

Republic of North Macedonia Broadband Competence Office

Report

Implementation of the National Operational Broadband Plan

Broadband development in the country

(period October 2022 - April 2023)

Skopje, July 2023

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Introduction

Pursuant to amendments to the Law on Electronic Communications (July 2019), the National Broadband Competence Office (NBCO) is defined as expert and advisory body for support of broadband network investments. Pursuant to the Law, NBCO is accountable before the minister of information society and administration for the operation thereof.

The National Broadband Competence Office (NBCO) was established in October 2019 upon decision of the minister of information society and administration and after the Parliament of the Republic of North Macedonia (PRNM) adopted amendments to the Law on Electronic Communications in July 2019 ("Official Gazette of the Republic of North Macedonia" no. 153/2019).

Pursuant to Article 71-a paragraph (2) of the Law on Electronic Communications, NBCO shall assume the following competences:

- Shall participate in the work of the broadband competence office network in the European Union and in the region,
- Shall issue opinions and proposals for faster development of electronic communications, and in particular of broadband in the country,
- Shall cooperate with state authorities, state administrative bodies, public enterprises, local self-government units, public institutions and legal entities with public authorizations and fully state-owned trade, and shall provide support for development plans/projects/studies related to broadband networks, as well as support in implementation thereof,
- Shall issue opinions and proposals for utilization and needed development of fiber-optic infrastructure that has been constructed or is to be constructed with public funds,
- · Shall participate in establishment of target areas that would use state aid in construction and development of broadband networks,
- Shall issue opinions and proposals during construction of broadband networks with utilization of state aid for: potential technical solutions, investment and business models, criteria for selection of operator, price policy and related issues,
- · Shall participate, issue opinions and proposals in preparation of plans for promotion of broadband in the country,
- · Shall participate in public discussions and consultations related to construction of broadband networks with utilization of state aid,
- · Shall participate in determining free WiFi internet access locations in municipalities,
- Shall participate, issue opinions and proposals in development of future national strategic documents and development plans
 related to broadband development,
- Shall monitor implementation of adopted national strategic document and plans for broadband development in the state, meeting
 national broadband targets set forth therein and shall issue opinions and proposals for review thereof,
- Shall, at least semi-annually, deliver a report to the minister of information society and administration on broadband development in the country related to development of broadband market in the European Union pursuant to DESI (The Digital Economy and Society Index), as well as report on implementation of adopted strategic documents and plans for broadband development in the country, meeting of national broadband goals set forth therein.

Implementation of National Operational Broadband Plan in the period October 2022 - April 2023

The National Operational Broadband Plan 2019-2029 (NOBP) was adopted on 01.04.2019 by the Government of RNM and is published on the designated website of the Ministry of Information Society and Administration (MISA): <u>https://mioa.gov.mk/?g=mk/node/2457</u>.1

NOBP is aligned with strategic goals of the EU's initiative "Digital Agenda for Europe", as rooftop strategy for development of information society 2010 and EU's strategy "Towards a European Gigabit Society for 2025" from 2016.

NOBP was lodged to the European Commission and to the World Bank that have both issued positive opinions thereto.

Activities conducted by the Government of the RNM and MISA in NOBP implementation

Based on the conclusions of the 54th session of the Government of the RNM, the Ministry of Information Society and Administration in cooperation with the National Broadband Competence Office applied to the EU IF (EU Integration Facility) to obtain technical assistance for the preparation of a Feasibility Study for the establishment of National Transport Optical Network (NTON). The Terms of Reference - ToR for the public procurement of consulting services for the preparation of the Feasibility Study were prepared by NBCO.

The Ministry of Information Society and Administration intensified the preparation of the National ICT strategy (2023-2027). NBCO gave its opinion on the National ICT Strategy for the "Digital connectivity and state ICT infrastructure" Pillar and the Action Plan.

Activities conducted by NBCO in NOBP implementation

Pursuant to Article 71-b of the Law on Electronic Communications, NBCO consists of seven members, one of whom is the president of the NBCO.

In the period from October 2022 to March 31st 2023, NBCO held a total of 8 meetings. Also, several meetings were held with relevant and concerned institutions in view of implementing the National Operational Broadband Plan (NOBP).

The NBCO sessions were attended by all members of the NBCO, independent experts (depending on the agenda), employees of the Communications Department, and representatives from the Cabinet of the Minister / Deputy Minister of MISA, as well as the State Secretary were also invited herein.

As before, depending on the NBCO meeting agenda, representatives from the EU Office in Skopje were invited, as well as representatives of other institutions, Agency for Electronic Communications, PE MRB etc.

The minutes of all sessions were regularly archived and published on the NBCO's website. Also, public announcements regarding NBCO's sessions and meetings with other institutions were regularly posted on the NBCO website.

Technical and administrative support for NBCO's operation was continuously provided by the staff of the Communications Department. The employees of the Communications Department prepared the minutes, the announcements to the public, they were translated into Albanian, and then posted on NBCO's website (<u>https://bco.mioa.gov.mk/</u>).

During **October 2022**, one session was held (56th session). Within this session, the National Broadband Competence Office discussed the latest European Commission Progress Report in 2022, especially for the section of electronic communications and broadband. A representative from the EU Office in Skopje attended the meeting, who pointed out that the report has several levels of grades with a gradation

¹ eng: <u>https://mioa.gov.mk/?q=en/node/2459</u>

of achievements in different areas, and with that the EU can make a comparative analysis between the countries of the Western Balkans region. It was also emphasized that the report contains general provisions for the field of electronic communications, and the terminology "Digital transformation and media" is introduced for the first time, for chapter 10. It was emphasized that according to the guidelines in the report, first of all, it is necessary to harmonize The Law on Electronic Communications with the latest CODE Directive of the EU, for which it will be necessary to form working group that will work on the transposition of the national legislation with the European.

During **November 2022**, one session was held (57th session). Within this session, the members of the National Broadband Competence Office discussed the methodology and the delivered DESI connectivity indicators for RNM by the RCC consultants. A review of the correspondence with the RSS consultant was conducted, in the section of defining the indicators "coverage with VHCN (Very High Capacity Networks)" and "coverage with FTTR (Fiber To The Premises)" networks. The session was attended by technical experts from the Macedonian telecom operators, who with their presentations contributed to a higher quality of the discussion.

During December 2022 three sessions were held (sessions 58, 59 and 60).

Within the framework of the 58th session, the preparation of the new ICT strategy was discussed. The invited guests at the session who were involved in the preparation of the new ICT strategy emphasized that various interested parties were involved in the preparation and that their suggestions, proposals and opinions were taken in to account. It was also said that the NBCO is expected to issue a statement regarding the fourth pillar of the strategy: Digital Connectivity. NBCO has undertaken to pronounce on the Draft version of the new ICT strategy, having in mind the Law on Electronic Communications, the Law on the Establishment of PE MRB, the National Operational Broadband Plan, and other regulations in the field.

Within the framework of the 59th session, the National Broadband Competence Office discussed the prepared proposals and comments regarding the draft text of the National ICT Strategy for the Digital Connectivity pillar. A review of the prepared material for the parts of pillar 1 of the strategy was conducted, i.e. the comments and suggestions for improving the content of the document. The purpose of this pillar is to strengthen the basis for future digital transformation, while the main strategic goal is to provide gigabit internet connection to citizens and public institutions throughout the country.

Within the framework of the 60th session, the National Broadband Competence Office discussed the comments and proposals of the body regarding the submitted draft DESI Report for the Western Balkans on the "connectivity" dimension, prepared by RCC consultants.

During **January 2023**, one session was held (61st session). Within this session, a discussion was opened about the proposals and comments made by the NBCO regarding the National ICT Strategy 2023-2027. The Action Plan of the National ICT Strategy 2023-2027 was also reviewed. The members of the body specified in the Action Plan the deadlines for the actual implementation of the planned activities for the following purposes: provision of gigabit connection and access to the Internet for citizens and public institutions, development of Government ICT infrastructure and development of National educational ICT infrastructure.

During **February 2023**, one session was held (62nd session). In this session the course of preparations for the bilateral meeting on Chapter 10 (Information Society and Media) was discussed, scheduled for March 21 and 22, 2023, in Brussels. Also, the members of the NBCO expressed their views on certain points that are part of the agenda for the bilateral meeting, with emphasis on the cyber security section.

During **March 2023**, one session was held (the 63rd session). Within the session, a reference was made to the document "Final DESI 2022 Report" of the Western Balkans and the comments of the RCC regarding the submitted comments of the NBCO. Bilateral screening for Chapter 10 "Information Society and Media" held on 21.03.2023 in Brussels, was also discussed. On that meeting AEK informed anyone that

has started the procedure of updating white, gray and black zones in the country and the coverage of the country's territory with VHCN networks.

During **April 2023**, one session was held (the 64th session). Within this session, the questions received by the EU Delegation in the RNM regarding the ToR for the preparation of the Feasibility Study for the development of the national transport optical network (NTOM) were discussed, and answers were prepared by the members of the expert body.

Participation of NBCO members in webinars organized by the European BCO network

Pursuant to Article 71-a of the Law on Electronic Communications, NBCO participates in the work of the Broadband Competence Offices network in the European Union and in the region.

The European BCOs network was established with the aim of promoting the exchange of knowledge and experiences between the European bodies competent for broadband (BCO-Broadband Competence Office), as well as overcoming obstacles for broadband projects and upgrading capacities in the areas of financing, planning and broadband policies. The European BCO Network has an annual program of activities on key areas of interest, which includes organizing networking events, training materials and publications, and seminars on policy, funding, good practice and issues about broadband.

In the period October 2022 – April 2023, members of the NBCO took an active part in the following events organized by the European BCO network:

• On Series 8 webinars:

On October 4, 2022, a session entitled "Revision of DESI indicators" was held, where a representative of DG Connect at the European Commission presented DESI: its meaning, structure, its connection with the Digital Decade path according to the Digital Compass, the European Commission Report for DESI 2022, key findings "Connectivity" dimension indicators for DESI 2022, findings from the "Broadband coverage in Europe 2021" study and future improvements to broadband coverage metrics.

On November 15, 2022, the session entitled "Broadband Cost Reduction Directive Toolbox" was held, where representatives of WIK-Consult presented the importance of mapping the telecommunications infrastructure and the Single Information Point (SIP), as well as the Information systems for mapping broadband infrastructure in Germany.

• On Series 9 webinars:

On January 17, 2023, a session entitled "New State aid rules" was held, where a representative of DG Competition at the European Commission presented the new State aid guidelines for broadband networks, which was adopted in December 2022, and will enter into force after its publication in the official gazette at the end of January 2023. The new guidance will contribute to the EU's strategic goals of ensuring gigabit connectivity for all citizens and 5G coverage everywhere by 2030.

On February 14, 2023, the session entitled "New broadband guidelines, focus on wholesale access and voucher" was held, where a representative of DG Competition at the European Commission presented the new Guidelines for state aid for broadband networks with a focus on wholesale access services on broadband infrastructure: general principles, products, network expansion and pricing as well as broadband vouchers: social vouchers and connectivity vouchers.

On February 21, 2023, the session titled "Broadband Cost Reduction Directive: small cells" was held, where a representative of WIK-Consult presented the meaning of small cells in general and in the context of 5G, the relevant regulations for approvals and permits for small cells, the opportunities and challenges of local authorities. Experiences from Korea regarding small cells were also presented at this session.

On February 28, 2023, the session entitled "Broadband Cost Reduction Directive: Permits" was held, where a WIK-Consult representative presented on possible improvements/facilitations of the procedures for issuing permits for construction works for electronic communication networks in accordance with the Broadband Cost Reduction Directive, and a representative of a regulatory body from Ireland presented the positive experience of implementing an information system for infrastructure construction procedures.

On March 7, 2023, the session entitled "Annex to broadband state aid guidelines, focus on mapping methodology" was held, at which a representative of DG Competition of the European Commission presented the significance of mapping when determining market failure (market failure) from the annex of the broadband state aid guideline. The mapping of connectivity infrastructure (5G, FWA and mobile) for the purpose of providing state aid was also presented.

On March 21, 2023, a session entitled "BCO Romania Ro-NET project and BCO Netherlands Model Agreement for Small Cell Locations on Municipal Infrastructure" was held, where representatives of NBCO from the Netherlands presented the model agreement for the installation of small cells at locations of infrastructure of the municipalities, while a representative of a ministry from Romania presented the RO-NET project for the construction of broadband infrastructure in the white zones in Romania.

On March 23, 2023, a workshop titled "Gigabit Infrastructure Act" was held, where representatives of DG Competition of the European Commission presented the new Gigabit Infrastructure Act, which was adopted by the European Commission in February 2023. The new act resulted from the EECC (European Electronic Communications Code) which encourages the construction and use of VHCN (Very High Capacity Network) networks, the Connectivity Toolbox and the 2030 Digital Decade strategy. It should facilitate and stimulate the construction and use of VHCN (Very High Capacity Network) networks) networks faster and at lower costs.

Conducted activities of the Agency for Electronic Communications in the implementation of NOBP

The Agency for Electronic Communications has started a procedure for amending the Rulebook on QoS Parameters for Public Electronic Communication Services provided via radio networks. The Rulebook will define the QoS parameters for 5G technology, as well as the obligation of operators to submit 5G coverage data.

The Agency for Electronic Communications has started the procedure of preparing a by-law that will implement the Directive on measures to reduce the costs of deploying broadband networks (Directive 2014/61/EU on measures to reduce the cost of deploying high-speed electronic communications networks – Official Journal of the European Union L155 of 23.5.2014) and the proposal for a new regulation on measures to reduce the cost of deploying gigabit electronic communications networks and repealing Directive 2014/61/EU (Gigabit Infrastructure Act), COM (2023) 94 final of 23.2.2023). This act envisages measures that will deploy the construction and use of broadband infrastructure, such as coordination of construction activities, cabling in built objects, etc.

REPORT ON THE MAPPING OF THE EXISTING AND PLANNED BROADBAND NETWORKS OF THE OPERATORS (STATUS APRIL 2023)

Through the NOBP Implementation Support System of the Agency for Electronic Communications, the data on built/planned broadband networks of the operators of the public electronic communication networks was updated and the situation at the end of April 2023 is as follows:

The fast and ultra-fast broadband network coverage (as a % of the total number of households in RNM) is shown in Table 1. and amounts to :

- 88,80% of households (531.571 households) have access to fast broadband networks (download speed between 30 and 100 Mbps). Of these, 149.893 households are in rural settlements, and 381.678 households are in urban settlements;
- 73,67% of households (440.995 households) have access to ultra-fast broadband networks (download speed higher than 100 Mbps). Of these, 80.109 households are in rural settlements, and 360.886 households are in rurban settlements.

Table 1 shows the growth of the coverage of fast and ultra-fast fixed broadband networks in the period from 2018 to April/2023 for RNM and the average in the EU, as well as the announced investments in the construction of broadband networks of the operators.

Table 1: Coverage of households with fixed fast and ultra-fast broadband netwo	orks, comparison with the EU average and realization of
announced investments by operators	

	FIXED FAST BROADBAND NETWORKS (download speed between 30 and 100 Mbps)	FIXED ULTRA-FAST BROADBAND NETWORKS (download speed higher than 100 Mbps)	
Households coverage, EU average	In 2018: 83% In 2019: 84% In 2021: 90%	In 2018: 60%	
Households coverage in RMN	In 2018: 78% (445.233) In 2020: 82,84% (467.599) In April/2023: 88,8% (531.571)	In 2018: 43,8% (249.979) In 2020: 63,1% (356.212) In April/2023: 73,67% (440.995)	

Announced investments for the	Announced in 2018 to the end of 2021: 84,94% (484.826)	Announced in 2018 to the end of 2021: 69,47% (396.542)
construction of broadband networks from network operators	Announced in 2020 to the end of 2023: 87,19% (492.170)	Announced in 2020 to the end of 2023: 75,06% (423.741)
	Announced in 2023 to the end of 2025: 91,89% (550.089)	Announced in 2023 to the end of 2025: 84,7% (507.036)

The percentage of households located in white, gray and black zones (for fixed high-speed broadband networks) is shown in Table 2. and is:

- 8.11% of households (48.556 households) are located in white zones, that is, 48.556 households do not have the possibility to access the Internet with a download speed between 30 and 100 Mbps, nor is it planned by any operator in the next three years to build/develop such a network. Of these, 47.715 households are in rural settlements, and 841 households are in urban settlements;
- 9,25% of households (55.371 households) are located in gray zones. Of them, 48.564 households are in rural settlements, and
 6.807 households are in urban settlements;
- 82.64% of households (494.718 households) are located in black zones. Of these, 116.795 households are in rural settlements, and 377.923 households are in urban settlements.

Table 2: Households in RNM located in white, gray and black zones for fixed high-speed broadband networks

Year	In white zones	In gray zones	In black zones
2018	Households: 85.958	Households: 61.931	Households: 422.895
	%: 15,06	%: 10,85	%: 74,09
2020	Households: 72.317	Households: 70.041	Households: 422.129
	%: 12,81	%: 12,41	%: 74,78
April/2023	Households: 48.556	Households: 55.371	Households: 494.718
	%: 8,11	%: 9,25	%: 82,64

The percentage of households located in white, gray and black zones (for fixed ultra-fast broadband networks) is shown in Table 3. and is:

- 15,3% of households (91.592 households) are located in white zones, that is, 91.592 households do not have the possibility to access the Internet with a download speed higher than 100 Mbps, nor is it planned by any operator in the next three years to build/ develop such a network. Of these, 87.934 households are in rural settlements, and 3.658 households are in urban settlements;
- 14,9% of households (89,205 households) are located in gray zones. Of these, 70,870 households are in rural settlements, and 18,335 households are in urban settlements.;
- 69.8% of households (417,831 households) are located in black zones. Of these, 54,159 households are in rural settlements, and 363,672 households are in urban settlements.

Table 3: Households in RNM located in white, gray and black zones for fixed ultra-fast broadband networks

Year In white zones In gray zones In black zones	Year	In white zones	In gray zones	In black zones
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2018	Households: 174.242	Households: 123.684	Households: 272.858
	%: 30,53	%: 21,67	%: 47,80
2020	Households: 140.752	Households: 91.367	Households: 332.374
	%: 24,93	%: 16,18	%: 58,89
April/2023	Households: 91.592	Households: 89.205	Households: 417.831
	%: 15,30	%: 14,90	%: 69,80

The announced planned investments in the construction of broadband networks of the operators in 2023 for the next three years, until the end of 2025, are:

- The number of households that will be able to have access to fast broadband networks by the end of 2025 is planned at **550.089** households (91.89%) or growth from 88.8% to 91.89%. Of these, **165.359** households are in rural settlements, and **384.730** households are in urban settlements;
- The number of households that will be able to have access to ultra-fast broadband networks by the end of 2025 is planned at **507.036 households (84.7%)** or growth from 73.67% to 84.70%. Of these, **125.029 households** are in **rural** settlements, and **382.007 households** are in **urban** settlements.

Report on Broadband Development in the Country

Pursuant to the Law on Electronic Communication, NBCO shall "at least semiannually, deliver a report to the minister of information society and administration about development of broadband in the country relative to development of the broadband market in the European Union, pursuant to DESI (The Digital Economy and Society Index), and report on implementation of adopted strategic documents and plan for broadband development in the country, meeting national broadband targets set forth therein".

In order to meet this obligation, in February 2020 NBCO adopted the "Methodology determining the Digital Economy and Society Index in the Republic of North Macedonia" and Template on the Form and Content of the Broadband Market Development Report Pursuant to DESI. The methodology was based on the DESI methodology of the European Commission (EC) from 2014, and pursuant to the same NBCO is responsible for monitoring only the "Connectivity" dimension.

At the session held on 27.05.2022, NBCO adopted a new "Methodology determining the Digital Economy and Society Index in the Republic of North Macedonia" harmonized to the EC Methodology for DESI 2021. After adopting the new methodology for the Republic of North Macedonia, NBCO approaches to align the institutions that are the source of the data for the indicators in the Connectivity dimension to start providing the data for the new indicators pursuant to the EC Methodology for DESI 2021.

The preparation of this Report is in accordance with the adopted Template for the form and content that should be contained in the Broadband Market Development Report according to DESI (consolidated text).

When preparing this Broadband Market Development Report for the "Connectivity" dimension, NBCO as data source for certain subdimensions and indicators used data from:

- Agency for Electronic Communication, in most parts,
- State Statistics Office²,
- National Bank.

This Report compares the RNM's indicators with the "DESI 2022 Report"³ published by the European Commission (EC) on 28.07.2022.

² For the demographic data, the official data of the State Statistics Office according to the Census of 2021 are used (population 1,836,713, households 598.632)

³ <u>https://digital-strategy.ec.europa.eu/en/policies/desi</u>

Connectivity - indicators

The indicators in the "Connectivity" dimension for RNM are shown in Table 4.

Indicator	Value/ Reference date						
2a1 Overall fixed broadband take-up	70,91%	72,95%	73,58%	75,79%	77,92%	74,49% ⁴	75,58%
	(Q3/2019)	(Q1/2020)	(Q3/2020)	(Q1/2021)	(Q3/2021)	(Q1/2022)	(Q3/2022)
2a2 At least 100 Mbps fixed broadband take-up	0,98% (Q3/2019)	1,74% (Q1/2020)	1,81% (Q3/2020)	1,97% (Q1/2021)	2,32% (Q3/2021)	2,36 % (Q1/2022)	2,53% (Q3/2022)
2a3 At least 1 Gbps fixed broadband take-up						0,024% (Q1/2022)	0,030% (Q3/2022)
2b1 Fast broadband (NGA) coverage	78% (Q1/2019)	78% (Q1/2019)	82,84% (Q4/2020)	82,84% (Q4/2020)	82,84% (Q4/2020)	78,11%⁵ (Q4/2020)	88,8% (April/2023)
2b2 Fixed Very high capacity networks (VHCN) coverage						NA ⁶	68,67% (April/2023)
2c1 4G coverage	99,365% (Q4/2019)	99,38% (Q2/2020)	99,395% (Q4/2020)	99,395% (Q2/2021)	99,395% (Q4/2021)	99,44% (Q2/2022)	99,395% (Q1/2023)
2c2 5G readiness	0%	22,2% (14.07.2020)	22,2%	22,2%	22,2%	44,44%	44,44%

Table 4. Indicators in the "Connecting	vity" dimension (April/2023)
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⁴ Indicator 2a1 in this report records a decrease due to the data from the State Statistics Office for the total number of households in the country. Namely, the number of households in the five previous reports of the NBCO according to the official data of the SSO was 564.296, while according to the official data from the 2021 Census in RNM there was an increase in the number of households to 598.632

⁵ Indicator 2b1 in this report records a decrease due to data from the State Statistics Office for the total number of households in the country. Namely, the number of households in the five previous reports of the NBCO according to the official data of the SSO was 564.296, while according to the official data from the 2021 Census in RNM there was an increase in the number of households to 598.632

⁶ Agency for Electronic Communications in September 2022 adopted amendments to the by-law to start collecting data from operators for the indicator 2b2 Very High Capacity Fixed Network (VHCN) Coverage

2c3 5G coverage						26,5% (Q3/2022)	31,5% territory 62,15% population (Q2/2023)
2c4 Mobile broadband take-up	70,06% (Q3/2019)	64,83% (Q1/2020)	64,95% (Q3/2020)	66,78% (Q1/2021)	75,83% (Q3/2021)	76,43% (Q1/2022)	86,12% (Q3/2022)
2d1 Broadband Price Index							47,07

In Table 5. the description for each indicator is shown separately:

Table 5. Description of the indicators of the "Connectivity" dimension

Indicator	Description
2a1	% of households subscribing to fixed
Overall fixed broadband take-up	broadband
2a2	% of households subscribing to fixed broadband of at least 100 Mbps
Fixed broadband take-up with at least 100	calculated as overall fixed broadband take-up multiplied with the
Mbps download speed	percentage of fixed broadband lines of at least 100 Mbps
	% of households subscribing to fixed broadband of at least 1 Gbps
Fixed broadband take-up with at least 1 Gbps	calculated as overall fixed broadband take-up multiplied with the
download speed	percentage of fixed broadband lines of at least 1 Gops
2b1	% of households covered by fixed broadband of at least 30 Mbps download. The
Fast broadband coverage(NGA)	technologies considered are FTTH, FTTB, cable Docsis 3.0 and VDSL
2b2	% of households covered by any fixed VHCN. The technologies considered are FTTH,
Fixed Very high capacity network (VHCN) coverage	FTTB and cable Docsis 3.1
201	% of populated areas with coverage by 4G
4G coverage	
2CZ	The amount of spectrum assigned and ready for 5G in the so called 5G pioneer
Preparedness for 5G	ranges. These bands are 700 MHz (703-733 MHz and 758-788 MHz), 3.6 GHz
	(3400-3800 MHz) and 26 GHz (1000 MHz in 24250- 27500 MHz). All three spectrum
	bands have an equal weight
	% of populated areas with coverage by 5G
5G coverage	
204 Mahila haradharad assaran	Individuals who used a mobile phone (or smart phone) to access the Internet
wobile broadband coverage	

⁷ https://www.rcc.int/pubs/159/western-balkans-digital-economy-society-index-wb-desi-2022-report

Comparison with indicators of EU member states

• Total revenues of telecom operators (in MKD, excluding VAT)

The data on the total revenues of the operators refer to the year 2021 and are shown in Table 6.

Table 6. Revenues from telecommunication services

Service	Revenues in 2018 (mkd)	Revenues in 2019	Revenues in 2020	Revenues in 2021
		(mkd)	(mkd)	(mkd)
Fixed telephony	2.131.578.000,00	2.026.590.000,00	2.004.000.000,00	1.998.928.000,00
Fixed internet access	3.990.676.000,00	4.126.204.000,00	4.145.699.000,00	4.469.349.000,00
Mobile telephony	6.823.893.000,00	7.076.195.000,00	7.007.180.000,00	7.335.682.000,00
Mobile internet access	1.468.488.000,00	1.628.726.000,00	1.622.939.000,00	1.773.654.000,00
Business Internet users	555.277.292,00	489.512.212,00	507.696.976,00	553.213.532,00

Source: Agency for Electronic Communications



Figure 1: Share of revenues from telecommunication services (Source AEC)

• Broadband coverage

Broadband infrastructure coverage data were obtained from the NOBP Implementation Support System launched by the Agency for Electronic Communications in December 2020. In the System for Support of the Implementation of the NOBP starting from September 2021, the categorization of all settlements in RNM (total 1,783) was performed according to the nomenclature of the State Statistical Office.⁸

A. Fixed broadband coverage

⁸ https://www.stat.gov.mk/OblastOpsto.aspx?id=1

Indicator2b1 Fast broadband (NGA) coverage

531.571 households or **88.80%** of the total number of households in RNM have fixed high-speed broadband coverage (download speed of at least 30 Mbps and no higher than 100 Mbps). Of these, **149.893 households** or **25.04%** of the total number of households in RNM are in **rural** settlements.



Indicator 2b2 Very High Capacity Networks (VHCN) coverage

411.072 households or **68.67%** of the total number of households in RNM have fixed very high capacity networks (VHCN) coverage. Of these, **65.614 households** or **10.96%** of the total number of households in RNM are in rural settlements.



B. Mobile broadband coverage

Indicator 2c1 4G Coverage



99,58% of the population in RNM is covered by a 4G (LTE) network (by at least one mobile operator). The average availability of 4G (as the middle value of the two mobile operators' coverage) is 99.395% of the population in RNM.

Indicator 2c2 Allocated frequency spectrum for 5G

The following frequency bands were awarded in the so-called 5G "pioneer bands" in the Republic of NM:

- 700MHz: A total of 60MHz is available (703-733 & 758-788 MHz). 40 MHz these are awarded to operators, and 20MHz are reserved for a new network operator;
- 3.6 GHz: A total of 400 MHz is available (3 400-3 800 MHz), 300 MHz of which is planned to be used for 5G. Operators are awarded 200 MHz and 100 MHz are reserved for a new network operator;
- 26 GHz: A total of 1000 MHz (24 250-27 500 MHz) is available for allocation for 5G. All 1000 MHz were offered to interested parties during the
 public tender, but there was no interest in their allocation.

In the calculation of the 2c2 indicator, all three frequency bands have equal weight. The indicator is calculated as a portion of the spectrum awarded in each of the three 5G "pioneer bands", compared to the maximum possible value.

2c2 = (40/60) * 33,33% + (200/300) * 33,33% + (0/1000) * 33,33% = 44,44%



Indicator 2c3 5G coverage

31,5%⁹ of the territory and 62,15% of the population in RNM is covered by a 5G network (by at least one mobile operator).

• Overall fixed broadband take-up (% of households)

Indicator 2a1

The overall take-up of fixed broadband in the Republic of NM is noted to have continuous growth, as shown in Table 7.

Reference date	Q3/2019	Q1/2020	Q3/2020	Q1/2021	Q3/2021	Q1/2022	Q3/2022
Number of residential subscribers	400.172	411.682	415.253	427.687	439.718	445.928	452.461

Table 7	Number	of hour	seholds	subscribing	to fi	ved hri	nadhand
100101.	1 MULTIDOI	01 11004	20110100	JUDJUIDIIIG	10 11		Juubunu

⁹ The data is provided by one of the two mobile operators that have received approval to use 5G



Figure 6: Change in the number of subscribers of fixed broadband in RNM (Source: AEC)

The take-up of fixed broadband for Q3/2022 is 75.58%, i.e. 452.461 households in RNM have subscription agreement for fixed broadband (basic and/or NGA). (Source: AEC (Q3/2022))



At least 100 Mbps fixed broadband take-up (% of households)

Indicator 2a2

The take-up of fixed broadband with at least 100 Mbps for Q3/2022 is **2.53%**, i.e. **15.152** households have subscription agreement for fixed broadband with download speed of at least 100 Mbps. (Source: Agency for Electronic Communications)



The overall take-up of fixed broadband with a speed higher than 100 Mbps in the RNM notes continuous growth, as shown in Table 8.

Reference date	Q3/2019	Q1/2020	Q3/2020	Q1/2021	Q3/2021	Q1/2022	Q3/2022
Number of residential subscribers	5.544	9.869	10.221	11.122	13.102	14.184	15.152

	Table	8. Number	r of household	s with fixed	d broadband w	ith a speed h	igher than	100 Mbps
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• At least 1 Gbps fixed broadband take-up (% of households)

Indicator 2a3

The take-up of fixed broadband with at least 1 Gbps download speed for Q3/2022 is 0.030%, i.e.181 households have subscription agreement for fixed broadband with download speed of at least 1 Gbps. (Source: Agency for Electronic Communications)





• Fixed broadband take-up, market share per technology

Table 9. shows the percentage of fixed broadband technology used:

Technology	Market	Market share	Market	Market share	Market	Market share	Market share
	share	(%)	share	(%)	share (%)	(%)	(%) (April/2023)
	(%)	(September/2020)	(%)	(September/2021)	(March/2022)	(September/2022)	
	(March/2022)		(March/2021)				
DSL (VDSL	30,75	29,14	28,22	26,75	25,33	24,22	23,44
included)							
Cable (with Docsis	34,29	33,29	31,99	30,37	30,37	30,09	29,42
3.0 included)							
FTTH+B	13.,87	15,45	17,04	19,66	21,05	22,38	24,10
Other (LL-	21,09	22,12	22,75	23,22	23,22	23,31	23,03
Leased Lines,							
LAN, Fix LTE)							

Table 9	. Market share	of fixed	broadband	by	technolo	gy used
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Source: Agency for Electronic Communications



The share of Fiber to the Premises - FTTP includes FTTH and FTTB technologies and its share in the total number of fixed broadband subscribers in RNM is 24.10% (the average value of the share of access through optics in the 28 EU member states is 31%, according to the EC Report "DESI 2022" from 2022.

Although xDSL is still the dominant technology at the level of the EU average, to which the main competing technology is Docsis 3.0 (according to the EC Report "DESI 2022" from 2022), Docsis 3.0 has surpassed xDSL technology in RNM according to the share and is the most utilized technology for providing fixed broadband.

The percentage of NGA subscriber contracts in RNM (download speed of at least 30 Mbps) in relation to the total number of subscriber contracts for fixed broadband in the country is **50.82%** and the same in the period from the first report of NBCO, March/2020 to this report of NBCO, April/2023 records a continuous **increase**.





• Number of active subscribers to fixed broadband - by access speed

Figure 12: Number of active fixed broadband subscribers by access speed (Source: AEC)

From the graph of Figure.12 it can be concluded that the number of active subscribers to fixed broadband access with speeds higher than 30 Mbps has recorded continuous growth, at the expense of a decrease in the number of active subscribers to fixed broadband access with speeds lower than 12 Mbps.

• Number of active subscribers to Packages

Table 10 shows the number of active users of bundled services for both residential users (households) and business users. The number of active users of packages with two services (double play), three services (triple play) and four services (quadruple play) is shown.

	Two Services Package (Double play)		Three Servi (Triple	ces Package e play)	Four Services Package (Quadruple play)		
	Households	Business Entities	Households	Business Entities	Households	Business Entities	
MARCH 2020	119.319	14.532	143.352	16.259	88.588	638	
MARCH 2021	122.314	15.765	164.754	17.637	78.657	0	
SEPT. 2021	125.419	17.165	167.181	17.951	82.874	0	
MARCH 2022	129.350	19.454	164.505	18.201	85.741	0	
SEPT. 2022	144.882	32.909	148.627	6.064	89.149	1	
APRIL 2023	126.314	20.492	168.922	19.063	91.857	1	

(Source: AEC)

• Fixed broadband market competition

In RNM, the share of the traditional (incumbent) operator "Makedonski Telekom" on the fixed broadband market in Q3/2022 according to the total number of subscribers (residential and business) according to all technologies for fixed broadband access is **40.23%**, while the share of new emerging operators on the fixed broadband market is **59.77%**. (Source: Agency for Electronic Communications)

This ratio in terms of market share between traditional and emerging operators in RNM is according to the average of the 28 EU member states (according to the EC Report "DESI 2022" from 2022), where traditional telecom operators still control 40% of subscribers.



• Mobile broadband take-up (subscribers per 100 inhabitants)

Indicator 2c4

The take-up of mobile broadband for Q3/2022 is **86.12%**, i.e. the total number of subscribers who use mobile broadband is 1.581.835. (Source: Agency for Electronic Communications).



Figure 14: Mobile broadband take-up (Source: EC (2022), AEC(Q3/2022))

• Internet (IP) traffic usage

A. Fixed broadband internet traffic per household during one month is 228.45 GB (Source: Agency for Electronic Communications).

The average fixed broadband internet traffic per household during one month in the period from the first NBCO report from March/2020 to this NBCO report, April/2023 records the following **increase**, as shown in Figure 14.



Figure 15: Change of fixed broadband internet traffic per household in RNM (Source: AEC)

B. Mobile broadband internet traffic per subscriber who uses mobile internet during a month is **7.23 GB** (Source: Agency for Electronic Communications)

The average mobile broadband internet traffic per subscriber during one month in the period from the first report of the NBCO from March/2020 to this report of the NBCO, April/2023 records the following **increase**, as shown in Figure 15.



Figure 16: Change of mobile broadband internet traffic per subscriber in RNM (Source: AEC)

Broadband price index

Indicator 2d1

The Broadband Price Index (BPI) measures the price level of representative baskets of fixed, mobile and converged broadband offers. The prices of the 34 consumer broadband baskets include different services: stand-alone internet, two-services package (fixed telephony + internet or mobile telephony + internet or TV + internet), three-services package (fixed telephony + TV + internet or mobile telephony + TV + Internet) and a package with four services (fixed telephony + mobile telephony + TV + Internet) and different Internet access speeds. A higher BPI score means lower prices.

This report uses the results of the DESI2022 Report for the Western Balkans¹⁰, published by the Regional Cooperation Council (RCC), according to it PBI for RNM is 47,0.



Figure 17: Broadband price index – all baskets (score 0-100, where 100 means lowest prices) (Sources: EC (2022), RCC (2022))

¹⁰ https://www.rcc.int/pubs/159/western-balkans-digital-economy-society-index-wb-desi-2022-report