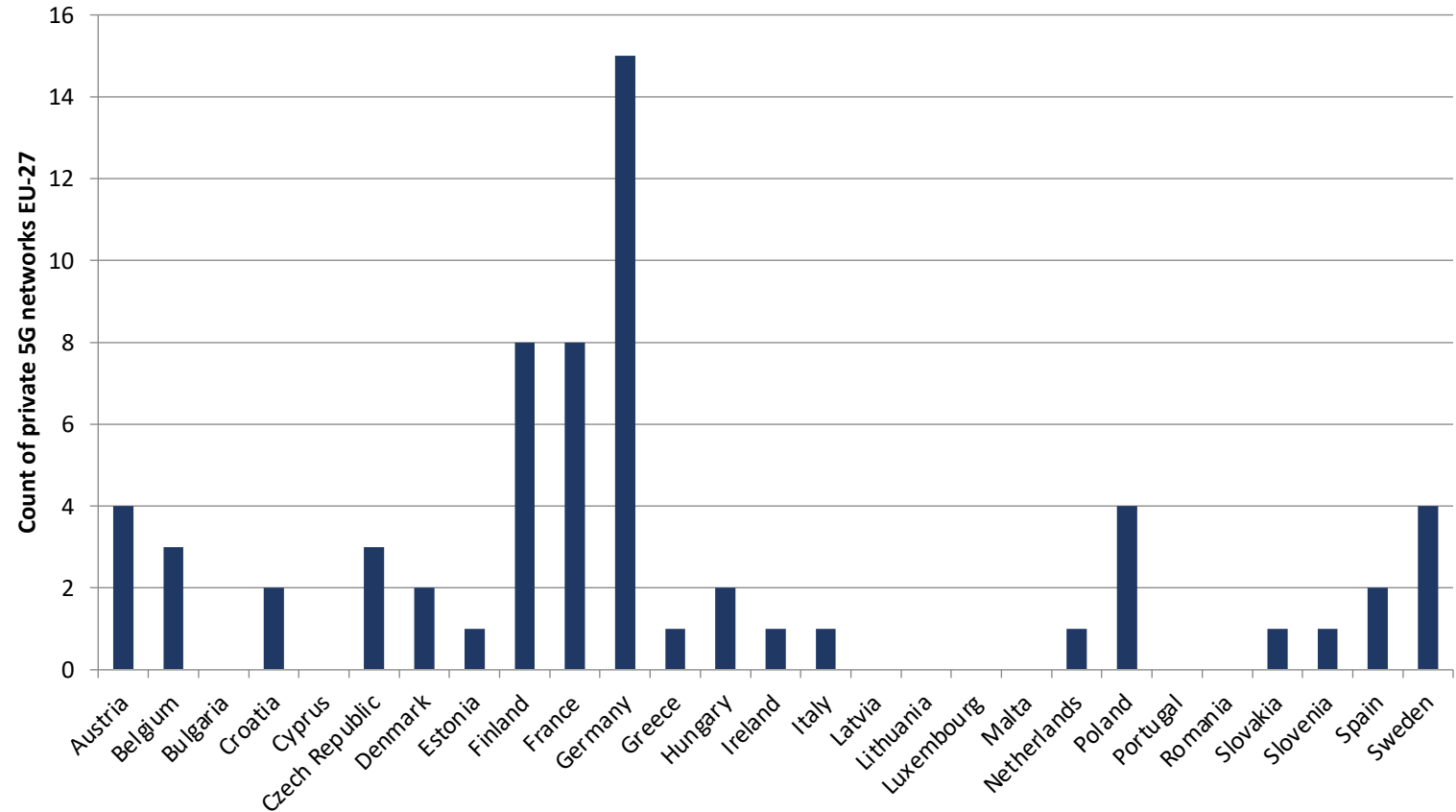


The screenshot shows the website interface for the European 5G Observatory. At the top, there is a navigation bar with the logo and the text 'European 5G Observatory'. Below the logo, there is a search bar and a list of menu items: ABOUT, REPORTING, EU INITIATIVES, THEMES, 5G POLICY, 5G SPECTRUM, and ARCHIVE. There are also icons for Print, Excel, CSV, Copy, and PDF. The main content area displays a table with the following columns: Date, Country, Company /E..., Operator, Equipment v..., and Last updated. The table contains 20 rows of data, each representing a private 5G network project.

Date	Country	Company /E...	Operator	Equipment v...	Last updated
2020	Austria	Automotive m...	A1 Austria	Nokia	17/03/2022
2020	Austria	5G playgroun...	A1 Austria	Nokia	17/03/2022
2020	Austria	Vienna airport	A1 Austria	Nokia	17/03/2022
2020	Austria	Siemens rene...	A1 Austria	Nokia	17/03/2022
2020	Belgium	Port of Antwerp	Proximus		17/03/2022
2020	Belgium	Port of Zeebr...		Nokia and Cit...	17/03/2022
2020	Belgium	Brussels Airport		Nokia and Cit...	17/03/2022
2022	Croatia	5G private net...	Croatian Tele...	FER	17/03/2022
2022	Croatia	AD Plastik		Noia and OIV ...	21/04/2022
2021	Czech Republic	5G Campus n...	T-Mobile	Ericsson	17/03/2022
2021	Czech Republic	5G Campus n...	T-Mobile	Ericsson	17/03/2022
2022	Czech Republic	5G StandAlon...	Vodafone	Nokia	25/07/2022
2021	Denmark	Grundfos (pu...	TDC NET	Ericsson	17/03/2022
2021	Denmark	Maersk Port o...	Three		17/03/2022
2021	Estonia	Thinect OÜ		Nokia	17/03/2022
2020	Finland	Fortum Power...		EDZCOM	17/03/2022
2020	Finland	Qualcomm, U...	Elisa		17/03/2022
2020	Finland	Sandvik mining		Nokia	17/03/2022
2021	Finland	KymiRing motor		Nokia, EDZC...	17/03/2022
2021	Finland	Konecranes		Nokia and Ed...	17/03/2022
2021	Finland	Steveco shipp...		Edzcom and ...	17/03/2022

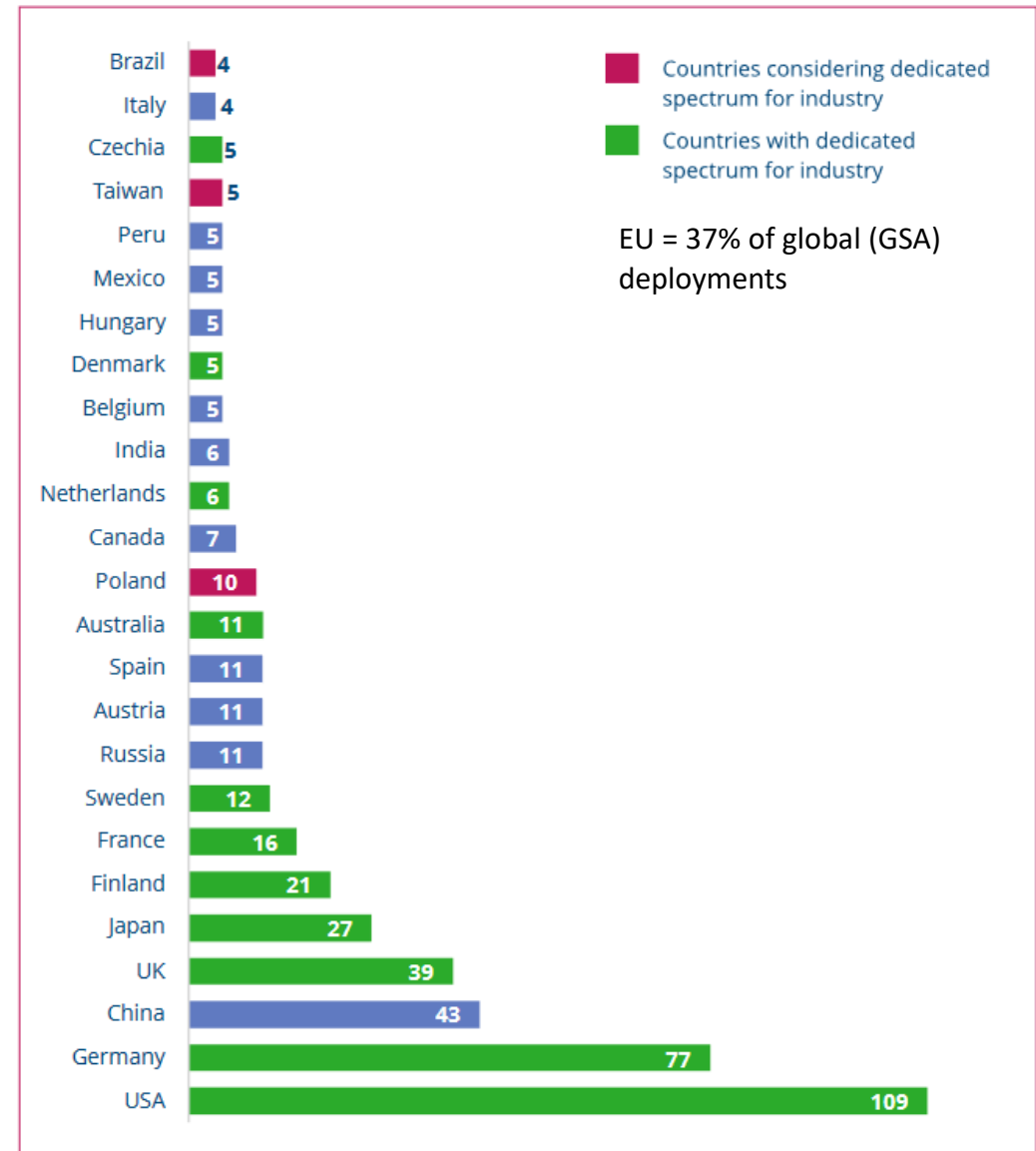
- A total of 64 networks with Germany (15), France (8) and Finland (8) as leading MSs
- Research latest public announcements of private 5G networks in EU countries
- Public search yields announcements from major vendors (e.g. Ericsson, Nokia), telco involvement or verticals themselves
- The 5GO list of networks include short summary including main applications being supported

### Private 5G networks in EU-27



DISCLAIMER: There are more 5G private networks deployed in practice, noting the data is based on search of publicly announced deployments and subject to continuous change.

- Outside of the EU countries including Japan, UK, China and the USA have a large proportion of total 5G private networks globally (Source: GSA)
- Our research indicates that 5G private networks are being deployed in dedicated spectrum (e.g Germany) or shared spectrum
- Some current 4G networks will be upgraded to 5G in due course
- Many of the applications being deployed include:
  - High definition video links
  - Low latency comms for vehicle control
  - Industry 4.0 applications
  - Secure, predictable and accessible wireless digital infrastructure
- A key attribute is 5G private networks are independent of loads on public or unlicensed networks



Source: Private Mobile Networks, August 2022, GSA Total Global deployments = 498

- Nokia and Ericsson are the main vendors deploying 5G private networks in the EU
- Telcos deploying 5G Private networks include Vodafone, Deutsche Telekom, Telefonica, T-Mobile, A1 Austria, Proximus, Orange, TDC Net and Three
- In most of the telco deployed networks MNOs are using their 5G spectrum (mostly in 3.4 – 3.8 GHz), in some cases the initial deployment is using 4G and equipment is '5G-ready'