

5G, beyond 5G, and 6G Activities Promoted by Member States

Release 2022



The voice of the European industry for the
development and evolution of 5G

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GOAL OF THIS DOCUMENT



To report on various activities promoted by Member States, Associated and Candidate Countries which are relevant for the deployment of 5G communication networks and their evolution towards beyond 5G and 6G networks.

Focus should be on activities stimulated by National and Regional Ministries, Public Agencies, Regulatory Bodies, Cities, etc.

Rapporteurs



The voice of the European industry for the development and evolution of 5G

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Many thanks for your support !!





5G/B5G/6G Activities in Austria

5G GigaApp

- Description: Funding is provided for the development of innovative digital applications (e.g., hardware or software) and services based on gigabit-capable 5G infrastructure. The focus is on regional problems in particular, so that the digitization process can also be driven forward in rural regions.
- Public bodies in charge:
 - Austrian Research Promotion Agency (FFG)
- Further information:
 - [GigaAppwebsite](#)
 - [Gigabit Wall](#)



5G/B5G/6G Activities in Belgium



5G Radio Spectrum Auction

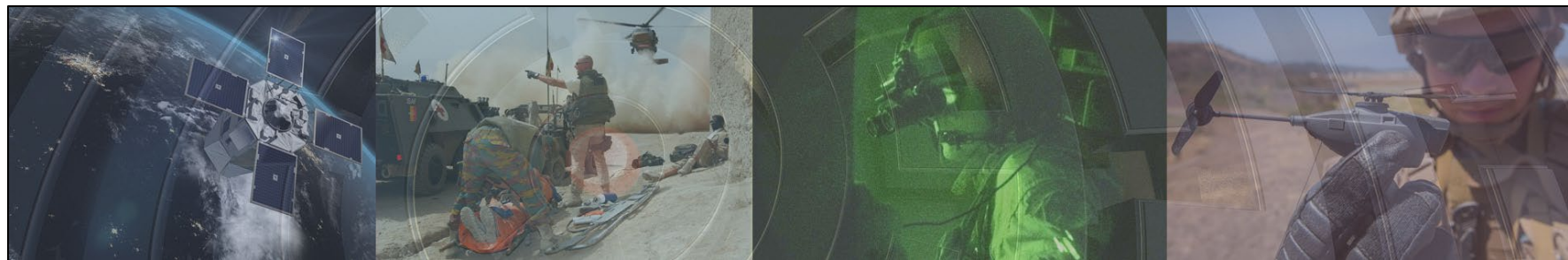


- Description: Following the start on 1 June 2022 the main phase of the auction of the new 5G spectrum (700 MHz, 3600 MHz) and the existing 2G and 3G radio spectrum (900MHz, 1800 MHz, 2100MHz) was ended with proceeds of 1,202,192,400 euro. Five operators, namely Citymesh Mobile NV/SA, Network Research Belgium NV/SA, Orange Belgium NV/SA, Proximus NV/SA and Telenet Group NV/SA, participated in the auction and each succeeded in acquiring part of the spectrum, thus shaping our country's mobile telecom landscape for the next 20 years.
- Public bodies in charge:
 - Belgian Institute for Postal Services and Telecommunications (BIPT, Belgian regulator)
- Further information:
 - [Press release by BIPT](#)



Defence-related Research Action – Call 2022

- Description: This second Defence-related Research Action (DEFRA) call for proposals 2022 covers 4 themes with an indicative budget of 1.600k€ each. One theme is related to 5/6G for military, security and crisis applications: “Many key features of 5G are still to be specified and implemented. Credible analyses in this topic area, particularly addressing the identified challenges, require significant effort. Proper attention will also be given to 6G predicted to be a lot like 5G in its general infrastructure, but with even more speed, accuracy, and ubiquity.”
- Public bodies in charge:
 - Ministry of Defence
 - Royal Higher Institute for Defence
- Further information:
 - [Webpage of DEFRA programme](#)



Flanders Make and Imec ICON call 2022

- Description:
 - Flanders Make ICON is a project type in which a well-balanced consortium of Flanders Make and at least three mutually independent Flemish companies develop new knowledge that can be applied in practice and thus contribute to economic and possibly broader social added value in Flanders. The typical project duration is 2 years with a maximum of 3 years.
 - The imec.icon research program is formula for demand-driven, cooperative research on hardware-, software- and combined hardware/software innovations. Over a period of typically two years, multi-disciplinary research teams of scientists, industry partners and/or social profit organizations work together to develop digital solutions that find their way into the market offer of the participating partners. The program has already resulted in over 50 completed projects in a wide range of application domains and markets including healthcare, industry 4.0, mobility, smart cities, energy, media and education.
- Public bodies in charge:
 - [Flanders Innovation and Entrepreneurship, VLAIO](#)
- Further information:
 - [ICON research programme](#)
 - [ICON projects at Flanders MAKE website](#)



5G/B5G/6G Activities in Finland

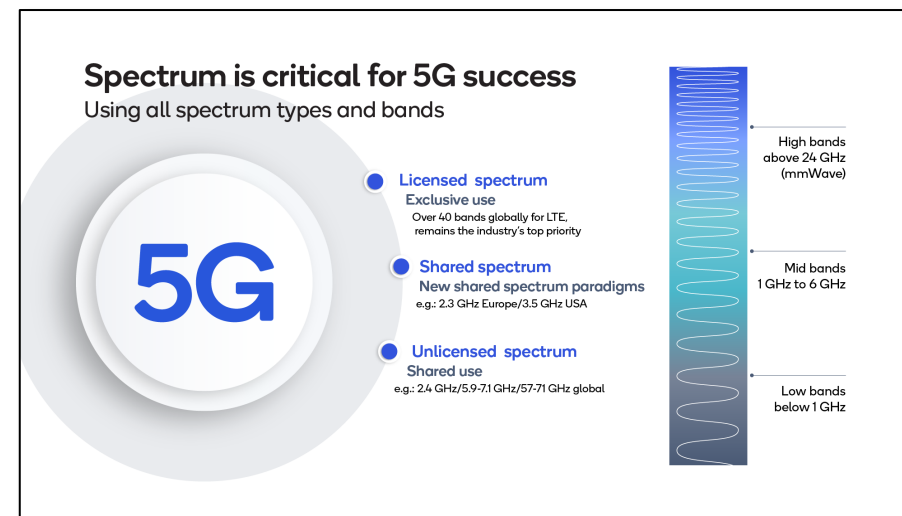
5G Momentum

- Description: 5G Momentum is an ecosystem initiative driven by The Finnish Transport and Communications Agency Traficom. The main target of the initiative is to promote and boost new trials and solutions in 5G. The ecosystem arranges and host networking events and workshops for e.g., vertical industry stakeholders to promote benefits and opportunities on 5G, linking together also other 5G related ecosystems in Finland. 5G Momentum provides also channel for discussion on frequency allocations and regulatory issues for e.g., 5G testbeds stakeholders and developers and vertical stakeholders with Traficom as a national licensing and regulation authority.
- Public body in charge:
 - Finnish Transport and Communications Agency Traficom
- Further information:
 - 5G Momentum [website](#)
 - 5G in Finnish [Industry](#)
 - 5G Trials in [Finland](#)
 - 5G in Finnish [Health](#)
 - 5G in Finnish [Ports](#)
 - 5G in Finnish [Smart Cities](#)



Frequency Bands for 5G Use, Trials and Pilots

- Description: National regulatory body Traficom has allocated frequency bands for 5G networks, including bands for private and local networks. In the light of the rapid progress of digitalisation, it is necessary to make sure that frequencies are available for the testing of wireless communications. Stakeholders in testing, research and education can apply fixed term radio licenses.
- Public bodies in charge:
 - Finnish Transport and Communications Agency Traficom
- Further information:
 - “Digital trials give testing a boost and help advance education” @ [Traficom](#)

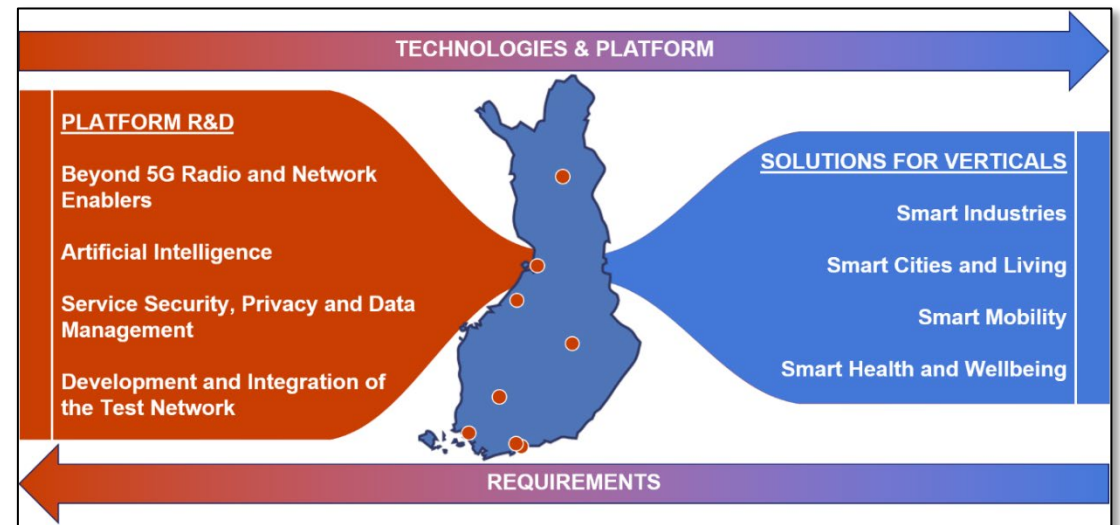




5G Test Network Finland Ecosystem Initiative



- Description: 5G Test Network Finland (5GTNF) open innovation ecosystem initiative supporting 5G and beyond technology research and validation, product developing, piloting and experiments is continuing. The ecosystem promotes the 5G technologies in vertical industry domains and support the activities for large scale trials and pre-commercial deployment of new communication technologies. The ecosystem partially funded by Finnish Government through Business Finland programmes. The 5GTNF is currently evolving towards 6G technologies.
 - Not-for-profit ecosystem
 - Over 40 industry and academic partner organizations
- Public body in charge:
 - VTT Ltd
- Further information:
 - 5GTNF [website](#)



Challenge Programs supporting 5G for verticals

- Description: Finnish Ministry of Employment and the Economy controlled Business Finland agency is supporting development of 5G technology and applications for vertical segments e.g., through its challenge driven programmes including Digital Trust Finland and New Space Economy. New Space Economy promotes e.g., satellite, HAPS and ground station communications and solutions, and Digital Trust especially cybersecurity. In addition, different ecosystems supported by Business Finland have been established for example around logistics, harbour operations, mining, future city, autonomous vehicles and future factories.
- Public bodies in charge:
 - Business Finland
- Further information:
 - <https://www.businessfinland.fi/en/for-finnish-customers/services/programs>





6G Bridge



- Description: The 6G Bridge program aims to provide new value with 5G Advanced and 6G technologies for sustainable industries and societies e.g. in smart cities, smart energy, smart ports and smart factories with different ecosystem players. The goals will be met e.g., by:
 - Increasing ecosystem-driven collaboration in research and innovation for 5GA/6G,
 - Building future business ecosystems in 5GA/6G and attracting international investments.
 - Strengthening the key capabilities in 5GA/6G
 - Fostering testing and experimentation facilities in 6G

Program duration: January 2023 until the end of 2026 with a planned budget of EUR 130 million for innovation funding.

- Public bodies in charge:
 - Business Finland
- Further information:
 - [6G bridge on Business Finland website](#)





6G Finland



- Description: 6G Finland is a coalition of Finnish 6G R&D organizations to advance the impact of Finnish 6G expertise globally, build new international partnerships, and intensify national 6G development efforts towards sustainable and data-driven society enabled by instant and unlimited wireless connectivity. 6G Finland is a national contact point of Finnish 6G know-how, and actively participates in 6G discussion both nationally and internationally. 6G Finland operates as a network to which new members are invited on a content basis.
- Public bodies in charge:
 - Non-profit coalition of national R&D organizations in collaboration with Business Finland and Academy of Finland
 - Founding members: Aalto University, BusinessOulu, Finnish Defence Research Agency, LUT University, Nokia Bell Labs, Oulu University of Applied Sciences, University of Helsinki, University of Oulu, Tampere University, VTT.
- Further information: [6G Finland website](#)

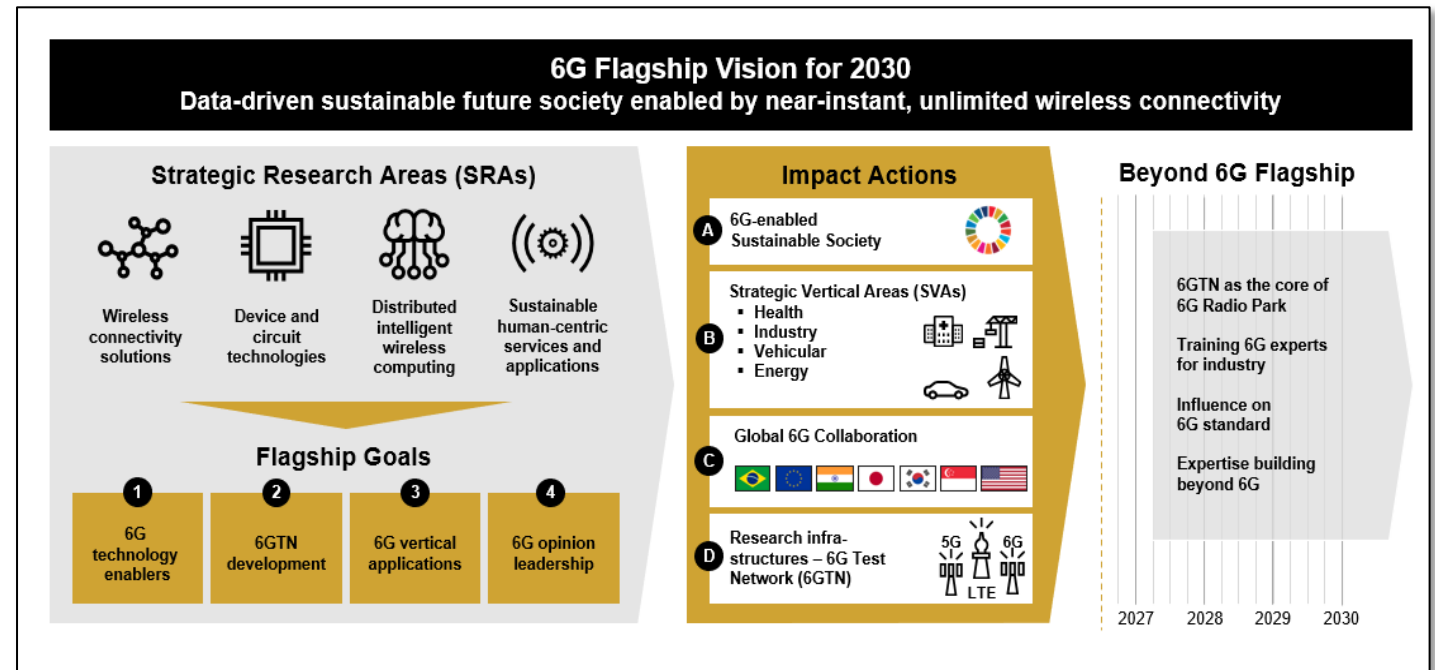


6G Flagship



The voice of the European industry for the development and evolution of 5G

- Description: A national research flagship for 2018 – 2026 with a total volume of 250M€. It is operated by the University of Oulu and currently involves 400 researchers from 50 nationalities. The 6G Flagship has steered the first 6G visions work via 13 6G White Papers (downloaded over 1M times) and has resulted into 2500 per-reviewed papers and 85 doctoral theses. It counts with over 400 company collaborators and more than 300 research projects so far.
- Public bodies in charge:
 - Academy of Finland
 - University of Oulu
- Further information:
 - [6G flagship website](#)



5G/B5G/6G Activities in France



French Acceleration Strategy on 5G & Future Network Technologies as 6G



- Description: This strategy, which was launched in 2021, focuses on 5G and future telecommunications network technologies. It is coordinated at the national level by the Directorate-General for Enterprise/Ministry of Economy and Finance, in collaboration with other competent ministries, government agencies and the national telecoms regulatory authority (ARCEP). It counts with a public support of 735 M€ by 2025 and by leveraging private investment, the ambition is to reach 1.7 B€ of total investment by that date.

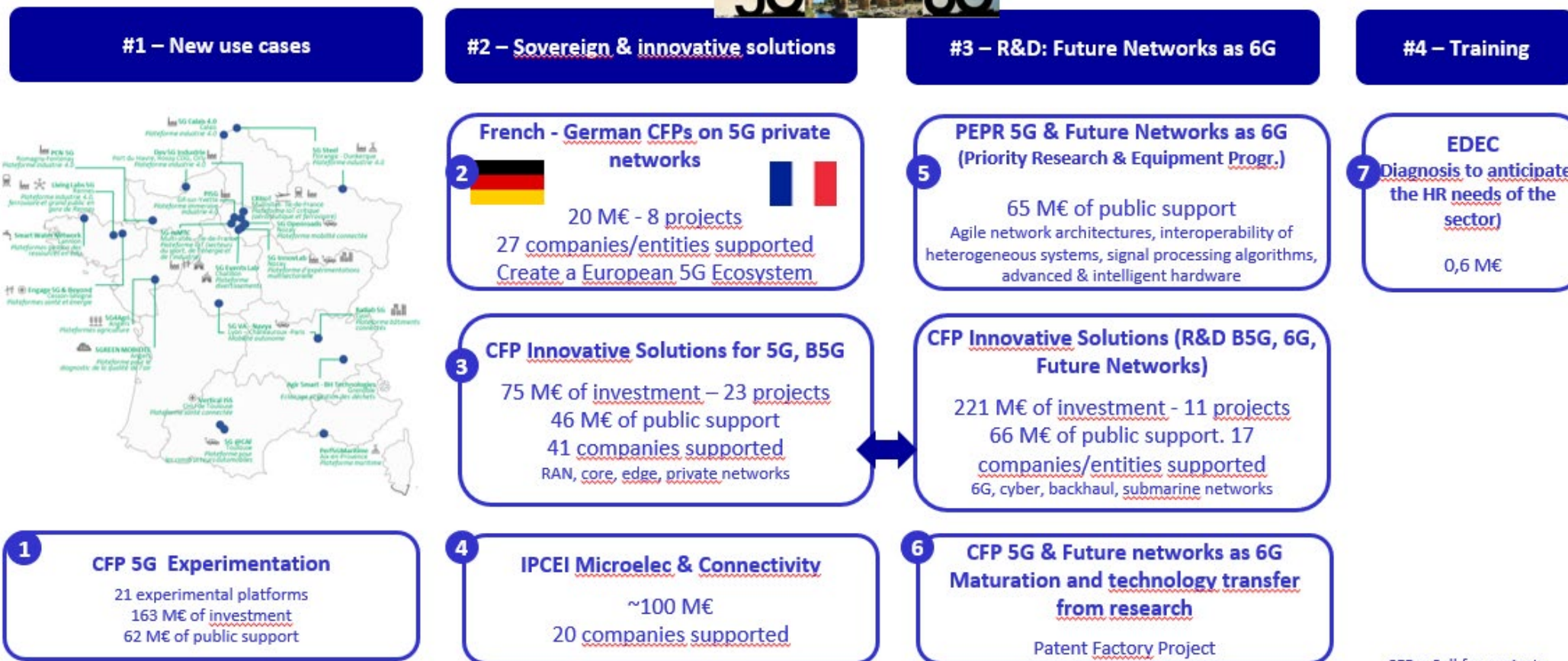
The four pillars of the strategy are:

- (i) Support the deployment of 5G innovative use cases for the benefit of local communities and industry.
- (ii) Support the development of sovereign & innovative solutions for telecoms networks.
- (iii) Consolidate research and development resources for future network technologies.
- (iv) Strengthen training programmes in order to provide the right skills for 5G deployment & attract foreign talents to France.



French Acceleration Strategy on 5G & Future 6G Network Technologies

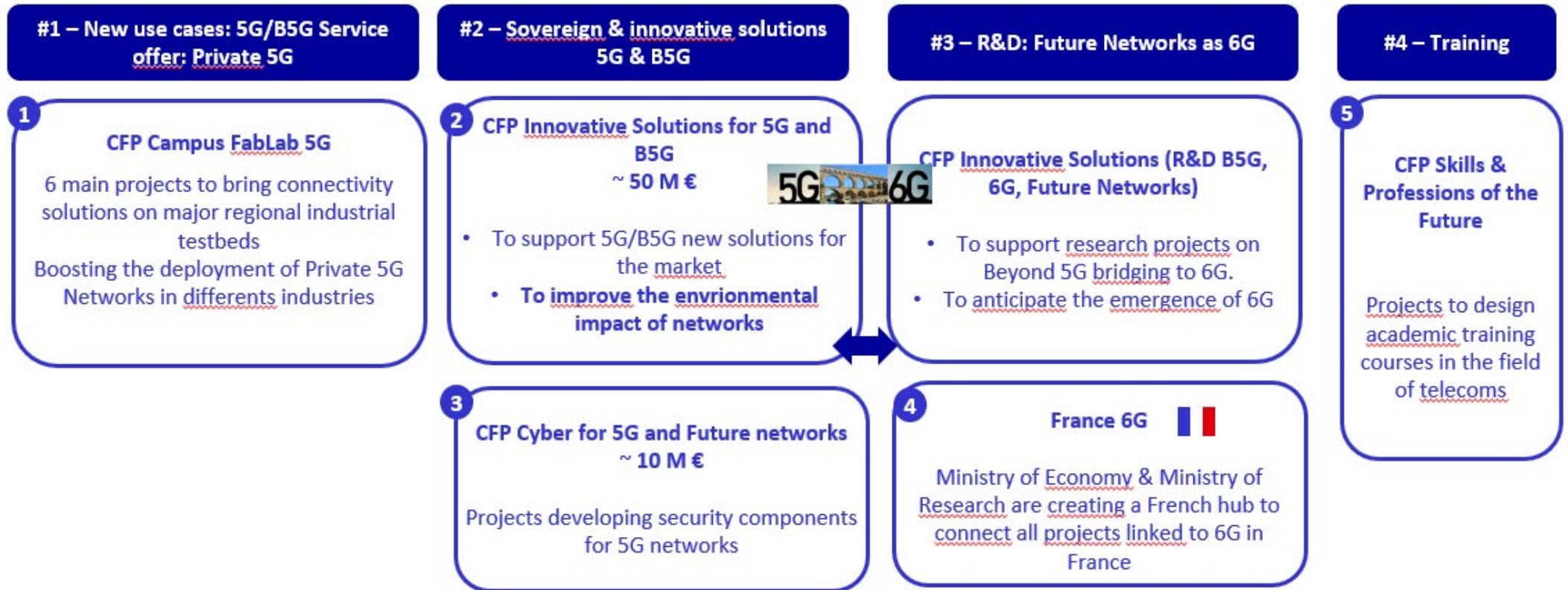
Projects launched so far:



French Acceleration Strategy on 5G & Future 6G Network Technologies

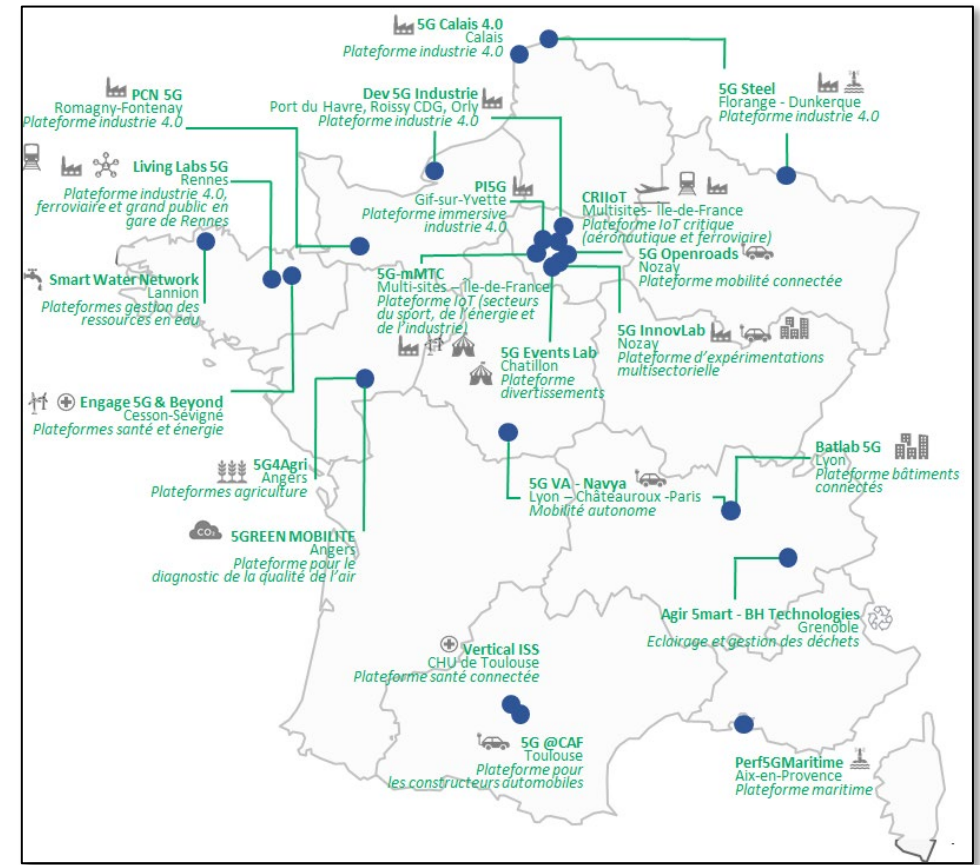


Projects to come:



French Acceleration Strategy on 5G & Future 6G Network Technologies

- Public bodies in charge:
 - Directorate-General for Enterprise/Ministry of Economy and Finance (coordinator)
 - French Ministry of Economy, Finances and Industrial and Digital Sovereignty.
 - National telecoms regulatory authority (ARCEP).
- Further information:
 - [News on Telecoms.com](https://www.newsontelecoms.com)
 - [Contact e-mail](mailto:contact@6gsnsia.eu)



5G/B5G/6G Activities in Germany

Funding Opportunities for R&D Projects

Description and public bodies in charge:

- At the **national level** there are several sources of grants, e.g.,:
 - BMBF (German Federal Ministry of Education and Research)
 - BMWi (Federal Ministry for Economic affairs and Energy)
- Each **Land** (region) funds its own initiatives, e.g., in Bayern via:
 - STMWK: (Science and art ministry of Bavaria)
 - STMWI: (Bavarian ministry of economic affairs, regional development an energy)
- New calls for proposals are announced each quarter. It is possible to also propose own ideas and ask for money to work on it. Funding rate for industry is around 40%, higher for SME and research institutions.

Further information:

- BMBF [website](#)
- BMWi [website](#)
- STMWK [website](#)
- STMWI [website](#)



Digitalization of the Society – Towards 6G

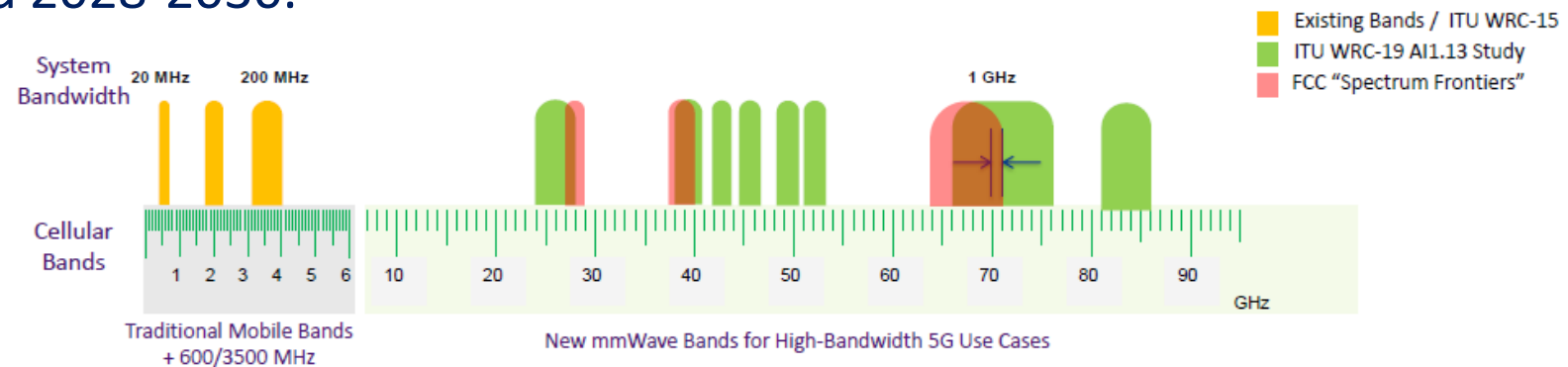
- Description: The frequency regulatory body of Germany BnetzA started in 2021 a funding program (176 M€ split in three years) calling for the ecosystem to address it forming consortia, under the label GAIA-X, with the scope of fostering a digital ecosystem in Europe. Out of the submitted 131 proposals, 16 were selected, were split in two sets and the first one composed of 11 projects managed to start activities in 2022. Additionally, a set of other activities focused on fostering the massive use of AI and increase the cybersecurity in the telco domain were started: a “Roadmap towards Standardization of AI” and an “Introduction to Blockchain”.



- Public bodies in charge:
 - Frequency regulatory body of Germany BnetzA
- Further information:
 - [Roadmap towards Standardization of AI](#)
 - [Introduction to Blockchain](#)
(in german)

5G Deployment and Frequency Bands

- Description: In Germany by 2025 the right of usage of frequencies in the ranges of 800 MHz, 2.6 GHz, and partially also 1.8 GHz are going to be redefined. That is part of a multi-year plan to rationalize the spectrum bands and to prepare of a smooth introduction of frequencies related to the forthcoming new 6G systems, expected to be standardized starting with 2025 and planned for market launch around 2028-2030.



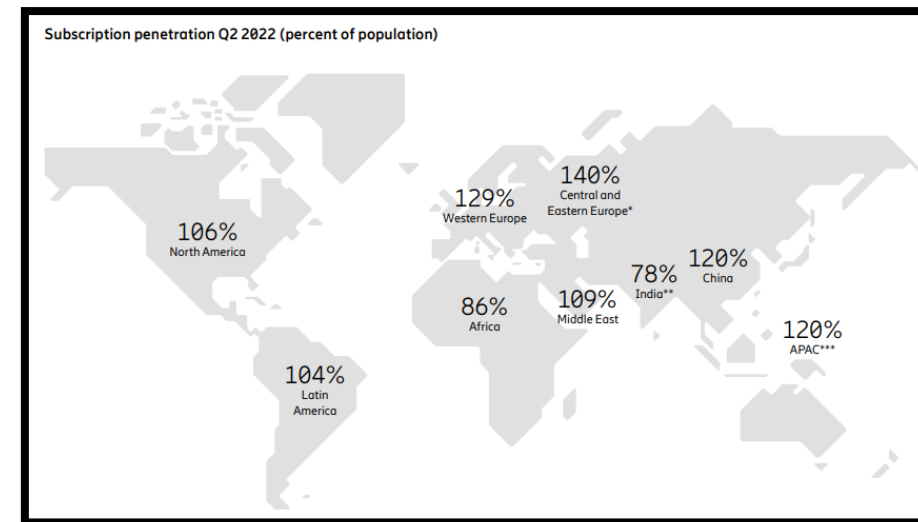
- Public bodies in charge:
 - Frequency regulatory body of Germany BnetzA
- Further information:
 - Website of [BnetzA](https://www.bnetz.de)



5G/B5G/6G Activities in Greece

Greek Users are Adopting 5G/B5G/6G

- Description: According to the Ericsson Mobility Market, Greece is adopting devices in order to be able to use new 5G/B5G/6G.
 - Greece has 5G network coverage of 65%
 - Within 2022, 26% of the users intended to upgrade their devices, in order to access 5G
 - 26% of the users realize they are using 5G network
 - 37% of the users will start/increase using AR apps in the real world, once 5G is adopted
- Public bodies in charge:
 - [Hellenic Telecommunications & Post Commission](#)
 - [Ministry of Digital Governance](#) (in Greek)
- Further information:
 - [Ericsson Mobility report](#)



Source: Ericsson Mobility Report Q2 2022

Vivo 6G White Paper

- Description: Vivo reports on 6G and specifically on services, potential and activation of the respective services. According to the white paper there is a new area of opportunity, the integration of sensory data and communication. Also the report indicates that 6G mobile data connectivity services will improve capacity, the rate at which data is transmitted and reliability. Specifically, the report focuses on the evolution of multiple-input multiple-output, reconfigurable smart surfaces and new waveforms.
- Further information:
 - [White paper](#)

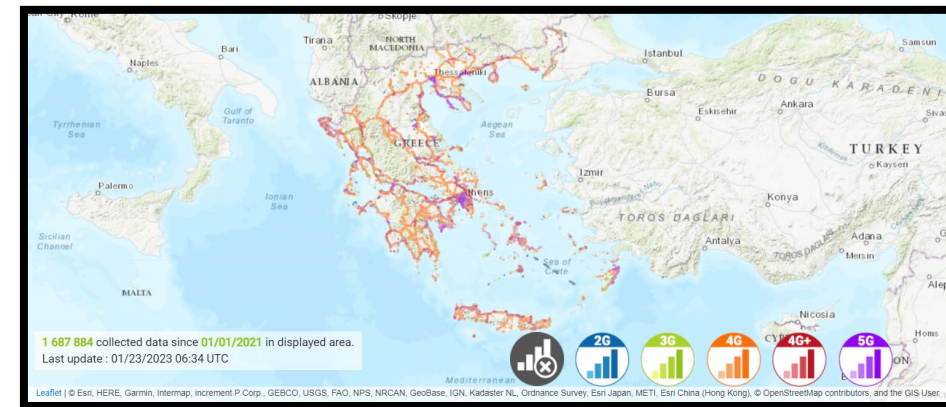




5G Coverage Expansion in Greece



- Description: Telecommunication companies expand their businesses, in order to meet the respective customer & services' demands.
 - **OTE/ COSMOTE** now covers 70% of Greece's population and is expecting to cover 90% by the end of 2023.
 - **Vodafone** covers 26 regions (cities) of Greece, also covering a significant part of the centre of Athens, Athens' suburbs, Thessaloniki.
 - **WIND** has recently merged with **Nova**, in order to provide fast and reliable internet connection, entertainment and digital transformation, having started the process of 5G transition in June 2022.
- Further information:
 - [European 5G Observatory](#)
 - [Telecompaper](#)
 - [Mononews.gr](#) (in Greek)



5G/B5G/6G Activities in Italy



The RESTART Program



- Description: RESTART is a comprehensive research program (Jan' 23- Feb'26, 116 M€) jointly carried out by universities, research centers, companies and public administrations. It includes 5G/6G networks; high-capacity fixed infrastructures, IoT, edge/core-cloud; applications and services in a variety of verticals. The program is organized along seven *missions*: Research, Labs, PoC and Demonstrators, Innovation and Tech. Transfer, Start-ups/Spin-offs; Education; PhD Programs; Communication, Standardization and Open-Source. The *research mission* comprises 14 structural (large scale) projects and 18 focused projects aimed to fill specific gaps (e.g., industrial).
- Public bodies in charge:
 - RESTART foundation
 - Ministero de la Università e della Ricerca
- Further information:
 - RESTART program [website](#)

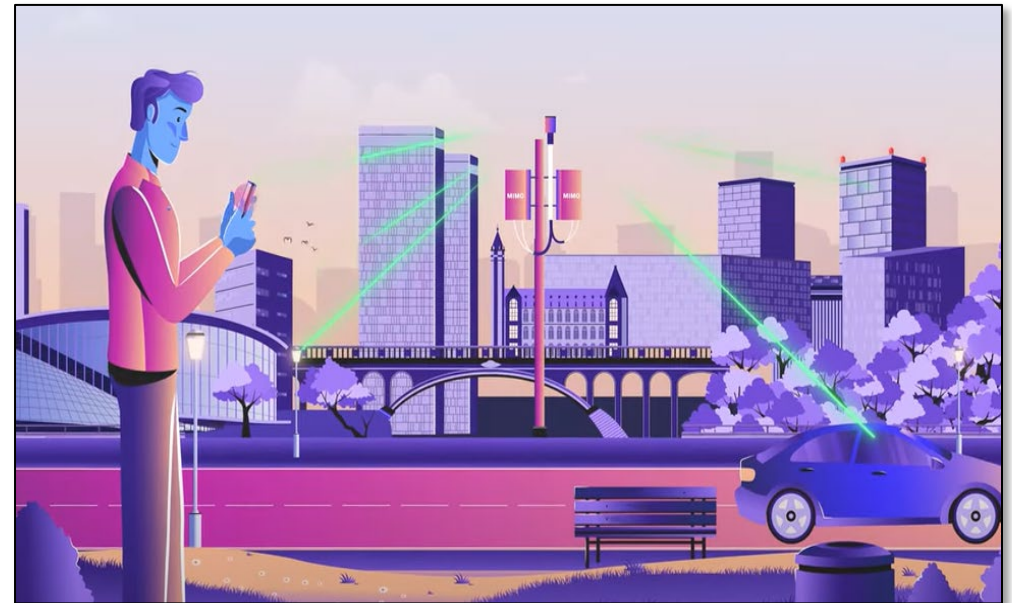




5G/B5G/6G Activities in Luxembourg

Luxembourg's 5G Strategy

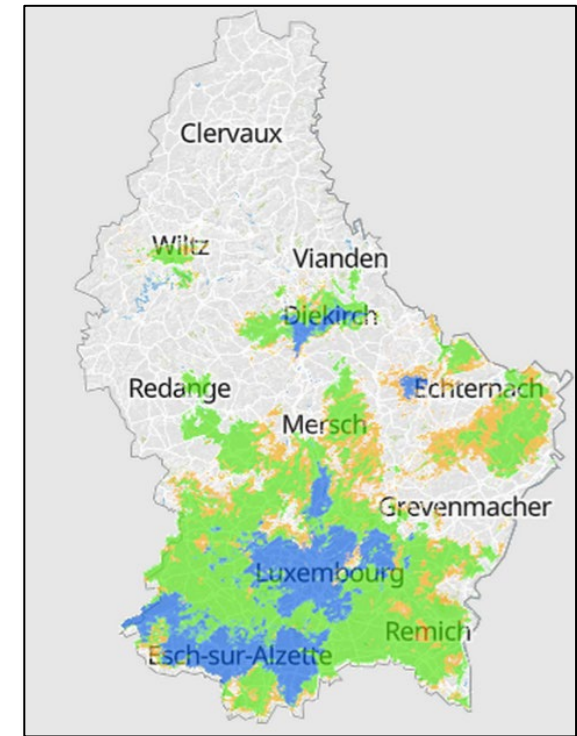
- Description: Luxembourg's 5G strategy was published at the end of 2018. It presents the importance of 5G, the role of public authorities, the plan for frequency auctions, regulatory aspects and the areas of importance for Luxembourg. Finally, it presents the roadmap for 5G deployment in Luxembourg
- Public bodies in charge:
 - Department of Media, Connectivity and Digital Policy (SMC)
 - Institut Luxembourgeois de Régulation (ILR)
- Further information:
 - [Luxembourg's 5G Strategy](#)
 - See next slides



Spectrum Regulation & Coverage

- Spectrum regulation:
 - Spectrum auction for the 700 MHz and 3600 MHz bands
 - Public consultation (26 GHz band)
 - [Results](#) of the public consultations and the auction.

- 5G Coverage as of May 2022:
 - The 700 MHz and 3.6 GHz bands were assigned in 2019. MNOs started deploying antennas and are operational with first commercial 5G services since autumn 2020. National coverage is progressing well according to the data provided by telecom operators.



5G coverage in Luxembourg (blue: excellent, green: good, and orange: satisfactory)

Digital Luxembourg



Goal: To strengthen Luxembourg's digitalization via three key missions: enable new projects, support existing initiatives & inform the nation of LU's digital efforts. See details [here](#).

Government + Agencies + Research + Industry = Success!

Two call for projects launched by SMC, currently 11 on-going



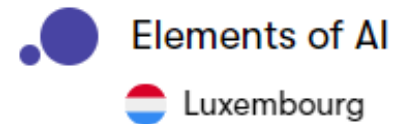
Highlighting the socio-economic benefit and added-value for citizens



5G and Beyond in Luxembourg



- Continuously building the ecosystem
 - Connecting tomorrow, with the “5G, broadband and beyond”
 - 5G Projects “get together”
 - Luxembourg Internet Days
- Training and upskilling
 - Elements of AI
 - “Skills and Jobs” [workshops](#)
- Beyond 5G:
 - FWA is part of the Ultra-high speed broadband strategy 2021-2025
 - Luxembourg has been a founding member of the Quantum Key Initiative
 - Luxembourg research community and 6G



Investing in Future Key Technology

- Artificial Intelligence and High-Performance Computing:

- A strategic vision for Luxembourg with a human-center approach: with data multiplying at an incredible speed, AI is the key to turning it into actionable solutions that benefit the population on a daily basis
- « MeluXina » - High-performance computing in Luxembourg



- Quantum Communications:

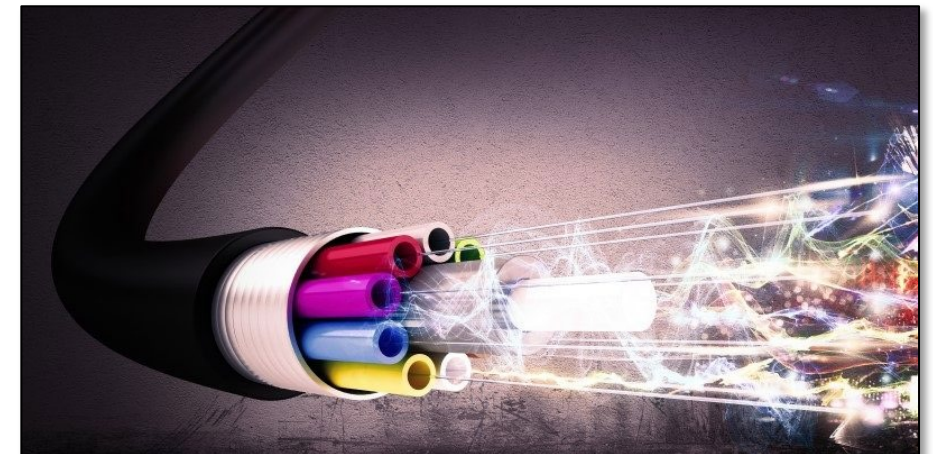


- Luxembourg's Quantum Communications Infrastructure (LuxQCI) project is coordinated by the Department of Media Telecommunications and Digital Policy (SMC) of the Luxembourg Ministry of State and is supported by the European Space Agency (ESA) and the Luxembourg Space Agency (LSA) under the Luxembourg National LuxIMPULSE programme.
- LuxQCI is a secure communication shield comprising satellite & terrestrial network for cybersecurity



High Speed Broadband Strategy

- Description: The Ultra High Speed Broadband Strategy for 2021-2025 complements the 5G next-generation mobile services strategy. Its objectives are:
 - Making connectivity accessible to everyone
 - Accelerating the transition of households and businesses to more efficient and sustainable technologies
 - Accelerating the deployment of future-proof infrastructures
 - Improving transparency and strengthening consumer protection
 - Developing Luxembourg as the platform of choice for the ICT services of today and tomorrow
- Public body in charge:
 - Department of Media, Telecommunications and Digital Policy (SMC)
- Further information:
 - High-speed broadband strategy





MyConnectivity Economic Interest Group



- Description: The MyConnectivity economic interest group group was jointly created in December 2021 by the State, via the Media, Connectivity and Digital Policy Service, and by the LU-CIX Management Economic Interest Group, which contributes with its close contact with players in the field of telecommunications and connectivity. The objectives are the following:
 - To implement the new Broadband Strategy
 - To accelerate and improve the connectivity of private households and businesses in the Grand Duchy of Luxembourg
 - To coordinate the 5G ecosystem in Luxembourg
- Public body in charge:
 - Department of Media, Telecommunications and Digital Policy (SMC)
 - LU-CIX Management Economic Interest Group
- Further information:
 - [MyConnectivity website](#)





5G/B5G/6G Activities in The Netherlands



Strategy Digital Economy



- Description: Comprehensive policy strategy, related to the EU 2030 digital compass. Maintaining and strengthening a secure, reliable and high-quality digital infrastructure is one of the priorities. Specific plans related to 5G: awarding the 3,5 GHz (2023) and 26 GHz bands and strengthening knowledge and innovation in areas such as 5G/6G through public-private partnerships.
- Public bodies in charge:
 - Ministry of Economic Affairs and Climate Policy
- Further information:
 - [Nederland Digital](#) (in Dutch)





Future Network Services

- Description: National 6G R&D and Innovation program proposed by TNO and technical universities in Delft and Eindhoven in close co-operation with Dutch government, with the objective to stimulate precompetitive R&D in 6G hardware and software for next generation mobile networks. 60 partners will work together to develop new generation of intelligent antenna's, (AI) network infrastructure and innovative 6G-applications in the healthcare, logistics, industry and energy sectors. A national 6G-testbed will facilitate the testing of components and applications. Total program budget: €300 Million over 6 years.

- Public bodies involved:
 - Ministry of Economic Affairs and Climate Policy
 - Topsector ICT
- Further information:
 - Future Network Services



6G FUTURE NETWORK SERVICES



Innovation Center Connected Solutions (ICCS)

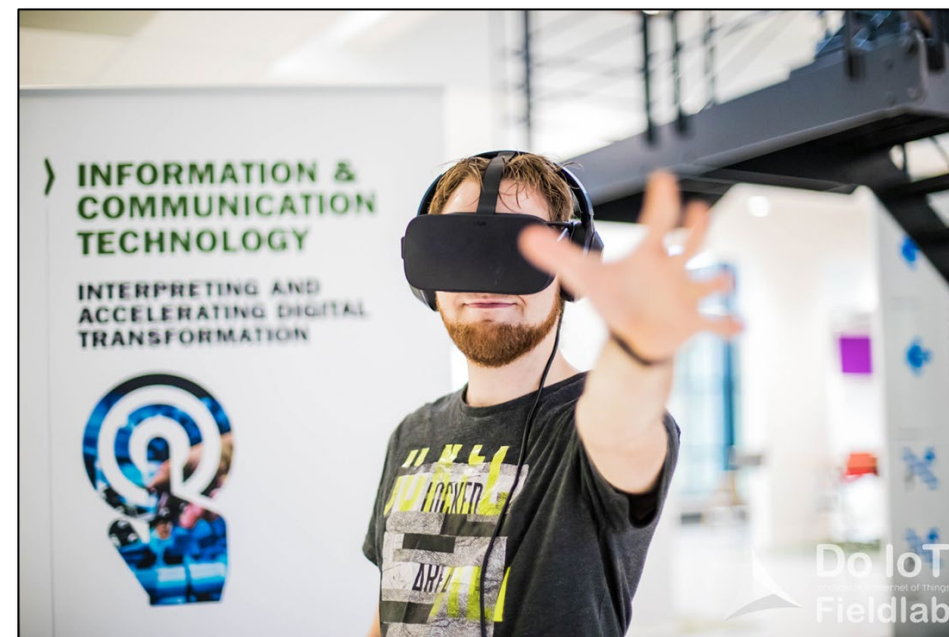


- Description: ICCS is the successor to 5Groningen : the 11 partners of 5Groningen have decided to make a lasting contribution to the innovation ecosystem in the Northern Netherlands in the form of a center for innovative applications with the latest communication technology. The mission of ICCS is, together with its partners, the innovation center develops solutions for mobility, energy transition, agriculture and care from a rural region, using the latest communication technology to sustainably stimulate the quality of life and broad prosperity in the Netherlands.
- Public bodies in charge:
 - Hanze Hogeschool Groningen
- Further information:
 - The ICCS is not just about the technology, but about its application. The “5G” designation is being dropped, as connectivity to wireless technology will continue to evolve with new generations and standards beyond 5G.
 - Strong anchoring in research and education of participating institutions and connection and collaboration with other (inter) national living labs and innovation clusters.



Do IoT FieldLab

- Description: Do IoT Fieldlab drives the acceleration of innovation in the field of Internet of Things (IoT). 5G mobile communication offers a great opportunity for the large-scale introduction of the Internet of Things. The fast connections, high reliability and short response times of 5G make it possible to bring new applications to the market in the areas of mobility, logistics, agriculture, health and safety. The Fieldlab supports the development of these new applications.
- Public bodies in charge:
 - Province of Zuid Holland
 - Metropool Region Rotterdam-The Hague
 - Holland Rijnland Region
 - Municipalities of Delft and Katwijk
- Further information:
 - Do IoT Field Lab [website](#)
 - [News](#) on TUDelft website



5GHub

- Description: 5G Hub in Brainport Eindhoven is a collaboration between Brainport Development, High Tech Campus, Ericsson, and VodafoneZiggo. This co-creation space researches and tests the possibilities of new technologies and stimulates innovative applications with its ecosystem of partners. This not only concerns 5G, but also, for example, artificial intelligence, virtual reality, augmented reality, blockchain and photonics.
- Public bodies in charge:
 - Brainport Development is the economic development company that stimulates innovation and growth in the region on behalf of the 21 municipalities in Southeast Brabant
- Further information:
 - 5G Hub [website](#)



Proeftuin op de Noordzee

- Description: Off the coast of The Hague, just outside the port of Scheveningen, the Municipality of The Hague, KPN, TU Delft, TNO, Sailing Innovation Centre, Svašek Hydraulics and the Watersportverbond are working together on an advanced test area of 10 x 10 nautical miles. The exceptional environmental factors of water, wind and currents make this 'smartest part of the North Sea unique in the world. The field lab enables start-ups and SMEs to test and demonstrate innovative products outside the classical laboratory, in real practical conditions on the water and with end users!
- Public bodies in charge:
 - The Municipality of The Hague.
- Further information:
 - Proeftuin op de Noordzee [website](#)



Proeftuin
op de
Noordzee



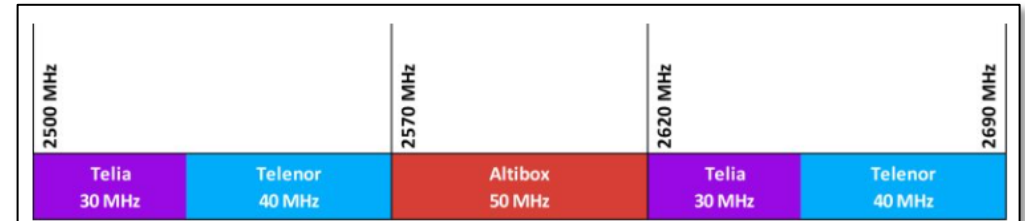
5G/B5G/6G Activities in Norway



5G Spectrum in Norway



- Description: From 1st January 2023, e.g., industry or broadband actors can apply for local frequencies in the 3.8-4.2 GHz band (smaller geographic areas). The plan is to harmonize regulation with EU. It can be used for testing and commercial or other purposes. This follows from the auctions for 3.6 GHz and 2.6 GHz that were completed in September 2021, with four actors acquiring spectrum.
- Public body in charge:
 - Norwegian Communication Authority ([Nkom](#))
- Further information (in Norwegian):
 - [News](#) on Nkom website: “2021 auctions for 5G related frequencies and special regulations”.



Figur 1: Innplassering i 2,6 GHz-båndet



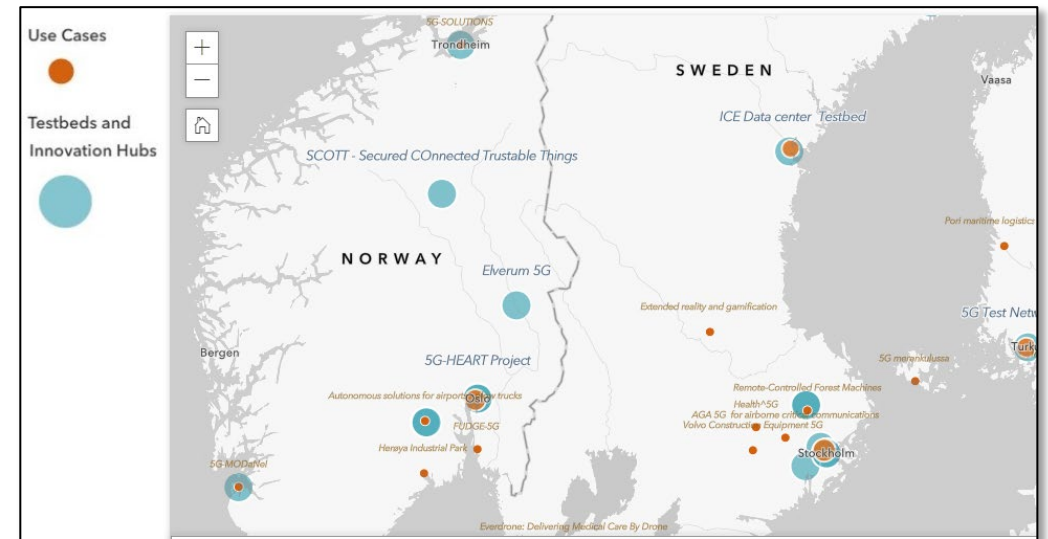
Figur 2: Innplassering i 3,6 GHz-båndet

Nkom, 2021, Four Norwegian holders of frequencies

Initiatives for Transnational Collaboration

Description:

- In 2022, the [Nordic-Baltic 5G monitoring tool](#) was launched.
- In 2021, [Nordic and Baltic ministers for digitalisation](#) promoted digital inclusion as part of digital transformation.
- In 2020, the Nordic Council of Ministers agreed on the [Ministerial Declaration Digital North 2.0](#).
- In 2019, [Nordic and Baltic ministers reinforced](#) the initiative with another a Nordic-Baltic 5G strategy.
- In 2018, the [Nordic prime ministers signed](#) a 5G Letter of Intent.
- Topics for collaboration:
 - Enable 5G testing
 - Coordinate 5G frequency bands
 - Remove obstacles
 - Encourage certain sectors, e.g. transport, emergency



Nordic-Baltic 5G Monitoring tool, Nordregio, 2022

Further information:

- [Nordregio](#) – driving Nordic-Baltic 5G monitoring tool
- [Letter of Intent - Development of 5G in the Nordic countries, 2018](#)
- Nordic- Baltic [5G Strategy, 2019](#)
- [Nordic co-operation](#) on digitalisation and innovation.





Public funding 5G research and innovation



Description: Two publicly-funded research calls have led to 5G-6G relevant research in Norway.

- ICTplus (Norwegian).
 - [Cooperative Human Activity Recognition and Localization of Healthcare and Wellbeing](#), U. Adger.
 - [National Hybrid Positioning Service for the future Digital and Autonomous society](#), Statens Kartverk.
 - [Sequences and Their Applications](#), U. Bergen
 - [5G Management and Orchestration for Data and Network Integration](#), U. Stavanger
 - [Cooperative Human Activity Recognition and Localization for Healthcare and Wellbeing](#), U. Agder
 - [Lightweight Cryptography for Future Smart Networks](#), NTNU, Gjøvik
- National research infrastructure
 - [Reconfigurable Radio Network Platform](#)
 - [Norwegian Infrastructure for drone-based research, mapping and monitoring in the coastal zone \(5G-relevant\)](#)
 - [Norwegian centre for Minimally invasive Image guided Therapy and medical technologies](#)

Public body in charge:

- The Norwegian Research [Council](#)



[Foto: Jonas Bendiksen](#)

European Digital Innovation Hubs & Innovation Norway

- Description: As of 31st December 2022, there are five fully operational Digital Innovation Hubs in Norway. The hubs and initiatives belong to the backbone for Norwegian 5G development.
- Public bodies in charge:
 - [Innovation Norway](#)
 - [Overview Norwegian hubs](#)
 - [European Digital Innovation Hubs](#)
- Further information:
 - “Digital Innovation Hubs [Handbook](#)” at the repository of the Joint Research Council.



From Kalpaka et. al., 2020, Digital Innovation Hubs as policy instruments to boost digitalisation of SMEs



Norwegian 5G Industry Forum



- Description: In May 2022, the Norwegian 5G Industry Forum was initiated under the auspices of the Norwegian government. Its purpose is to drive the use of 5G-technology in manufacturing, industry, and in the public sector. The forum is run by Digital Norway and NKOM. Partners broadly recruited from the private and public sectors.
- Public bodies in charge:
 - Norwegian Communications Authority (NKOM)
 - Digital Norway
- Further information:
 - [Press release](#) on the launch of the Norwegian 5G Industry Forum (in Norwegian).



Minister of Industry Jan Christian Vetre, Minister of Local Government ; Sigbjørn Gjelsvik, Director Digital Norway Liv Dingsør, Director Norwegian Communications Authority Pål Wien Espen.

5G/B5G/6G Activities in Poland

Frequency Bands for Trials and Tests

- Description: The Office of Electronic Communications (UKE) has issued permits to MNOs, telecoms companies or technical universities to conduct 5G tests (normally for free) in the following frequency bands:
 - 700 MHz (2x5 MHz);
 - 800 MHz (2x5 MHz);
 - 2100 MHz (2x14,8 MHz);
 - 3400-3800 MHz (block widths from 40 to 200 MHz);
 - 26 GHz (block widths from 100 to 200 MHz);
 - 28 GHz (block widths from 100 MHz to 1 GHz).
- Public bodies in charge:
 - Office of Electronic Communications (UKE)
- Further information:
 - Office of Electronic Communications [website](#).



Office of Electronic Communications

Commercial Frequency Bands

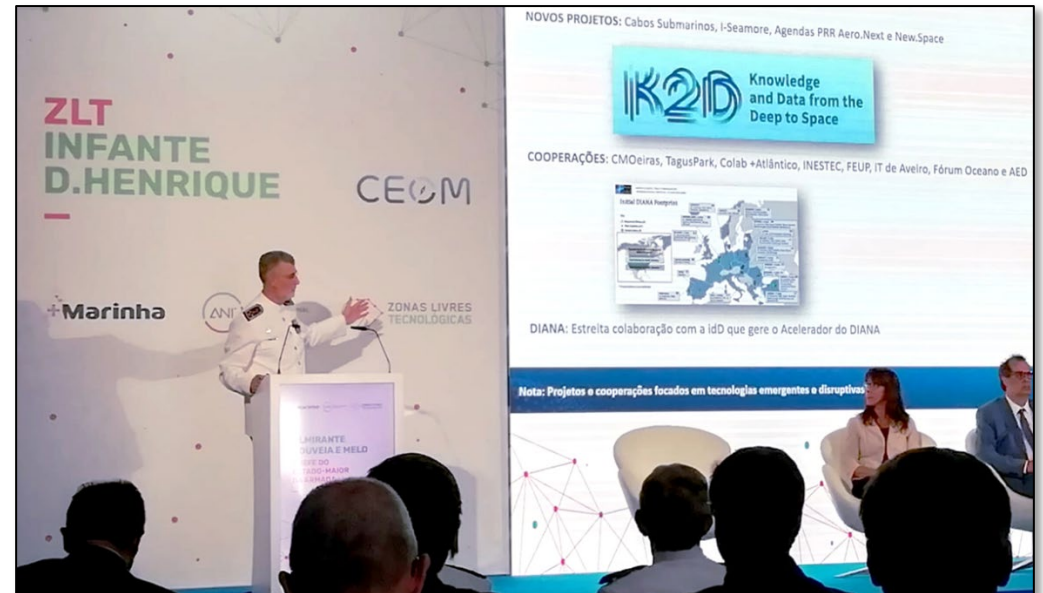
- Description: The following frequency bands are planned for 5G networks:
 - 3480-3800 MHz: auction in Q1/Q2 2023; blocks of 4x80 MHz.
 - 700 MHz: distribution process planned for Q3/Q4 2023.
 - 26 GHz: distribution process planned for 2023 depending on demand and availability of radio equipment (at least 1 GHz).
 - 3410-3480 MHz: to be allocated as dedicated spectrum to private 5G networks.However, MNOs have already launched commercial 5G networks operating in the 1800 MHz, 2100 MHz, 2600 MHz (FDD and TDD) frequency bands.
- Public bodies in charge:
 - Office of Electronic Communications (UKE)
- Further information:
 - Office of Electronic Communications [website](#).



5G/B5G/6G Activities in Portugal

Free Technological 5G Zones

- Description: Geographically delimited spaces where it is possible to safely test and demonstrate trial technologies, services, products and innovative solutions, in real conditions (i.e., sandbox, living labs). Aimed towards enterprises, research centers, etc.
- Public bodies in charge:
 - Agência Nacional de Inovação (ANI)
- Further information:
 - [News](#) on the inauguration of the first Portuguese FTZ at ZLT Infante D. Henrique.



26 GHz consultation

- Description: The Portuguese National Communication Authority (ANACOM) is currently undergoing a consultation effort (until the 31st of January 2023) about the utilization of the 26 GHz band in Portugal.
- Public bodies in charge:
 - Portuguese National Communication Authority (ANACOM)
- Further information:
 - News: ANACOM launches public consultation on the use of the 26 GHz band for the development of 5G





Portuguese Recovery Plan – Digital Transition



- Description: Under the framework of Next Generation EU, established by the European council, spans the Portuguese Recovery Plan with 3 clear dimension, one of these being the Digital transition with an overall investment of 2.5 B€. The aim of the Digital transition dimension is to promote the adoption of technologies, including 5G and beyond, that foster the digital revolution in areas like : the empowerment and digital inclusion of people through education, training in digital skills and promotion of digital literacy, digital transformation of the business sector and digitization of the State.
- Public bodies in charge:
 - Government of the Portuguese Republic – Mission structure “Recover Portugal” (Resolução do Conselho de Ministros nº 46-B/2021 de 04 de maio de 2021)
- Further information:
 - News in the portal of the Portuguese Recovery Plan.





Portuguese Recovery Plan – Digital Transition: Companies 4.0

- Description: Companies 4.0 is a component of the dimension Digital transition of the Portuguese Recovery Plan (PRR) . The aim of this component is to reinforce the digitization of companies and catch up with the digital transition process. For that purpose a financial investment of 650M€ is foreseen under 3 lines of investment : Digital Training of Companies (100 M€), Digital transition of Companies (450M€), and Catalyzing the digital transition of companies (100 M€).

Pilot actions foreseen/being implemented: Academia Portugal Digital – platform and program for the development of large-scale digital skills; Employment + Digital 2025 – training program in digital technologies; and National Network of Test Beds – Creation of a national network of test beds through infrastructures that aim to create the necessary conditions for companies to develop and test new products and services, and to foster digitalization among others initiatives.

- Public bodies in charge:
 - Support Institute for small and medium-sized companies ([IAPMEI](#))
- Further information:
 - [Companies 4.0](#) at PRR website

RECOVERAR PORTUGAL
 Recuperar Portugal
 Enterprises 4.0

RECOVERAR PORTUGAL PRR MONITORIZAÇÃO CANDIDATURAS FAZS EN Q

C10

Enhancing the digitalisation of enterprises and catching up with the digital transition process

This component, with the specific goal of enhancing the digitalisation of enterprises, aims at catching up with the digital transition process, allowing access to knowledge and digital technologies, balanced inclusion of women and men, incorporation of remote working tools and methodologies, creation of new digital channels for marketing and selling products and services, adoption of a culture of experimentation and innovation, strengthening of the national entrepreneurial ecosystem, and incorporation of disruptive technologies in enterprises' value propositions.

Reforms

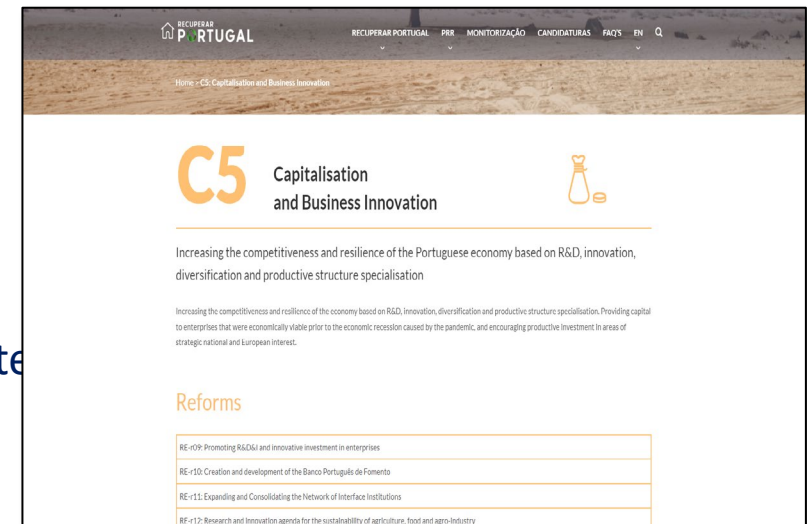
TD-C10: Digital transition of business community

Investments

TD-C16-01: Digital Empowerment of Enterprises	100 M	>
TD-C16-02: Digital Transition of Enterprises	450 M	>
TD-C16-03: Catalyzing the Digital Transition of Enterprises	100 M	>

Portuguese Recovery Plan –Resilience: Capitalization and Business Innovation

- Description: Capitalisation and Business Innovation is a component of another dimension of the Portuguese Recovery Plan (PRR) called Resilience . The aim of the C5 component is to increase the competitiveness and resilience of the economy based on R&D, innovation, diversification and productive structure specialisation. For that purpose, a financial investment of 651M€ is being applied under investments RE-C05-i01: Business Innovation mobilization Agendas/Alliances and RE-C05-i03: Research and innovation agenda for the sustainability of agriculture, food and agro-industry both these lines of investment addresses 5G and 6G technologies in several multidomain, multifactored projects.
- Public bodies in charge:
 - Support Institute for small and medium-sized companies ([IAPMEI](#))
- Further information:
 - [Capitalization and business innovation](#) at PRR website



Portuguese Recovery Plan – Resilience: Bussiness Innovation Mobilization Agendas/Alliances



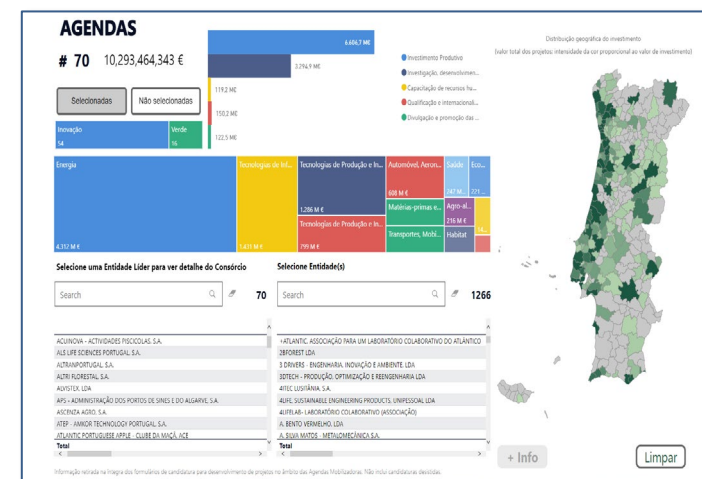
- Description: The Mobilising Agendas/Alliances for business innovation, with emphasis on reindustrialisation, aim to accelerate the structural transformation of the Portuguese economy, improving its specialisation profile through the formation of solid and structured consortia that guarantee the development, diversification and specialisation of national value chains. The thematic areas to be supported are aligned with the smart strategic priorities defined in the National Research and Innovation Strategy for Smart Specialisation (ENEI), and include the following: **Information and Communication Technologies**, Raw Materials and Materials; Manufacturing industries and technologies; Automotive, Aeronautics and Space, Transport, Mobility and Logistics, Health, Tourism and Cultural, Creative and Audio-visual Industries. Several approved projects, under these strategic priorities, address 5G/6G technologies.

- Public bodies in charge:

- Support Institute for small and medium-sized companies ([IAPMEI](#))

- Further information:

- [Bussiness Innovation Mobilization](#) at PRR webiste



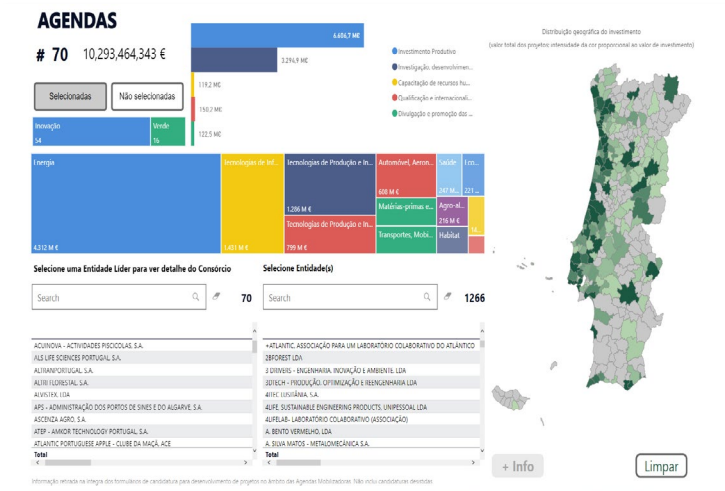
Portuguese Recovery Plan – Resilience: Business Innovation Mobilization Agendas/Alliances (cont'd)



- Description: The Mobilising Agendas/Alliances for business innovation has approved 53 projects with a total budget of up to 7.5B€. Most of the approved projects, under these strategic priorities, address to some extent 5G/6G technologies:
 - Energy: 5 projects, up to 2B€, 120 different entities.
 - Product industries and production technologies: 15 projects, up to 2B€, 400 different entities.
 - Logistics, Mobility and Transport: 4 projects, up to 680 M€, 145 different entities.
 - Production technologies and Process Industries: 6 projects, up to 670 M€, 169 different entities.
 - Space, Aeronautics and Auto – 5 projects, up to 580 M€, 104 different entities.

- Public bodies in charge:
 - Support Institute for small and medium-sized companies ([IAPMEI](#))

- Further information:
 - [Call website](#)





Release of Strategic Documents by ANACOM: Measurement of Electromagnetic fields



- Description: The aim of this study is to evaluate the impact of 5G, in terms of exposure of the general population to EMF, and present the result of measurements taken between June and October 2020 in the vicinity of stations conducting 5G pilot tests in the 3.4-3.8 GHz (3.6 GHz) band, which were authorized by ANACOM, within the scope of its powers. EMF measurements were performed at five locations (hereinafter referred to as “points”), in the vicinity of four different 5G networks.
- Public bodies in charge:
 - ANACOM - Portuguese Communications Authority
- Further information:
 - ANACOM’s [Portal](#)



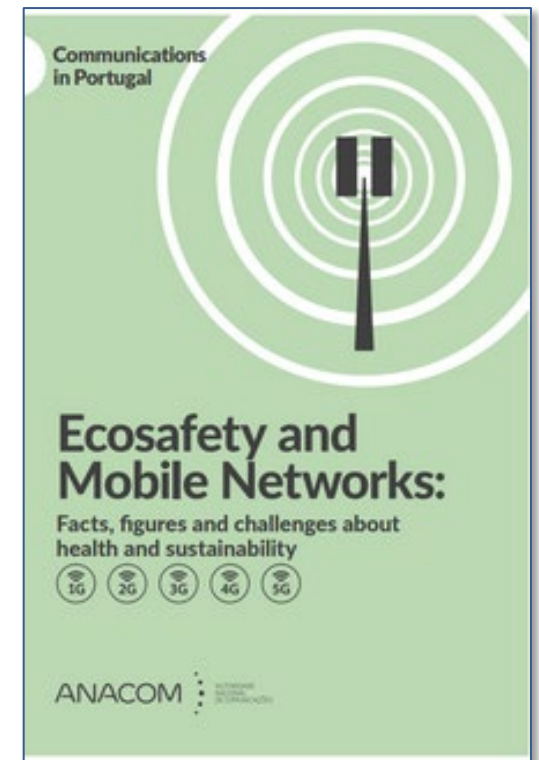
Release of Strategic Documents by ANACOM: Mobile Networks and Health

- Description: In this guide, ANACOM presents information on the possible effects of the fifth mobile generation (5G) on health, accompanying the intense debate in Portugal and on the international scene on this matter. This document frames the discussion of safety standards and their expression in the national case and addresses a set of key questions and the respective answers and indicates the sources for their development.
- Public bodies in charge:
 - ANACOM - Portuguese Communications Authority
- Further information:
 - [Report](#)



Release of Strategic Documents by ANACOM: Eco-security and Mobile Networks

- Description: With this guide, ANACOM intends to contribute to clarifying doubts regarding the impact of mobile networks on human health and environmental balance. The document reviews, updates and expands a the guide “Mobile networks and health - facts, data and challenges”. Modern communication technologies, namely radio, result from the progress achieved at the frontier of knowledge in science and engineering. With a very wide development potential, innovations in this area are, and should remain, under scrutiny as they are often associated with doubts or controversies about their safety and impact on the global ecosystem.
- Public bodies in charge:
 - ANACOM - Portuguese Communications Authority
- Further information:
 - [Report](#)



PORTUGUESE DIGITAL INNOVATION HUBS

- Description: The Digital Innovation Hubs are intended to be a collaborative networks established by centers of specific digital competences - aim to encourage the adoption of advanced digital technologies by companies, in particular SMEs, through the development, testing and experimentation of these technologies. This National Network will be articulated with the European Network of Digital Innovation Hubs, being framed by the European framework programs for 2021-2027 of the European Commission for R&D and Innovation (Horizon 2020 and Digital Europe).
- Public bodies in charge:
 - ANI – Portuguese National Agency for Innovation
- Further information:
 - [News](#) on Digital Innovation Hubs on ANI's website





PORTUGUESE DIGITAL INNOVATION HUBS: CONNECTED5G and PTCentroDiH



- Description:
 - **PTCentroDIH** - A regional hub to support small and medium-sized enterprises addressing the digital transformation challenge ahead.
 - **CONNECT5G** - Aims to become a national and European reference DIH, by providing advanced services in the areas of integrated connectivity systems and CPS through the combination of 5G, cloud systems, IoT, Big Data capabilities, to SMEs and public organizations, enabling them to access the latest knowledge, expertise and technology for testing and experimenting with digital innovations relevant to their activity, products, processes or business models.

- Public bodies in charge:
 - ANI – Portuguese National Agency for Innovation

- Further information:
 - PTCentroDIH [website](#)
 - CONNECT5G [website](#)



5G/B5G/6G Activities in Romania



5G Spectrum Auction



- Description: Following a spectrum auction organized by the Romanian Authority for Management and Regulation in Communications (ANCOM), three major Romanian operators (Vodafone, Orange, Digi) won 420 MHz in the 700 MHz, 1500 MHz, 2600 MHz and 3400-3800 MHz bands. In total, the auction raised €432.6 million. Only 76% of the total spectrum was sold. Auction winners will be required to cover 70% of the country’s population as well as most urban areas, highways, international airports and railways.

- Public body in charge:
 - Romanian Authority for Management and Regulation in Communications ([ANCOM](#))
- Further information:
 - ANCOM [press release](#)

Operator	Spectrum awarded below 1 GHz (MHz)		Spectrum awarded between 1 and 3 GHz (MHz)		Spectrum awarded above 3 GHz (MHz)	
	before the 2022 auction	after the 2022 auction	before the 2022 auction	after the 2022 auction	before the 2022 auction	after the 2022 auction
Orange	40 (2 x 20)	60 (2 x 30)	110 (2 x 55)	150 (2x55 + 1x40)	115	160
Vodafone	40 (2 x 20)	50 (2 x 25)	90 (2 x 45)	90 (2 x 45)	40	100
RCS&RDS	20 (2 x 10)	20 (2 x 10)	115 (2x35 + 1x45)	155 (2x55 + 1x45)	50	50
Telekom	30 (2 x 15)	30 (2 x 15)	100 (2 x 50)	100 (2 x 50)	-	-
Other	-	-	-	-	55	-
TOTAL	130 (2 x 65)	160 (2 x 80)	415 (2x185 + 1x45)	495 (2x205 + 1x85)	260 (until 31.12.2025)	310 (from 01.01.2026)

Adoption of National Smart Specialisation Strategy and National RDI Plan 2022-2027

- Description: Romania adopted its National Smart Specialisation Strategy with key targets enabled by 5G and B5G: Fog/Edge Computing integrated with geospatial techniques, new materials for B5G communications, Agriculture 4.0, Health and wellbeing, environmental sustainability, Artificial Intelligence, Blockchain, IoT. The associated National RDI Plan 2022-2027 was also adopted with an extra focus on technology transfer in the field of 5G and B5G and stimulating partnerships between national research institutes, research organizations and the Romanian private sector,
- Public body in charge:
 - Ministry of Research, Innovation and Digitalization
- Further information:
 - National [Smart Specialisation Strategy](#).
 - National [RDI Plan](#)



National Reference Center on Quantum Communications

- Description: The program is aimed at the establishment of a national R&D center for the assimilation of emerging technologies in the field of quantum telecommunications. The role is to make a decisive contribution and support the actions of Academia and Industry in Romania for the development of an ecosystem in the field of quantum telecommunications. This center will ensure the premises for the participation of Romanian entities in R&D and infrastructure projects in the field of quantum telecommunications financed by the EU programs.
- Public body in charge:
 - Ministry of Research, Innovation and Digitalization
 - Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI).
- Further information:
 - QUANTEC [Call for Proposals](#).





Establishment of a National Competence Center on Climate-Neutral Smart Cities

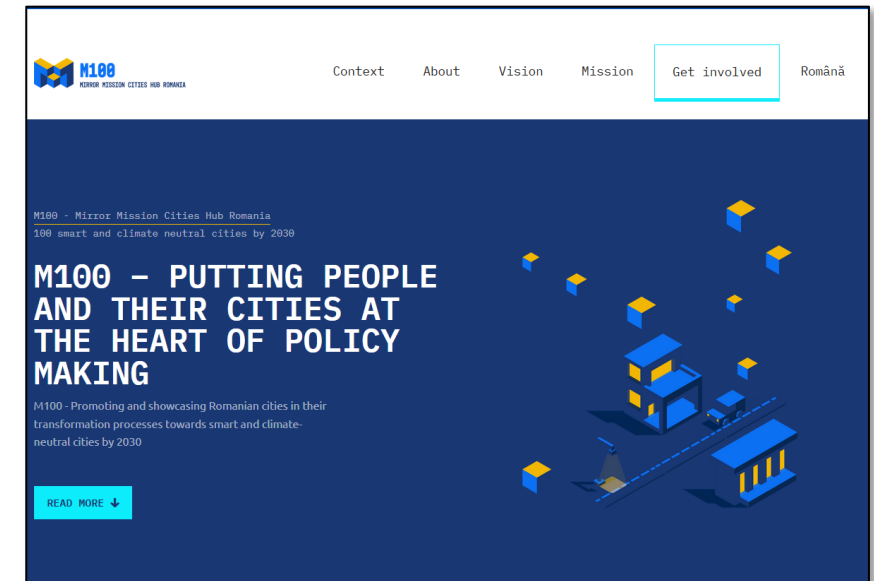


- Description: Within Romania's National Recovery and Resilience Plan (part of EU's RRF) the creation of 5 Competence Centers has started by establishing PPPs to create the critical mass, interdisciplinarity and skills necessary to address the societal challenges associated with each of the five EU missions within HE. The project NetZeRoCities - National Competence Centre and solutions for the development of Climate Neutral and Smart Cities has been tasked with the creation of a National Competence Center on Climate-Neutral Smart Cities and a B5G living lab within a university campus.
- Public body in charge:
 - Ministry of Research, Innovation and Digitalization
- Further information:
 - National Competence Centers [Call for Proposals](#).
 - In the [media](#)



Launching the Mirror Missions Cities Hub

- Description: Romania establishes the "Mirror Mission Cities Hub Romania", for the implementation of the HE Mission "100 smart and climate-neutral cities by 2030". The Hub facilitates dialogue between central, regional and local public authorities, universities and public research-innovation institutes, civil society and citizens with the aim of a maximum impact of Romanian presence within the Mission. Romanian Research Executive Unit UEFISCDI is leading the HE CapaCITIES project aiming to shape a European environment conducive to urban climate neutrality transitions for national, regional and local authorities.
- Public body in charge:
 - Ministry of Research, Innovation and Digitalization
 - Executive Agency for Higher Education, Research, Development and Innovation Funding ([UEFISCDI](#)).
- Further information:
 - [Mirror Mission Cities Hub Romania](#)
 - CapaCITIES project [website](#)



5G/B5G/6G Activities in Serbia

5G Spectrum auction planned for 2023

- Description: Public auction for 5G spectrum is postponed to 2023. Operators have already invested into equipment for 5G, and are waiting for the public auction to be held.

		Available FDD	Available TDD
1.	700 MHz	2x30 MHz	15 MHz (SDL)
2.	900 MHz	2x1 MHz	
3.	2100 MHz	2x15 MHz	
4.	2600 MHz	2x70 MHz	30 MHz
5.	3500 MHz		400 MHz

- Public bodies in charge:

- Regulatory agency for electronic communications and postal services

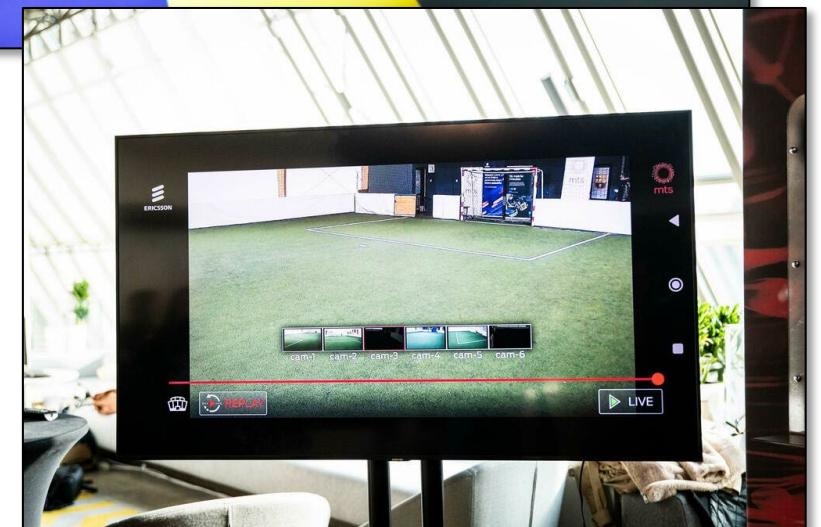
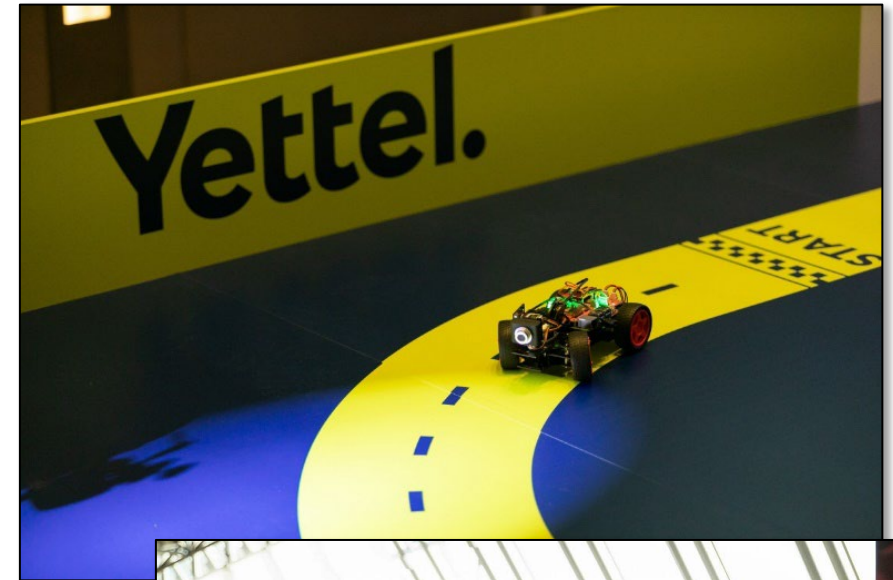
- Operators:

- Telekom Serbia
- Telenor
- A1 Serbia
- Serbia Broadband (SBB) – new operator for mobile services.



5G current situation in Serbia

- Demonstration at Telfor conference in Belgrade:
 - Yettel, in cooperation with CETIN, presented at the 30th Telfor conference in November 2022. the potential of the fifth generation 5G network and announced that it is preparing extensively for its introduction in Serbia.
 - Telekom Srbija and Ericsson demonstrated the possibilities of 5G technology in the domain of enriching customer experience during watching sports or other entertainment content.



5G/B5G/6G Activities in Spain

UNICO R&D program in 6G/beyond 5G technologies



- Description: This program is aimed to fund R&D projects aligned with the strategic research agenda of the JU SNS and stimulate public-private collaborations, notably with SMEs, in Spain. The 2022 call, with a total budget allocation of 116 Meuro, comprises two distinctive sub-programmes aimed at (i) Research Infrastructures and Scientific Equipment; and (ii) Research Project in Beyond 5G networks. This is in addition to the 95 Meuro already invested in the 2021 call. Currently, project proposals are under evaluation.
- Public bodies in charge:
 - Ministry of Economic Affairs and Digital Transformation
 - State Secretary of Telecommunications and Digital Transformation.
- Further information:
 - UNICO R&D 6G program [Call for Proposals](#).



Spectrum Auctions for the 26 GHz Band

- Description: Movistar, Vodafone, Orange and Globe Operator participated in the bids for spectrum in the 26 GHz band that was auctioned at the national and regional levels. The total amount paid for the concessions granted amounts to 36.2 million euros for a 20-year period. After this auction in 2022, Spain has become one of the first EU countries to make available virtually then entire 26 GHz band to accelerate the deployment of 5G networks and services.
- Public body in charge:
 - Ministry of Economic Affairs and Digital Transformation
- Further information:
 - [Press release](#) on the outcome of the auction.
 - [News](#) at the Ministry website



ETSI 7# MCX Plugtest

- Description: Ministry of Economic Affairs and Digital Transformation and University of Malaga (ITIS) supports with frequencies and equipment for ETSI 7# MCX Plugtest. During the event, with more than 100 participants, features like end-to-end eMBMS based MCX were tested for the first time.
- Public body in charge:
 - Ministry of Economic Affairs and Digital Transformation (license support)
- Further information:
 - News on 'Critical Communications Review'.
 - News on ETSI's web page



5G/B5G/6G Activities in Sweden

5G Test Environments

- Description: Luleå University of Technology has in collaboration with Telia, Ericsson and TietoEVRY established five test beds for 5G in Northern Sweden. The aim is to give small and medium-sized companies opportunities to develop their products and services for 5G and test everything from drones and robots to agricultural machinery and solutions for health care.
- Public body in charge:
 - Luleå University of Technology
- Further information:
 - [Wireless Innovation Arena](#)



5G/B5G/6G Activities in Turkiye

5G Frequency Auctions

- Description: There is no commercial 5G service in Türkiye yet. Still, a national frequency plan exists, which will be the basis for such auction. Information and Communication Technologies Authority (BTK) is the responsible public body for 5G auctions. The schedule for auction has not been announced yet. Following frequency bands are expected to be allocated: 3.4 – 3.8 GHz band; 24 – 27 GHz band; 700 MHz band. Test licenses are granted on a temporary basis.
- Public bodies in charge:
 - Ministry of Transport and Infrastructure.
 - Information and Communication Technologies Authority (BTK).
 - Telecom Operators (Turkcell, Turk Telekom, Vodafone).
 - Communication Technologies Clustering (HTK).
- Further information:
 - BTK has published a white book containing Türkiye's priorities, strategy and roadmaps for 5G and beyond [document](#).
 - The national frequency [plan](#).



5G Trials, Tests & Applications for Verticals

- Description: By providing temporary frequency bands with time and location restrictions, BTK supports 5G R&D studies and test/trial activities such as remote surgery, transferring sports competitions to the audience with 360° VR experience. In addition, companies in technology development zones develop software and solutions for vertical industries such as healthcare, agriculture, Industry 4.0, IoT/smart cities, remote driving, and autonomous mobile robots.
- Public bodies in charge:
 - Ministry of Transport and Infrastructure.
 - Information and Communication Technologies Authority (BTK).
- Further information:
 - 5G Test Valley news in BTK [website](#)
 - The [full list](#) of test licenses in Türkiye.
 - Türkiye's [first commercial 5G launch](#) at Istanbul Airport



5G Ecosystem & Government Funding

- Description: A 5G ecosystem has been established in Türkiye. The Communication Technologies Cluster (HTK), which consists of communication-centric companies and has 160 members, is one of the main actors of 5G activities in the country, and all telecom operators have been involved in the R&D activities. Following these activities, E2E 5G prototypes (TRL 5 to 7) were developed (including 5G Core network, 5G BBU, 5G New Radio, MIMO Antenna, NFV and EMS). They are still being tested in different environments on each operators' premises. 5G & 6G projects are supported by different public bodies with various funds depending on TRL.
- Public bodies in charge:
 - Ministry of Industry and Technology – [Productization & Commercialization Fund \(HAMLE\)](#)
 - TÜBİTAK – [R&D Funds](#)
 - Ministry of Transport and Infrastructure – [R&D Funds](#)
 - KOSGEB – [Infrastructure Funds](#)



5G Valley Open Test Site

- Description: Information and Communication Technologies Authority (BTK), jointly with the academia (Middle East Technical University, Bilkent University and Hacettepe University) and the mobile network operators (Turkcell, Turk Telekom, and Vodafone), set up an open test site in Ankara, where the R&D, product developments and tests of new communication technologies can be conducted.
 - The aim is offer a platform, which creates R&D opportunities and enables public, university, operator and industry collaborations for all parties like academics, researchers, Ph.D. students and start-ups that work on 5G and Beyond Technologies.
 - A «5G and beyond joint graduate support programme» is launched to serve as an exemplary industry-academy collaboration within the valley, whereby outstanding graduate students from the universities are employed and mentored by the three operators throughout their graduate studies.
- Public bodies in charge:
 - Information and Communication Technologies Authority (BTK)
- Further information:
 - [5G Valley Open Test Site](#)



6G Initiatives: 6Gen Lab

- Description: Türkiye's first 6G research lab, 6Gen, is established with the 10 years of support of The Scientific And Technological Research Council Of Turkiye (TUBITAK). The objectives of 6GEN Lab are to design the autonomous 6G network and to integrate with vertical sectors in line with its capabilities using the artificial intelligence algorithms. Moreover, under the leadership of Istanbul Medipol University, 6G Conference was held within the scope of 6th generation wireless communication technology studies and Turkiye's vision in this field were discussed at the conference.
- Public bodies in charge:
 - The Scientific And Technological Research Council Of Turkiye (TUBITAK)
 - Turkcell
 - Medipol University
- Further information:
 - [6Gen Lab](#)
 - [6G Conference](#)





5G/B5G/6G Activities in the United Kingdom



UK to accelerate research on 5G and 6G technology



Research and development on next-generation 5G and 6G wireless technology and telecoms security is to be ramped up as part of a £110 million government investment.

- UK joins forces with Republic of Korea to solve power efficiency challenges in rollout of more innovative and secure networks:
Flexi-DAS (£1,211,615): aims to develop highly flexible Distributed Antenna System (DAS) radio heads/units based on field-programmable flexible radio chipsets and Radio Frequency Identification cards. It also aims to test Reconfigurable Intelligent Surfaces (RIS) that might be reflective (e.g. as placed on walls) or transmissive (e.g., as placed on windows) to steer the radio signals and cover difficult to reach areas.
- **Ground breaking £80 million fund to set up state-of-the-art UK Telecoms Lab in the West Midlands for testing network equipment**
A new state-of-the-art UK Telecommunications Lab will be based in Solihull, creating dozens of high-skilled jobs for the region, Tech Minister Damian Collins has announced today.
New research for Birmingham Tech Week shows West Midlands is one of the UK's fastest growing tech sectors - valued at £15.3 billion, up from £11.5 billion in 2021
- Three top UK universities awarded **£28 million** to develop next-generation 6G network technology.



[Press release](#)



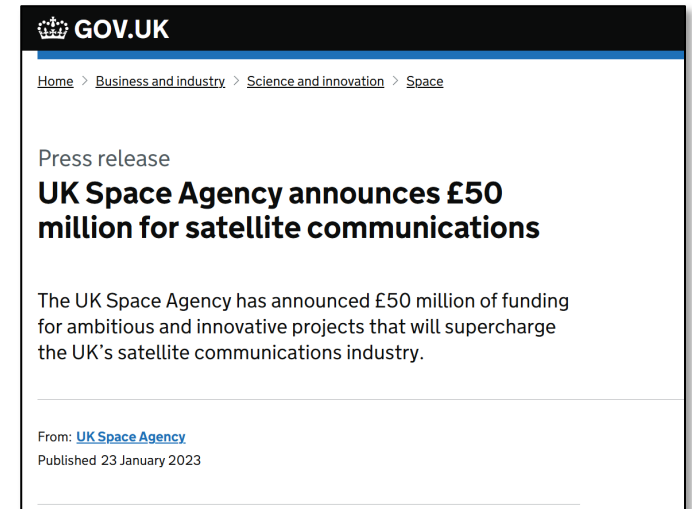
[Press release](#)



UK Invests on 5G-Satellite Integration

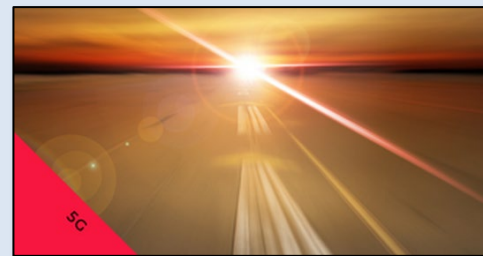


- ❑ **UK Space Agency announces £50 million for satellite communications**
 - The UK Space Agency has announced £50 million of funding for ambitious and innovative projects that will supercharge the UK’s satellite communications industry.
 - The funding, which is part of the European Space Agency (ESA) Advanced Research in Telecommunications Services (ARTES) programme, could include **integrating 5G systems to unlock connectivity for people and machines** through upgrading infrastructure to enable new markets and services such as drones or driverless haulage, creating space-based networks to rival cable-based terrestrial ones, and helping UK space operators to use disruptive new technologies and business models to enable global operations.



[link](#)

- ❑ **Vodafone has begun inviting customers to join a trial network for 5G Standalone (5G SA), the first time in the UK customers will be able to experience “full” 5G** ([link](#))



- ❑ **Vodafone opens UK’s first Edge innovation lab at HOST, MediaCity** ([link](#))

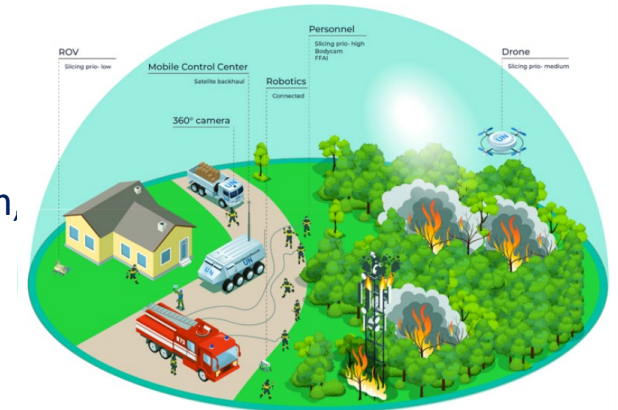




5G/B5G/6G Activities conducted by Private Companies and Other Public Bodies

Belgium: DEFRA Call 2022 – funded projects (sample)

- **BOLSTER - Beyond 5G mObile Standalone Tactical nEtwoRk**
 - Theme 2: 5/6G for military, security and crisis applications
 - Objective: research to design, develop, validate and optimise innovative beyond 5G solutions for a private mobile standalone tactical network
 - Duration of the project: 01/12/2022 - 31/05/2025
 - Budget: 800.679 €
 - Coordinator: Ingrid Moerman (Interuniversitair Micro-Electronica Centrum,
 - Partner: Jens Buysse (Citymesh)



- **Dep5GforRNAV**
 - Theme 2: 5/6G for military, security and crisis applications
 - Key words: 5G networks, navy, deployable, localisation, private networks
 - Duration of the project: 01/12/2022 - 30/11/2025
 - Budget: 735.805 €
 - Coordinator: Ronny Dewaele (e-BO Enterprises)
 - Partner: François Quitin (Université Libre de Bruxelles, ULB)



- Further information:
 - https://www.belspo.be/belspo/defra/projects/BOLSTER/BOLSTER_fiche_en.ppt
 - https://www.belspo.be/belspo/defra/project_en.stm#Dep5GforRNAV



Belgium: ICON call 2022 –funded projects (sample)

- **5GECO - 5G intelligent radio and transport Edge network Cross-Optimization**
 - 5G networks come with a high cost of ownership. A solution would be to add more network sharing. 5GECO is looking to enable such sharing for two specific use cases: setting up intelligent neutral host sharing and shared transport networks. In addition, two proofs of concept will serve to validate the 5GECO innovation.
 - Partners: Accelleran, Citymesh, Nokia Bell, imec-IDLab-UGent, imec-IDLab-UAntwerpen
 - Further information: <https://www.imec-int.com/en/research-portfolio/5geco>
- **ValArch5G**
 - High reliability, low-latency 5G networks will be implemented, capable of supporting time-critical industrial applications. Extensive trials will then be done in relation to controlling automated guided vehicles (AGVs) at a factory site on land, plus unmanned marine vessels over an offshore network.
 - Partners: Accelleran, eBO Enterprises, Bekaert, GEOxyz, Flanders Make, imec IDLab
 - Further information: <https://euka.flandersmake.be/5g-voor-controle-op-afstand-en-samenwerking-van-autonome-mobiele-systemen/>



Poland: Private 5G deployments

- **PKN Orlen tested the first private (industrial) 5G network in Poland**
PKN Orlen – the largest oil & gas company in CEE region
 - 5G NSA (80 MHz n78 + 5 MHz B20) launched: October 2021
 - 5G SA (80 MHz n78 + 5 MHz n20) launched: January 2022
- **5G campus network at Miele plant**
Devices use SIM cards provided under contract by Orange Polska, while the network run on eight Ericsson antennas operating in 3.6GHz and 2100MHz bands.
- **Private wireless network at Polish Nokia factory**
Polish telecommunications provider Orange Polska (Orange Poland) has deployed private LTE and 5G networks at Nokia's factory and R&D facility in the city of Bydgoszcz.



Poland: 5G/B5G/6G Initiatives



- **#Polish 5G:** The concept of establishing one wholesale operator of a nationwide PPDR (Public Protection and Disaster Relief) network in the 5G standard, operating in the 700 MHz band. The project is lead by EXATEL S.A.

www.exatel.pl/en/

#Polskie5G

- **5G Competence Centre:** The 5G Competence Centre has been established at Lodz University of Technology. It will provide support to enterprises in working on new services and technologies. A pilot network, funded by the Ministry of Development was launched in May this year at the Lodz University of Technology.

<https://centrumkompetencji5g.pl/en/>



- **5G lab in Łódź:** In the Lodz Special Economic Zone (SEZ) the first 5G campus for start-ups in Poland has been created. Thanks to it, young technology companies can take advantage of modern infrastructure, which was created by the Lodz SEZ in cooperation with partners: Orange, Ericsson, UKE.

www.startupspark.io



Spain: Broadway final evaluation demos

- Description: From July 18 to 21, the BroadWay PCP Project for a pan-European broadband mobile system for PPDR organised its third and last pilot with Frequentis consortium as the technical provider: a ferry fire scenario in Malaga (Spain). The event was supported by Spanish Government, Ansalusian Government, Malaga city, University of Malaga (ITIS) and Telefonica
- Public body in charge:
 - Regional Government (112 and 061), Ministry of Interior (Guardia Civil and Policía Nacional), Malaga Port and Malaga Council (Malaga Police and Fire Department)
- Further information:
 - [Press release](#) on the outcome of the auction
 - [News](#) at [Broadway web page](#)



Sweden: 5G Northern European Transport Corridor

- Description: Under the first Call for Proposals for the digital strand of the (CEF Digital), closed for applications on 20 April 2022, the operators Telia Sweden, Telia Finland, and LMT (Lithuania) received funding for the project "5G Northern European Transport Corridor" to create 5G-corridors to test smart and green transport solutions with connected, remotely controlled, and autonomous vehicles.
- Public body in charge:
 - Post-and telestyrelsen(PTS), PTS is a public authority reporting to the Ministry of Infrastructure, Energy and Digital Development.
 - European Health and Digital Executive Agency
- Further information:
 - [PTS news](#)
 - [European Health and Digital Executive Agency news](#)



The Netherlands: DoIoT for Greenhouse Horticulture



- Description: 'Do IoT for Greenhouse Horticulture' will accelerate digital innovation in the horticultural sector by helping companies to develop, test and demonstrate innovative sensor systems, robots and autonomous vehicles, which require high-quality mobile data connections. The project aims to provide 5G test and experimentation facilities where SMEs can test their digital innovations and test their scalability from prototype to practice. The project encourages collaboration between science, end users and the business community in the field of digitization in greenhouse horticulture.
- Public bodies in charge:
 - Municipality Westland
 - Metropolitan Region Rotterdam-The Hague
 - Province of Zuid Holland
- Co-operating fieldlabs:
 - DoIoT Fieldlab
 - RoboHouse
 - TomatoWorld



Turkiye: 5G Horizon Europe Projects Awarded

- Description: The network operators and the academical centers are actively conducting Horizon Europe projects based on the vehicular communication services tailor made to assess seamless and efficient crossing of the hard borders (5G-MOBIX), the performance limits of the D-band in especially dense urban areas (DRAGON), and the integration of the 5G network with the non-terrestrial networks for agricultural application (COMNECT).
- Public bodies in charge:
 - Turkcell
 - Horizon Europe
- Further information:
 - [5G Horizon Europe Projects](#)
 - [5G-MOBIX](#)
 - [DRAGON](#)



Turkiye: 5G Initiatives

- Description: Arçelik, Nokia and Turk Telekom joined forces and launched the 5G@EndTech program with the aim of supporting the commercialization and globalization processes of the products of enterprises that develop manufacturing industry technology solutions that come to life with 5G infrastructure in Turkiye. Vodafone launched Turkiye's first 5G Customized Mobile Network solution to examine the end-to-end solutions for the industry and the technologies for the digital factory applications.
- Public bodies in charge:
 - Arcelik
 - Nokia
 - Turk Telekom
 - Vodafone
- Further information:
 - [5G@EndTech](#)
 - [MEXT – Vodafone Business](#)

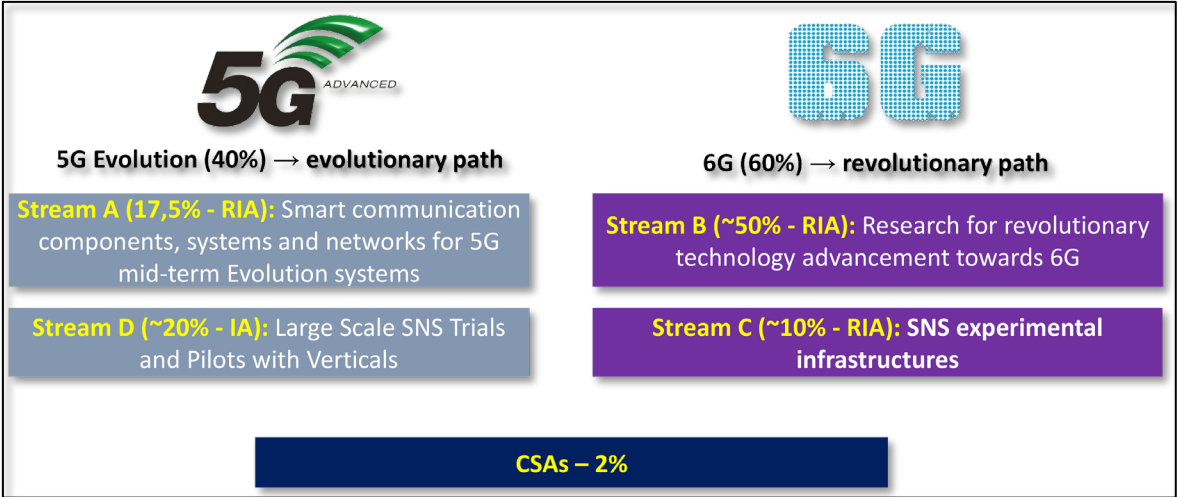




Turkiye: 6G Initiatives



- Description: To support the development of 5G ecosystems and advance 6G research in Europe, the Smart Networks and Services Joint Undertaking (SNS JU) has chosen its initial portfolio of 35 research, innovation, and trial projects. Turkiye is involved in one of the 35 projects, Artificial Intelligence Assisted Evolution Summary for Operational and Secure Architectural Designs (VERGE), which focuses on the security, privacy and reliability, and accelarete the studies on 5G and beyond technologies .
- Public bodies in charge:
 - Turkcell
 - Horizon Europe
- Further information:
 - [Europe scales up 6G research investments](#)





UK Investing on Future Open Networks Research



Three university led consortiums awarded £28 million to develop next-generation 6G network technology

The **Future Open Networks Research Challenge** will enable universities to work with large Radio Access Network (RAN) vendors, and other telecoms organisations, to conduct research and development to drive **the openness and interoperability of future network architectures**. These technologies will need to be commercially attractive to large vendors, MNOs and Venture Capitalists, and promote diversification in future network architectures.

❑ **REASON** (Total project funding amount: £11,993,730)

REASON brings together **16 academic and industrial partners** to develop a roadmap for open 6G network architectures, which will set the framework for new developments across the entire technology stack.

❑ **TUDOR** (Total project funding amount £12,000,000)

TUDOR, a **25 partner consortium from academia and industry**, will research and develop open network components and their seamless interoperability in the wider RAN, core, and transport network environment and service platforms, applying them across heterogeneous networks in 5G and beyond.

❑ **YO-RAN** (Total project funding amount £4,795,662.16)

YO-RAN, with its **8 partners from York area**, aims to develop Open RAN components and a RAN Intelligent Controller (RIC) for Neutral Host Networks – another development which allows the same infrastructure to be used by multiple operators, and also by private or enterprise-based networks.

For further information on The Future Open Networks Research winners please visit:

<https://www.gov.uk/guidance/the-future-open-networks-research-challenge-winners#challenge-winners>



Conclusions and Key Takeaways



Highlights and Key Takeaways



- **Additional 5G auctions** planned/conducted: Belgium (2022), Serbia (2023), Finland (2022), Norway (2023), Poland (2023), Romania (2022), Spain (2022), Turkiye (TBD).
- **Plans to re-define/rationalize the spectrum bands** to prepare for a smooth introduction of frequencies related to new **6G systems** (e.g., in Germany). **Consultations** on 26 GHz band on-going in Portugal.
- Allocation of **frequency bands for trials and tests, non-commercial** use, and R&D activities often available free-of-charge and on a **temporary basis** (e.g, Poland, Portugal, Sweden, Turkiye).
- Several large **R&D programmes on 6G/B5G networks** already launched with the support of EU's Recovery and/or national funds: 6G Bridge (Finland), French Acceleration Strategy on 5G/6G Network Technologies, UNICO R&D (Spain), 6G Platform (Germany), RESTART program (Italy), Future Network Services (The Netherlands), Digital Transition/Resilience plans (Portugal), National Smart Specialization Strategy/National RDI plan (Romania), 6Gen Lab (Turkey), ICTplus/National Research Infrastructure (Norway), 5G GigaApp (Austria).



Highlights and Key Takeaways



- Specific **calls for proposals** for the adoption of **5G in the defense vertical**: defence-related research action (DEFRA) program in Belgium.
- **UK Space Agency** invests in R&D projects to support satellite communications including **integration of 5G systems** for connectivity of people and machines.
- Substantial **investments** in related enabling technologies: **AI and High-Performance Computing** (Luxembourg), **Quantum Communications** (Romania, Luxembourg).
- Launch of **new Digital Innovation Hubs** in Norway and Portugal.
- New **facilities** for the realization of **5G trials and pilots**: 5G Momentum & 5G Test Network Finland Ecosystem initiatives (Finland), 5G Valley Open Test Site (Turkiye), 5G Hub & DoloT Field Lab (The Netherlands)
- **Member States** have developed **strategies/roadmaps for 5G** deployment, and their **evolution towards B5G/6G** networks in the 2023-2030 timeframe. In some cases (e.g., Nordic and Baltic countries, Franco-German Calls, UK-South Korea), **transnational collaboration** is envisaged.



Highlights and Key Takeaways



- Release of **strategic documents** and on eco-security/health and mobile networks (Portugal), AI and cybersecurity (Germany). **Strategic initiatives** to advance the impact of **6G expertise globally**: 6G Finland and 6G Flagship.
- **5G open innovation ecosystems**, technological clusters, and 5G city platform with strong participation of **vertical industries** formed: MyConnectivity (Luxembourg), Norwegian 5G Industry Forum, Communication Technologies Cluster (Turkiye), Climate-Neutral Smart Cities/Mirror missions (Romania).
- Several **initiatives for raising awareness**, networking, know-how exchange foresight: Connecting Tomorrow conference (Luxembourg), Telfor Conference (Serbia), ETSI 7# MCX Plugtest (Spain), Luxembourg Internet Days.
- Very **large number of R&D projects, testbeds, and labs/competence centers** addressing **beyond 5G** networks in combination with **AI, and IoT** supported national/EU funding. Large involvement of both **private companies** and **public bodies**.

Thank you for your attention!



**The voice of the European industry for the
development and evolution of 5G**