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# **4th European 5G Observatory Stakeholder Workshop "5G in the Digital Decade"**

**20 October 2022 (10:30 – 13:30 CET)**

**Venue: online event**

Public Summary

# 1 Presentation of the state of 5G deployment in the EU

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The workshop was opened by Pearse O'Donohue, Director for the Future Networks Directorate at the European Commission. He emphasised that the European 5G Observatory plays an important role in EU policymaking, providing an objective and independent source of information on 5G deployment.

Mr O'Donohue also highlighted the increasing need for detailed network infrastructure deployment data, especially in the context of the policy programme 'Path to the Digital Decade' which includes targets on connectivity. Based on the [Digital Economy and Society Index \(DESI\)](#), a monitoring system has been developed to measure the progress towards each key performance indicator (KPI). The progress is currently measured mainly in terms of basic 5G (which mostly concerns increases in speed and capacity from 4G). In the near future, it will necessary to track also "gigabit 5G" for both consumers and businesses (i.e. measuring the performance obtained from the use of the mid-band spectrum) and progressively working our way up to the millimetre band, as well as standalone 5G for mission-critical applications often in combination with edge computing and AI, which in themselves are key targets for the digital decade.

Following the introduction by the Commission, the consultants in charge of the 5G Observatory gave their perspective on the state of 5G in Europe and key developments in other parts of the world, reflecting on the data recently published in the latest [Quarterly Report \(QR 17\)](#). The consultants first mentioned the significant number of spectrum auctions of the 700 MHz and 3.6 GHz band that have taken place in several Member States since last year's workshop, catching up with the delays due to the COVID-19 pandemic. They also pointed out that several countries are now finally planning for the auction of the 26 GHz band. Member States have also announced an impressive number of 5G (or even 6G) projects to foster new use cases, some benefiting from financial support under their Recovery and Resilience Plans.

On top of that, the EU reached a critical milestone in January 2022 with all Member States having launched 5G commercial services, which are benefiting from continuous investment to expand coverage (including trials for new 5G technologies). Based on operator announcements, the Observatory assessed that 72% of the EU's population have 5G coverage, a 23% increase from January, with 62% of pioneer bands having now been assigned, up 6% from May. Currently, 5G base stations in the EU correspond to around a third of the total number of existing 4G base stations. The majority (around 60%) are based on Dynamic Spectrum Sharing (DSS) base stations, 20% rely on the 700 MHz band, and 20% are related to 3.6 GHz.

International [sales of 5G smartphones are now exceeding 4G ones](#) and sizeable spectrum auctions have recently taken place in Brazil and India. The Global Mobile Suppliers Association announced that around [40% of private mobile networks now utilise 5G as the technology of choice](#). South Korea has the highest number worldwide of 5G base stations per capita, followed by China and Japan, while the EU and the US are lagging. Mid-band spectrums (especially 3.6 GHz) are the most popular globally with the highest number of spectrums assigned, followed by high-band spectrums (of which the US has the highest number assigned) and lastly, low-band spectrums.

Additionally, the Observatory noted a significant growth of local private 5G networks on a year-to-year basis, led by high-profile demonstrations supported by major vendors (mainly Ericsson and Nokia). The variety of use cases of those private networks (in particular autonomous vehicles and industry 4.0 applications), as well as the wide range of geographical deployment across EU countries, were highlighted as a strength of the EU market.

Overall, the US and Germany are the two leading countries on global private local 5G networks deployments, with the EU accounting for 37% of global deployment, while smaller enterprises are emerging, adding diversity to the ecosystem. In addition, those private networks are increasingly using advanced configurations based on spectrum in the 3.4 to 3.8 GHz frequencies, either on a dedicated basis or using a slice of the public network infrastructure.

Finally, the consultants gave an overview of the investment data and 5G market forecasts made available by recent third-party studies.<sup>1</sup>

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<sup>1</sup> See accompanying presentation slides for more details.

## 2 ENISA support for 5G Cybersecurity Toolbox

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The European Network Information and Security Agency (ENISA) presented an update on the agency's work on the implementation of the 5G Cybersecurity Toolbox, including key publications by ENISA, such as the [ENISA EECC GUIDELINE](#), the [5G Supplement to the EECC Guidelines](#), and the [5G Threat Landscape](#).<sup>2</sup>

Details on this presentation are available in the accompanying slides.

## 3 Panel Discussion – Realising EU ambitions for 5G deployment: the challenges ahead

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### Measuring 5G deployment

The panellists first gave their individual perspectives on 5G developments and expectations in their opening remarks. One of the recurrent concerns of the panellists was the challenge of measuring 5G deployment in a way that is relevant for policymaking – i.e. it accurately reflects the actual deployment progress in the Member States. Given that 5G addresses very different needs and use cases, the majority of speakers emphasised that it is necessary to be more precise on the type of 5G to be tracked and reported. According to the experts, the best option would be to track either the quality of service or the quality of end-user experience or even both at the same time. However, this does not seem to be feasible in the short term.

A panellist, whose company's key task is to survey mobile service delivery across Europe, observed that a wide range of 5G network configurations are being deployed, delivering very different performances to the end user and further highlighting the challenge of accurate 5G measurement. In addition, the differences in use cases mean that a metric used today is likely to become obsolete tomorrow. 5G measurement was considered by the panellists to be the most critical point, as it is indispensable for creating investor confidence in the European 5G infrastructure, network, and ecosystem. In fact, a high-quality 5G infrastructure in Europe depends on private investments as well as public support and good regulation. Panellists agreed that more effort could still be made to improve the framework conditions for investments.


### Standalone 5G

As emphasised by a panellist, the EU deployment has relied to date on non-standalone 5G (5G NSA), while advanced 5G will require standalone configurations (5G SA) as a pre-requisite to unleash the disruptive functionalities of 5G, such as very low latency and greater energy savings. Reflecting on partial data from the Observatory, one panellist calculated that advanced 5G coverage accounts for around 20% of all coverage. Even though the overall number of base stations in the EU is higher than the US, the EU is lagging significantly behind the US in terms of the number of advanced 5G base stations. Another important point raised by the panel was that 5G should not be considered solely from a connectivity viewpoint, but also form its 'enabling' impact on digital transformation in a range of industry sectors.

The debate highlighted that most of the current coverage of 5G networks in the EU, achieved on the basis of a 4G spectrum shared with 5G (i.e. DSS), does not improve notably the average user experience of 4G. From recent data, one panellist pointed out that 5G download speed is uneven across the EU and speed and availability do not always go hand in hand (the examples given were Bulgaria and Sweden, which enjoy fast connections but have relatively poor coverage). Another panellist concurred with the first observation of an estimated coverage of the 3.6 GHz mid-band at close to 20% in the EU (panellist estimate it at around 16%); mid-band is the only band that could currently offer a definite improvement in user experience on 4G. As an alternative method used by specialised monitoring services, 5G availability is measured by assessing the percentage of users on 5G-enabled devices that spend most of their time accessing 5G networks, which in turn is a function of 5G network coverage, tariffs, and having 5G capable devices. Overall,

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<sup>2</sup> A full list of ENISA publications is available in the accompanying ENISA presentation slides



this method leads to comparable measures to the geographical coverage reported by EU Member States in the context of the DESI indicator.

According to a panellist, many private 5G networks have been forced to fall back on 4G due to the lack of available devices. In such a context, it could take some time before 5G standalone takes off as private networks is precisely the use case where the expected benefits from an upgrade to standalone would be the highest from a commercial perspective. In turn, the delay would also hamper the monetisation of 5G services relying on more advanced 5G (i.e. 5G SA) and the introduction of pre-determined performance levels, with differentiated pricing models.

In order to ensure a faster transition to 5G SA, one panellist suggested that a 5G co-network approach is needed (i.e. a change in the architecture to allow SA co-network). While implementing the approach, operators can launch 5G NSA using either only DSS on the existing frequencies or on 3.6 GHz mid-band. Currently, however, most operators are not using the lowest band, even though 5G NSA would require 4G (which is always situated on the lowest band) as the anchor. Moreover, current devices do not allow simultaneous transmission of 4G and 5G on the same lowest band. As such, the network would need to be reconfigured.

Asked about “in city” deployment in the US, which has delivered super high-speed 5G, the panel disagreed with the urgency of deploying millimetre wave band at 26 GHz or higher bands. One panellist argued that the needs are limited and that such bands are not widely deployed globally. Millimetre waves are mostly used only for dedicated usage in specialised areas. This points rather to private network use. The panellists also agreed that, for the time being, the mid-band (i.e. 3.6 GHz) represents the ‘sweet spot’, providing the necessary speed and capacity if properly implemented (with the right cell density). It is also worth noting that, although 5G deployment in the US started with the introduction of 5G hotspots in high bands, its coverage remains limited to small areas. With the recent availability of the C-band, US operators are now shifting focus to building mid-band capacity, working in conjunction with existing high- and low-frequency bands.

### **Vertical industries**

The panel affirmed that the Observatory Report correctly highlights that 5G is likely to become progressively a vertical industry phenomenon. Recent use cases (i.e. seaports, wide area non-public networks, industry 4.0, campus networks, etc.) are displaying promising versatility and heterogeneity, including for niche markets, while still keeping a strong focus on the proof-of-concept stage. One panellist highlighted that private networks also have a huge potential to take off in the future outside of traditional regions since around 80% of the global workforce is currently ‘deskless’ (i.e. located in a digital desert), often with no coverage at all (e.g. workers in agriculture, healthcare, manufacturing, etc.). Given that nearly all activities will require access to digital services, even simple connectivity devices would be very valuable. Consequently, private 5G networks could become the biggest productivity driver in those environments.

### **Private 5G networks**

Further commenting on local deployment, one panellist acknowledged that private network deployment is very diverse, not only in terms of uses but also in terms of operations of the network, starting with the choice of using an individually owned network or using the existing infrastructure of a third party operator. In any case, the landscape of private networks is expected to remain diverse, and it is, therefore, vital to provide such networks with the flexibility to choose the optimal setting for any particular needs. In this context, a panellist highlighted the necessity of having a sufficient number of testbeds to allow private networks to catch up with public networks. More generally, the exchanges between panellists highlighted the challenge of monitoring recent developments for vertical industries, especially in the critical phase of moving industrial 5G from theory to practice.

## **Transformational 5G**

Another topic raised by the panel was the importance of the so called “transformational 5G”, the advanced version of gigabit 5G that delivers on all the promised functionalities and performances. It was noted that quality of connectivity is the main driver for progress in our societies. All panellists recognised that the main obstacles to achieving EU objectives are high investment costs and the capital constraints for the sector, as well as investor scepticism due to the declining return on capital experienced by the telecom sector. Consequently, panellists say that it necessary to increase the scale of 5G policies underpinning investment in the sector, especially with regard to spectrum policies, to create a fairer and more balanced investment ecosystem that makes 5G deployment more cost effective and more efficient. Energy consumption is another area of concern since energy costs will increase in line with quantitative and qualitative improvements in connectivity. However, the eventual replacement of 4G networks by 5G networks is also an opportunity to better control energy consumption since it will enable the delivery of 10 times more capacity with 30% lower energy consumption.

One panellist also emphasised the importance of considering all the connectivity technologies as a whole, in particular to bridge the digital divide. With many rural areas in Europe having yet to benefit from access to the internet, it is relevant to consider fixed broadband and satellite access in addition to mobile 5G.

## **Conclusion**

In conclusion, the panel experts were optimistic about how the market will develop over the coming years. The panel reflected on the work of the 5G Observatory and its contribution to provide an accurate picture on network deployment and market developments how important. They note that the Observatory is mainly focused on the retail market but that it should increasingly keep track of the 5G developments in vertical industries as they constitute where a large part of the value will be created. In this context, the Commission is expected to continue its support for vertical applications of 5G and the ecosystem in general. Furthermore, the panel emphasised the importance of close collaboration between the ICT industry and the vertical industries to unleash the 5G use cases of the future.

## **Annexes**

The slide presentations used in the workshop are available as separate documents in annex.

## Annex - Agenda

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**10:30-10:50**    **Opening** (*Pearse O'DONOHUE, Director, EC DG CONNECT*)

**10:50-11:30**    **Presentation of the State of 5G deployment in the EU** (*Richard Haas, PolicyTracker, Saul Friedner, LS telcom, Armando Luciano, VVA*)

*Presentation of the 5G market developments over the last twelve months by the consultants in charge of the 5G Observatory, including a comparative analysis of the deployment situation outside Europe.*

**11:30-11:50**    **ENISA support for 5G Cybersecurity Toolbox** (*Marnix Dekker and Slawek Bryska, ENISA*)

*Overview of main ENISA projects supporting the implementation of 5G Cybersecurity Toolbox.*

**11:30-11:50**    **Panel discussion – Realising EU ambitions for 5G deployment: the next challenges ahead**

*Moderator: Peter STUCKMANN*

*Panellists:*

*Joe LYNCH, International unit analyst and co-chair BEREC Wireless Network Evolution group, **BEREC***

*Erzsébet FITORI, Head of EU Affairs & Relations, **VODAFONE***

*Hans HAMMAR, Head of Radio Networks - Market Area Europe and Latin America, **ERICSSON***

*Sylwia KECHICHE, Principal Analyst - Enterprise, **OOKLA***

*Andreas MÜLLER, General Chair, **ACIA** (5G Alliance for Connected Industries and Automation)*

*Nanda MENON, Senior Vice President, **ATHONET***

*The session will discuss the latest report from the 5G Observatory and the current state of play of 5G deployment in Europe and globally, as well as how the deployment monitoring can be improved in the future.*

*More specifically, the following issues are expected to be debated:*

- *Main investment trends (including. regional comparison):*
  - o     Densification using mid band versus use of legacy bands*
  - o     Transition to 5G core and investments in vertical sectors (industrial take up of 5G)*
  - o     Impact of TowerCo model on investment dynamics*
- *How to monitor 5G deployment for policy making (Basic 5G, Gigabit 5G, Industrial 5G)*
- *Need to move to tracking QoS: market expectations?*

**13:30**            **Closure** (*European Commission*)