Connected Bulgaria

Updated National Broadband Infrastructure Plan for Next Generation Access

Sofia, 2020

Content

INTRODUCTION

Broadband access is recognised by the European Commission (EC, The Commission) as one of the main tools for improving the economic and social well-being of the population. It becoms an increasingly important factor not only for the competitiveness of enterprises but also to support social inclusion while expanding the opportunities to develop and use services based on digital technologies, including e-Governance services. The spread of high-speed connectivity can lead to a significant increase in gross domestic product, employment, the competitiveness of national economies on the international stage and the improvement of the quality of life.

Broadband access is a key element of the digital transformation. The non-discriminatory, safe and effective internet access must be provided as a public interest service (PIS) so that everyone can participate in economic and social life. Without a high-quality and sustainable digital infrastructure, the efficient use of digital services is severely limited or hampered, as are the use and development of technologies and various innovative solutions.

Favorable investment framework is essential for achieving a European gigabit society, in which access to and use of very high-capacity networks allow the ubiquitous use of products, services and applications within the digital single market. The measures proposed in this direction by the Commission at European level must be implemented by the Member States, taking into account the priorities and trends at national level. Bulgaria, as a member state of the European Union, should develop strategic goals that are in line with the priorities and strategic goals set out in the EU programming documents.

The trends show the desire in Europe to havefixed and wireless internet connectivity witha very high capacity and cover a wide range of issues that need to be addressedin order for this intention to become a reality.

In January 2016, the European Parliament underlined the importance of private investment in internet connectivity networks for the digital progress and the role of a stable regulatory framework which to allow the market participants to invest in all areas, including rural and remote ones. In June 2016, the European Council called for the provision of a very high-capacity fixed and wireless broadband connectivity across Europe as a prerequisite for future competitiveness, as well as for regulatory reform in telecommunications which to encouragelarge-scale investments in the networks, while promoting the effective competition and consumer rights.

The Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - "Connectivity for a Competitive Digital Single Market – Towards a a European Gigabit Society"[1] develops the concept of a Gigabit Internet society. In order to achieve the set out strategic goals, it is necessary to build an infrastructure based on Next Generation Access (NGA) networks.

This document is a logical continuation of the adopted by Decision № 435 of the Council of Ministers on June 26, 2014[2] National Broadband Infrastructure Plan for Next Generation Access, and the Roadmap for its implementation, and its updating and implementation in accordance with the requirements of the European Commission and the new strategic and

---

[1] Communication from the Commission "Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society"
[2] National Broadband Infrastructure Plan for Next Generation Access

normative documents, incl. the European Gigabit Society Strategy, the EU Strategic Goals for the Gigabit Internet Society by 2025, the European Electronic Communications Code[3] and the 5G Action Plan[4].

The vision and goals set out in this document are in line with the thematic enabling conditions set out in the Proposal for a Regulation of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, and the European Maritime and Fisheries Fund and financial rules for those and for the Asylum and Migration Fund, the Internal Security Fund and the Border Management and Visa Instrument[5]. The national priorities correspond mainly to the policy objectives 1 and 3 of the Regulation, namely:

1. A smarter Europe - innovative and smart economic transformation;

2. A greener, low-carbon Europe;

3. A more connected Europe - mobility and regional ICT connectivity;

4. A more social Europe - implementing the European Pillar of Social Rights;

5. Europe closer to citizens - sustainable and integrated development of urban, rural and coastal areas through local initiatives.

1.   GOALS ON EUROPEAN LEVEL

1.1   Digital Agenda for Europe

As a member state of the EU, the Republic of Bulgaria develops national strategic goals, which are in line with the priorities and strategic goals set out in the EU programming documents. In the field of information technologies, the European programming documents that set the trends and had a 10-year horizon were the European Strategy for smart, sustainable and Inclusive growth (Europe 2020), and in particular one of the flagship initiatives set on it - the Digital Agenda for Europe (DAE).

To achieve these goals, it was necessary to develop a comprehensive policy based on digital technologies aiming to ensure coverage with universal broadband Internet access (via fixed and wireless networks) at a rate gradually increasing up to 30 Mbps and more, and in the longer term, to promote the implementation and deployment of NGA networks in a large part of the EU territory, allowing very high speed internet connections above 100 Mbps.

The Program defines specific objectivesregarding the broadband access development andcurrently relevant are:

- The Entire EU to be covered by broadband above 30 Mbps by 2020;
- 50% of all EU households to subscibe to broadband above 100 Mbps by 2020;
- To double public investment in research and innovation in ICT (ICT R&D) to EUR 11 billion by 2020;
- To reduce by 20% the energy used for lighting until 2020.

---

[3] Directive (EU) 2018/1972 establishing the European Electronic Communications Code
[4] Communication from the Commission "5G for Europe: An Action Plan"
[5] Regulation of the European Parliament and of the Council laying down common provisions

Serious efforts have been focused on broadband access implementation pervasively at ever-increasing rates through both fixed and wireless connectivity technologies and facilitating investment in new very-high-speed open and competitive Internet networks letting them become the arteries of the future economy.

Investments in the construction of next-generation optical networks are of strategic importance and guarantee stable broadband access coverage. However, without strong public intervention, there is a risk of not achieving an optimal result due to significant market entry costs and high prices, with high-speed networks being concentrated in a small number of densely populated areas. The indirect benefits of these networks for the economy and society justify public policy guaranteeing universal broadband access coverage at an increasing rate.

The proposal for a Regulation of the European Parliament and of the Council for establishing the Digital Europe program for the period 2021-2027 states that the program will focus on building large-scale digital capacity and infrastructure, taking into account the synergies with other EU programs - Horizon Europe, Connecting Europe Facility, etc. The Connecting Europe Facility (CEF) will provide the physical infrastructure for the high-capacity broadband networks needed to deploy the digital services and technologies proposed in the Digital Europe program. CEF will support cross-sectoral critical infrastructures that need an appropriate level of cybersecurity, and will, therefore, rely on "Digital Europe" deployments. In the future, Digital Europe program will mainly support the deployment of digital services in areas of public interest.

1.2 Communication "Connectivity for a Competitive Digital Single Market - Towards a European Gigabit internet Society"

The Commission's Communication of September 14, 2016, on the Gigabit Internet society, sets out three strategic goals to be achieved by 2025. These goals complement the ones set out in the Digital Agenda for 2020 and require speeds of 100 Mbps up to 1 Gbps.

The full dimension of the economic and social benefits from the digital transformation - increasing the number of Internet of Things-based services and applications, cloud computing, virtual reality - can only be achieved if Europe succeeds in ensuring very high capacity networks implementation pervasively in both rural and urban areas and in society in general. One of the main objectives of the European Commission's Digital Single Market Strategy of May 2015 is to create the proper environment and conditions for the deployment of advanced digital networks with a very high capacity. Today, the electronic communications sector is the engine of the digital economy and the digital society in general.

The Commission's Communication underlines the importance of Internet access for the Digital Single Market and the need for Europe to deploy networks for its digital future. In this context, the vision for European Gigabit Society is being developed, in which availabilty and use of very high-capacity networks enable the ubiquitous use of products, services and applications in the Digital Single Market.

The vision is operationalized through three strategic objectives for 2025: 1) for achieving growth and employment in Europe to ensure gigabit connectivity for regions generating socio-economic development; 2) for achieving competitiveness in Europe to build fifth-generation (5G) coverage for all urban areas and main land transport routes; 3) for bringing Europe closer

together to develop internet connectivity to speeds of at least 100 Mbps for all European households.

The European Commission's public consultation conducted at the end of 2015 on the needs forspeed and quality of Internet access beyond 2020 and the measures to fulfil these needs by 2025 reveals clear expectations for the quality of service of fixed internet connectivity to improve by 2025, especially regarding the downlink speed (above 1 Gbps) and responsiveness (less than 10 milliseconds), and confirms the increasing importance of features other than download speeds for both fixed and mobile connectivity.

Citizens and businesses in Europe need networks with high and very high-capacities to develop, provide and use online goods, applications and services. The success of e-commerce, the e-health applications reliability, the satisfaction of users of video and audio content for online games, streaming and so on depend on the networks' quality. Very high-capacity networks are needed for territorial cohesion so that every citizen in every community in Europe can participate in and benefit from the digital single market.

Networks with very high-capacities are becoming a necessity for achieving growth, employment, competitiveness and cohesion in Europe. In order to define more precisely what the future internet connectivity in Europe should be, the Commission Communication sets out a set of goals for the networks' deployment by 2025.

> **Strategic goal for 2025 for growth and employment in Europe:** to provide gigabit connectivity for all main socio-economic drivings such as schools, transport hubs and main providers of public service as well as for digitally intensive enterprises.

In addition to increasingly demanding connectivity for media applications, professional-gradecommunication in the industrial and service sectors such as automotive, transport, manufacturing, health as well as next generation safety and emergency services will require a seamless, shared, fixed and wireless infrastructure which offers a range of customer-controlled levels of quality and reliability of service, tailored to specific business needs.

Industrial zones, road corridors and train connections are expected to to be key areas for the first phase of the new applications. The viability of some of these new applications will require the availability of 5G services simultaneously in all Member States to enable service continuity across borders and sufficient economies of scale. Therefore, the Commission proposes below a common intermediate goal to support the common timetable for network deployment proposed in the 5G Action Plan.

The EU was first to develop 4G wireless technology, but late in deploying it compared to other advanced regions. A delayed and fragmented assignment of the relevant spectrum by Member States has a direct negative impact on wireless network coverage and penetration overall in Europe. Such delays, if repeated, will endanger the successful introduction of 5G in Europe and the deployment of new innovative services.

> **Strategic goal for 2025 for competitiveness in Europe:** All urban areas and major terrestrial transport paths to have uninterrupted 5G coverage.

In most rural and remote areas, the availability of internet connectivity can play a significant role in bridging digital divide, isolation and depopulation by reducing the cost of delivering both goods and services and partially compensating for the remote location. Businesses can reduce costs by using videoconferencing, accessing online administration, e-commerce or cloud storage. Modern agriculture and rural development are increasingly

relying on online applications to support tourism, sensor technologies for crop monitoring and use of unmanned aircraft in trade and agriculture.

Very high-capacity networks will generate a return on investment as well as greater economic benefits only if they are widely used by citizens and enterprises. Although many different factors are important, the rules must ensure competitive markets and consumer choice.

The Commission also proposes a 5G Action Plan to foster a coordinated approach for the deployment of 5G infrastructures which will play a major role in Europe's future Internet connectivity. It will open up entirely new opportunities to innovate, not only in the communications sector, but also throughout the whole economy and society. Establishing the new 5G infrastructure requires an appropriate degree of coordination between Member States and between relevant sectors to stimulate investments. The action plan aims to realise such coordination based on a number of targeted actions, largely of a voluntary nature.

> **Strategic goal by 2025 for cohesion in Europe:** All European households will have access to Internet connectivity offering a downlink of at least 100 Mbps, upgradable to 1 Gbps speed.

1.3   5G for Europe: An Action Plan

5G is considered as a radical innovation that makes changes in the industry possible through wireless broadband services delivered at gigabit speeds, support for new types of applications that connect devices and objects (Internet of Things), offering diversity through software virtualization that will allow the development of innovative business models linking multiple sectors (e.g. transport, health, manufacturing, logistics, energy, media and entertainment). Although these changes have already begun based on existing networks, they will need 5G to reach their full potential.

The Commission strategy for Digital Single Market and the Communication "Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society" underline the very high-capacity networks' importance as a key factor for Europe competitiveness on the global market. Worldwide 5G revenues should reach the equivalent of €225 billion in 2025.

The Communication presents an Action Plan for the timely and coordinated deployment of 5G networks in Europe through a partnership between the Commission, Member States and industry.

If Europe wants to be involved in reaching a global consensus on the choice of technologies, sprectrum bands and leading 5G applications, cross-border coordination and planning will be necessary in the EU. The introduction of commercial 5G services will also require significant investment, availability of an appropriate radio spectrum and close cooperation between the participants in the electronic communications sector and the main users in the respective industries. Network operators will not invest in new infrastructures if they do not see clear prospects for stable demand and regulatory conditions that make investments profitable. Besides, industries intrigued by 5G, for the purposes of their digitization, may prefer to wait until the 5G infrastructure is tested and ready.

In this context, the lack of coordination between national approaches to 5G networks deployment would create a significant risk of fragmentation in terms of radio spectrum

availability, continuity of services across national borders (e.g. connected vehicles) and applying the standards.

The Commission has identified the following 5G plan key elements:

- align roadmaps and priorities for a coordinated 5G deployment across all EU Member States, targeting early network introduction by 2018 and moving commercial large-scale introdustion by the end of 2020 at the latest;
- make provisional spectrum bandsavailable for 5G before the 2019 World Radiocommunication Conference (WRC-19), October-November 2019, to be complited by additional bands as quickly as possible, and work towards a recommended approach for the authorization of the specific 5G spectrum bands above 6 GHz;
- promote early deployment in major urban areas and along major transport paths;
- promote pan-European multi-stakeholder trials as catalysts to turn technological innovation into full business solutions;
- facilitate the implementation of an industry-led venture fund in support of 5G-based innovation;
- unite leading actors in the working towards the promotion of global standards.

An ambitious 5G introduction timeline is essential for Europe to have a leading position and to take early advantage of the new market opportunities enabled by 5G, not only in the telecom sector, but in the whole economy and society. The European industry digitalisation sould be initiated today on the basis of available resources (in particular 4G/LTE, wireless or satellite) and will be boosted by the gradual adoption of 5G. The Commission will assist Member States in the context of their national broadband plans and the Future Internet Forum (FIF), and in collaboration with industry through a public-private partnership (5G-PPP), to establish common goals and concrete steps for testing and deploying 5G.

Action 1 - The Commission will work with Member States and industry stakeholders towards the voluntary establishment of a common timetable for the launch of early 5G networks by the end of 2018, followed by the launch of fully commercial 5G services in Europe by the end of 2020. The common timetable should be driven by the following keyobjectives:
- preliminary trials under the 5G-PPP arrangement to take place from 2017 onwards and pre-commercial trials with a clear EU cross-border dimension from 2018;
- to support preliminary tests under the 5G-PPP agreement to be launched after 2017 and clear pre-market EU cross-border dimension tests after 2018;
- Encouraging Member States to develop, by the end of 2017, national 5G deployment roadmaps as part of national broadband plans; at least one major city to be ” 5G-anabled” by the end of 2020 and that by 2025 all urban areas and major terrestrial transport paths have uninterrupted 5G coverage.

The deployment of 5G networks requires the timely availability of a sufficiently amount of harmonised spectrum. A major new requirement, specific for 5G, is the need for large contiguous bandwidths of spectrum (up to 100 MHz) in appropriate frequency ranges to provide higher wireless broadband speeds. Such bandwidths are only available in spectrum above 6 GHz.

Action 2 - The Commission will work by the end of 2016 with Member States a provisional list of pioneer spectrum bands for the initial launch of 5G services. Taking due account of the Radio Spectrum Policy Group (RSPG) opinion in preparation, the list should include frequencies in at least three ranges of the spectrum: below 1 GHz, between 1 GHz and 6 GHz and above 6 GHz, to account for the diverse application requirements of 5G.

Action 3 - The Commission will work with Member States to:

- Agree by the end of 2017 the full set of spectrum bands (below and above 6 GHz) to be harmonised for the initial deployment of commercial 5G networks in Europe, based on a planned RSPG opinion on 5G spectrum. The final spectrum harmonisation at EU level will be subject to the usual regulatory process once relevant standards have been developed.;

- work towards a recommended approach for the authorization of 5G spectrum bands above 6 GHz, taking due account of the opinion of BEREG and RSPG. An early indication of the technical options and feasibility should be available through European Conference of Postal and Telecommunications Administrations (CEPT) studies by end of 2017.

The planned 5G networks are expected to serve up to one million connected devices per square kilometre, about a thousand fold increase as compared to today. This dramatic surge in the the number of devices will also increase traffic per network access point, which will require increasingly smaller cells to deliver the planned connectivity performance and an increasein the density of the antennas deployment.

The small cells will also have to be connected effectively to the rest of the network with high capacity backhaul communications sincethe aggregated volume of data will transit through these small cells will reach several Gbps. In most cases, these will be fibre links, while other high capacity wireless backhauling could also be used.

A simplification of the deployment conditions for dense cellular networks would reduce costs and support investment. The European Electronic Communications Code aims to remove deployment barriers for installation of small cells, subject to meeting common technical requirements.

Action 4 - as a part of the development of the 5G national roadmaps, the Commission will work with industry, Member States and other stakeholders to:

- set roll-out and quality objectives for the monitoring of the progress of key fible and cell deployment scenarios , to meet the target of at least all urban areas and all main major terrestrial transport paths, having uninterrupted 5G coverage by 2025;

- identify immediately actionable best practices to increase the consistency of administrative conditions and tome to facilitate denser cell deployment in line with the relevant provisions of the European Electronic Communications Code.

Action 5 - The Commission calls on Member States and the industry to commit to the following objectives regarding the standardisation approach:

- Ensure the availability of the initial global 5G standards by the end of 2019 at the latest, so as to enable a timely sommercial launch of 5G , and paving the way for a wide range of future connectivity scenarios beyond the ultra-fast broadband;

- promote efforts to support a holistic standartisation approach encompassing both the radio access and core network challenges, including due for the disruptive use cases and open innovation;

- Establishing appropriate cross-industry partnerships by the end of 2017 to support the timely definition of standards backed by industrial user experiments, including throught the leveraging of international cooperation partnerships, in particular for the digitalisation of industry

Action 6 - the Commission calls the industry to:

- To foster the emergence of digital ecosystems based on 5G connectivity;

- plan for key technological experiments to take place as early as 2017, including the testing of new terminals and applications through the 5G-PPP, to demonstrating the benefits of 5G connectivity for important industrial sectors;

- present detailed roadmaps by March 2017 for the implementation of advanced pre-commercials trials to be promoted at EU level (trialsg in key sectors must be launched in 2018 in order to ensure Europe leadership in the context of the accelerated global agenda for the introduction of 5G).

Action 7 - The Commission encourages Member States to consider usingof the future 5G infrastructure to improve the performance of communications services used for public safety and security, including shared approaches in view of future public procurement of advanced broadband public protection and disaster relief systems.

Action 8 - The Commission will work with industry and the European Investment Bank (EIB) Group to identify the objectives, possible configuration and modalities for a venture financing mechanism, possibly linked with other digital start-up actions. The feasibility shoul be assessmed by the end of March 2017, taking into account the possibility to enhance private funding by adding several sources of public funding, in particular from the European Fund for Strategic Investments (EFSI) and other EU financial instrument.

According to the EC Communication "Shaping Europe's digital future"[6] connectivity is a main building block of the digital transformation. It enables the data traffic, cooperation between people wherever they are, and the connection of more objects to the Internet,by transforming the industyrg, mobility and logistics chains. Gigabit connectivity based on secure fiber-optic and 5G infrastructures is vital if we are to harness Europe's digital growth potential. In this regard, adequate investment is needed at EU level, as well as on national and regional level, to achieve the EU's 2025 connectivity goals.

One of the key actions is accelerating investments in Europe's Gigabit Connectivity through a revision of the Broadband Cost Reduction Directive, an updated Action Plan on 5G and 6G, a new Ratio Spectrum Policy Programme (2021). 5G corridors for connected and automated mobility, including railway corridors, will be roll-out in 2021-2030 and 2021-2023.

2. OVERVIEW ON THE THE STATE OF PLAY OF THE BROADBAND INFRASTRUCTURE FOR NEXT GENERATION ACCESS

2.1 Technological solutions

In the context of internet access, the term "broadband" does not have a specific technical meaning but is used to refer to any infrastructure that provides access to high-speed internet. The Commission has defined three categories of download speeds:

- "Basic broadband" for speeds between 144 Kbps and 30 Mbps;
- "Fast broadband " for speeds between 30 Mbps and 100 Mbps;
- "Ultra-fast broadband" for speeds higher than 100 Mbps.

A broadband access network is generally made of three parts: the backbone network,middle mile and the last mile connections to the end users.

---

[6] Communication "Shaping Europe's digital future"

Segments of a broadband network
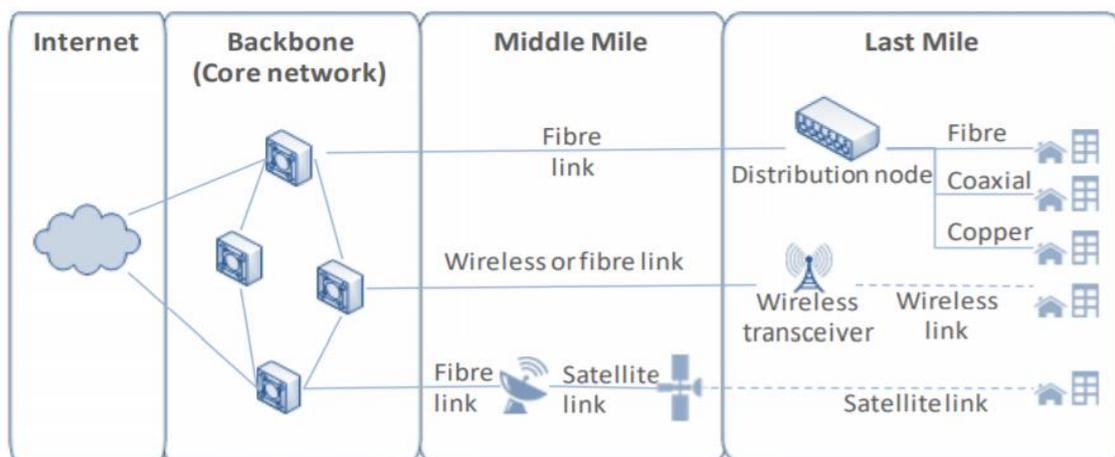
Source: ECA

In assessing internet speed, there is an important distinction between download and upload speeds. Download speed refers to the rate data is received from a remote system, such as when browsing the internet or streaming videos; upload speed refers to the rate data is sent to a remote system, such as when video-conferencing. Other technical characteristics are becoming increasingly relevant for the provision of certain services (cloud computing, connected driving and e-health). The type of infrastructure used defines the upper limit of the connection speed. There are five types of infrastructure that can deliver broadband services: fiber lines, coaxial cable, twisted copper pair, terrestrial wireless and satellite.

Broadband infrastructure types

Wired or wireless	Infrastructure	Indicative download speed	Indicative upload speed
Wired	Fibre	up to 2.5 Gbps	up to 1.2 Gbps
	Coaxial cable	300 Mbps up to 2 Gbps	up to 50 Mbps
	Copper phone	5 Mbps up to 100 Mbps	up to 10 Mbps
Wireless	Terrestrial wireless	60 Mbps	up to 10 Mbps
	Satellite	up to 20 Mbps	up to 8 Mbps

Source: ECA analysis

Due to rapid technological development, broadband services can be provided through:

- Hybrid internet solutions combine the copper phone network and the 4G mobile network to increase speed to customers.

- The satellite industry is currently delivering next-generation satellite broadband. Two recent innovations are the high-throughput satellites and the non-geostationary orbit satellites. By using these types of satellites, connections over 30 Mbps may be offered in the future to a larger number of rural or remote customers.

- **5G**, the 5th generation mobile networks are the next wireless telecommunications standarts. 5G planning aims at higher capacity than current 4G, allowing a higher density of mobile broadband users, and supporting device-to-device, more reliable, and massive machine communications. 5G has three elements: 1) enhanced mobile broadband, 2) massive Internet of Things, 3) mission critical services (such as self-driving cars). 5G requires a middle mile infrastructure based on fibremaking 5G a complement to, but not a replacement for, high speed broadband networks close to the end user.

According to the EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks" (Broadband Guidelines), three types of areas are defined depending on the level of broadband connectivity, namely:

- "white" – areas in which is no broadband infrastructure;
- "gray" – areas in which one network operator provide broadband infrastructure;
- "black" - areas in which are at least two operators that provide broadband infrastructures.

2.2   Technologies as a tool for digital transformation

Digital transformation advances so fast that information and communication technologies will soon shape every aspect of the economy and society.

Data to mobile internet subscribers and sales of mobile terminals show a clear growth trend. This trend is particularly evident in the Internet of Things (IoT) aspect. In the coming years, the number of connected devices in the economy and in everyday life will continue to grow. In the future, there will be billions of objects, sensors or machines around the world that will communicate with each other. The consumer internet will be enhanced and become an industrial internet. This industrial and intelligent interconnectedness poses unprecedented challenges in terms of connectivity, capacity, safety and security, as well as the quality of services. Mobile communications are particularly affected because many of the digital applications of the future require a mobile gigabit connection. The next generation of mobile communications (5G) is a key technology for achieving this digital transformation and is therefore the center of public attention. 5G will be a key component of the future gigabit networks and will require entirely new ICT architectures.

5G offers huge opportunities for the private and public sectors in respect of innovation and added value. This technological evolution has the potential to improve the quality of life through smart health services, connected mobility, mobile e-government and, last but not least, unlimited access to information sources.

Effective upgrading of key sectors such as self-driving vehicles, Industry 4.0, intelligent transport systems, supply networks, smart cities, e-health and more will be based on the specifications developed by the Radiocommunications Sector of the International Telecommunication Union (ITU-R)[7] and the 3rd Generation Partnership Project (3GPP)[8]. ITU-R establishes specific requirements and criteria for evaluation of 5G, the so-called IMT-2020 (International Mobile Communications). Depending on the use case, ITU-R has set minimum requirements for 5G performance, which include indicators such as: minimal upload/download speed; maximal levels of delay; maximal energy consumption, etc.

---

[7] ITU Radiocommunication Sector
[8] 3rd Generation Partnership Project

According to IMT-2020, technologies that will be mainly affected by the introduction of 5G will have an overall effect only through interoperable interfaces, standards and clear requirements and implementation scenarios. However, 5G will not only stimulate the development of sectors with high innovation potential such as mobile communications, ICT and industry, but will also bring together different areas of the economy. Therefore, the development and implementation of clearly established standards is key to effective future development. ITU-R has defined the following three areas of impact of IMT-2020, according to the scheme:

Fields of Application for 5G
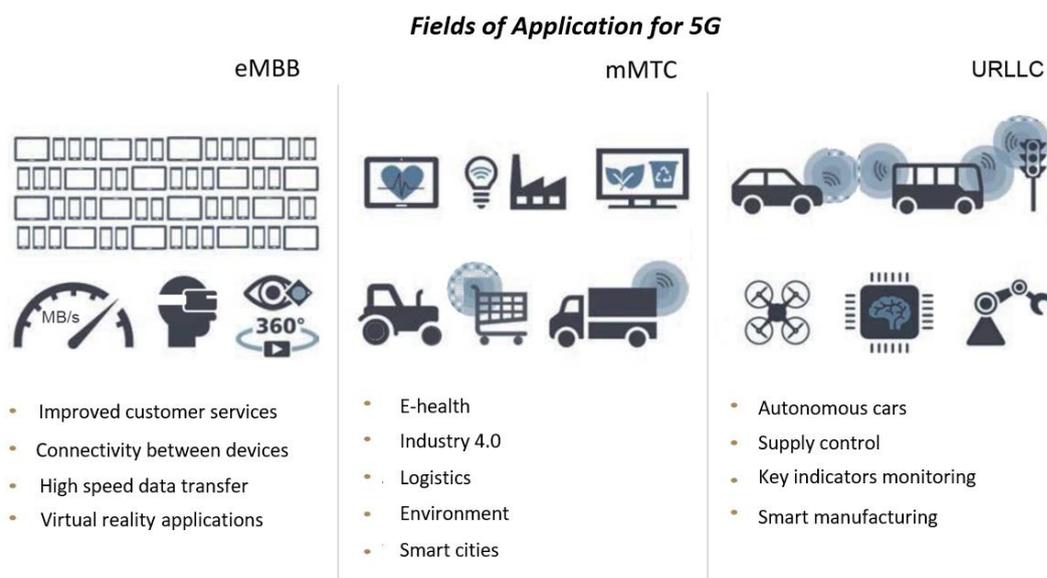
Source: ITU; Ofcom, 2017

Enhanced Mobile Broadband (eMBB): If the number of users is high, applications with high bit rates, for example ultra-high resolution video streaming, depend on high bandwidths per user and high capacities per cell. In order to make available such data ratestransmission, technologies that allow for a significant increase in the spectral efficiency as well as broad frequency bands are required.

Massive Machine Type Communication (mMTC): The Internet of Things requires communication with control centers, which requires a high network capacity to manage hundreds of thousands of connected devices for each cell. In addition, the signals must be transmitted with maximum energy efficiency to facilitate the battery life of the connected sensors for ten years or more.

Ultra-Reliable and Low-Latency Communication (URLLC): Applications where safety and security can be critical issue, for example in production area are dependent on the maximum on the quality, stability and availability of connections.

Unlike previous generations of mobile communications, where an old technology was replaced by a new one, 5G will evolve a number of existing features and introduce improvements by adding new ones. The emphasis is not on communication between users but on the exchange of information between users and the world wide web, and especially on the benefits of communication between network devices serving users. In this regard, a key element for large-scale use of the services and applications provided by 5G is to ensure high trust in users. It is necessary to ensure that 5G technology's use meets the safety and security requirements of all applications and protects privacy. Using 5G networks to manage devices

outside the networks, external databases, cloud technologies beyond operators' control, virtualization of networks and services, as well as decision-making using artificial intelligence, set requirements other than the ways used in 4G to protect the security and integrity of networks.

2.3   Monitoring and support policies

The European Court of Auditors (ECA) draws up special reports presenting the results of its audits of EU policies and programs or governance topics in specific budgetary areas. ECA selects and develops its audit tasks to maximize tasks' impact, taking into account the risks to implementation or compliance, the amount of revenue or expenditure audited, the forthcoming changes, and the political and public interest. In its Special Report № 12 of 2018: Broadband in the EU Member States: despite progress, not all the Europe 2020 targets will be met[9], ECA states that "Various factors limited Member States' progress towards meeting their broadband targets".

In November 2015, the Commissioners of the Directorates-General (DGs), "Communication networks, content and technology" (CNECT), "Agriculture and Rural Development" (AGRI) and "Regional and Urban Policy" (REGIO) invited the Member States to take part, on a voluntary basis, in the set-up of a European network of Broadband Competence Offices (BCO). The intention was for each BCO to give advice to citizens and businesses and provide technical support to representatives of local and regional authorities on ways to invest effectively in broadband, including the use of EU funds. In January 2017, the Commission sets up a Support Facility which helps the BCOs in running events, workshops and training seminars, as well as in managing and moderating web-based forums about relevant topics to the BCOs. The potential advantage of the BCO network is that BCOs are able to deal with a wider range of issues and tasks, including policy matters, than a technician specialist would be able to. Inr Bulgaria, the role of the National Broadband Competense office (BCO) is performed by the Ministry of Transport, Information Technology and Communications (MTITC), which assists and advises all stakeholders, including the institutions and major telecommunications operators involved in the process of implementation of forthcoming investment initiatives in the field of broadband access.

The Commission carries out a regular monitoring on the state of play of the Member States and aggregates the information at EU level. However, there is no common monitoring across the Commission's Directorates-General to support the achievements of the Europe 2020 broadband targets.

An Annual report on the digital economy and society index (DESI Report)[10] and a European Digital Progress Report (EDPR) are drawn up annually. These documents allow the Member States to compare their achievements over time to those of other Member States. Although the Commission collects the relevant data and reports it in the EDPR and its predecessors, the connectivity indicators reported in DESI do not include a broadband target to the Europe 2020 targets, defied as 50% of households with subscriptions of over 100 Mbps. DG REGIO's monitoring is based on the indicators defined for each Operational Programme and takes place through the Monitoring Committees in which the Commission has an advisory

---

[9] Special Report № 12 of 2018.: Broadband in the EU Member States
[10] Digital Economy and Society Index (DESI)

role and the Annual implementation Reports. The common output indicator defined by the Commission for ERDF spending does not allow progress against the achievement of all three Digital Agenda 2020 targets to be monitored, as it is defined as "Additional households with broadband access of at least 30 Mbps" and is not broken down between fast broadband (above 30 Mbps) and ultra-fast broadband (above 100 Mbps). This also applies to the European Agricultural Fund for Rural Development (EAFRD), for which DG AGRI has defined the performance indicator as "Population benefiting from improved services/infrastructures (IT or other)". Both for the ERDF and EAFRD, the common indicators do not distinguish fast and ultra-fast broadband.

2.4   Broadband access in the Republic of Bulgaria

According to the European Commission's Digital Economy and Society Index (DESI) for 2020, in the field of connectivity, specifically as regards the wide availability of ultrafast and mobile broadband networks, Bulgaria ranks 26th among the Member States.

Connectivity	Bulgaria		EU
	rank	score	score
DESI 2020	26	38.5	50.1
DESI 2019	26	37.2	44.7
DESI 2018	24	35.6	39.9
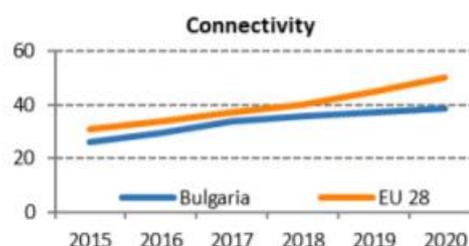
Source: DESI, 2020

Fast broadband coverage (NGA) is 77%, and very high capacity networks coverage (VHCN) is 42%. Bulgaria ranks at the bottom to other EU countries in terms of the overall broadband take-up, with only 58% households subscribing and 25th on take-up of high-speed fixed broadband of at least 100 Mbps. On the other hand, the mobile broadband indicators are relatively good having further improved average 4G coverage increased to 81% in 2019, and with a high take-up steadily increasing to 103 subscriptions per 100 people in 2019. This places Bulgaria slightly above the EU average. Bulgaria ranks 10th in the broadband price index with prices lower than the EU average mainly for fixed services.

	Bulgaria			EU
	DESI 2018 value	DESI 2019 value	DESI 2020 value	DESI 2020 value
1a1 Overall fixed broadband take-up % households	59% 2017	58% 2018	58% 2019	78% 2019
1a2 At least 100 Mbps fixed broadband take-up % households	7% 2017	10% 2018	11% 2019	26% 2019
1b1 Fast broadband (NGA) coverage % households	75% 2017	75% 2018	77% 2019	86% 2019
1b2 Fixed Very High Capacity Network (VHCN) coverage % households	38% 2017	38% 2018	42% 2019	44% 2019
1c1 4G coverage % households (average of operators)	72% 2017	80% 2018	81% 2019	96% 2019
1c2 Mobile broadband take-up Subscriptions per 100 people	87 2017	98 2018	103 2019	100 2019
1c3 5G readiness Assigned spectrum as a % of total harmonised 5G spectrum	NA	0% 2019	0% 2020	21% 2020
1d1 Broadband price index Score (0 to 100)	NA	NA	72 2019	64 2019

Source: DESI, 2020

The National Statistical Institute (NSI) conducts an annual survey on the use of ICT in households and by individuals, which is part of the European statistical program and is conducted in all EU Member States according to a uniform methodology, under Regulation (EC) № 808/2004[11]. According to data as of December 2019, 75.1% of households in the country have Internet access, and the percentage of broadband Internet access users is 74.9%. 79.6% of them are in the cities and only 60% - in the villages. Broadband connection is divided into two categories: fixed broadband connection, incl. wireless (DSL, ADSL, VDSL, LAN, optic, satellite, public WiFi) used by 57.8% of households and mobile broadband connection (via mobile phone network - 3G or 4G, using a SIM card or flash drive for mobile internet, mobile phone or smartphone used as an access point) - 64%.

In its Annual Reports, the Communications Regulation Commission (CRC) recognizes the implementation of one of the main priorities, namely providing conditions for new technologies and services to enter the market through efficient allocation and provision of the limited resource - spectrum , in including spectrum for building wireless broadband networks and enabling all citizens to have broadband access at the highest possible speed and capacity. According to the 2019 report[12] the upward development of data transmission and Internet access services in the country is preserved.

In 2019, the trend of growth in the number of subscribers to Internet access services in the country continues. As of December 31, 2019, the total number of subscribers to retail Internet services (fixed and mobile Internet access) is 8.483 million and marks an increase of 5.4% compared to 2018. Number of subscribers to bundle services (including fixed and/or mobile internet access) also grows, increasing by 6.9% over the last year to 6.086 million.

---

[11] Regulation (EC) 808/2004 of the European Parliament and of the Council of 21 April 2004 concerning Community statistics on the information society
[12] Annual Report of the Communications Regulation Commission for 2019.

Figure 1 shows the penetration[13] of fixed broadband Internet access by households and population[14] and mobile access[15] by population for the period 2017 - 2019:

Figure 1

Penetration of fixed broadband and mobile Internet access on a household and population basis for the 2017-2019 period
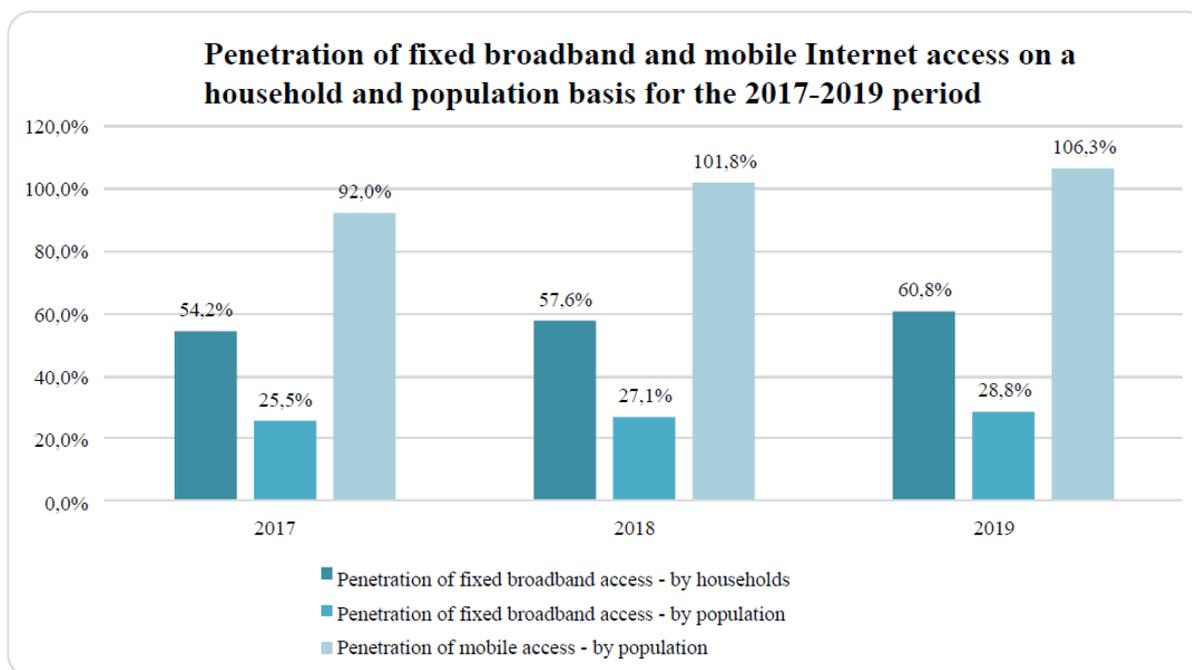
Source: Data submitted to CRC

At the end of 2019, fixed broadband subscribers using high-speed access through next-generation access networks (NGA) will reach 88.7% of the total number of fixed broadband internet access subscribers. The upward development of broadband Internet access, realized through NGA networks, has a positive role for the speed of the offered Internet services. Figure 2 shows the distribution of the number of subscribers of fixed broadband Internet access according to the download speed from the international space for the 2017 - 2019 three-year period.

---

[13] To calculate this indicator, the data from the NSI assessment of the country's population as of December 31, 2016, December 31, 2017, and as of December 31, 2018, and the data on the number of households from the 2011 census have been used;

[14] Data on the number of home subscribers at the end of the respective year have been used;

[15] Includes: subscribers to bundle services with mobile internet access included (including subscribers to transmission data packets purchased in addition to voice plans), subscribers to a standalone service by means of data cards or modems, and users of mobile internet access services provided without an individual subscription.

Figure 2

Distribution of fixed broadband access subscribers by speed for the period 2017-2019
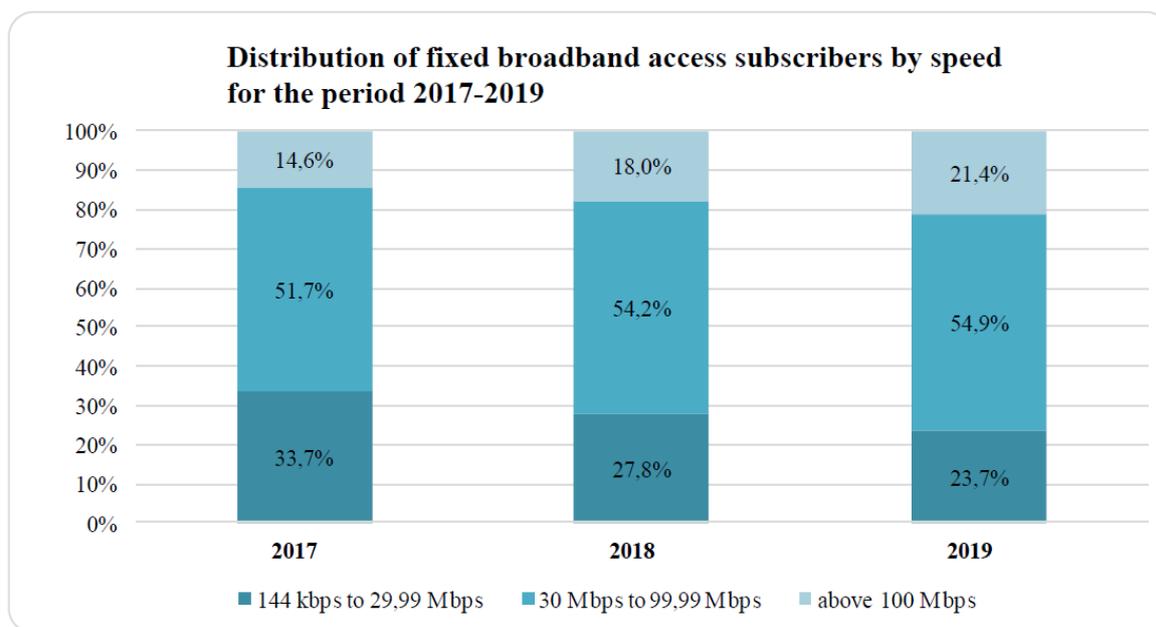
Source: Data submitted to CRC

As a result of the increasing number of subscribers using optic connectivity and cable access protocol DOCSIS 3.0 (Data Over Cable Service Interface Specification), the number of subscribers using Internet access at speeds including above 30 Mbps grows. As of the end of 2019, more than half (54.9%) of the fixed broadband access users use high-speed access to the international space at a download speed from 30 Mbps to 99.99 Mbps. The highest growth is observed in the number of users of ultra-fast (over 100 Mbps)broadband access.

Development of Internet access services in the regions

Bulgaria is above the EU average level in terms of Very High Capacity Networks' (VHCN) and NGA networks' deployment. The situation in rural areas is less satisfactory, as only 1% of households have the benefit of VHCN technology - well below the EU average of 24%. FTTP (Fiber to the Premises) increased to 42%, but not in rural areas, where it reaches only 1% of households, compared to 21% for EU. In 2019, FWA (Fixed Wireless Access) reached 19% in total and 10% in rural areas.

The coverage in rural areas based on the technologies used is illustrated in the graph below.

Graph 1

Rural coverage by technology (% of households), 2015-2019
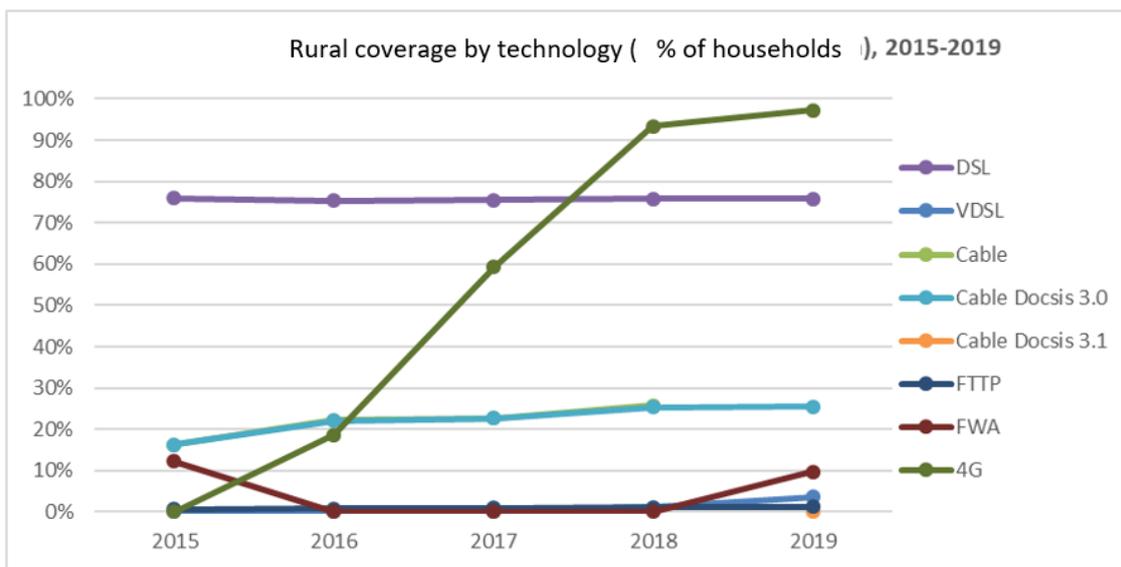
Source: IHS and Point Topic, Broadband coverage in Europe studies

Bulgaria has assigned only 14% of the spectrum for wireless broadband. Spectrum assignment has been challenging due to use by the military and for aircraft communicationof parts of the 700 MHz and 800 MHz bands.

Harmonised spectrum per band for Bulgaria
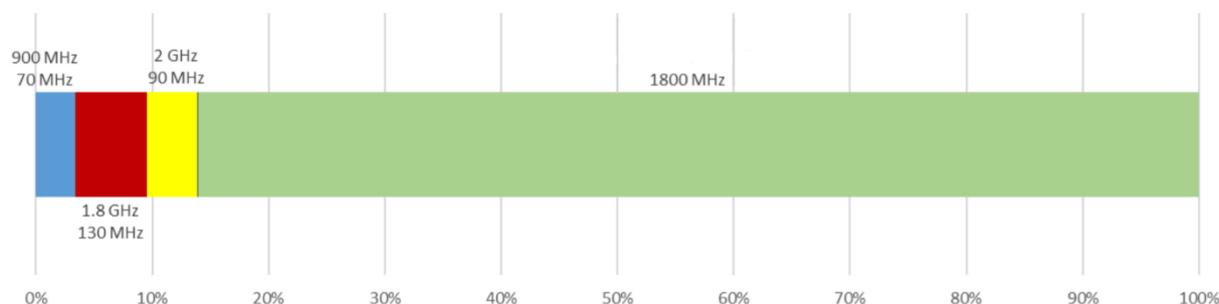
Source: Commission services. Data of April 2020

An amendment to the National Plan for Radio Frequency Spectrum Allocation has been adopted through Decision № 536 of the Council of Ministers of 12 September 2019. The changes: 1) create conditions for providing telecommunications operators with the 700 MHz radio frequency bands, which is a prerequisite for the deployment of fifth-generation (5G) mobile networks and full coverage in the country. The use of this band is of particular importance for providing coverage in remote and sparsely populated regions, where operators do not have the economic benefit of developing their networks by building a large number of base stations; 2) make it possible to provide large enough frequency blocks in the radio frequency band 24.25-27.5 GHz and provide them to operators for the 5G networks building in densely populated areas, where there will be more users of high-speed mobile connections.

Although Bulgaria achieves a high level of broadband coverage, the country must take additional measures to timely achieve the objectives of the current National Broadband Infrastructure Plan for Next Generation Access 2014-2020, including in respect of high-speed broadband networks' deployment. It is in the interest of our country to ensure that the entire

EU harmonized spectrum, incl. the 5G bands will be available in a timely manner to all interested parties under conditions that stimulate the goals for gigabit connectivity to be achieved. Although 5G tests show investment interest, the lack of a sufficient spectrum remains a major obstacle to the timely implementation of 5G.

Pursuant to the measure "Updating the data on next generation broadband, which includes information on the availability and geographical location of the regional operators' infrastructure" of the current National Broadband Infrastructure Plan for Next Generation Access, MTITC annually prepares and publishes information on the supply of broadband internet access in the country.

The database creation takes into account the goals set out in the Digital Agenda, namely to provide fast broadband coverage (> 30 Mbps) for all Europeans by 2020; and by 2020, at least 50% of all European households to be connected to a ultra-fast broadband (> 100 Mbps). In addition, the strategic goal of the European gigabit society remains: by 2025, all European households, in rural or urban regions, will have access to Internet connectivity offering a downlink of at least 100 Mbps, upgradable to 1 Gbps speed.

The data was analysed according to the requirements of the European Commission (EC) and the Body of European Regulators for Electronic Communications (BEREC). The main database is based of the Annual Report of the Communications Regulation Commission 2018 and information from its annual questionnaires on the Activity of the enterprises in 2018. In particular is based on the information from the Form "A Questionnaire to Report the Activity in 2019 of the enterprises, which offering data transmission services and / or Internet access services" and "A Questionnary of the Broadband Access to Internet by 01/07/2019". The information of the broadband access in the country for 2019 by municipalities according to the above requirements is presented on the map below and can be summarized as follows: 112 "black" areas, 82 "gray" areas and 71 "white" areas. The information is available in .csv format[16] (List of "white and gray areas").

---

[16] List of "white and gray areas"

Broadband access in the Republic of Bulgaria
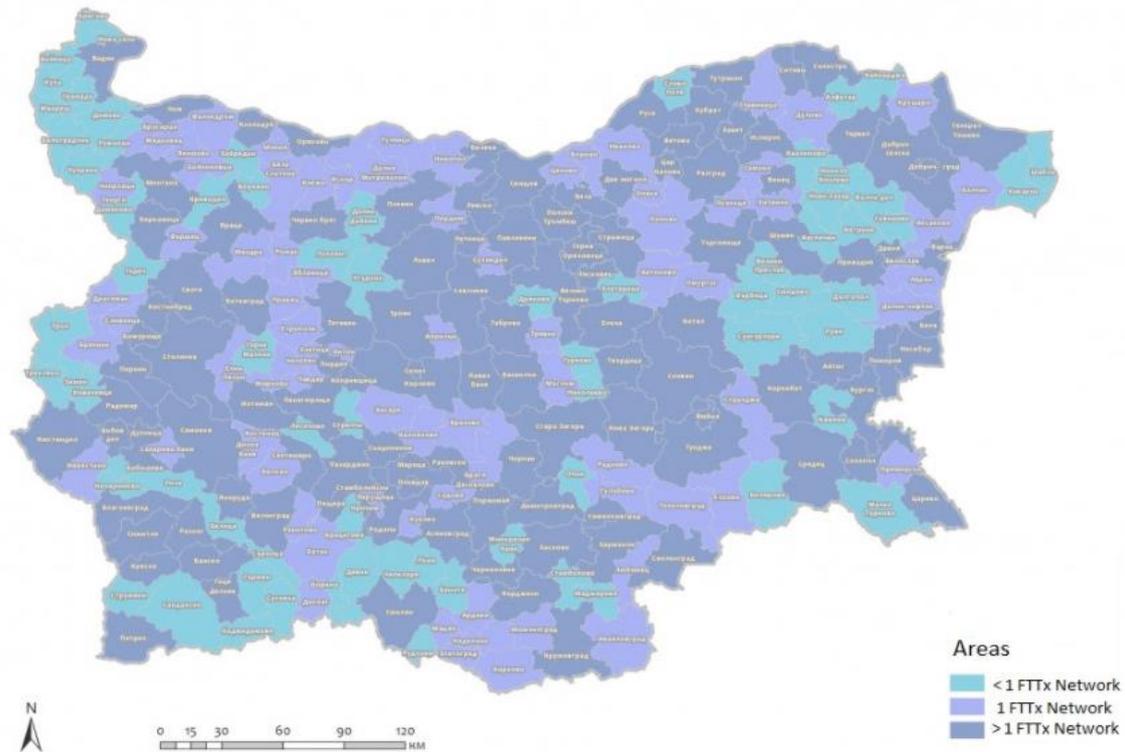
In accordance with the requirements of the Electronic Communication Networks and Physical Infrastructure Act (ECNPIA), the Single Information Point (SIP)[17] platform has been developed and put into operation.

SIP provides a system of base layers that can be used by all stakeholders - administration, business and citizens, in accordance with the requirements of the Spatial Data Access Act. The platform consolidates and systematizes the information on the procedures and normative acts, regulating the deployment and maintenance of infrastructure, and the bodies which are competent to issue acts in the field and the respective fees. SIP ensures access to all available models of authorization documents and other acts related to the infrastructure building. The functionalities allow electronically filling in and submitting applications and documents necessary for the deployment and maintenance of electronic communications networks and physical infrastructure, as well as for obtaining information on the progress of their consideration by the competent authorities.

By mid-2020, SIP has data on:

- 7 511 objects, 13 316 km of electronic communications network (ECN);
- 1 377 233 objects, 11 748 km of infrastructure for ECN deployment;
- 2 118 objects, 194 km of electricity transmission and distribution network;
- 8 142 objects, 4 216 km of railway network.

---

[17] Single Information Point (SIP)

3.   OVERVIEW OF THE STRATEGIC AND LEGAL FRAMEWORK

3.1   EU strategic and legal framework

The EU's electronic communications and broadband policy framework improves competition, stimulates innovation and strengthens consumer rights within the European single market. In recent decades, the European Commission has introduced a number of policy measures and financial instruments that foster private and public investment in fast and ultra-fast broadband networks. These measures will help European citizens and businesses to reap the full benefits from digitalisation.

DIGITAL EUROPE

The 2010 program outlines seven priority areas for action: building a digital single market, greater interoperability, increasing internet trust and security, much faster internet access, more investment in research and development, improving handling skills and developing good routine of using digital technologies, applying information and telecommunications technologies to meet such societal challenges as climate change and population aging. Examples of benefits include easier electronic payments and invoicing, rapid introduction of telemedicine and energy-efficient lighting. The program is updated in 2012 and sets three broadband access objectives: 1) to provide basic broadband for all Europeans by 2013; 2) to provide high-speed broadband access coverage (> 30 Mbps) for all Europeans by 2020 and 3) to ensure very high-speed broadband internet connection (> 100 Mbps) for at least 50% of European households by 2020.

The first two objectives are aimed at providing certain speeds, and the third one is related to consumer demand. These objectives have become a starting point for public policy across the EU and have provided guidelines for public and private investment.

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE – "A DIGITAL SINGLE MARKET STRATEGY FOR EUROPE"

In its Communication of 6 May 2015 establishing a Digital Single Market Strategy for Europe, the Commission stated that the review of the legal framework for electronic communications would focus on measures to stimulate investment in high-speed broadband networks. A more coherent approach to the internal market in RF spectrum policy and governance will ensure the conditions for a true single market by overcoming regulatory fragmentation, ensuring effective consumer protection, a level playing field for all market participants and consistent rules' implementation, and that it will provide a more effective regulatory institutional framework.

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE – "EUROPE'S 5G ACTION PLAN"

The 5G plan announced in September 2016 with a Communication from the Commission to the European parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The Plan aims at harmonized 5G deployment

in EU countries, following the roadmaps and bringing priorities for coordinated 5G deployment in all EU Member States into line; to encourageearly deployment in large urban areas and along main transport routes; to facilitate the implementation of an industry-led risk fund to support 5G-based innovation; to provide temporary 5G RF bands to which additional bands can be added as soon as possible and to work on a recommended approach to allowing specific 5G frequency bands above 6 GHz; to promote pan-European testing as a catalyst for transforming technological innovation into real business solutions; to unite the leading participants in the work to raise world standards.

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE – "CONNECTIVITY FOR A COMPETITIVE DIGITAL SINGLE MARKET - TOWARDS A EUROPEAN GIGABIT SOCIETY"

The Communication is adopted in September 2016 and sets out a vision for Europe where the availability and use of very high-capacity networks allows for the widespread use of products, services and applications in the digital single market. This vision is based on three main strategic   until 2025: 1) gigabit connectivityfor all major socio-economic drivers; 2) uninterrupted 5G coverage for all urban areas and all major terrestrial transport paths and 3) access to connectivity offering a downlink of at least 100 Mbps, upgradable to Gigabit speed,for all European households.

The full economic and social benefits of the digital transformation will only be achieved if Europe can ensure the pervasive deployment of very high-capacity networks in both rural and urban areas and among the public at large.

High-quality internet connection is an absolute prerequisite for achieving a digital single market and securing Europe's digital future. To this end, it sets out a vision for a European gigabit society in which the accessibility and uptake of very high-capacity networks allow the widespread use of products, services and applications.

DIRECTIVE 2014/61/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL ON MEASURES TO REDUCE THE COST OF DEPLOYING HIGH-SPEED ELECTRONIC COMMUNICATIONS NETWORKS

The purpose of the Directive of 15 May 2014 is to facilitate and foster the deployment of high-speed electronic communications networks (i.e. high-speed broadband internet). The main obstacle here is the financial one, as the installation costs for the infrastructure amount to up to 80% of the total costs (i.e. digging roads for laying fibre broadband infrastructure). This obstacle could be overcome by fostering the re-use of existing physical infrastructure and creating the conditions for a more efficient installation of new physical infrastructure.

According to the Directive, EU countries must take appropriate action to remove any legal barriers that could prevent network operators from providing access to their physical infrastructure to electronic communications network operators (ECNs). Network operators are required to provide access to their physical infrastructure on clear, proportionate and fair terms, including price. States should also remove any legal barriers that may prevent network operators from negotiating agreements with ECN operators in order to coordinate their construction work. If these works are publicly funded, network operators must respond to any timely request for coordination, provided that the additional costs are covered by the ECN operator. In this case, the network operators retain control over the works.

In order to improve coordination, EU countries must ensure that companies deploying broadband infrastructure have access to minimum information on existing physical infrastructure, such as: location; type/use of infrastructure; contact person. It should also be ensured that all authorization procedures are accessible through a Single Information Point.

DIRECTIVE (EU) 2018/1972 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ESTABLISHING THE EUROPEAN ELECTRONIC COMMUNICATIONS CODE

The Directive of 11 December 2018 establishes a set of updated rules for the regulation of electronic communications (telecommunication) networks, telecommunication services, as well as related facilities and services. It sets out tasks for national regulatory authorities and other competent authorities and establishes a set of procedures to ensure that the regulatory framework is harmonized across the EU. The main goal is to stimulate competition and increase investment in 5G and very high-capacity networks so that every citizen and every business in the EU can be guaranteed high-quality connectivity, a high level of consumer protection and a greater choice of innovative digital services.

The overall objectives of the Directive include promoting connectivity and building very high-capacity networks, including fixed, mobile and wireless networks, for all EU citizens and businesses; promoting the interests of EU citizens by enabling maximum benefits in terms of choice, price and quality through effective competition; maintaining networks and services security; ensuring consumer protection through specific rules and meeting the needs of specific social groups, in particular people with disabilities, the elderly and people with special social needs; facilitating market entry and promoting competition in the provision of telecommunication networks and related facilities; contributing to the development of the internal market for telecommunication networks and services in the EU by developing common rules and predictable regulation.

REGULATION (EU) 2017/1953 OF THE EUROPEAN PARLIAMENT AND THE COUNCIL AMENDING REGULATIONS (EU) № 1316/2013 AND (EU) No 283/2014 AS REGARDS THE PROMOTION OF INTERNET CONNECTIVITY IN LOCAL COMMUNITIES

This Regulation allows the EU to provide funding to support the access to high-quality free local wireless connectivity, without discrimination, in public places (such as libraries and hospitals, as well as in open spaces such as parks). It introduces the Wifi4EU initiative. The initiative fosters free access to wireless internet connections for citizens in public places throughout the EU, through vouchers to be used for the installation of wireless internet equipment in public places in the respective municipality.

ACTION PLAN FOR RURAL BROADBAND

In 2017, the EC has committed to drawing up a special action plan to help achieve better broadband coverage in the EU's rural areas. This plan is based on 5 actions: 1) setting up the Broadband Competence Offices (BCO Network). The BCO Network will help to improve broadband connectivity in rural areas. They will provide guidance to public administrations, telecom operators, and all other public and private stakeholders on funding opportunities, technology and regulatory issues; 2) Deployment of "broadband missions" to member states and regions with low levels of rural broadband coverage. These missions will comprise experts from across the Commission, who can provide technical assistance to unlock the administrative and financial bottlenecks to broadband roll-out; 3) design a "common

methodology" for planning, reporting and monitoring of broadband investments; 4) introduction of a "rural proof test" which will prioritise rural broadband in the reprogramming of any structural and investment funds with the aim to avoid to further increase the digital gap between rural and remote areas and other areas; 5) update the Commission's guide to high-speed broadband investment to help local communities launch successful projects, 6) design a "rural broadband framework" to help implement broadband investment in rural areas.

In rural and remote areas, there is a lack of market efficiency due to significant inequalities in the investment intentions of private operators to build broadband networks and the purchasing power and characteristics of the local population. The cost of deploying an ultrafast broadband network to these areas is significantly higher than the cost of reaching urban densely populated areas due to geographical remoteness and unsatisfactory infrastructure in general. In addition, the base for achievable future revenues of the end operators will be more limited due to the low population density in these areas and the correspondingly lower incomes. These circumstances call for special measures to complement the effect of ex ante regulation.

3.2 Strategic and legal framework in Bulgaria

Technological development achievements, the level of innovation in electronic communications and the need to strengthen the integration of the internal market dictate a number of changes in the legislation in order to ensure the pace of technological change for ensuring efficiency in the next decade. The main objectives of the broadband policy in Bulgaria are set out in the National Plan for NGA Broadband Infrastructure and the Roadmap to it. Broadband policies are also reflected in Priority 8 "Digital Connectivity" of the National Development Program BULGARIA 2030.

NATIONAL DEVELOPMENT PROGRAM BULGARIA 2030

The National Development Program BULGARIA 2030 is a framework strategic document of the highest order in the hierarchy of national programming documents, determining the vision and general objectives of development policies in all sectors of government, including their territorial dimensions. The document defines three strategic goals, for the implementation of which it groups the government's intentions in five areas of development and raises 13 national priorities. BULGARIA 2030 steps on a deliberate Analysis of the socio-economic development of the country after its accession to the European Union[18], aiming to identify key problem areas and gaps in the country's development policies.

By Decision № 33 of the Council of Ministers of January 20, 2020, the vision, goals and priorities of the National Development Program BULGARIA 2030 were approved, as one of the leading priorities of the program is Priority 8 "Digital Connectivity" with MTITC as a leading department.

Digital connectivity is defined as the core of digital transformation. It is a set of horizontal policies on the various components and needs targeted digital cooperation arrangements, broadparticipation of all stakeholders. Secure cyberspace and trust are drivers

---

[18] NDP BULGARIA 2030. Analysis of socio-economic development

of the demand and use of ICT-based products and services and are key factors for successful digital transformation.

Efforts will be focused on providing conditions for the economy's overall digitalisation. The necessary digital infrastructure will be provided for the development of ICT, as a platform for providing various electronic services, including public ones. Measures in this area will be concentrated in improving access to high-speed internet in less populated regions and its active use by the population and business, as well as in high-speed mobile internet development in the country.

Expending accesss to high-speed internet in rural areas will be an important prerequisite for the development of smart and sustainable agriculture projects, stimulating the local economy and improving the quality of life. Government support in this direction will also be expressed in the expansion of high-quality wireless broadband services through the release of RF spectrum and active participation in initiatives to provide free public Wi-Fi. In order to ensure investment efficiency, they will be accompanied by measures to increase the digital literacy of the population and stimulate the use of digital services by society and business.

NATIONAL STRATEGIC DOCUMENT DIGITAL TRANSFORMATION OF BULGARIA FOR THE PERIOD 2020-2030

By Decision № 493 of the Council of Ministers of 21 July 2020, a National Strategic Document "Digital Transformation of Bulgaria for the period 2020-2030" has been adopted. The document sets out the principles of digital transformation, characterized by the widespred implementation and combination of digital technologies in all spheres of public and economic life.

One of the main priorities of the strategy is to improve the existing infrastructure by ensuring the wide deployment and use of very high-capacity networks. High-speed fibre-optic routes, as well as fifth-generation networks, will be among the most important building blocks of the digital economy and society. Improving connectivity will allow the development of innovative business models in many sectors such as research, digital and distance health, security, logistics, autonomous and connected vehicles, digital governance and digital education, and the development of "smart cities". Support for high-speed connectivity will be accompanied by measures to increase digital skills and stimulate the demand for Internet-based services by citizens and businesses.

The digital transformation is a necessary process for Bulgaria's technological development to create conditions for innovation and business growth, workforce efficiency increase, competitive digital economy and citizens' high standard. Guided by the strategic goals for accelerated economic development, demographic growth and reduction of inequalities set in the National Development Programme BULGARIA 2030, by 2030 our country must build a functioning and secure environment to unlock the full potential of digital technologies for the digital transformation of all key sectors, reaching the average European values of the European Commission's Digital Economy and Society Index (DESI).

ELECTRONIC COMMUNICATIONS ACT

The Electronic Communications Act (ECA) and its implementing regulations harmonize our national legislation with the European Regulatory Framework for Electronic Communications of 2002/2009, taking into account national specificities related to competition and technological development. This regulation achieves synchronization of the

legal and regulatory framework for the liberalized electronic communications market and accelerates the integration processes in the EU's digital single market and the provision of cross-border networks/services. The aim is to improve the legal model for the citizens' interests protection, being end-users of public electronic communications services, as a fragment of the pan-European policy on services of public interest.

The adoption of the Law determines the functions and powers of the state bodies exercising the state government in the sector; the functions and powers of the Communications Regulation Commission (CRC) as an independent state body for regulation and control of electronic communications and its relations with other national regulators are comprehensively defined; the general requirements for entering the market of public electronic communications networks and services and the special terms and conditions for granting permits for efficient use of limited national frequency and numbering resources are determined; the procedures for defining, analyzing and evaluating the relevant networks/services market, subject to ex ante regulation, imposing specific obligations on enterprises with a significant impact on dominated markets are regulated in order to ensure conditions for effective competition.

ELECTRONIC COMMUNICATION NETWORKS AND PHYSICAL INFRASTRUCTURE ACT

The Electronic Communications Networks and Physical Infrastructure Act (ECNPIA) regulates public relations in view of the deployment, use, maintenance and development of electronic communications networks; ensuring access to and use of existing physical infrastructure, including such infrastructure serving other types of networks; joint planning and use of physical infrastructure; the rights and obligations of network operators related to these activities; as well as the rights and obligations of construction assigners, property owners, holders of limited rights in rem, persons who manage or use real estate, and tenants related to providing access to real estate, in order to ensure conditions for providing electronic communications services.

Among the Act's main objectives are: facilitating and stimulating the deployment of high-speed electronic communications networks by encouraging the sharing of existing physical infrastructure; creating conditions for more efficient and lower-cost building of new physical infrastructure; defining specific requirements regarding the planning and coordination of the building of physical infrastructure for deployment, use, maintenance and improvement of electronic communications networks in accordance with the requirements for the physical infrastructure's safe operation and ensuring the continuity of the services provided through it.

The Act also provides for a reduction in administrative burdens and the creation of conditions to facilitate procedures by establishing a Single Information Point (SIP) andproviding for the possibility , including electronically, to coordinate the planning, construction and maintenance of physical infrastructure and the deployment of electronic communications networks. SIP functioning provides access to minimum information on existing physical infrastructure, as well as improves cross-sectoral coordination on the joint planning, building, use and maintenance of physical infrastructure for electronic communications network deployment.

ORDINANCE ON DATA FORMATS AND ON THE CONDITIONS AND PROCEDURE FOR GRANTING ACCESS TO INFORMATION IN THE SINGLE INFORMATION POINT

The purpose of the Ordinance is to establish a legal framework for the provision of information by and to the Single Information Point (SIP), which will contribute to achieving the ECNPIA's objectives to improve cross-sectoral coordination in terms of joint planning, building, use and maintaining physical infrastructure for electronic communications networks deployment and, ultimately, facilitating and stimulating the deployment of high-speed electronic communications networks. SIP is set up as a geographic information system to provide network operators with reliable information on the physical infrastructure suitable for the deployment of high-speed networks and information on the coordination of planned activities in a specific geographical area and section.

Specific technical rules on the formats of the provided information are included. For users' convenience, several of the most common formats are listed, as the single information point provides an opportunity for direct entry of physical infrastructure data, as well as for integration with the system of the respective network operator.

ORDINANCE ON THE RULES AND NORMS FOR THE DESIGN, DEPLOYMENT AND DISASSEMBLY OF ELECTRONIC COMMUNICATIONS NETWORKS

The Ordinance determines the rules and norms for design, deployment and disassembly of electronic communications networks (ECNs); the rules for maintenance, operation and removal of ECNs on or in the physical infrastructure of energy companies used for the provision of services of public interest under the Energy Act; the conditions for deployment of high-speed ECN and building access points in buildings; the criteria for terminating the access to and sharing of the physical infrastructure of network operators; the rules for the abolition of the ECN; as well as the ECN marking.

ORDINANCE № 21 ON THE CONTENT, CONDITIONS AND PROCEDURE FOR ESTABLISHMENT AND MAINTENANCE OF SPECIALIZED MAPS AND REGISTERS FOR ELECTRONIC COMMUNICATIONS NETWORKS, FACILITIES AND RELATED PHYSICAL INFRASTRUCTURE

The Ordinance determines the content, conditions and procedure for establishment and maintenance of specialized maps and registers of the electronic communications networks, facilities and the related physical infrastructure located by the operators, as well as the formats of maintenance in electronic form.

The specialized maps and registers of the underground and aboveground telecommunication infrastructure provide information on: operation and maintenance of the underground and aboveground lines and facilities of telecommunication infrastructure; research and design for construction of new and reconstruction of existing underground and aboveground lines and facilities of the telecommunication infrastructure; elaboration of development schemes and general and detailed development plans; preliminary (pre-investment) and volumetric surveys and elaboration of investment projects; building by the telecommunication operator of an information system for the telecommunication infrastructure; an information layer input for the telecommunication infrastructure in the information system of the Cadastre Agency.

ORDINANCE № 6 ON THE EASEMENTS THAT ARISE IN FAVOR OF THE OPERATORS OF ELECTRONIC COMMUNICATIONS NETWORKS UNDER THE ELECTRONIC COMMUNICATION NETWORKS AND PHYSICAL INFRASTRUCTURE ACT

The Ordinance determines the size and location of the easement strips in which the easements under the ECNPIA are exercised for building new and/or extension of existing linear physical infrastructure for the deployment of electronic communications networks, as well as the special regime for exercising the easements under technical requirements and restrictions in using the land properties.

4. NATIONAL GOALS AND PRIORITIES TO 2030

By 2030, Bulgaria must be equipped with gigabit-symmetric access networks throughout the country. The sustainable fibre network, combined with a universal access mobile network, will allow every citizen, every business and every public institution to use the digitalisation opportunities on equal terms throughout the country.

The digital divide will be maximally overcome by deploying digital connectivity in the remote and sparsely populated regions and raising the digital competences of the population, reaching the average European values of the DESI Connectivity indicator. As a result, Bulgaria will play a significant role in the European digital market and will secure and expand its position as a trusted partner, affirming the European values in Western Balkans.

4.1 TARGET INDICATORS

The objectives set out in this document are relevant to the following **United Nations (UN) Sustainable Development Goals (SDGs)**:
Goal 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;
Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable.

DESI[19] components will be used to measure progress:

---

[19] The Digital Economy and Society Index (DESI)

Fixed Very High Capacity Network (VHCN), DESI,% of households	• current value- 42 • target value - 52 • average EU value - 44
Fast broadband (NGA) coverage, DESI, % of households	• current value - 77 • target value - 86 • average EU value - 90
NGA high-speed rural coverage, DESI, % of households	• current value - 28,4 • target value - 60 • average EU value - 59,3
5G readiness, DESI, Assigned spectrum as a % of total harmonized 5G spectrum	• current value - 0 • target value - 50 • average EU value - 21
At least 100 Mbps fixed broadband take-up, DESI, % of households	• current value - 11 • target value - 33 • average EU value - 26
Internet users, DESI, % individuals	• current value - 67 • target value - 85 • average EU value - 85

* *current values are shown according to DESI 2019;*
** *EU averages are shown according to DESI 2019;*
*** *the target values are set to be reached by 2030.*

4.2   SWOT ANALYSIS

Strengths	Weaknesses
• Fully liberalized electronic communications market; • High share of FTTx networks; • Low service prices based on high-speed networks and enhanced volumes of exchanged data; • Significant investments in the state support network; • Large number of qualified IT specialists; • Sufficient coverage in rural regions, which provides opportunities for market development.	• Insufficient level of investment, especially in rural areas, where investment costs are high and returns are low; • Low level of digital skills; • Delays in the implementation of digital services such as public services, Internet of Things, smart cities, etc.; • Administrative delay of the investment process.
Opportunities	**Threats**
• Creating a clear institutional framework through a timely	• Lack of investment interest;

transposition of the European Electronic Communications Code; • Creating new jobs and opportunities such as teleworking; • The digital infrastructure development will lead to lower prices of various digital technologies and applications; • Increasing SMEs' competitiveness by facilitating access to digital technologies; • Significant reduction of the differences between urban and rural areas; • Reducing high-speed networks deploying cost by reducing administrative burdens; • Effective joint investments to reduce construction costs; • Raising the digital competence of the population.	• Offering services based on technologies that do not have the very-high-speed ones' capacity; • Ineffective measures to reduce investment costs; • Non-unified administrative requirements for building high-speed networks; • Failure to use the financing opportunities provided under various national and European programs; • Untimely provision of sufficient radio frequency spectrum in economically efficient RF bands in the 700 MHz and 800 MHz bands; • Ineffective measures to ensure cybersecurity.

4.3   PRIORITY FIELDS

4.3.1.   Broadband infrastructure - accelerated building of broadband infrastructure, incl. for the needs of the state administration

An important prerequisite for sustainable growth, innovation and the provision of a wide range of digital services based on the fast exchange of large volumes of data is the availability of modern broadband infrastructure. This infrastructure must be able to support rapidly growing traffic, providing sufficient capacity coverage and the ability to transmit data at a volume, speed and reliability needed to meet modern life's needs. Improved connectivity will play a crucial role in innovation and productivity increase, as well as enabling everyone, regardless of their location, to make full use of the digital services and benefit from participation in the digital economy.

The goal of the priority area is to build high-speed networks, which will form a platform for providing a variety of digital value-added services while ensuring that no part of the country or a society group will be left without adequate digital connectivity.

Broadband connectivity is of a strategic importance for growth and innovation in all economy's sectors and for social and territorial cohesion. It maintains business efficiency, ensures the competitiveness of the economy and enables citizens to improve their skills and benefit from online services and offers, including key public services.

Gigabit connectivity for transport arteries and settlements will be ensured, which will facilitate the access to and use of public resources and will improve synergies and coordination between different sectors through innovative applications.

The main national priority will continue to be the full deployment of a backbone network covering all municipal centers. This is planned to be achieved by building ultra-high-speed networks using digital technologies with a guaranteed high degree of security, as a key factor in ensuring the digital governance functioning.

4.3.2. Very high-speed infrastructure – creating conditions for very high-speed networks' deployment

Very high-capacity networks (VHCN) are essential to maximizing the digital economy growth potential. Instant transmission and high reliability will allow hundreds of devices to work together in real time. The first visible effect of high-speed networks is the devices' speed increase when downloading and exchanging information. Uploading files to clouds will be as fast as storing them locally. Enhanced data transfer capacity, speed and low latency will allow ordinary users to have fun through the so-called virtual and alternative reality.

With a view to improving the legislation, a comprehensive set of new EU rules for the electronic communications sector has been adopted at the end of 2018 in order to promote connectivity and access to VHCN and competition, including in terms of infrastructure, as well as to support the internal market development and the protection of the citizens' interests. The EU's regulatory framework aims to foster investment in VHCN due to its crucial importance for achieving sustainable economic growth in the context of the economy digitalisation, but this in turn must not harm the competitive environment and consumers' interests.

The priority field is aimed at elaborating an investment-friendly legal framework to create the conditions for the deployment of very high-capacity networks, ensuring fixed and mobile high-quality connectivity for all citizens and businesses, which is key to a competitive economy and modern inclusive digital society. This will stimulate the VHCN widespread deployment to all citizens and businesses based on reasonable prices and choice opportunities, real and fair competition, open innovation, common rules and predictable regulatory approaches in the internal market and the necessary sector-specific rules to protect citizens' interests.

4.3.3. Spectrum efficient use - establishing conditions for building NGA networks

Due to the growing digital integration of social and economic processes, Internet mobile use significantly increases, which requires the provision of more efficient, effective and coordinated use of the spectrum to create conditions for building NGA networks. These dynamic processes make 5G the future key technology in this field. 5G networks will build modern society's and the economy's backbone by connecting billions of devices and systems, including in key sectors such as energy, transport, banking and healthcare, as well as industrial process management systems that transmit sensitive information and support security systems. It is necessary for 5G networks to respond to technology development and high-speed access imposition worldwide. The building of these networks will be carried out in compliance with the emission limit values set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the provisions of Ordinance № 9 of 1991 for the maximum levels of electromagnetic fields.

5G technology is seen as a tool for industrial transformation through the deployment of new networks that will provide data gigabit transfer rates with low latency and significantly improved performance and reliability. Simplification of regulation and reduction of business costs will be an essential aspect for building infrastructure and deploying new very high-capacity networks.

5G will provide infrastructure for all types of new business models, as its main function is to serve as a mobile network. In addition to communications' rationalization, 5G will help the organizations to take advantage of so-called big data by improving data transfer rates and will contribute to the development of cloud and blockchain technologies.

At the beginning of 2020, an amendment to the Tariff for fees collected by CRC under the ECA has been promulgated, which significantly reduces the fees for the spectrum use. This change is essential and will foster investment in infrastructure, create conditions for the timely 5G network deployment in Bulgaria.

The actions will be concentrated in the high-speed mobile internet development in the country, incl. the timely release of the RF spectrum, allowing investments for the introduction of 5G mobile networks in the country. Promotion tools will enable to build 5G networks and facilitate their dissemination through infrastructure sharing policies and assistance in building complementary infrastructure.

The main priority will be the timely provision of sufficient and appropriate RF spectrum to meet market demand and thus stimulate the provision of wireless broadband access by releasing sufficient radio spectrum in economically efficient bands in 700 MHz and 800 MHz bands.

Conditions will be created for building short-range wireless access points, as well as fostering infrastructure sharing. We will work to provide 5G connectivity along transport corridors, develop intelligent transport systems, build "smart" settlements and more in order to foster innovation and investment through the application of means to increase flexibility in the use of spectrum, as well as its shared and joint use.

4.3.4. Improving coverage in settlements located in peripheral, sparsely populated and rural areas

The full dimension of the economic and social benefits of digital connectivity can only be achieved by ensuring the widespread deployment and implementation of very high-capacity networks. Bulgaria has made significant progress in terms of broadband speed, but coverage remains a problem in some small towns and villages located in peripheral, sparsely populated and rural areas - with limited or even no coverage.

Measures will be taken to support digital connectivity in remote and sparsely populated areas by stimulating private internet operators' investment to provide internet access to end users in these areas.

Private operators are reluctant to invest in remote, rural areas with low population density, which is due, on the one hand, to the significant costs of infrastructure deployment and, on the other hand, to the low profitability of such investment. Another factor that makes private investment in the respective areas unattractive for private operators is the local

residents' relatively low purchasing power. Thus the number of potential customers of telecommunications services compared to the investment would be significantly unprofitable.

Ensuring anteriorly state and public institutions connectivity will be a prerequisite not only for the local institutions' development and access to online services but also for a greater opportunity for people living in rural areas. This will overcome the tendencies to isolate this population from the social and cultural life of the country. This approach aims to increase trust in Internet services by imposing security and behavioral standards that meet business standards. By providing very-high-speed infrastructure in rural areas, Internet use will be greatly facilitated and fostered in order to implement new business strategies and models by local businesses, as well as to develop new digital services.

4.3.5. Bridging the Digital divide

The opportunity for citizens to try state-of-the-art digital tools, including through wireless internet access in public places and places such as libraries, railway stations or employment services and training centers, is a positive side effect that can promote awareness and demand for gigabit internet access.

Bulgarian municipalities have actively participated in the WiFi4EU initiative. In the overall EU ranking, Bulgaria ranks first, in the percentage of municipalities that have participated and won a voucher from the initiative, which is evidence of the interest in such services by society and administration.

By 2030, priority will be given to continuing to achieve the goal of better integrating local communities into the digital single market, by giving users an insight into the gigabit internet society, improving digital literacy and expanding the range of services provided in these places by continuing the proactive use of instruments at EU level.

The priority area is aimed at overcoming the territorial imbalances related to the spread of broadband access. In this way, the utilization of the economic and social benefits of information and communication technologies related to overcoming obstacles in distance and development, especially in backward areas, will be favored. Efforts will be made to support digital connectivity in remote and sparsely populated areas, as well as in the centers of social life. The scope of the initiative, providing free public internet access, will be expanded, ensuring the sustainability of the implemented interventions.

Gigabit Internet connectivity will assist innovative teaching and learning methods to provide access to up-to-date learning materials, tools and techniques, and to enable learners to acquire e-skills while ensuring efficient distance learning. Access to enterprises and industrial sectors will be stimulated, especially to those actively using digital technologies, to create new applications and new business models for the production and distribution of their goods and services under more competitive conditions.

4.3.6. Network security

With the growing number of digital services and levels of risk, strengthening trust and security in the use of information and communication technologies is the basis for economic

growth and prosperity. The growing dependence of public life on digital infrastructure, including 5G networks, determines the need to provide adequate protection.

Coordinated action is being taken within the European Union to ensure the security of using 5G. In this context, the Commission's Recommendation on the cybersecurity of 5G networks has been published. According to its requirements, all Member States have made their own national security assessments. The data obtained have been summarized and a European Coordinated Risk Assessment report has been issued as a first made step following the recommendation.

The European Union Agency for Cybersecurity (ENISA), in connection with the EU cybersecurity certification framework, established under the EU Cybersecurity Act, continues to work on enhancing the level of cybersecurity of ICT products, services and processes.

The EU Council conclusions, adopted on 3 December 2019, on the importance of 5G for the European economy and the need to mitigate the security risks related to 5G, point out that although standardization and certification can handle some of the challenges in terms of 5G network security, additional security measures are needed to efficiently mitigate risks. As such is the need to diversify suppliers in order to avoid or limit the creation of a preferential dependence on one supplier, as this increases the exposure to the consequences of a possible failure of that supplier.

It is emphasized that increasingly complex, interconnected and rapidly evolving technologies require a coordinated holistic approach and efficient and proportionate security measures, with particular emphasis on security and privacy when designed as an integral part of 5G infrastructure and terminal equipment.

It is emphasized that 5G and other connected electronic communications networks need constant protection throughout their life cycle in order to cover the entire supply chain and all relevant equipment.

The activities on the organization, management and control of cybersecurity, as well as on taking the necessary measures to achieve a high general level of network and information security are laid down by the Cybersecurity Act (it establishes uniform standards) and its regulations, including the Ordinance on the minimum requirements for network and information security, as well as by the National Cybersecurity Strategy "Cyber Sustainable Bulgaria 2020". Risk management requirements for the security of the public electronic communications networks and services are determined by the Electronic Communications Act.

The Conclusions call on the Member States and the Commission, supported by ENISA, to take all necessary measures within their competences to ensure the security and integrity of electronic communications networks, in particular 5G networks, establishing a coordinated approach to overcoming security-related challenges of 5G technologies, on the basis of ongoing collaboration on the 5G security toolbox, to identify effective common methodologies and tools to mitigate the risks of 5G networks.

As a next step, an EU Toolbox of risk mitigating measures for 5G networks is published on 29 January 2020. The toolbox identifies and describes a set of strategic and technical measures and relevant support actions that can be used to mitigate the identified risks.

Directive (EU) 2016/1148[20] proposes comprehensive measures to strengthen the level of security of networks and information systems (cybersecurity) in the provision of services vital to the EU economy and society. It aims to ensure that EU countries are well prepared to deal with and respond to cyberattacks by: 1) designating competent authorities, 2) setting up computer security incident response teams (CSIRT) and 3) adopting national cybersecurity strategies.

The Directive aims to enhance the risk management culture.

5. CONCLUSIONS

Digital technologies play an increasingly important role in our economy and social life. Significant investment in digital infrastructure must be a top priority in order to remain competitive and enable new businesses and jobs to be created. The deployment of very-high-speed Internet access will stimulate the improvement of information technology skills as a factor in the efficient use of high-speed broadband connections.

On the road to a gigabit society, 5G technology will play a key role, especially in the field of vertical industries, which have significant potential for innovation. High-speed mobile communication infrastructures are a prerequisite for the overall development of key fields such as connected driving, logistics, energy, healthcare, spatial development etc.

Effective digital connectivity is key in overcoming the digital divide between regions by ensuring affordable internet access. This will improve the quality of life and the working environment by creating conditions for local development. Information and communication technologies and the Internet are key tools for developing a data-driven economy, so the deployment of very-high-speed broadband infrastructure will contribute to the goals of improving digital competence.

In order to achieve the goals and priorities set in this plan, targeted investments in technological development, completion of the necessary infrastructure and guaranteed network and information security are needed. Efforts should be focused on reducing costs and deploying new infrastructure more quickly and easily and improving existing ones. Greater regulatory stability and clarity will give bigger confidence to companies that make large, risky investments and will equalize market risk. Providing flexibility to operators in the field of developing new approaches to reduce the costs of implementing and managing risks and active public investment in infrastructure are efficient measures that will stimulate the deployment of digital networks.

---

[20] Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union

ANNEX – MEASURES TOWARDS THE UPDATED NATIONAL BROADBAND INFRASTRUCTURE PLAN FOR NEXT GENERATION ACCESS

List of Measures	Implementation period
Broadband infrastructure - accelerated building of broadband infrastructure, incl. for the needs of the state administration	
Implement a favorable legal framework to facilitate the broadband infrastructure building and deployment	2020
Taking up measures to alleviate administrative burdens in order to stimulate investment in the building and deployment of electronic communications networks and their nationwide deployment	permanent
Providing fitting fibre optic connectivity between base stations	2025
Capacity development of the Bulgarian broadband competence office (BCO)	permanent
Development of the state backbone network by building fibre optic connectivity to all municipalities and by enhancing its transmission capacity	2025
Very high-speed infrastructure – creating conditions for very high-speed networks' deployment	
Fostering changes in existing networks by including new or replacing old facilities, adding capacity, etc.	permanent
Upgrading the capacity of the Single Information Point in order to provide new services and elaborate up-to-date mapping of existing and planned infrastructure	2025
Gigabit connectivity for transport arteries and settlements to simplify access to and use of public resources	2027
Simplifying VHCN infrastructure building and deployment	permanent
Elaborating mechanisms for infrastructure sharing between operators and sectors	2022
Spectrum efficient use - creating conditions for building NGA networks	
Establishment of an organization for building 5G networks in Bulgaria	according to the terms set out in the "5G for Europe: An Action Plan"
Building and maintenance of the mobile networks' transceiver stations register	2022
Organising trials of RF spectrum in the 800 MHz band	2020
Taking up actions for 800 MHz band to be fully released and available to civilians	2022
Ensuring fitting spectrum for 5G, harmonized at European Union level	2024

Avoidance of risks related to exposure to electromagnetic fields and compliance with their maximum permissible field values in populated areas	permanent
Creating conditions for the building of short-range wireless access points, as well as promoting infrastructure sharing	2025
Preparation of project initiatives for 5G transport corridors implementation	2022
Applying 5G standards and technical specifications to European and international organizations	permanent
Promoting the shared use of spectrum bands	permanent
Partnerships for testing and using 5G	2021
Improving coverage in settlements located in peripheral, sparsely populated and rural areas	
Prioritising the building of passive broadband infrastructure and implementation of measures for access to solutions through a broadband infrastructure in sparsely populated and rural areas	2023
Creating conditions for increasing the investment interest in building networks in sparsely populated and remote areas by reducing costs	permanent
Update of broadband infrastructure data, which includes information on the availability and geographical location of the operators' infrastructure by regions	permanent
Digital divide overcoming	
Municipalities' wide participation in the WiFi4EU initiative	2020
Stakeholder maximum participation in the 5G4EU initiative	2027
Expanding initiatives to offer free internet access	2030
Prioritising the connecting of schools, institutions, high-performance enterprises, etc.	2025
Support for building smart settlements	2027
Network security	
Maintaining network security and integrity	permanent
Efficient implementation, at a national level, of methodology for 5G networks' security risk assessment and for the creation of a package with preventive security measures	permanent
Fostering the building of technological capacity and expertise for successful and secure deployment of 5G networks	permanent
Coordinated cooperation at EU level in the field of 5G network cybersecurity	according to the relevant issues considered at EU level
Ensuring, as far as possible, the availability of services and internet access provided through public electronic communications networks in case of force majeure	permanent

Responsible institutions for the implementation of the measures within their competence are the Ministry of Transport, Information Technology and Communications, the Communications Regulation Commission, the State e-Government Agency and other executive authorities.