Annual Report 2023

Communications Regulation Commission

June 2024

25 YEARS
COMMUNICATIONS
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INTRODUCTION

The Communications Regulation Commission is a specialised independent state body implementing the policies in the field of electronic communications and postal services, and the radio spectrum planning and allocation policy in the Republic of Bulgaria.

The work of the Communications Regulation Commission in 2023 was in line with the dynamically developing market for electronic communications and services, following the national and European priorities and its Strategic Plan. In fulfilment of its mission, CRC has continued its activities towards creating conditions for the development of the electronic communications market, including conditions for investments in next-generation electronic communications networks, effective and sustainable competition in the provision of modern and quality electronic communications networks and services to citizens and businesses, with a guaranteed equal access to them.

Achieving an effective and future-oriented regulatory environment, promoting a sustainable competitive market and consumer protection, sustainable institutional development and international partnership, continued to be the main strategic objectives for the regulatory activities in 2023, the year in which the Commission has marked 25 years of regulatory activity.

One of the key factors for the achievement of these objectives were the activities related to the effective management of scarce resources.

In 2023, CRC completed the bringing of the authorisations for use of scarce resource in compliance with the new regulations adopted in connection with the Law on amendment and supplement of the Law on Electronic Communications.

Following public consultations, CRC has adopted a Position on the prospects and conditions for use of the free spectrum resource in the 700 MHz and 800 MHz frequency bands.

Three authorisations were issued for the use of 2x10 MHz frequency resource in the 700 MHz and 800 MHz bands for terrestrial networks allowing the provision of electronic communications services. By issuing these authorisations to the three mobile operators, the Commission has completed Milestone 139 of Reform 2 (C7.R2) Efficient use of radio frequency spectrum from the National Recovery and Resilience Plan, and Decision No 699 of the Council of Ministers of 04.10.2023 on taking action to ensure the possibility of radio frequency spectrum use in the 700 MHz and 800 MHz bands for civil needs and measures to ensure the safety of flights of the Air Force of the Republic of Bulgaria.

CRC has conducted public consultations on the prospects for use of the free resources in the 1.5 GHz, 2.6 GHz, 3.6 GHz and 26 GHz frequency bands.

The adopted in 2023 Regulatory Policy on the use of numbering resources for electronic communications set out the main objectives, mechanisms and approaches for the management and use of numbering resources in the development of electronic networks and services.

The Register of transceiver stations on terrestrial networks allowing the provision of electronic communications services, the activities referred to in Article 151, paragraph 1, item 16 of the Spatial Planning Act (SPA) and short-range wireless access points, and the Register of the rights granted for use of the radio frequency spectrum based on registration for point-to-point networks in the 71-76 GHz/81-86 GHz range have been launched, thus enabling the development of 5G networks and the promotion of infrastructure investments.

Another important activity in 2023 was related to the market for electronic communications and services, the analyses and forecasts for markets` state and development.

With the change in the scope of the universal service in 2023, Rules for the calculation of the net cost of providing the universal service were adopted and promulgated, which completed the process of amending the relevant regulatory framework. On the basis of an analysis, CRC has made a proposal to define an appropriate broadband Internet access service within the scope of the universal service.

At the beginning of 2023, CRC has adopted a summary annual report on security-related incidents having a significant impact on the functioning of networks or services and the actions taken in 2022 by undertakings providing public electronic communications networks or services. The report was sent to the European Commission (EC) and the European Union Agency for Cybersecurity (ENISA).

In compliance with the Guidelines for the implementation of the Open Internet Regulation (BoR (22) 81) of the Body of European Regulators for Electronic Communications (BEREC), the Commission gave instructions to the mobile operators to suspend the provision and offering of an included volume of traffic data from/to certain applications or a group of applications for their end users.

In view of the expiry of the transitional period of the obligations that were cancelled within the framework on the 5th round of market analyses of wholesale markets for call termination, CRC has adopted a position on the granting of interconnection access based on Internet protocol (IP) aiming to ensure regulatory predictability for market players.

Based on the reported growth of the received requests for binding decisions under the Law on Electronic Communications Networks and Physical Infrastructure related to the prices for duct network access, CRC has started collecting the necessary information for carrying out analysis of the wholesale market for access to passive (physical) infrastructure. The purpose of the analysis is to establish the existence or absence of effective competition in accordance with the general principles of competition law and the specific national conditions and, where appropriate, to impose specific obligations on undertakings with a dominant position (significant market power) in order to ensure conditions for maintaining the competitive environment.

An important point in 2023 was also the designation of a future status of the Communications Regulation Commission as a national digital services coordinator for the Republic of Bulgaria within the meaning of Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services. In this regard, an interdepartmental working group chaired by CRC has been set up with the task to analyse the provisions of Regulation (EU) 2022/2065 and preparing a draft Law on amendment and supplement to the Law on Electronic Communications (LEC), and this task was completed with the preparation of the draft law.

The dynamic development of new technologies, has increased consumers` needs and expectations and efficient management of scarce resources have also highlighted the need for effective monitoring and control of spectrum for civil needs.

In response to the increasing use of new technologies and the ever-increasing workload of the spectrum, the Commission continued to work on the development of the National Radio Frequency Spectrum Monitoring System for civil needs (NRFSMS) under its Development Plan for the period 2021-2025, and in implementation of the strategic objectives for development of the radio monitoring system related to its expansion and modernisation.

In 2023, the design of an electromagnetic compatibility (EMC) laboratory was completed. It is intended to support the Commission's control activities under the LEC concerning the radio devices and to verify their compliance with the EMC regulatory documents.

The contents of this introduction reflects only a small part of the main aspects of regulatory activities performed in 2023 by the Commission. The particular results achieved from all activities during 2023 are reflected in the following sections of the report, which the Commission prepares and presents on the basis of Article 38 of the Law on Electronic Communications.

I. STATE, DEVELOPMENT AND PROSPECTS OF THE ELECTRONIC COMMUNICATIONS MARKET

Methodological notes on Section I

The information provided is based on data received as of 25.04.2024 from 88% of the undertakings registered with CRC as of 31.12.2023. The information was provided in accordance with model forms for reporting of the activity for provision of electronic communications networks and/or services endorsed by Decision No 381/14.12.2023. A major part of the indicators monitored and included in the forms are defined by various international institutions and organisations, to which CRC by law has a commitment to regularly provide data on the electronic communications sector in Bulgaria (ITU[1], European Commission (EC), BEREC, etc.).

In the summation rounded amounts and percentage data, rounding- related differences may occur due to the use of standard calculation functions of the electronic tables and charts.

The relative shares are presented rounded to one decimal place. As a result of such rounding, the sum of the relative shares may exceed or may be less than 100%.

The total number of undertakings presented in the tables for a particular market segment does not represent the sum of the number of undertakings by the individual services included in the segment. In the event that an undertaking provides more than one of the listed services, it is accounted for only once in the total number of undertakings.

For the purposes of the annual report, the term "subscriber" is defined as "any natural or legal person who is a party to a contract with an undertaking providing public electronic communications services" and should be considered to be identical to "end-user, party to a contract under Article 227" in accordance with the Law on Electronic Communications (amended SG, no. 84 of 6 October 2023).

1. Volume and structure of the Bulgarian electronic communications market

1.1. Market volume

According to data from the CRC register, as of 31.12.2023, a total of 1,087 undertakings were registered with the intention to provide public electronic communications. In implementation of Art. 4 of the General Requirements[2] and Decision No 381/14.12.2023 of CRC, a total of 957 of the undertakings registered as of 31.12.2023 have submitted to the Commission an annual activity report for 2023 (the share of undertakings having submitted reports makes up 88% of those registered as of the said date).

In 2023, 855 undertakings performed their activity, including 44 undertakings which suspended their activity on providing public electronic communications during the year and submitted a report pursuant to Art. 5 of the General Requirements (as of 31.12.2023, those undertakings were removed from the CRC register). In comparison to the previous reporting period (2022), a decline was observed in 2023 in the number of undertakings registered at CRC for the

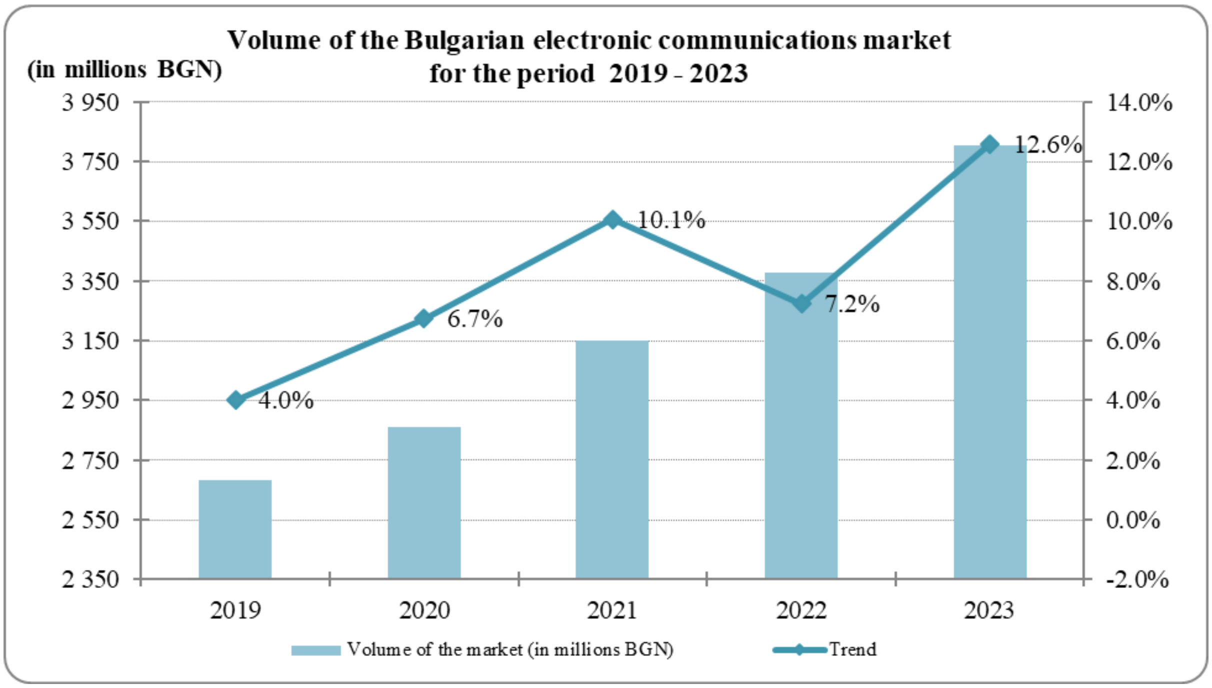
[1] International Telecommunication Union

[2] General requirements for the provision of public electronic communications (amended SG, no. 56 of 30 June 2023)

provision of public electronic communications (by 3.5%). At the same time, the number of undertakings that actually operated during the year increased by 1.2%.

In 2023, the total volume of the electronic communications market in Bulgaria amounted to BGN 3.803 billion (BGN 19.666 million of this revenue were generated by 510 undertakings that have reported annual revenue below BGN 100,000). The upward trend in the total market volume continued for yet another year – the reported growth was 12.6% compared to the data for 2022.

Figure 1 presents the dynamics in the volume of electronic communications market in the country for the period 2019-2023.



Note: *The data for 2022 have been updated.*

Source: Data submitted to CRC

Figure 1

The share of the total volume of the public electronic communications market in the volume of Bulgaria's GDP[3] for 2023 amounted to 2.1%, with an increase of 0.06 percentage points of its share in the GDP compared to 2022, when it amounted to 2.0%.[4]

1.2. Market structure

Information on the structure of revenue generated from the provision of public electronic communications in Bulgaria is presented in Table 1 by segments, determined according to the type

[3] Calculated at current prices. Source: NSI (GDP - Production Method - national level | National Statistical Institute (nsi.bg)).
[4] The GDP data for 2022 have been updated. Source: NSI (Gross domestic product in 2022 (updated data) | National Statistical Institute (nsi.bg)).

of services provided, including distributed[5] revenue from bundled services (information on the definition of "bundled services" is contained in p. 1.2.1. Bundled Services below).

Table 1

Structure of the public electronic communications market in Bulgaria according to the type of services provided for the period 2021-2023

Public electronic communications services	Revenue		
	2021	2022 [1]	2023
	(in millions BGN)		
1. Interpersonal communication services	1 149.605	1 067.320	1 067.881
1.1. Fixed voice service through numbers from the NNP and public payphones	81.588	71.241	69.512
1.2. Mobile voice service through numbers from the NNP	1 023.819	946.460	922.782
1.3. Other voice services[2]	44.199	49.619	75.587
2. Leased lines services	24.757	21.321	23.170
3. Data transfer and/or Internet access services	1 452.475	1 673.694	1 953.036
4. Transmission and/or distribution of radio and/or TV programmes services	453.320	474.044	541.424
5. Other services[3]	69.291	141.083	217.620
TOTAL	**3 149.449**	**3 377.462**	**3 803.131**

[1] The data for 2022 have been updated.

[2] Includes revenue from the provision of VoIP services, provision of voice services through trade representation, etc.

[3] The segment includes revenue from the provision of duct network, satellite systems access service, shared use, incuding provision of towers, masts; dark fibre, co-location services other than those provided for interconnection and other services.

Source: Data submitted to CRC

In 2023, the total volume of the electronic communications market in Bulgaria continued to be determined mainly by revenue from interpersonal communications services and data transfer and/or Internet access services.

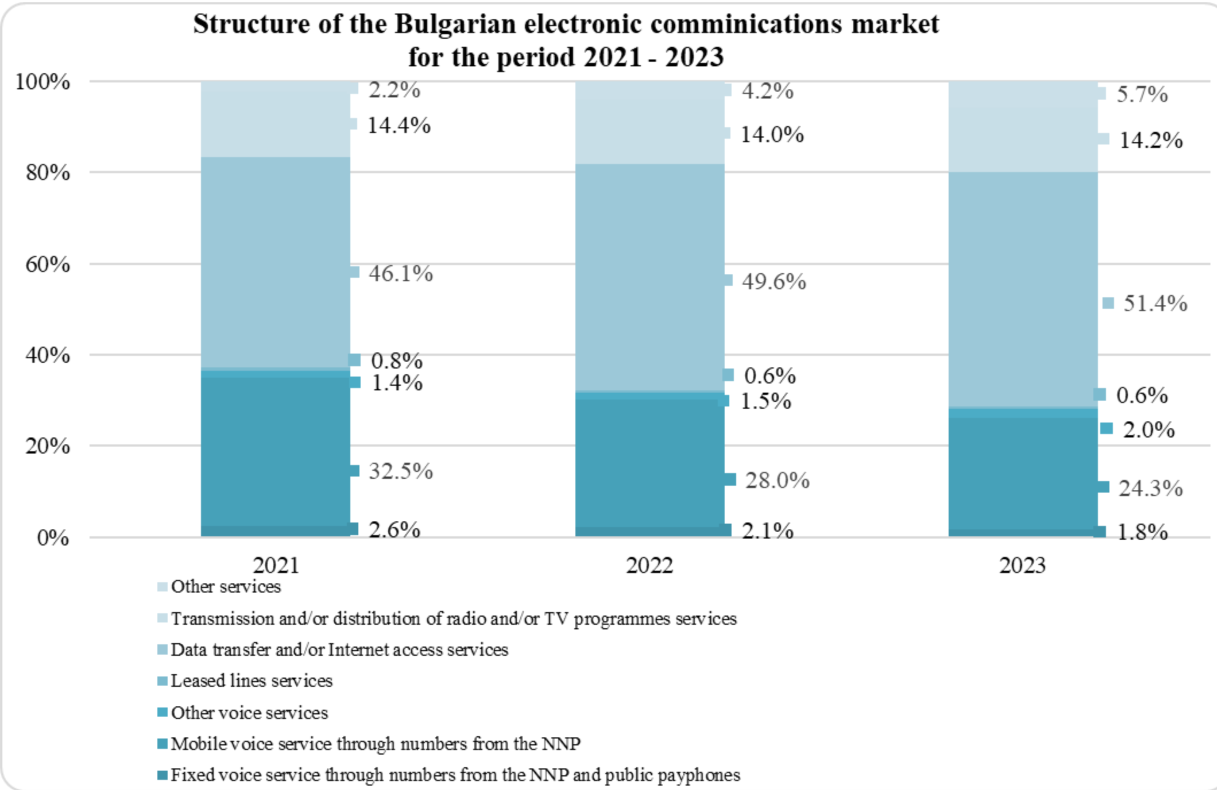
The revenue from data transfer and/or Internet access services helds a leading position with a 51.4% share in the total market volume. The relative share of revenue from this market segment within the market structure increased by 1.8 percentage points compared to 2022.

Regardless the growth reported in 2023 in the volume of revenue generated from interpersonal communications services (fixed, mobile and other voice services) compared to the

[5] The breakdown of revenue from bundled services (installation fees and monthly subscription for fixed and mobile voice services, Internet access and television) by types of services included in the bundle is made and presented in the Annual Report by the undertakings which have submitted information. The breakdown was made based on evaluation of the prices of standalone services having close or similar characteristics (e.g.: minutes to national fixed and/or mobile networks, Internet download speed, number of television programmes, etc. included in the monthly subscription fee) of services included in the bundled service.

previous year (in absolute terms, the increase is by 0.1%), its share in the total volume of the public electronic communications market dropped by 3.5 percentage points down to 28.1%.

Figure 2 presents the dynamics in the relative shares of revenue from electronic communication services within the structure of the electronic communications market for the period 2021-2023.



Source: Data submitted to CRC

Figure 2

As compared to the year before, revenue in all market segments registered a growth in 2023, namely:

- “Data transfer and/or Internet access“ – 16.7%; over a one-year period, the relative share of the segment grew by 1.8 percentage points. The revenue from the “Data transfer and/or Internet access via mobile terrestrial networks” group grew by 17.0%, and revenue from the “Data transfer and/or Internet access via fixed networks” group was up by 16.2% compared to the previous year.
- “Transmission and/or distribution of radio and TV programmes services” rose by 14.2%. The reported growth of this segment is mainly due to the increase in revenue from IPTV (by 30.7% compared to 2022).
- “Other services” registered a significant growth of 54.2%. Revenue from other forms of sharing, including the provision of towers, masts; dark fibre; co-location and others increased by 64.1% compared to 2022, leading to a growth in the share of the segment as

well (by 1.5 percentage points). Revenue from the "Provision of duct access" service, included in this segment, registered a growth of 17.0%.

- "Leased lines services" - up by 8.7% in 2023 as compared to 2022.
- "Interpersonal communications services" – by 0.1% in absolute terms, which is due to the reported significant growth in revenue from the VoIP service by 56.1%. At the same time, fixed (reported decrease of 2.4%) and mobile (reported decrease of 2.5%) voice services through numbers from the NNP have kept the downward trend in recent years.

Detailed information on the state and trends of development of the relevant market segments is presented in points 2 through 5 of this section of the report.

1.2.1. Bundled services

Revenue from bundled services[6] play a significant role on the electronic communications market in Bulgaria. In 2023, for another consecutive year, consumption of bundled services in Bulgaria increased - as of 31.12.2023, 53.74% of fixed voice service subscribers, 78.8% of mobile voice service subscribers, 34.34% of fixed Internet access subscribers, 83.5% of mobile Internet access subscribers, and 42.4% of pay TV subscribers used the service in a bundle with other electronic communications services. As a result, the total volume of revenue (from installation fees and monthly subscriptions) gained from bundled services reached BGN 1.865 billion,[7] which represents a growth of 15.9% compared to the revenue in the previous year.

Market players

According to the data submitted to CRC in 2023, two undertakings have launched activity for the provision of a bundled service - in particular, double-play package including fixed Internet access and television, while four undertakings have discontinued the provision. In this way, in 2023, the total number of undertakings providing bundled services amounted to 92, which is by 2 less in comparison with the previous year (94 in 2022).

The main providers of bundled services were Vivacom Bulgaria EAD (Vivacom), A1 Bulgaria EAD (A1) and Yettel Bulgaria EAD (Yettel). In 2023, they accounted for 95.9% of the market volume, calculated on the basis of the revenue generated, and covered 96.9% of the total number of subscribers of bundled services. With the exception of Bulsatcom EOOD (Bulsatcom), all other undertakings providing bundled services have a share that does not exceed 1% of the total number of subscribers of bundled services.

[6] "Bundled services" shall mean commercial offers offered on the basis of a monthly subscription and comprising two or more of the following services: (1) Fixed broadband Internet access, (2) Fixed voice service, (3) Mobile voice service, (4) Mobile broadband Internet access, and (5) pay TV (cable, satellite, or IPTV). As bundled services should also be considered the so-called "pure", "joint" and "mixed" bundles.

[7] The data are included in the total volume of the electronic communications market, distributed by services but presented with a view to achieving comparability with previous years.

Table 2

Market shares of undertakings providing bundled services

Undertakings	2022		2023	
	Share based on number of bundled services subscribers	**Share based on revenue from bundled services**	**Share based on number of bundled services subscribers**	**Share based on revenue from bundled services**
A1 BULGARIA	37.3%	33.1%	37.4%	38.4%
VIVACOM BULGARIA	28.5%	23.1%	30.7%	27.6%
YETTEL BULGARIA	28.3%	26.0%	28.8%	30.0%
BULSATCOM	1.6%	1.7%	1.4%	1.7%
All other*	4.3%	15.9%	1.7%	2.3%

***Note:** „*” including the providers of bundles with a share not more than 1% of the total number of subscribers of bundled services.*

Source: Data submitted to CRC

In 2023, Vivacom's market share, calculated on the basis of subscribers of bundled services, amounted to 30.7%, with its value increasing by 2.1 percentage points compared to 2022. In 2023, compared to 2022, a growth was also reported for Yettel – by 0.5 percentage points, and A1 - by 0.2 percentage points. Bulsatcom's share[8], which stood at 1.4%, saw a decline of 0.2 percentage points compared to the previous year. Subscribers of all other undertakings made up only 1.7% of the market, calculated on the basis of the number of subscribers (down by 2.6 percentage points compared to 2022).

In the market shares of undertakings, calculated on the basis of revenue from the provision of bundled services to subscribers, the changes are as follows: Vivacom's share grew by 4.4 percentage points compared to the previous year; A1 also saw a growth – by 5.3 percentage points, Yettel's market share increased by 3.9 percentage points, while Bulsatcom retained its market share at 1.7%. The aggregate market share of the remaining market players, calculated on the basis of the total volume of revenue from bundled services, dropped by 13.6 percentage points - from 15.9% in 2022 to 2.3% in 2023.

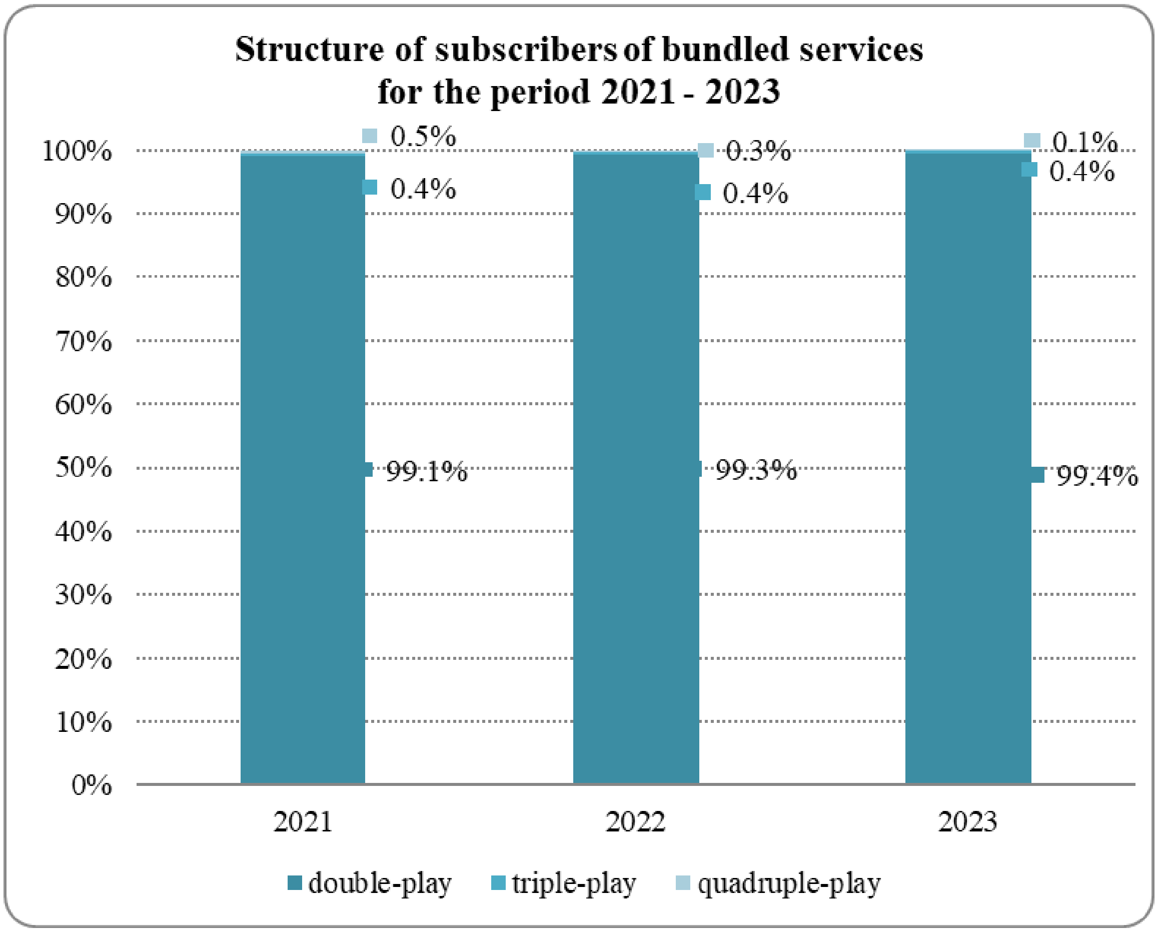
Subscribers of bundled services

The number of subscribers of bundled services toward the end of 2023, according to the data submitted by the undertakings providing public electronic communications in Bulgaria, increased compared to the previous year by 2.6% to reach 7.164 million. As a result, in the period

[8] By Decision No 114/01.02.2024, the Commission for Protection of Competition (CPC) sanctioned the acquisition by United Group Bulgaria EOOD of direct sole control over Viva Corporate Bulgaria EOOD and indirect sole control over Bulsatcom EOOD.

2022-2023, the value of the "penetration by population"[9] indicator also grew by 2.9 percentage points, thus reaching 111.1 %.

The breakdown of subscribers by types of bundled services, according to the number of electronic communications services included, in Bulgaria is presented in Figure 3.



Source: Data submitted to CRC

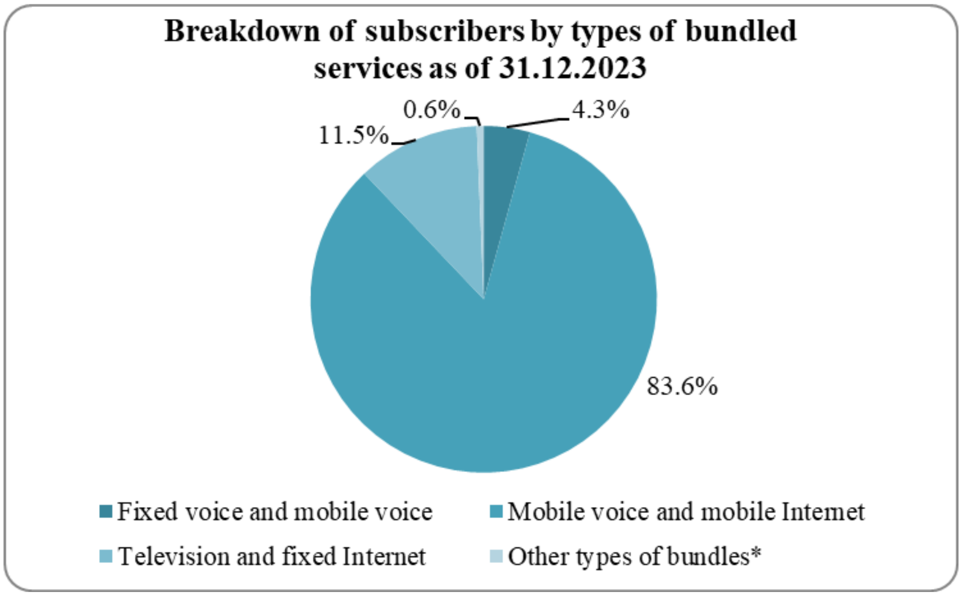
Figure 3

The data presented in Figure 3 confirm the upward trend in the share of packages including two electronic communications services (double-play packages) which has been observed during the recent years. In 2023, double-play packages covered 99.4% of the total number of subscribers of bundled services, with the number of subscribers of this type of packages increasing both in absolute terms (by 2.8% over a one-year period) and in relative terms (by 0.1 percentage points) compared to the data for 2022. For the second year in a row, interest in triple-play packages has increased, which is evident from the reported higher number of subscribers – by 8.2% compared to 2022. However, this increase does not significantly affect their share, which has remained at 0.4% since 2022. As in the previous year, in 2023, the number of subscribers of quadruple-play

[9] The indicators for 2022 and 2023 were calculated as the ratio between the total number of subscribers of bundled services as of 31 December of the respective year and the number of population according to NSI data as of the same date (https://www.nsi.bg/bg/content/2975/население-по-области-общини-местоживеене-и-пол).

packages dropped significantly (by 49.5%). This also affected the share of quadruple-play packages which amounted to 0.1%, down by 0.1 percentage points at the expense of an increase in the share of double- and triple-play packages.

Figure 4 presents the breakdown of subscribers by the most preferred bundled services in 2023.



Note: *"Other types of bundles" include the subscribers of bundles, each with a share not exceeding 1% of the total number of subscribers of bundled services.*

Source: Data submitted to CRC

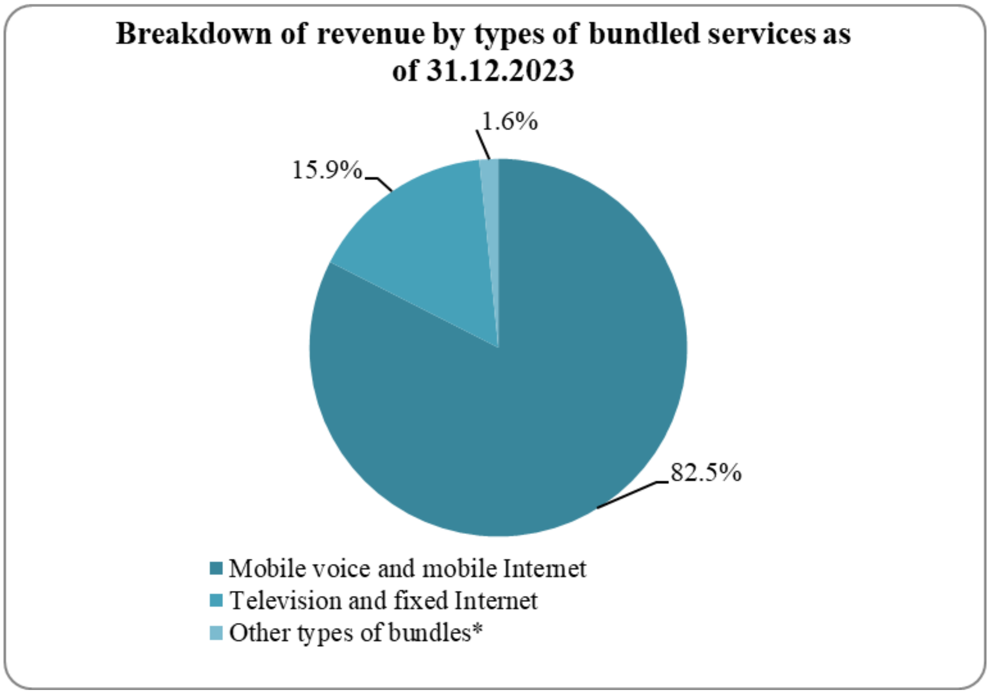
Figure 4

The number of subscribers of the most preferred bundled service – "mobile voice and mobile Internet access" - has increased by 2.8% compared to 2022 to reach 5.988 million at the end of 2023, with a slight decrease in their share (83.6%) by 0.2 percentage points in relative terms. The number of subscribers who used the second most distributed package ("TV and fixed Internet access") in 2023 amounted to 821 thousand, with an increase of 6.4% in absolute value compared to 2022 and by 0.4 percentage points in relative terms (their share amounted to 11.5%). Fixed voice service and mobile voice service in a bundle, with a relative share of 4.3% of the total number of bundled services subscribers, was used by 309 thousand subscribers (down by 6.6% in absolute value).

Revenue from bundled services

Revenue from bundled services amounted to BGN 1.865 billion in 2023, registering a growth of 15.9% year-on-year. The highest share (98.7%) in the total volume of revenue from these services continued to be held by double-play packages which, as compared to 2022, reported a growth of 16.5% in absolute value and by 0.5 percentage points in relative value. The share of revenue from triple-play bundles registered a decline in 2023 (by 0.1 percentage points), despite the reported 5.3% increase in absolute terms. Revenue from quadruple-play bundles continued to decline in 2023, by 41.7% compared to 2022, accounting for 0.5% of the total revenue in the segment (by 0.5 percentage points less than in 2022).

Figure 5 presents the breakdown of revenue by types of bundled services in 2023.



Note: *"Other types of bundles" include revenue from bundles, each with a share not exceeding 1% of the total revenue from bundled services.*

Source: Data submitted to CRC

Figure 5

In 2023, the share of revenue from the most used bundled service including mobile voice service and mobile Internet access fell by 0.3 percentage points from 2022 to reach 82.5% of the total volume of revenue from bundles, despite the registered growth of 15.5% in absolute value. Revenue from the double-play bundled service "TV and fixed Internet" reported a rise of 23.3% compared to 2022, which reflected on the increase in their share (15.9%), up by 1 percentage point. The total share of the other types of bundles which include revenue from a bundle, each with a share not exceeding 1% of the total revenue from bundled services, amounted to 1.6%, decreasing by 18.3% compared to 2022 (down by 0.7 percentage points).

Summary

In 2023, the following trends were observed in the bundled services:

- The consumption of double- and triple-play bundles grew at the expense of quadruple-play bundles;
- Once again, the most preferred bundled services were those that included mobile service – 88.4% of the total number of subscribers of bundled services used bundles with mobile voice included, while 83.9% of the subscribers used bundles with mobile Internet included;

- The growth in the total volume of revenue from bundled services was mainly due to the increase in revenue generated from bundles with mobile Internet access included and in revenue from bundles with television service included.
- In 2023, there was no new redistribution of market shares among the three largest undertakings providing bundled services, with their total share based on number of subscribers amounting to 96.9%. The largest market share was retained by A1, followed by Vivacom and Yettel, which occupied third position.

1.2.2. Investments

In 2023, 378 undertakings invested funds in the construction and maintenance of public electronic communications networks amounting to BGN 672.658 million, which is by 3% more than the funds invested the year before.

During the year, BGN 129.467 million were invested in fixed networks for the provision of electronic communication services (by 0.4% more than the previous year in absolute terms), of which BGN 75.985 million were invested in next-generation access (NGA) networks.

In 2023, the investments in mobile networks amounted to BGN 283.757 million (with an increase of 14.4% compared to the previous year), which represents a 42.2% share of the total investments of the undertakings.

2. Interpersonal communications services

The “Interpersonal communications services” segment includes the following public electronic services: fixed voice service provided through numbers from the National Numbering Plan (NNP), voice service through public payphones, mobile voice service provided through numbers from the NNP (including SMS[10] and MMS[11]) and other voice services (retail provision of VoIP; transfer of voice traffic between operators (wholesale VoIP); services provided through non-geographic numbers from the NNP of the "90" range serviced in networks of other undertakings; voice services provided through satellite systems, etc.).

Table 3 provides a summary of the key indicators characterising this segment in 2023, namely: the number of undertakings which provided services in this market segment during the year, the number of their subscribers/lines, and the annual revenue from services provided.[12]

[10] Short message service.
[11] Multimedia messaging service.
[12] Detailed information on the provision of fixed and mobile voice services through numbers from the NNP is presented in p. 2.1 and p. 2.2.

Table 3

Number of undertakings, number of subscribers/lines and revenue by type of voice services provided in 2023

Service	Number of undertakings providing the service in 2023	Number of subscribers/lines as of 31.12.2023		Revenue (in million BGN excl.VAT)	
		Total[1]	including bundled service subscribers	Total[2]	including from bundled services
1. Fixed voice service through numbers from the NNP and public payphones	30	592 899*	318,310	69.512	3.029
2. Mobile voice service through numbers from the NNP	3	8,014,473	6,316,549	922.782	575.945
3. Other voice services	23	///	///	75.587	///
Total	**49**	///	///	**1,067.881**	**578.974**

[1] Including subscribers of bundled services.

[2] Including the share of revenue from the provision of voice services bundled with other electronic communication services

* Number of lines of subscribers to a fixed voice service.

Note: *The symbol /// used in this document means that the information is not applicable to the indicated parameter or is confidential.*

Source: Data submitted to CRC

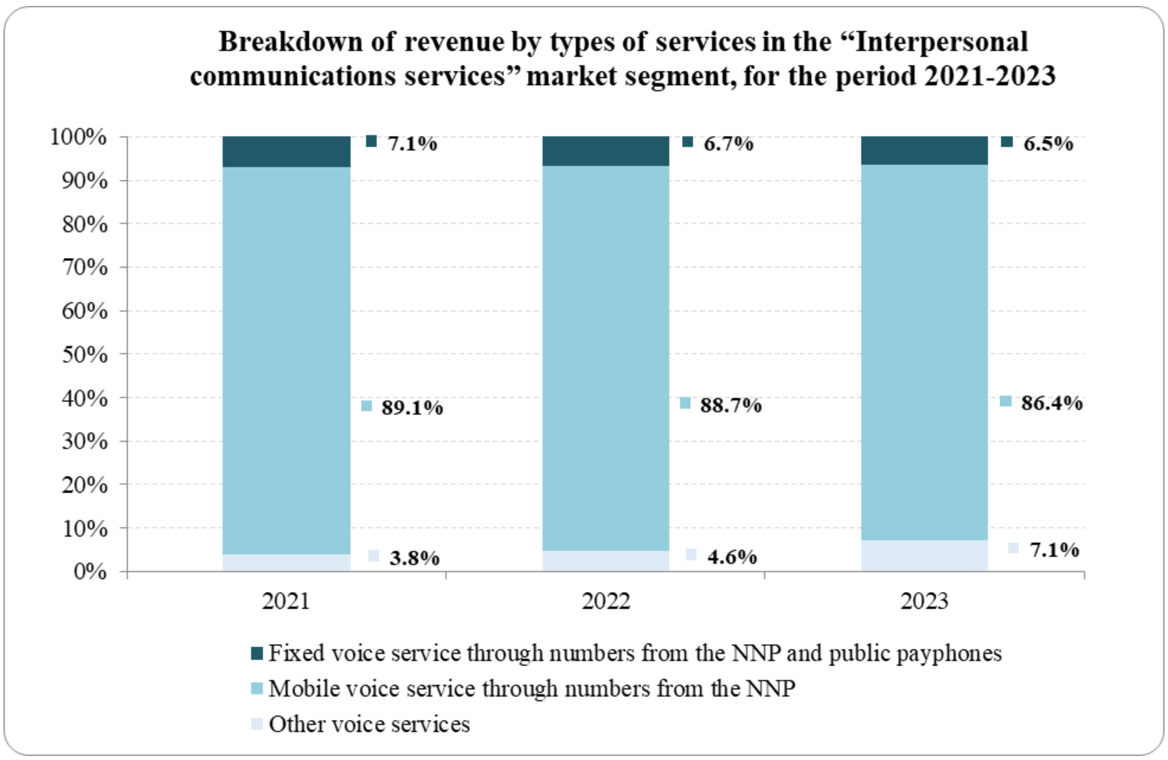
Activity related to the provision of services included in the "Interpersonal communications services" segment for 2023 was declared by a total of 49 undertakings, one less compared to the year before.[13] There was no change in the undertakings providing services from the "Mobile voice service through numbers from the NNP" group. Undertakings that declared activity of providing access to a fixed voice service (fixed voice service) through numbers from the NNP and/or wholesale public telephone network interconnection services amounted to 30. The number of providers of other voice voice services amounted to 23, of which 18 undertakings declared the retail or wholesale provision of VoIP services (transfer of voice traffic between operators).

In 2023, the total volume of revenue generated from services included in the "Interpersonal communications services" segment amounted to BGN 1,067.881 million, with an insignificant change compared to the previous year (BGN 1,067.320 million) – an increase of 0.1%. In the individual groups of services forming the segment in 2023, the following changes in absolute terms were observed compared to the previous year:

[13] As a result of questionnaires received additionally from 4 undertakings for the activity report in 2022, the data were updated. According to the updated data for 2022, the total number of undertakings that had declared activity of providing interpersonal voice services amounted to 50. A total of 33 undertakings provided a fixed voice service through numbers from the NNP and/or wholesale public telephone network interconnection services, three of which also provided a mobile voice service. The number of undertakings providing other voice services, including VoIP, was 22.

- a decrease of 2.4% was registered in the volume of revenue from the provision of a fixed voice service for the reporting year, with a decrease of 12.7% over the previous one-year period (2021-2022);
- the amount of revenue from the provision of the mobile voice service reported a decrease of 2.5% compared to the year before, with a drop of 7.6% for the previous period;
- in 2023, compared to 2022, the total volume of revenue from the services included in the "Other voice services" segment rose by 52.3%, resulting from the increase in revenue generated from the provision of services related to transmission of voice traffic between operators (wholesale VoIP) forming the main share (74.6%) in the group of services under consideration.

The reported changes in the absolute value of the volume of revenue by groups of services did not substantially alter the structure of the "Interpersonal communications services" segment presented in the figure below.



Source: Data submitted to CRC

Figure 6

As is evident from the information presented, the main share in the structure of this market segment (86.4%) is formed by revenue from the mobile voice service. The reported decline of 2.3 percentage points compared to 2022 is due to the increase in the share of revenue from the group of other services related to the provision of voice services – from 4.6% in 2022 to 7.1% in 2023. The change in revenue from a fixed voice service in absolute terms did not have a significant impact on its relative share in the structure of the segment in 2023, the decrease being by only 0.2

percentage points compared to the year before

2.1. Fixed voice service through numbers from the NNP

Market players

As of 31.12.2023, the total number of undertakings authorised by CRC for the provision of voice voice services through primary assigned resource from the NNP – geographic numbers, non-geographic numbers for access to national non-geographic services, and access code to the “carrier selection" service amounted to 23. The number of undertakings without a primary assigned resource, which have notified CRC of their intention to provide interpersonal communications services with numbers (through resale of a fixed voice service through secondary assigned numbers) was 24.

The total number of undertakings that declared a fixed voice service activity through numbers from the NNP and/or wholesale services for public telephone networks interconnection in 2023 amounted to 30. Of these, 26 undertakings have declared activity of providing a fixed voice service to end-users through geographic numbers and/or non-geographic numbers. Fifteen undertakings provided the service through a primary assigned resource, and eleven declared activity related to resale of a fixed voice service through secondary received geographic numbers and/or non-geographic numbers for access to national non-geographic services. Four undertakings have declared activity of providing wholesale services only (“transit” and “physical interconnection”) which are relevant to the provision of a fixed voice service through numbers from the NNP. In 2023, as in the previous year, an activity of providing voice service through public payphones/booths was declared solely by Vivacom.

In 2023, the main providers of fixed voice service through numbers from the NNP for end-users (retail service) remained Vivacom, A1, and Yettel. These undertakings made up 97.7% of the market volume, measured on the basis of the number of lines of fixed voice service subscribers (97.8% in 2022) and 94.1% of the revenue generated from subscribers of the service provided at retail level (94.0% in 2022).

Table 4

Market shares of undertakings providing retail fixed voice service

Undertaking	2022		2023	
	Share based on number of fixed telephone lines	Share based on revenue from subscribers	Share based on number of fixed telephone lines	Share based on revenue from subscribers
VIVACOM BULGARIA EAD	58.0%	81.8%	57.3%	83.0%
A1 BULGARIA EAD	24.9%	6.3%	24.6%	5.3%
YETTEL BULGARIA EAD	14.9%	5.8%	15.8%	5.8%
Rest of operators	2.2%	6.0%	2.3%	5.9%

Source: Data submitted to CRC

In 2023, there was no significant change in the values of market shares of undertakings providing access to a fixed voice service, calculated on the basis of the number of fixed lines of subscribers compared to the previous year. The value of Vivacom's indicator was down by 0.7 percentage points compared to the previous year and, at the end of 2023, it amounted to 57.3%. A drop was also reported in A1 – by 0.3 percentage points, with its market share declining from

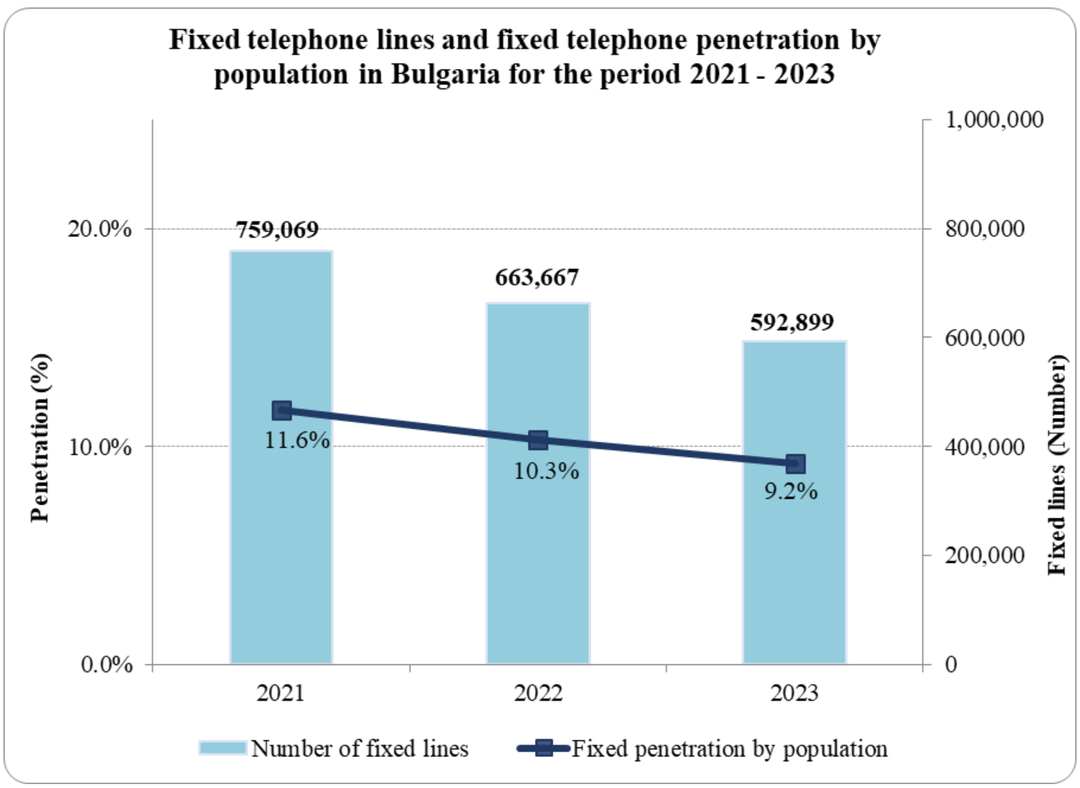
24.9% to 24.6% at the end of the reporting period. This has led to a rise in the value of Yettel's indicator – by 0.9 percentage points - and by only 0.1 percentage points in the total relative share of all other competitors.

In the market shares of undertakings, calculated on the basis of revenue from the provision of a fixed voice service to subscribers, the changes are as follows: Vivacom's share grew by 1.2 percentage points year-on-year, while A1's share decreased by 1.0 percentage point. As for Yettel, the value of the indicator remained at the level of the previous year – 5.8%, and the total market share of the other market players, calculated on the basis of the total volume of revenue from retail services, remained almost unchanged – down by 0.1 percentage points only.

Lines of fixed voice service subscribers

According to the data declared by the undertakings, at the end of 2023, the total number of lines of fixed voice service subscribers was 592,899 and, for yet another year, the downward trend in this indicator was maintained due to the decreasing interest of end-users in the service. The reported drop over a one-year period was by 10.7%, with a decrease of 12.6% for the period 2021-2022. The number of Vivacom lines dropped by 11.7% in 2023, with a decrease of 12.0% for the previous period (2021-2022), and the decline in the total number of subscribers of fixed voice service of the competing undertakings was by 9.2% versus 2022, compared to 13.4% for the previous reporting period.

The figure below presents information on the variation in the number of fixed lines of voice service subscribers and the fixed telephone density by population for a three-year period.



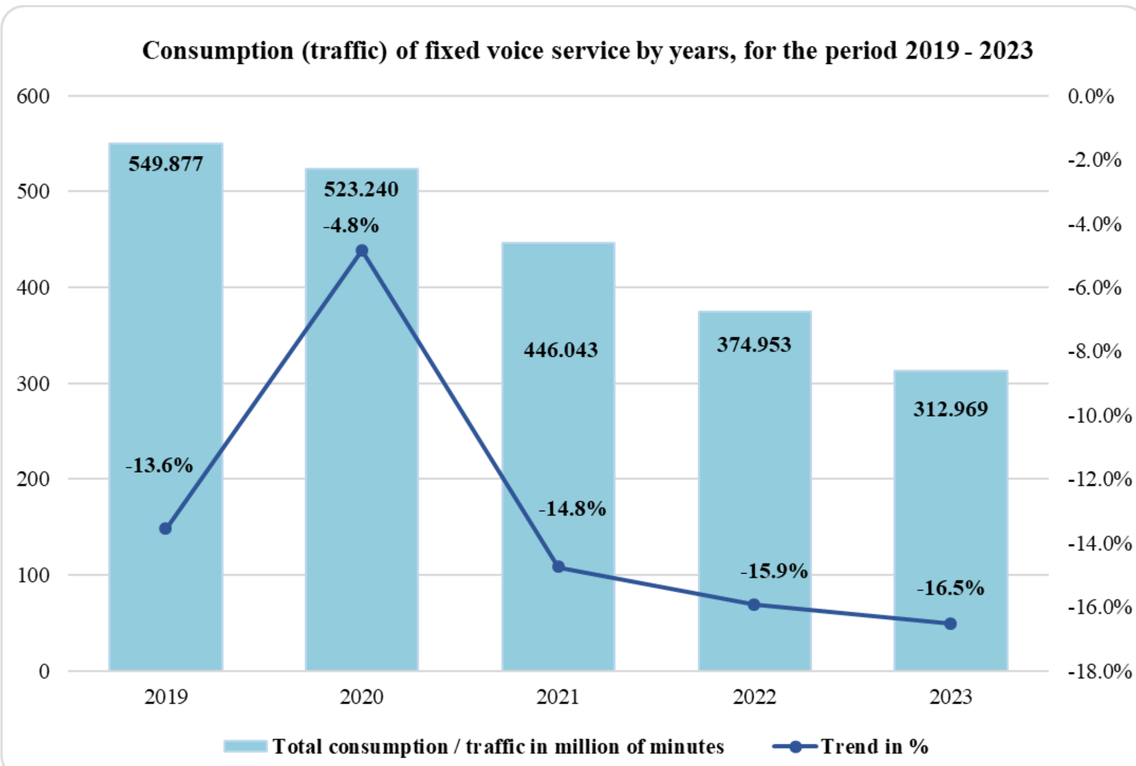
Source: Data submitted to CRC

Figure 7

As a result of the annual decrease in the total number of fixed lines in absolute value (by 21.9% in 2023, compared to 2021), the value of the "fixed telephone density by population" indicator also dropped down to 9.2%[14] in 2023.

Consumption (traffic) of fixed voice service

The total consumption of the fixed voice service includes the volume of outgoing traffic (in minutes) generated by the end-users of the service when making national (local and long-distance calls, calls to mobile terrestrial networks and to non-geographic numbers) and international calls over a one-year period. According to data provided by the undertakings, in 2023, the total volume of generated voice traffic amounted to 312.969 million minutes, compared to 374.953 million minutes in 2022, which represents a decrease of 16.5% over the one-year period. As shown in the figure below, the data for the period 2019-2023 show a persistent downward trend in the total volume of generated outgoing call traffic, with the lowest rate of decrease continuing to be in 2020 due to increased service consumption during the COVID-19 crisis.



Source: Data submitted to CRC

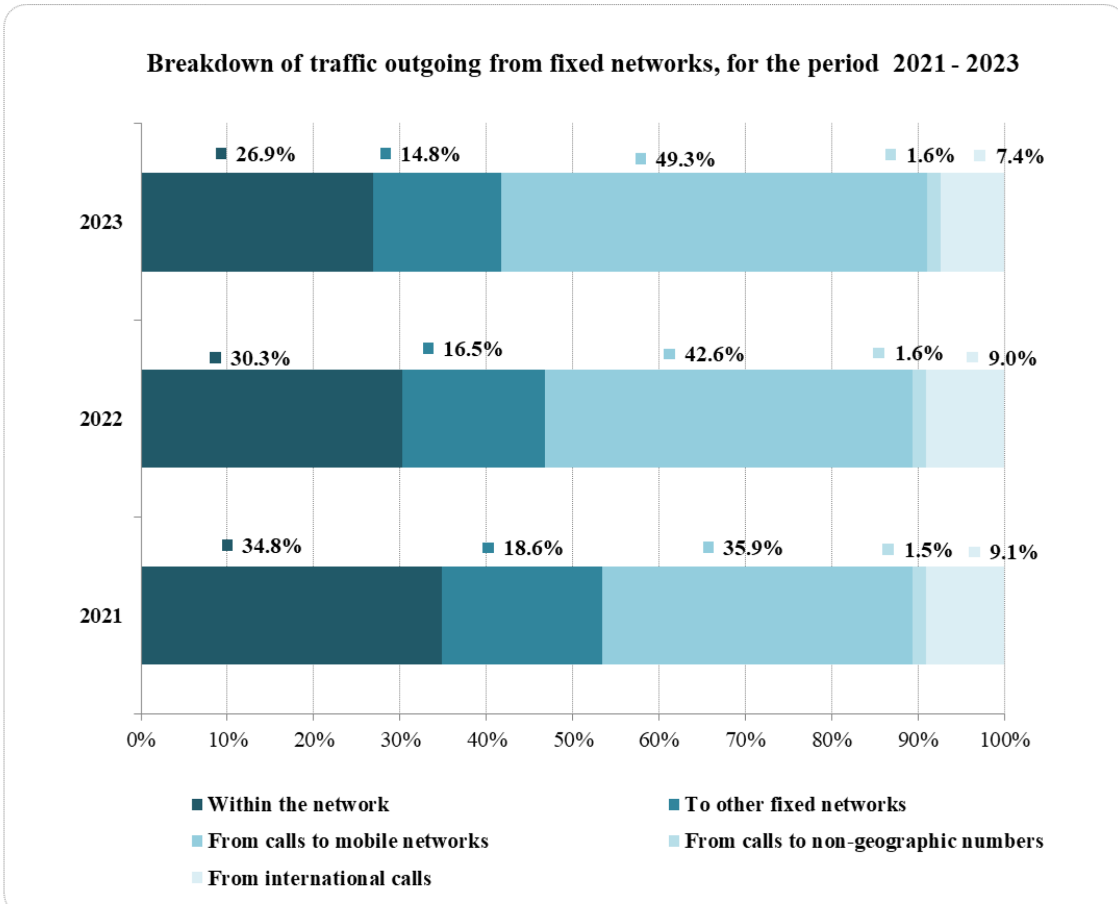
Figure 8

The share of traffic generated from calls included in subscription plans remained high in 2023 as well, amounting to 89.2%. Only 10.8% of the total traffic generated is paid by end-users of the service beyond the subscription plan, which shows that there is no change in the model of

[14] The data for 2022 and 2023 were calculated as the ratio between the total number of active telephone lines of fixed voice service subscribers as of 31 December of the respective year and the number of population according to NSI data as of the same date (https://www.nsi.bg/bg/content/2975/население-по-области-общини-местоживеене-и-пол); to calculate the indicator for 2021, the final population figures obtained from the NSI census conducted as of 7 September 2021 were used (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_population.pdf).

service provision, namely the inclusion of a large volume of call traffic in the monthly subscriptions of fixed voice service subscribers.

The breakdown of the total volume of traffic generated by fixed networks in the period 2021-2023, depending on the call directions, is presented in the figure below.



Source: Data submitted to CRC

Figure 9

In 2023, as in the previous year, a decrease was reported not only in the total volume of outgoing traffic generated, but also in all groups of calls formed by directions, as follows: within the undertaking's network (on net), to other fixed networks (off net), to mobile networks, to non-geographic numbers, and to networks abroad. The following changes were reported in 2023, compared to 2022, both in absolute value and as a share in the total volume of generated outgoing traffic:

- the volume of traffic within the networks (on net) decreased by 25.6% and the share it forms in the total volume of generated traffic fell by 3.4 percentage points;
- call traffic to other fixed networks (off net) dropped by 25.2%, and its share decreased by 1.7 percentage points to 14.8% year-on-year;
- the volume of calls to mobile networks registered a decline for the second year in a row; for 2023, it dropped by 3.4%, compared to 0.3% for the previous period (2021 – 2022). Due

to the smaller rate of decline compared to the drop in the volume of traffic in other calls, the share of this traffic rose by 6.7 percentage points over a year to make up 49.3% of the total volume of consumption by subscribers to fixed voice service in 2023;

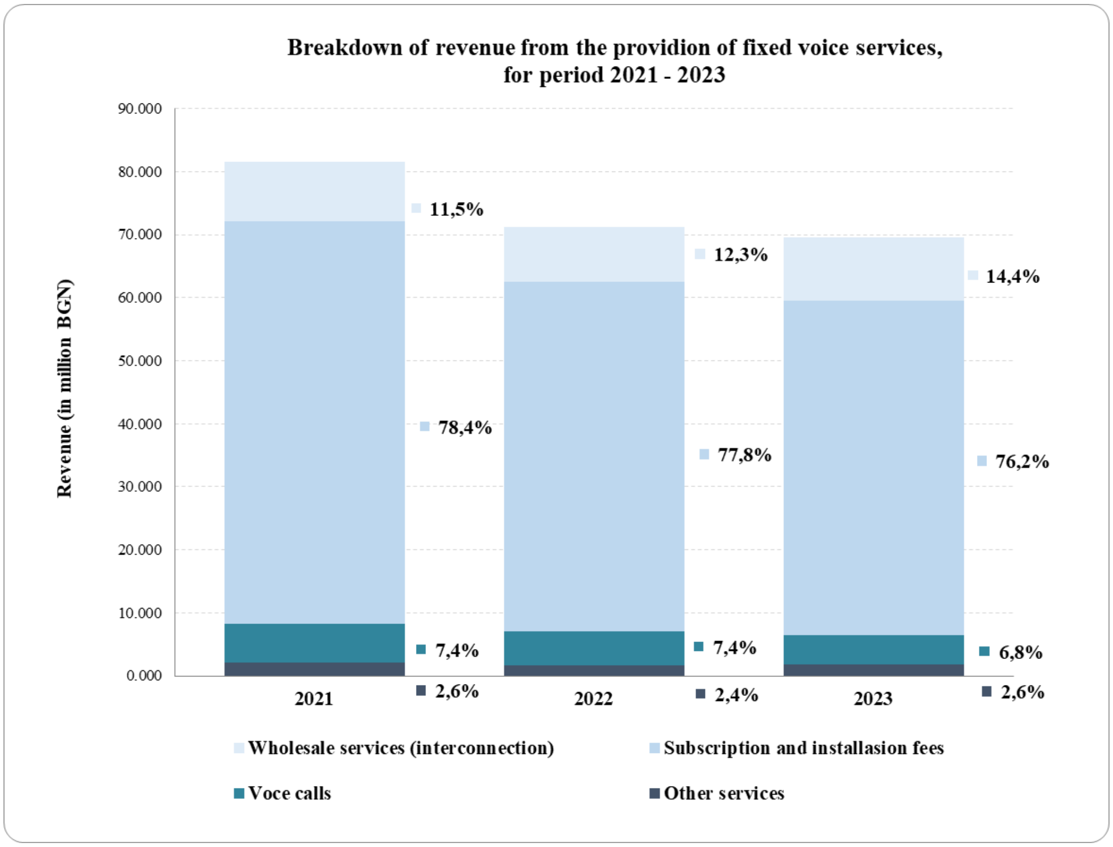
- the share of consumption to non-geographic numbers for services and short numbers in the total volume of traffic remained unchanged compared to the previous year (1.6%), as its decrease in absolute value amounted to 16.1% and is comparable to the overall decline in the consumption of the service (16.5%);
- calls to networks abroad registered a drop of 32.2% in absolute terms in the generated traffic, which reduced the share of this traffic in the total volume by 1.6 percentage points to a 7.4% share in the total retail traffic.

The reduced use of the fixed voice service by end-users also affects the related wholesale call termination service on fixed networks. According to the data declared by the undertakings providing interpersonal communications through geographic numbers, in 2023, the total volume of terminated traffic on fixed networks in the country decreased by 12.4% compared to 2022, with 21.1% for the previous one-year period. The total consumption of the service related to termination of national traffic decreased by 10.9%, with the largest decline being registered in traffic generated by geographic numbers and terminated in geographic numbers – by 24.9%. The traffic terminated on fixed networks which was generated from mobile networks of other undertakings in the country fell by 8.7% compared to 2022, exceeding the decrease for the previous period by only 0.7 percentage points. In 2023, the lowest rate of decrease was reported in call termination in non-geographic numbers on fixed networks – 1.5% for the one-year period, and this traffic also held the smallest share in the total volume of terminated traffic – 9.6%. The data provided by the undertakings show that a decrease was also reported in the volume of traffic terminated on national fixed networks from calls generated by networks abroad, which in 2023, compared to 2022, amounted to 19.5%, with a drop of 24.8% for the previous period (2021-2022).

In the structure of the total volume of traffic terminated on fixed networks, the largest share was traffic generated by mobile networks in the country (including generated by own mobile network) – 64.8% for 2023 versus 62.8% for the previous year. In the volume of the terminated national traffic, this share amounted to 76.8% for 2023 and 75.7% for 2022, which also shows a shift of consumption from fixed to mobile voice service.

Revenue from fixed voice service

In 2023, the total volume of revenue generated from the provision of fixed voice service amounted to BGN 69.512 million, registering a decline of 2.4% compared to 2022 (BGN 71.241 million). The main share in the structure of revenue generated by the service providers is formed by installation and subscription fees from the provision of a fixed voice service to end-users, including the part of a bundled service. In 2023, it accounted for 76.2% of the total revenue generated, with the decrease for the three-year period presented in the figure below being 2.2 percentage points and amounting to 17.3% in absolute terms.



Source: Data submitted to CRC

Figure 10

In absolute value, the changes in the main groups of revenue from the provision of fixed voice service, presented in the figure above, in 2023 versus 2022, are as follows:

- drop of 4.5% in the volume of revenue generated from the provision of access to the fixed voice service (installation and subscription fees), with a decline of 13.3% in 2022 compared to 2021;
- revenue generated from calls beyond the subscriptions for the reporting period fell by 11.3%, with a decrease of 12.6% for the period 2021-2022;
- in the total volume of revenue from the provision of wholesale services (including interconnection services - generation, termination, transit and physical interconnection) in 2023, there was a growth of 14.5% compared to 2022, due to an increase in revenue generated from voice traffic transit by 28.5%, with an increase of 14.0% for the previous period.

In 2023, wholesale fixed voice termination rates set out in the Delegated Act on single EU-wide voice call termination rates for mobile and fixed networks (Commission Delegated Regulation (EU) 2021/654), which have been in force since 01.07.2021, applied. The decline in the volume of revenue from physical interconnection was by 1.9% in 2023, compared to the year before. This rate of decrease was lower than in the previous period, when the decrease of 11.9%

was influenced by the application of the provisions of the Delegated Act regarding the use of the interconnection ports included in the termination service as an essential element of it.

Summary

In 2023, the established steady trend of decline in the consumption of fixed voice service by end-users continued, and the following changes in the main indicators were registered:

- The decrease in the number of lines of fixed voice service subscribers was by 10.7% the year before;
- Revenue generated by retail services made up 85.3% of the total revenue from fixed voice service, with a decrease of 4.8% compared to the previous year, as the main share in its volume (89.3%) was formed by subscription and installation fees. The total consumption of the service, expressed in minutes of traffic from retail calls, continued to shrink (by 16.5% for the reporting year).
- Calls with traffic included in subscriptions made up a significant share in the total volume of outgoing traffic – 89.2%, and the share of calls to mobile networks continued to increase and reached 49.3% of the total traffic generated from outgoing calls;
- The main providers of the service - A1, Vivacom, and Yettel - formed 97.7% of the total number of subscribers of fixed voice service and 94.1% of the revenue generated from subscribers of the service provided at retail level. There was no change in their positions based on the number of subscriber lines.

On the basis of the above data and the trends reported in recent years, it can be expected that the consumption of fixed voice service subscribers will continue to shrink. The preferences of voice service end-users will continue to focus on the use of mobile services and on Internet applications for interpersonal communication.

2.2. Mobile voice service through numbers from the NNP

Market players

In 2023, the number of undertakings providing mobile voice service through numbers from the NNP (mobile voice service) in Bulgaria was three - A1, Yettel, and Vivacom. They hold registration in the Public Register of CRC for the provision of the service, as well as authorisations for the use of individually assigned scarce resource – radio spectrum, and have been provided with codes for access to digital mobile networks (non-geographic numbers from the NNP for the provision of mobile voice service).

The reports submitted to CRC on the activity of providing public electronic communications in 2023 show that the growth in the market shares registered by Vivacom in 2022, based on number of subscribers and based on retail income,[15] continued (Table 5). As a result, at the end of 2023, a shift was observed in the market positions in the market segment "mobile voice

[15] Market shares were calculated based on revenue from the provision of retail mobile voice service (revenue from retail service provided standalone and the part of revenue provided bundled with other electronic communication services). In the 2010-2017 Annual Reports of CRC, market shares based on revenue were calculated based on revenue from the provision of wholesale mobile voice service and revenue from retail service provided standalone, excluding the part of revenue provided bundled with other electronic communication services.

service through numbers from the NNP" and, as of 31.12.2023, based on number of subscribers, Vivacom already held the second largest share (32.4%) in the segment, replacing Yettel which ranked third with a market share of 31.4%. With a market share of 36.2%, calculated on the basis of the number of subscribers, A1 once again occupied the leading position in the provision of mobile voice service.

Table 5

Market shares of undertakings providing retail mobile voice service

Предприятие	2022		2023	
	Share based on number of subscribers	Share based on revenue	Share based on number of subscribers	Share based on revenue
A1 BULGARIA EAD	36.7%	34.2%	36.2%	29.9%
YETTEL BULGARIA EAD	32.1%	38.0%	31.4%	40.7%
VIVACOM BULGARIA EAD	31.2%	27.8%	32.4%	29.4%

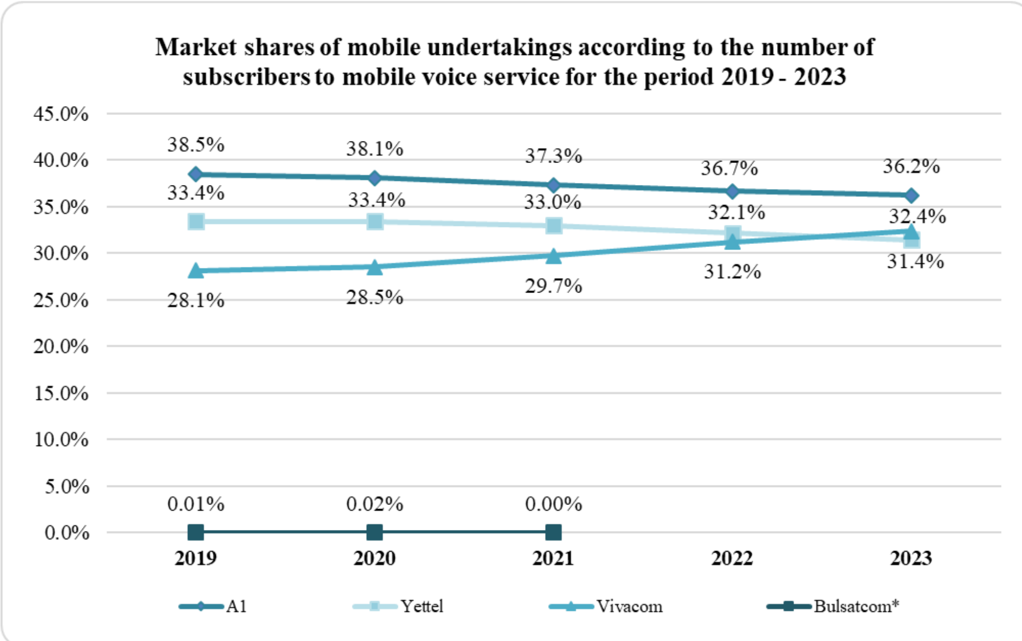
Source: Data submitted to CRC

The data in Table 5 shows that, for 2023, based on revenue from the provision of mobile voice service at retail level, all three mobile undertakings retained their positions from the previous year – Yettel continued to hold the highest market share (40.7%), followed by A1 (29.9%) and Vivacom (29.4%). However, the difference between the market shares of the second and third undertaking based on revenue is insignificant and in case the trend of growth in Vivacom's market share continues next year, it will take second place in the segment in terms of this indicator.

In 2023, compared to 2022, the specific values of the changes in the market shares of A1, Yettel and Vivacom were as follows:

- the relative share of A1, calculated on the basis of number of subscribers, fell by 0.5 percentage points, while the one calculated on the basis of revenue dropped by 4.3 percentage points;
- the relative share of Yettel, calculated on the basis of number of subscribers, decreased by 0.7 percentage points, while the one calculated on the basis of revenue grew by 2.7 percentage points;
- the relative share of Vivacom, calculated on the basis of number of subscribers, rose by 1.2 percentage points, while the one calculated on the basis of revenue was up by 1.6 percentage points.

The following two figures present data on the trend of development of the market shares of mobile undertakings over the last five years (2019 – 2023), calculated on the basis of number of subscribers and revenue from the provision of mobile voice service.



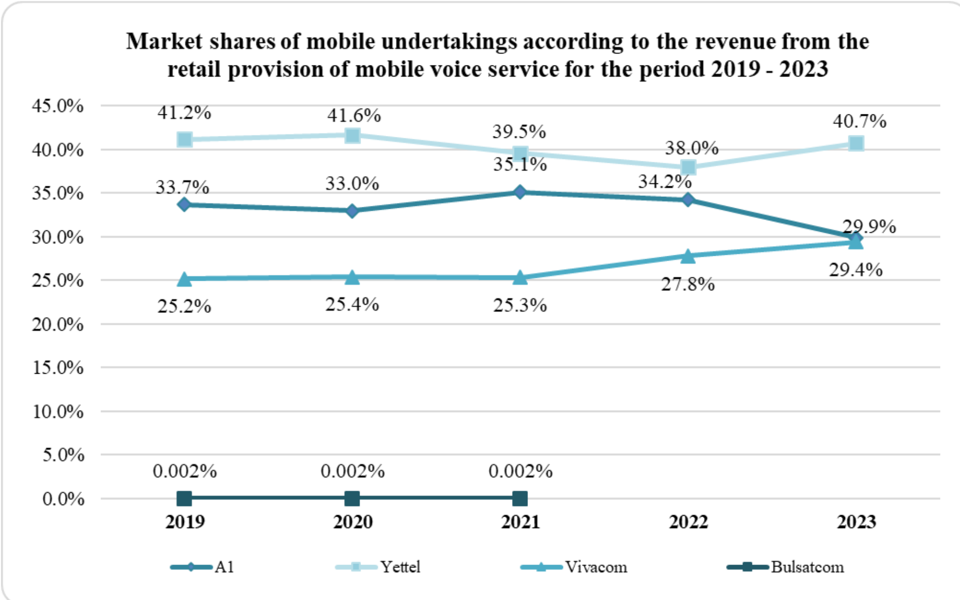
*The undertaking provided mobile voice service until 15.12.2021.

Source: Data submitted to CRC

Figure 11

From the data presented in the figure above, it is evident that, during the period considered, the smooth trend of decline in the market share of A1 subscribers continued - at the end of 2023, it was by 2.3 percentage points lower than as of 31.12.2019. In 2023, this decline was also at the expense of a growth in the relative market share of Vivacom, which has been continually increasing since 2019 (by 4.3 percentage points for the period 2019-2023). For the period considered, the decrease in the market share of Yettel based on number of subscribers was by 2 percentage points.

In the market shares based on retail income (Figure 12), over the last two years, there has been a trend of growth for Yettel and Vivacom, while the share of A1 has decreased. For the period 2019-2023, Vivacom increased its share by 4.2 percentage points while A1's share fell by 3.8 percentage points. In Yettel, the values of the indicator fluctuated during the said period, but in 2023, there was an increase (from 38% in 2022 to 40.7% in 2023), which gave it a lead of more than 10 percentage points over the market shares of A1 and Vivacom.

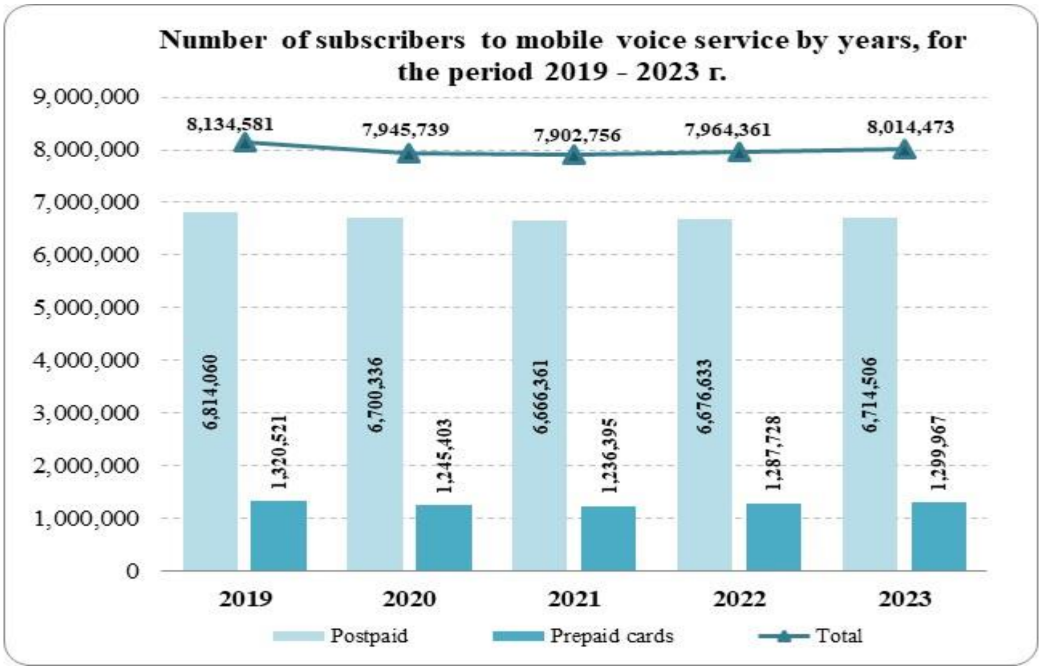


Source: Data submitted to CRC

Figure 12

Subscribers of mobile voice service

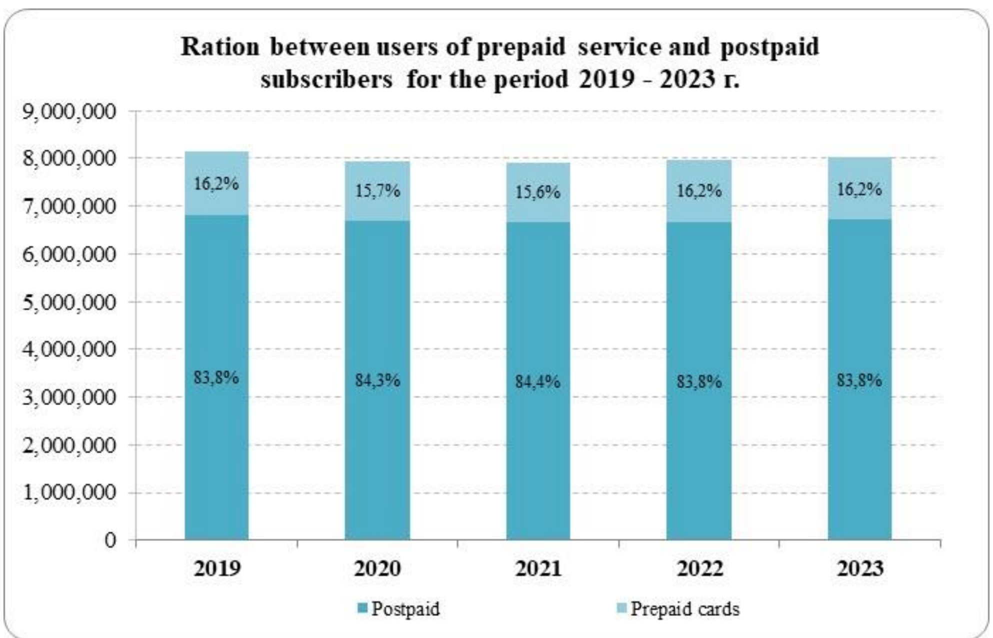
As of 31.12.2023, the number of subscribers of mobile voice service (number of unique SIM cards) amounted to 8,014,473, registering a rise of 0.6% since the previous year 2022. The figures presented in the figure below show that, compared to the end of 2022, as of 31.12.2023, there was an increase both in the number of postpaid subscribers (by 0.6%) and in the number of end-users of the prepaid card service (by 1.0%). To compare with, in 2022, the growth registered in postpaid subscribers was by 0.2% and by 4.2% for those with prepaid cards.



Source: Data submitted to CRC

Figure 13

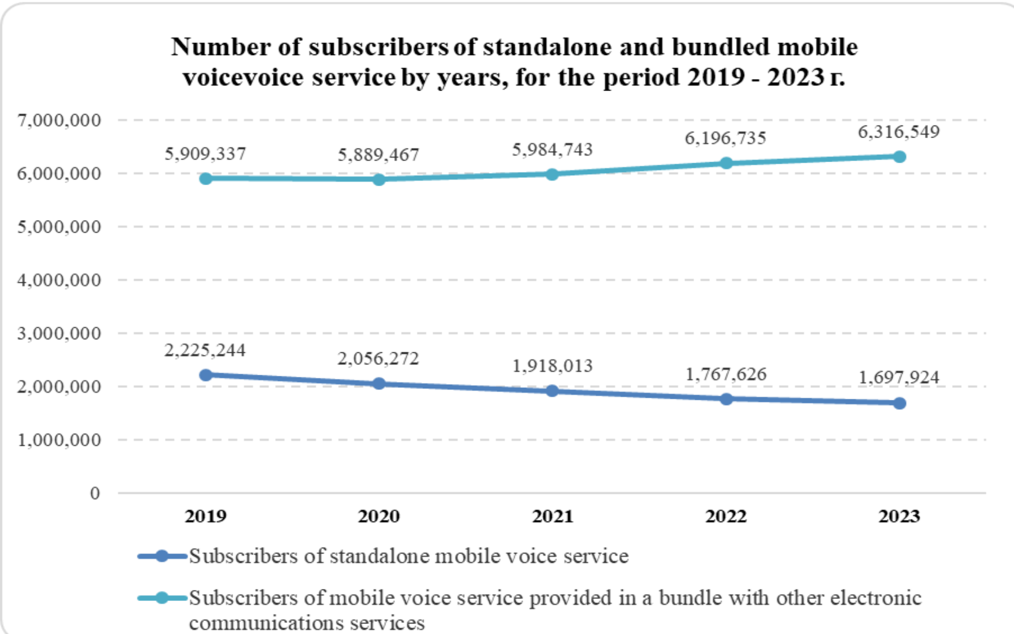
The following figure shows the ratio between subscribers of a prepaid mobile voice service and postpaid subscribers – the data presented shows that, as of 31.12.2023, the share of postpaid subscribers (83.8%) and of prepaid service subscribers (16.2%) remained at the level of the previous year 2022.



Source: Data submitted to CRC

Figure 14

As is evident from the data (Figure 15), the number of subscribers who use a mobile voice service in a package with other electronic communications services continued to grow in 2023 as well. At the end of 2023, the number of subscribers to bundled services reached 6,316,549, which represents 78.8% of the total number of subscribers to mobile voice service in Bulgaria as of 31.12.2023. For the last five years (2019-2023), the reported growth in the number of subscribers using the service in a package was by 6.9%.

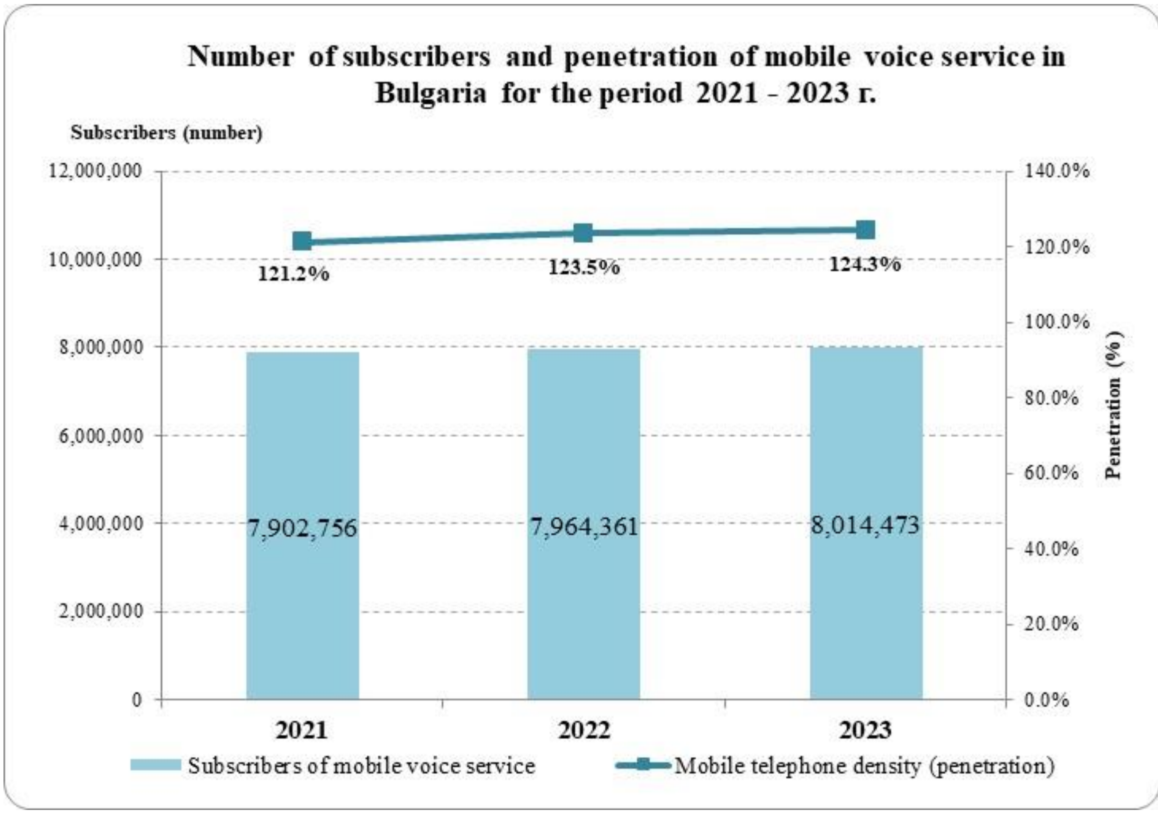


Source: Data submitted to CRC

Figure 15

The figure below presents information on the number of subscribers to mobile voice service and service penetration among the population for the period 2021-2023.[16] The data show that the penetration of the service among the population in 2023 continued to increase (from 123.5% as of 31.12.2022, it reached 124.3% as of 31.12.2023).

[16] The data for 2022 and 2023 were calculated as the ratio between the number of mobile voice service subscribers as of 31 December of the respective year and the number of population according to NSI data as of the same date (https://www.nsi.bg/bg/content/2975/население-по-области-общини-местоживеене-и-пол); to calculate the indicator for 2021, the final population figures obtained from the NSI census as of 7 September 2021 were used (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_population.pdf).



Source: Data submitted to CRC

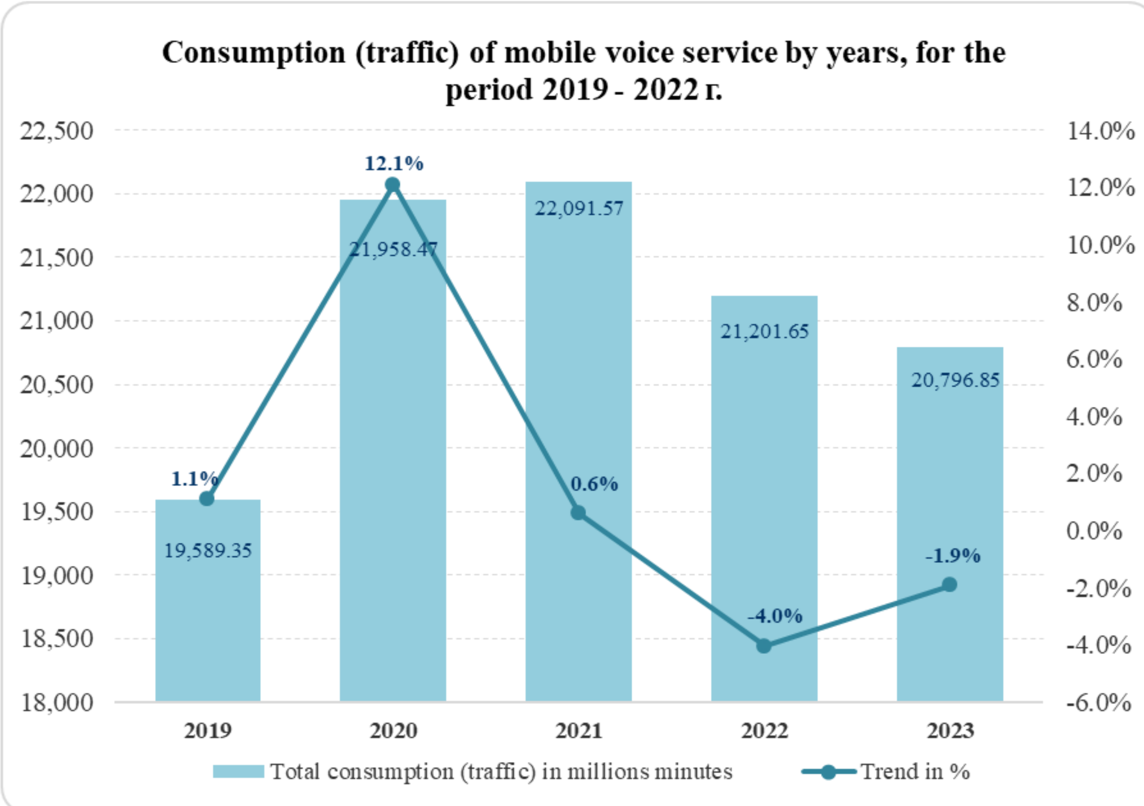
Figure 16

The observed growth in mobile voice service penetration in 2023 amounted to 0.8 percentage points and continued to be the result of two factors – a decrease in the number of population in 2023 (by 0.03%) and the reported growth in the number of subscribers using the service for the second year in a row.

Consumption (traffic) of mobile voice service

The total volume of outgoing traffic from mobile networks in the country[17] for 2023 amounted to 20,796.85 million minutes, registering a drop of 1.9% in the consumption of mobile voice service compared to the previous year 2022. The decrease is a result of a fall in the number of minutes used from mobile to fixed networks in the country (by 4.9%), to other mobile networks in the country (by 0.3%), to the own mobile network (by 3.1%), and to networks abroad (by 9.2%). Despite the decline in the consumption of mobile voice service which has been observed over the last two years, in 2023, the total volume of outgoing traffic from mobile networks in the country was higher (by 6.2%) than the one reported for the pre-pandemic year 2019 (in 2019, it amounted to 19,589.35 million minutes). As evidenced by the data presented in the following figure, the consumption of mobile voice service in the country reached a saturation point in 2021, after which the use of the service started to decrease.

[17] Including outgoing traffic generated by mobile voice service subscribers within a mobile network (on-net traffic), to other mobile networks in the country (off-net traffic), to fixed networks in the country, and to networks abroad.



Source: Data submitted to CRC

Figure 17

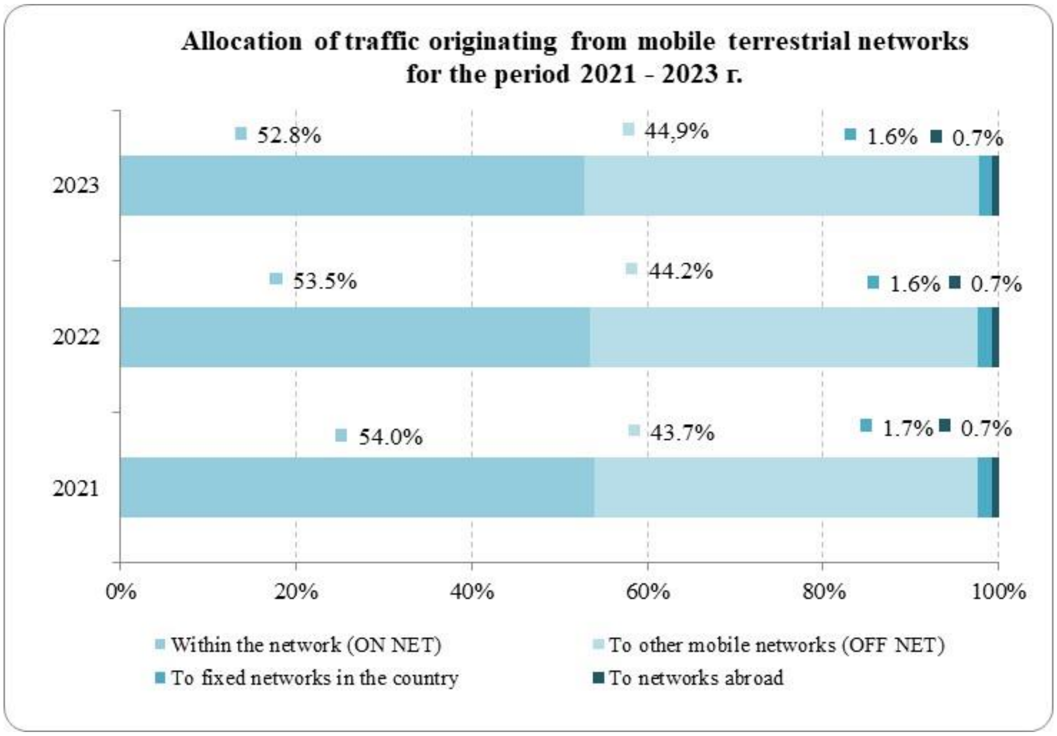
After a 3.9% increase in outgoing roaming calls from subscribers of the Bulgarian mobile undertakings abroad registered in 2022, a decline (by 7%) was observed in 2023. In the case of incoming calls in roaming, the downward trend grew stronger in 2023, with a reported decrease of 10.5% versus 2022 (compared to 2022, the registered decline was by 4.5%). According to information provided by the mobile undertakings, the trend of decline in the consumption of roaming services is the result of the increasing use of mobile data and the so-called Over The Top (OTT) applications[18], such as WhatsApp, Facebook Messenger, iMessage, Viber, and other voice call and instant messaging applications.

The share of consumption (number of minutes used) by subscribers with prepaid SIM cards in the total consumption of mobile voice service in 2023 continued to gradually decrease, reaching 3.2% (vs. 3.3% in 2022). For postpaid subscribers, the relevant share was 96.8%. In both categories of subscribers, the trend of decline in the volume of minutes used continued in 2023, but at a slower rate than in the year before – for postpaid subscribers, the decline was by 1.8% (compared to 4% for 2022), and for subscribers with prepaid cards, it was 4.5% (6.1% in 2022).

The structure of traffic originating from mobile networks in the country is presented in the figure below. The figure shows that, in 2023, there was no significant change in the shares of the respective types of traffic originating from mobile networks: for yet another year, the share of traffic within the own mobile network (on net) decreased - from 53.5% for 2022 to 52.8% for 2023,

[18] In the BoR (16) 35 "Report on OTT services", BEREC defined the term "over-the-top" ("OTT") as: “Content, service or application that is provided to the end-user over the open Internet”.

and the upward trend in the share of traffic outside the own mobile network (off net) continued and its share reached 44.9% in 2023. This data shows that the level of competition between mobile voice service providers is maintained and that the conditions for calls both on and off the network of the undertaking to which end-users are subscribers are favourable, and there is no market defect associated with “traffic closure” within the own mobile network.[19]



Source: Data submitted to CRC

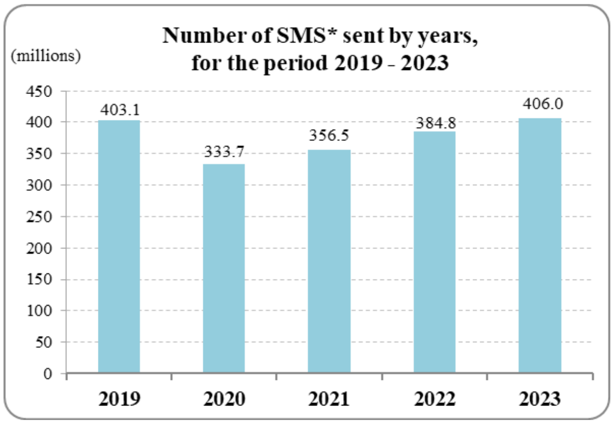
Figure 18

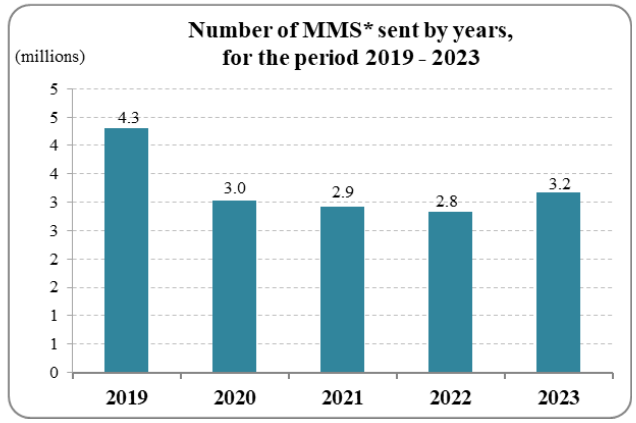
The data in the above figure show that the share of traffic to fixed networks in the country (1.6%) was preserved compared to 2022. The share of traffic to networks abroad remained unchanged compared to the previous year – 0.7%.

Short multimedia and text messages

In 2023, the total number of SMS messages sent by Bulgarian subscribers to networks in the country and abroad as well as to short numbers amounted to 406.0 million (Figure 19), and the total number of MMS sent amounted to 3.2 million (Figure 20).

[19] “Traffic closure” is a product and pricing strategy in which a user is given far better conditions for calls to users of the same network (on-net calls) than to users of other networks (off-net calls).





** Sent to networks in the country and abroad and to short numbers*

Source: Data submitted to CRC ***Source:*** Data submitted to CRC

Figure 19 **Fig. 20**

As shown by the data presented in the above figures, for the third consecutive year, short text messages reported a growth (by 5.5% for 2023). MMS messages also saw an increase (by 12.7%) in 2023. The number of SMS messages sent in roaming in 2023 was down by 6.7%.

Revenue from mobile voice service

In 2023, the total volume of revenue from the provision of mobile voice service amounted to BGN 922.782 million and, registering a drop of 2.5% compared to the previous year 2022. To compare with, the decline in revenue registered in 2022 was 7.6%.

The volume of revenue from the provision of retail mobile voice service was BGN 804.912 million, while that of revenue from wholesale services amounted to BGN 117.870 million. These data show that the decline in the revenue from the provision of mobile voice service in 2023 resulted from a decrease of 22.1% in the revenue from wholesale services. As for revenue from retail services, there was a growth of 1.2% compared to 2022.

The observed decline in wholesale revenue was mainly provoked by a decrease of 23.6% in the total revenue from wholesale traffic services. In 2023, the main reason for the drop of this revenue was also the application of new, lower rates of wholesale voice call termination on mobile networks from 1 January 2023 (according to the Delegated Act on single EU-wide voice call termination rates for mobile and fixed networks (Delegated Regulation (EU) 2021/654)). In terms of revenue from non-traffic services provided at wholesale level in 2023, there was an increase (by 26.8% versus 2022) for the third year in a row.

The total volume of non-traffic and traffic revenue from standalone mobile voice service, provided to retail business subscribers, grew by 6.9% compared to 2022.

The analysis of the data shows that the slight increase recorded in 2023 in revenue from the provision of mobile voice service at retail level is the result of a growth in revenue from the provision of the service in bundle with other electronic communications services (by 2.7%). Non-traffic[20] and traffic revenue from the standalone provision of the retail service reported a drop (by

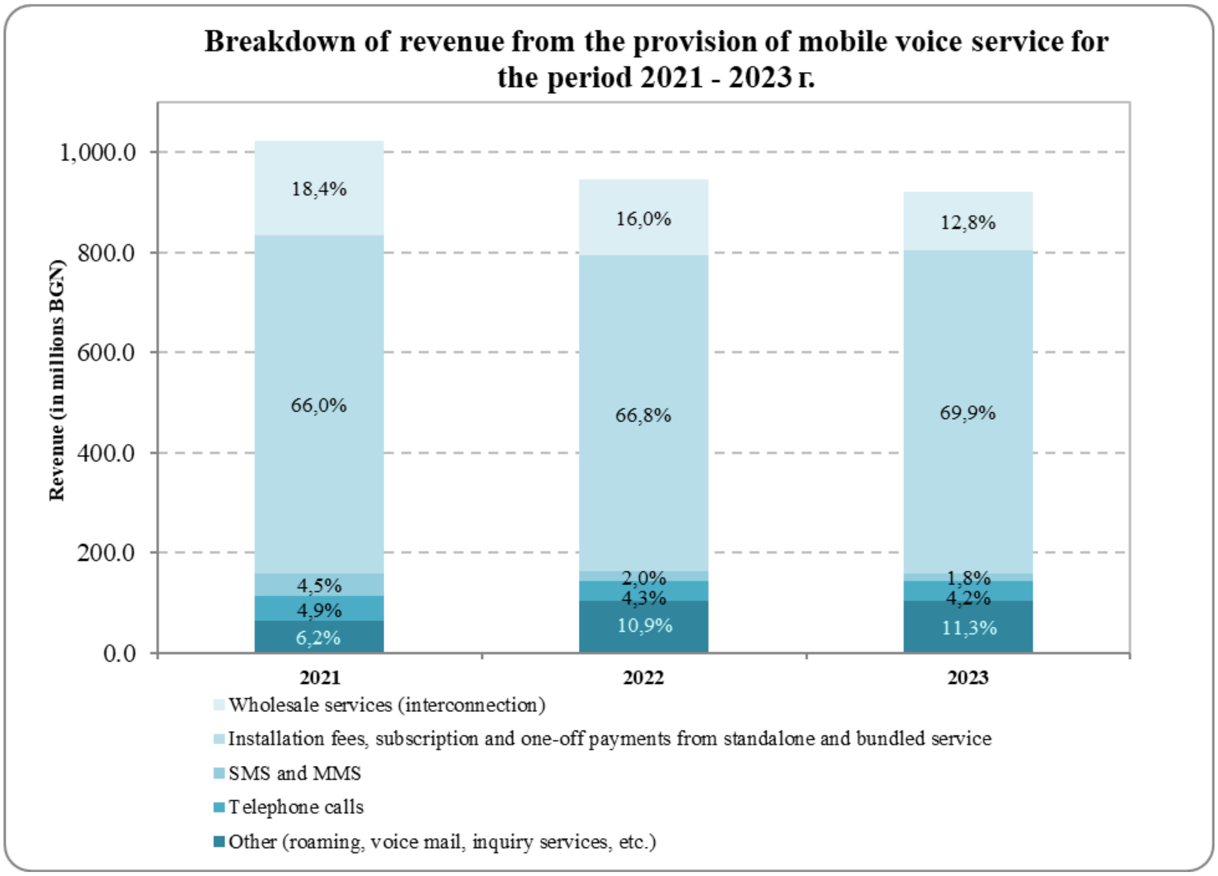
[20] Includes the following revenue from the standalone provision of mobile voice service: revenue from monthly subscription and installation fees, revenue from number portability, revenue from concluded contracts with applicants for short and/or non-geographic numbers (from one-off and regular/monthly payments) and other revenue from one-

3.6% for non-traffic revenue and by 1.8% for traffic revenue). The increase in revenue from the provision of mobile voice services in a package in 2023 was due to a growth in the indicator of Yettel and Vivacom. Although all three mobile undertakings raised the mobile plan rates in 2023 using their right to inflation indexation provided for in their General Terms and Conditions,[21] A1 saw a decrease in revenue from the provision of mobile voice service in a package in 2023. According to information provided by A1, the lack of growth in revenue from the bundled provision of mobile voice service is due to the fact that the consumption of mobile voice is continuously decreasing at the expense of consumption of mobile data (mobile Internet access) and this imbalance is also reflected in the breakdown of revenue from packages included in these services: the share of revenue from voice continues to drop at the expense of the share of revenue from mobile Internet.

The distribution (structure) of total revenue from mobile voice service by years, for the period 2021-2023, is shown in Figure 21. It clearly shows that the share of revenue from monthly subscription and installation fees from standalone and bundled provision of mobile voice continued to grow and remained the largest in 2023 as well (69.9%). The drop in the total volume of wholesale revenue reported for the second year in a row also led to a decrease of 3.2 percentage points in its share, which shrinks to 12.8%. The share of revenue from mobile calls (4.2%) registered a small decline - by 0.1 percentage points.

off payments for ancillary services (e.g. replacement of SIM card, issuance of itemised bills, changing telephone number, number by choice and other similar services).

[21] General Terms and Conditions governing the relations between mobile undertakings and subscribers and users of electronic communications services, which the undertakings issue on the basis of Art. 226 (1) of the Law on Electronic Communications (LEC).



Source: Data submitted to CRC

Figure 21

The share of revenue from SMS and MMS also fell slightly in 2023 (by 0.2 percentage points). The share of revenue from other services continued to increase in 2023 (by 0.4 percentage points) and reached 11.3% - this growth was provoked by the higher revenue which was reported by mobile undertakings from messages to short network numbers and from contracts concluded with applicants for short and non-geographic numbers.

Summary

Competition between the three undertakings providing mobile voice service in the country in 2023 is increasing, as a result of which there is a rearrangement of the market shares, calculated on the basis of the number of subscribers, that Yettel and Vivacom occupy in the segment: Vivacom moved Yettel from second to third position, and A1 continued to be the leader. The changes in market shares based on revenue from the provision of the service at retail level for 2023 also show that there is a fiercer competition between Vivacom and A1 for the second place, which the market share of A1 occupied in 2023 with a minimum lead of 0.5 percentage points over that of Vivacom. Yettel's market share remained the highest on the basis of retail revenue and continued to grow in 2023, giving it a lead of more than 10 percentage points over the other two players.

The growth in the number of mobile voice service subscribers continued in 2023, but at a slower pace than that observed in 2022. Despite the presence of a higher number of mobile voice service subscribers, the service consumption in 2023 decreased, and so did the total volume of revenue generated from it. Compared to the previous year 2022, the rate of decrease in revenue is slowing, as a result of the higher revenue from the provision of the service at retail level which was reported by mobile undertakings after the inflation indexation of the prices of monthly subscription plans in 2023.

The new, lower wholesale rates of voice call termination on mobile networks originating from European Union and European Economic Area (EU/EEA) countries that have been applied since 1 January 2023, combined with a lower volume of termination traffic, has led to a decline in the total revenue from the provision of wholesale mobile voice service for the second year in a row.

The increasingly favourable conditions for the use of mobile data and the so-called Over-The-Top (OTT) applications for calls and instant messages over the Internet are expected to continue to exert competitive pressure on the use of a traditional mobile voice service and to replace the consumption of roaming calls and SMS messages in the coming year.

3. Leased lines services

The leased lines segment, which includes retail lines services, including international leased lines and wholesale leased lines in 2023, is growing both in terms of generated revenue and number of leased lines. The total revenue from the provision of the service in 2023 amounted to BGN 23.170 million, registering an increase of 8.7% compared to revenue generated the year before (BGN 21.321 million).

Table 6 below presents a summary of the number of undertakings providing the "leased lines" service, the number of leased lines and the amount of revenue generated from them.

Table 6

Number of undertakings, number of lines and revenue by type of leased lines provided in 2023

Service	Number of undertakings providing the service in 2023	Number of leased lines as of 31.12.2023	Revenue in 2023 (in millions BGN, excl. VAT)
1. Wholesale leased lines	**18**	**2517**	**18,352**
1.1. National leased lines	18	1898	13,475
1.2. International leased lines	8	619	4,877
2. Retail leased lines	**9**	**1836**	**4,818**
Total	**21**	**///**	**23,170**

Source: *Data submitted to CRC*

In 2023, compared to 2022, a decrease was reported in absolute terms in revenue from retail leased lines by 0.8%, while revenue from wholesale leased lines was up by 11.5%.

Market players

The active undertakings in the segment under consideration in 2023 were 21 (out of 117 that are included in the Public Register of CRC as of 31.12.2023 with the intention to provide the "leased lines" service), or by 3 less than in 2022. Six of them provided the service both in the retail and in the wholesale market. Seven undertakings provided the "wholesale international leased lines" service.

Tables 7 and 8 present the market shares of the three leading undertakings in the retail/wholesale leased lines segment in 2023 based on the number of lines leased by them.

Table 7

Market shares of undertakings providing retail leased lines

Undertaking	2022		2023	
	Share based on number of retail leased lines	Share based on retail revenue	Share based on number of retail leased lines	Share based on retail revenue
VIVACOM BULGARIA EAD	72.2%	47.5%	71.5%	47.0%
A1 BULGARIA EAD	10.5%	18.6%	10.2%	18.6%
NETERRA EOOD	7.1%	5.6%	10.5%	8.8%
All other	10.1%	28.3%	7.8%	25.6%

Source: Data submitted to CRC

In 2023, the leading positions in terms of market share based on the number of retail lines were Vivacom, A1 and Neterra. During the reporting period, the total market share (92.2%) based on the number of retail lines of the three major undertakings rose by 2.4 percentage points compared to 2022, which is due to an increase of 3.4 percentage points for Neterra compared to the previous year. The share of Vivacom, the largest company by this indicator, dropped by 0.7 percentage points. In 2023, A1 was replaced from the second position by Neterra and its relative share fell by 0.3 percentage points to 10.2%. The total share of the three undertakings on the basis of retail revenue also grew by 3.2 percentage points, which is entirely due to the increased share of Neterra.

The relative share of the other undertakings providing retail leased lines decreased by 2.3 percentage points on the basis of number of lines and by 2.7 percentage points on the basis of revenue.

Table 8

Market shares of undertakings providing wholesale leased lines

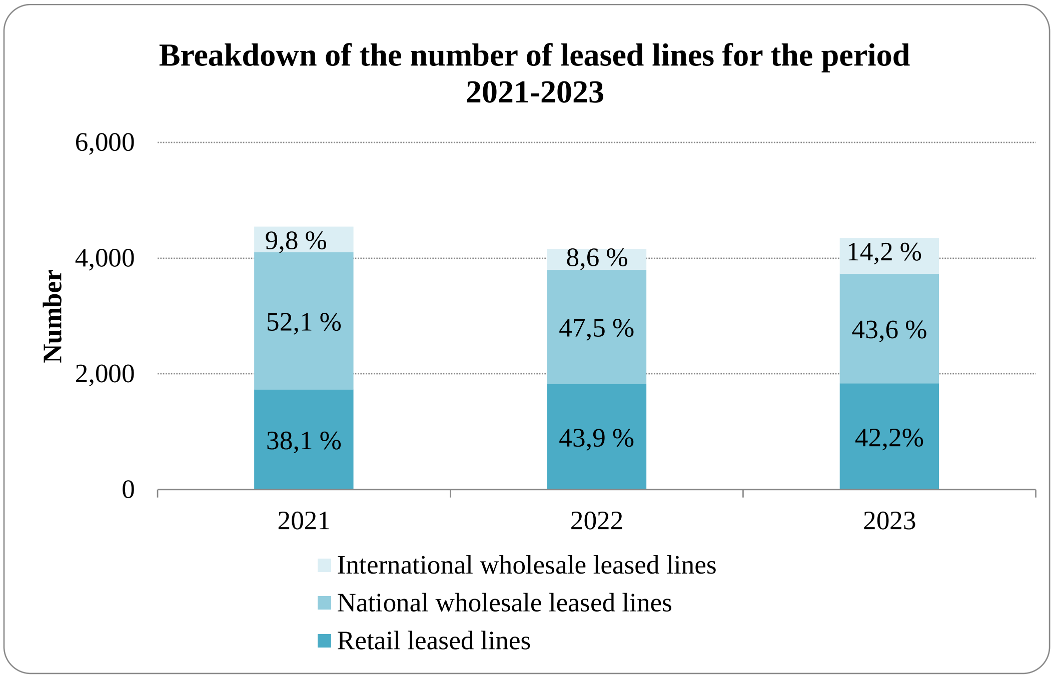
Undertaking	2022		2023	
	Share based on wholesale	Share based on wholesale	Share based on wholesale	Share based on wholesale
NOVATEL EOOD	19.2%	28.9%	16.5%	26.4%
NETERRA EOOD	17.9%	13.6%	27.1%	17.7%
VIVACOM BULGARIA EAD	9.8%	15.7%	16.3%	21.4%
All other	53.1%	41.8%	40.1%	34.5%

Source: Data submitted to CRC

In 2023, there was a shift in the positions of the first three undertakings by the number of wholesale leased lines provided compared to 2022. The third most important undertaking in the wholesale market in the leased lines segment is now Vivacom, with an increased market share of 6.5 percentage points, which replaced Cetin Bulgaria EAD (Cetin) (a market share of 12.4% in 2023, compared to 17.6 for 2022, or a decrease of 5.2 percentage points). The total market share (59.9%) based on the number of wholesale lines of the three major undertakings increased significantly – 13 percentage points. The increase is due to both the growth in the market share of Vivacom as a result of the merging of Telnet OOD (Telnet) into the incumbent undertaking in 2023 and the increased share of Neterra by 9.2 percentage points. On the basis of wholesale revenue, an increase of 7.3 percentage points was recorded in the total share of the three undertakings.

Number of wholesale and retail leased lines

According to data provided by the undertakings, the number of retail and wholesale leased lines in 2023 increased by 0.6% and 7.9% respectively, compared to the previous year. The breakdown of leased lines is displayed in Figure 22.

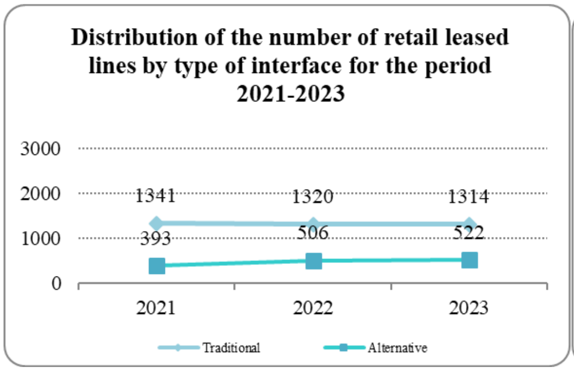


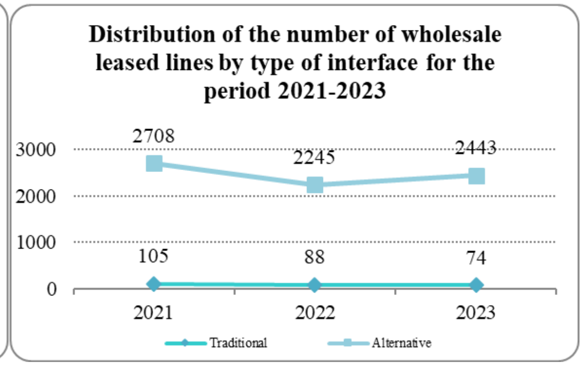
Source: Data submitted to CRC

Figure 22

In 2023, the national wholesale leased lines held the highest relative share again, although their share dropped by 3.9 percentage points compared to 2022. The relative share of retail lines in the total number of leased lines in that reporting period fell by 1.7 percentage points. A significant growth – 5.6 percentage points - was reported in international wholesale leased lines, which is due to the increase in absolute value of this type of lines by 72.9%.

The following two figures display the breakdown of the number of wholesale and retail leased lines, according to the type of interface used, for the period 2021-2023.





Source: Data submitted to CRC

Figure 23

Source: Data submitted to CRC

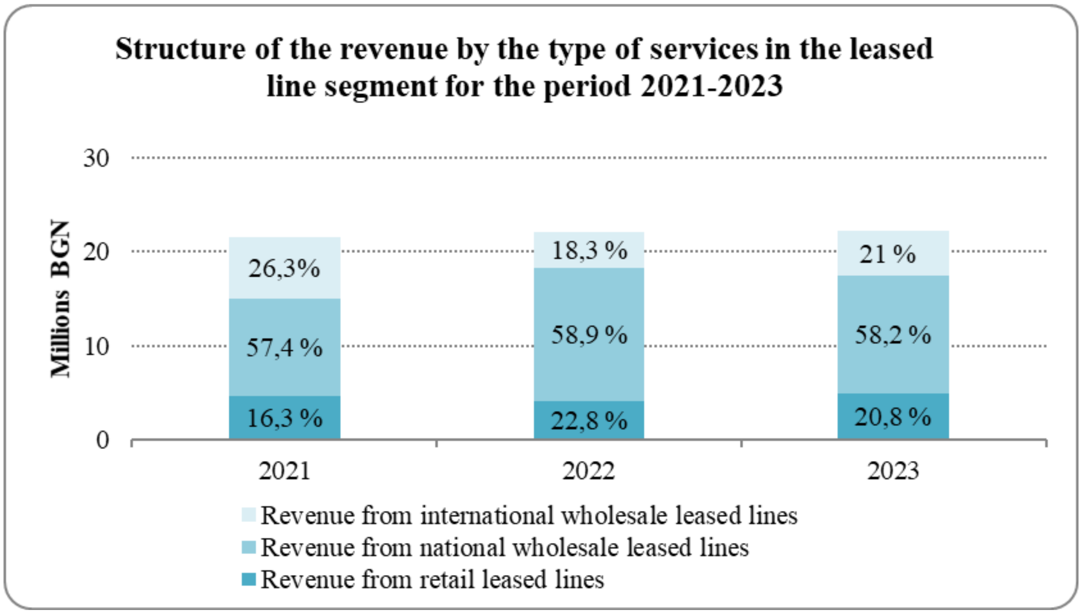
Figure 24

As shown in Figure 23, in 2023, there was a slight decrease in traditional retail leased lines of 0.5%, while alternative lines rose by 3.2%. The alternative retail leased lines provided held a lower relative share in the total number of retail lines.

The data on the interfaces used for the wholesale leased lines (Figure 24) show a reverse trend in terms of their relative shares. The alternative lines held a larger share - 97.6%, while the traditional lines accounted for as little as 2.4%. In 2023, there was a decline in traditional wholesale leased lines from 15.9% compared to 2022, while alternative lines grew by 8.8% over the same period.

Revenue from leased lines

Figure 25 presents the structure of revenue generated from the provision of leased lines services (wholesale and retail) for the period 2021-2023.



Source: Data submitted to CRC

Figure 25

In 2023, there was a significant increase in revenue from international wholesale leased lines (by 24.8% compared to the year before) as well as an increase in revenue from wholesale leased lines by 11.5%.

Summary

In 2023, the leased lines services segment registered the following trends:

- The number of undertakings providing the leased lines service continued to decline;
- A growth in the market volume of 8.7% was reported compared to the previous reporting period which is due to an increase in revenue from the provision of wholesale leased lines;
- The upward trend in the number of retail leased lines continued, although at a slower pace – 0.6% (compared to 5.3% for 2022), while at the same time there was a growth of 7.9% compared to 2022 (for the previous reporting period 2021-2022, there was a decrease of 11.6%) in the number of wholesale leased lines;
- The trend with regard to the interfaces used for wholesale and retail lines continues. While the relative share of alternative wholesale leased lines was higher than the relative share of traditional lines, this trend was reversed for retail leased lines;
- The market share for retail leased lines, calculated on the basis of the number of lines of two of the leading undertakings – Vivacom and A1 - remained almost unchanged, while the second undertaking, Neterra, reported a growth of 3.3 percentage points. The market share of the other undertakings fell by 2.3 percentage points.
- For wholesale leased lines, Vivacom is already among the first three undertakings, with a market share of 16.3% (an increase of 6.5 percentage points compared to the previous

reporting period), calculated on the basis of the number of wholesale lines, thus replacing Cetin. The other two undertakings (Neterra and Novatel EOOD) retained their positions.

4. Data transfer and Internet access

In 2023, the total volume of revenue generated from the services included in the "data transfer and Internet access" segment was BGN 1,953.036 million, with a reported increase of 16.7% compared to the previous year 2022.[22]

Table 9 presents summarised information about the number of undertakings which provided services in this market segment in 2023 as well as about the number of their subscribers/users and the revenue generated from them.

Table 9

Number of undertakings, subscribers/users and revenue by type of Internet access and data transfer services provided in 2023

Service	Number of undertakings, providing the service in 2023	Number of subscribers/users as of 31.12.2023		Revenue (in millions BGN, excl. VAT)	
		Total[1]	incl. bundled services subscribers	Total[2]	incl. revenue from bundled services
1. Retail Internet access and data transfer services	**656**	///	///	**1 680,680**	**1 092,815**
1.1. Internet access[3], incl.:	646	9 695 517	6 854 892	1 621,160	1 092,815
1.1.1. fixed	646	2 512 617	861 652	426,941	114,070
1.1.2. mobile[4]	3	7 201 768	6 012 108	1 194,220	978,745
1.2. Data transfer services	56	1 150 375	///	56,623	///
1.3. Other services (hosting, e-mail, etc.)	18	4 790	///	2,897	///
2. Wholesale services	**142**	///	///	**272,356**	**///**
2.1. Provision of capacity for Internet connectivity (Peering and Transit)	98	929	///	29,189	///
2.2. Data transfer services	28	516	///	15,816	///
2.3. Wholesale provision of Internet access via NGA networks	49	374	///	10,247	///
2.4. Other wholesale services	12	35	///	217,104	///
Total	**700**	///	///	**1 953,036**	///

[1] Including subscribers of bundled services.
[2] Including revenue from bundled services.
[3] The data on the total number of subscribers to and revenue from Internet access services have been obtained on the basis of data received by CRC from 89.2% of the registered undertakings.
[4] Including mobile access via data cards or modem and bundled services with mobile Internet access included (including subscribers to data transfer packages purchased in addition to voice plans via 3G, 4G and 5G UMTS/HSPA+/LTE+/NR (5G) mobile networks).

Source: Data submitted to CRC

[22] The data for 2022 have been updated, as segment revenue for 2022 amounted to BGN 1,673.694 million.

Market players

The number of undertakings actually providing services for Internet access and data transfer in 2023 was 700,[23] down by 2 undertakings compared to 2022.[24] The number of undertakings providing retail services in 2023 was by 4 less than in 2022, [25] falling to 656. The number of undertakings providing wholesale services decreased by 2 over the one-year period, as in 2023, wholesale services were provided by 142 undertakings.

The main providers of fixed Internet access for end-users (retail service), both in the previous year and in 2023, were Vivacom, A1 and Bulsatcom.

Table 10

Market shares of undertakings providing fixed Internet access at retail level

Undertaking	2022		2023	
	Share based on number of fixed access subscribers[1]	Share based on revenue from fixed access[2]	Share based on number of fixed access subscribers[1]	Share based on revenue from fixed access[2]
VIVACOM BULGARIA EAD	31,3%	22,1%	32,2%	28,8%
A1 BULGARIA EAD	27,8%	20,4%	28,4%	23,2%
BULSATCOM EAD	6,2%	5,1%	5,4%	3,9%
All other	34,6%	52,3%	33,9%	44,0%

[1] Including subscribers of bundled services.

[2] Including revenue from bundled services

Source: Data submitted to CRC

Vivacom remained the market leader based on the number of subscribers of the market segment of fixed Internet access at retail level in 2023. The undertaking increased its market share by 0.9 percentage points based on the number of subscribers compared to the previous year, reaching 32.2%. A1 retained the second position, increasing its market share by 0.6 percentage points compared to 2022 and covering 28.4% of fixed Internet access subscribers. Bulsatcom retained the negative trend of previous years towards reduction of its market share based on the number of subscribers, with the reported decline amounting to 0.8 percentage points. In the market share of undertakings based on revenue from fixed Internet access at retail level, including the share of revenue from the provision of fixed Internet access bundled with other electronic communications services, Vivacom and A1 recorded an increase of 6.7 and 2.8 percentage points respectively, while Bulsatcom registered another fall in its share on the basis of revenue from fixed access of 1.2 percentage points compared to 2022. The undertakings classified as "All other"[26] also

[23] Including undertakings that notified CRC for suspension of their activity in 2023 and declared revenue during the year.
[24] The data for 2022 have been updated.
[25] The data for 2022 have been updated.
[26] This includes all undertakings ranked outside the top three undertakings with the highest market share based on the number of subscribers and revenue from fixed Internet access.

saw a decline in both indicators, with the share of subscribers down by 0.7 percentage points, and the market share based on revenue decreased by 8.3 percentage points over a one-year period.

In 2023, the acquisition of Networx-Bulgaria EOOD (Networx-Bulgaria), Online Direct EOOD (Online Direct), TVN Distribution Bulgaria EOOD (TVN Distribution), and Telnet by Vivacom was finally approved by a decision of CPC.[27] Networx-Bulgaria is the fourth largest undertaking in this market segment with a share of 3.1% based on the number of subscribers of fixed Internet access as of 31.12.2023, and the third largest based on revenue from providing the service with a share of 5.1%. In this regard, Vivacom's calculated aggregate share would be 35.1% based on the number of subscribers and almost 34% based on revenue. It is expected that, following the acquisitions and mergers made in 2023, Vivacom will strengthen its positions in the following year.

In addition, the transaction approved by CPC at the beginning of 2024, according to which United Group Bulgaria EOOD, which controls Vivacom, is allowed to acquire direct sole control over Viva Corporate Bulgaria EOOD and indirect sole control over Bulsatcom, will also have an impact. This transaction is expected to affect the market positions of Internet providers in Bulgaria, given that Bulsatcom is the third among undertakings providing fixed Internet access at retail level.

In 2023, mobile Internet access was again provided by 3 undertakings – A1, Vivacom, and Yettel. Table 11 presents their shares in the provision of mobile Internet in 2022 and 2023.

Table 11

Market shares of undertakings providing retail mobile Internet access

Undertaking	2022		2023	
	Share based on number of mobile access subscribers[1]	Share based on revenue from mobile access[2]	Share based on number of mobile access subscribers[1]	Share based on revenue from mobile access[2]
VIVACOM BULGARIA	36,0%	30,0%	36,3%	29,4%
A1 BULGARIA	32,6%	38,6%	32,7%	39,8%
YETTEL BULGARIA	31,5%	31,4%	31,0%	30,8%

[1] Including subscribers to standalone service via data cards or modem, and bundled service subscribers, including a certain amount of data traffic at maximum speed and/or volume of data traffic per month.

[2] Including revenue from standalone service via data cards or modem, revenue from traffic, and the part of revenue from the provision of mobile Internet in a bundle with other electronic communications services.

Source: Data submitted to CRC

According to the data presented in the table, in 2023, there was no change in the positions of undertakings providing mobile Internet access at retail level compared to the previous year 2022. The market share on the basis of the number of subscribers remained almost unchanged for all three undertakings compared to 2022, with a slight increase for Vivacom and A1 by 0.3 and 0.1 percentage points respectively, and a decrease of 0.4 percentage points in the share of Yettel. Market shares calculated on the basis of revenue from the provision of mobile Internet access did nor register any changes in the positions as well. As in 2022, Vivacom reported a decline by 0.6

[27] Decision No AKT-633/29.06.2023 (https://reg.cpc.bg/Decision.aspx?DecID=300065234).

percentage points in 2023. Unlike in 2022, when a growth was recorded, in 2023, Yettel reported the same decline as Vivacom – by 0.6 percentage points. In 2023, as in 2022, A1 remained the undertaking with the largest market share based on revenue, growing by 1.1 percentage points.

Subscribers of Internet access services

As of 31.12.2023, the total number of subscribers of retail Internet services (fixed and mobile Internet access) reached 9.696 million, up by 3.6%, as the growth rate is slowing down compared to previous reporting periods. The upward trend in the number of subscribers of bundled services (with fixed and/or mobile Internet access included) was maintained in 2023 as well. A growth of 3.1% was registered in absolute terms last year, with the number of subscribers reaching 6.855 million. The share of subscribers of bundled services in the total number of subscribers[28] remained unchanged compared to the previous year, and it was 71% in 2023.

The total number of subscribers to fixed Internet access (including services provided in a bundle) grew by 5.3%, reaching 2.513 million in the past year. In addition to the growth in the total number of subscribers to fixed Internet access, an increase was also observed in the number of subscribers to fixed access provided in a bundle - by 4.3%. The share of fixed access subscribers in the total number of Internet access subscribers registered an increase of 0.4 percentage points compared to the previous year[29] to reach 25.9%.

In 2023, the total number of subscribers using mobile Internet access services[30] reached 7.202 million, with a growth of 2.8% compared to the previous year. Subscribers to mobile Internet access in a bundle saw a similar increase of 2.7% and, at the end of 2023, their number reached 6.012 million (to compare with, the growth in 2022 versus 2021 was by 4.2%). Unlike the previous year when there was a slight decrease in the number of subscribers using the service standalone (via data cards and/or modem), in 2023, there was a growth of 3.3% and these subscribers reached 1.190 million. The share of subscribers to mobile Internet access via LTE in the total number of subscribers to mobile Internet access was 70.7%, registering a slight decrease of 1.8 percentage points compared to the previous year. As of 31.12.2023, the total number of 5G subscribers in Bulgaria amounted to 1.36 million, with a significant increase of more than two and a half times compared to the declared data for 2022. The significant growth in the number of 5G subscribers also affected their share in the total number of subscribers to mobile Internet access, as this share rose by 11.5 percentage points to 18.9% over the one-year period. The consumption of the service also increased significantly compared to the previous one-year period. The total traffic on 5G networks in 2023 grew more than 4 times compared to 2022, and the estimated average monthly traffic on 5G networks generated by a single subscriber nearly doubled, reaching 16.8 GB in 2023.

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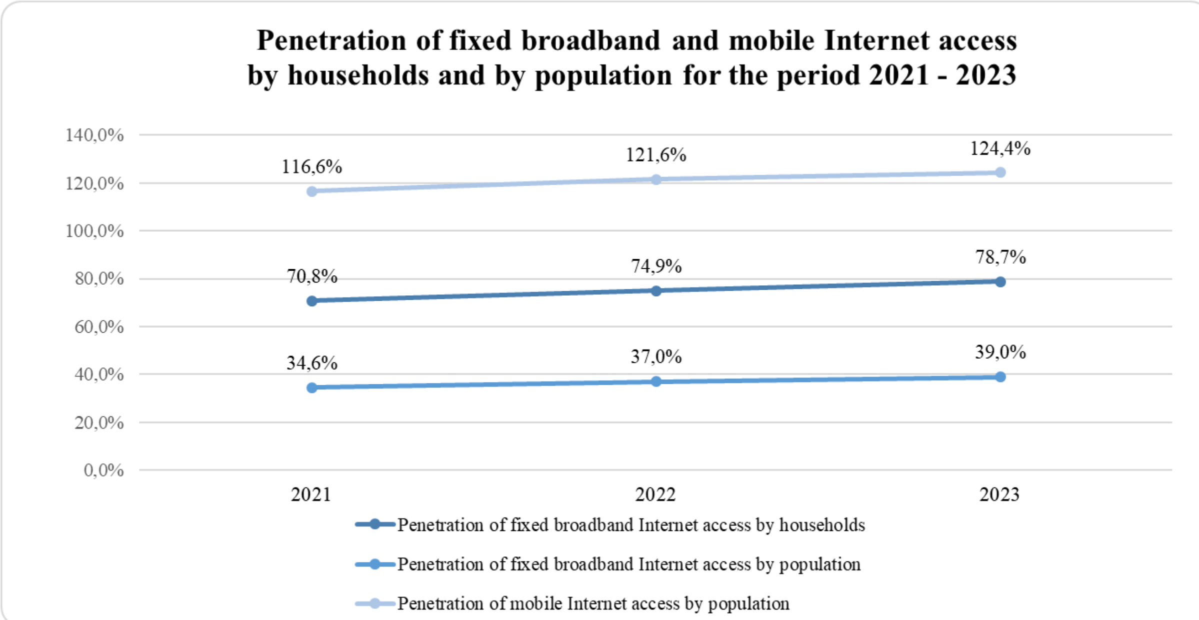
[28] In order to avoid duplication, subscribers of bundled services with both fixed and mobile Internet access are excluded from the total number of Internet access subscribers.
[29]The data for 2022 have been updated.
[30] Standalone service via data cards or modems and bundled services with mobile Internet access included, via 3G, 4G and 5G UMTS/HSPA+/LTE+/NR (5G) mobile networks. (including data transfer packages purchased in addition to voice plans).

Figure 26 presents penetration of fixed broadband Internet access by population[31] and by households[32] as well as of mobile access[33] by population for the period 2021 - 2023.



Source: Data submitted to CRC

Figure 26

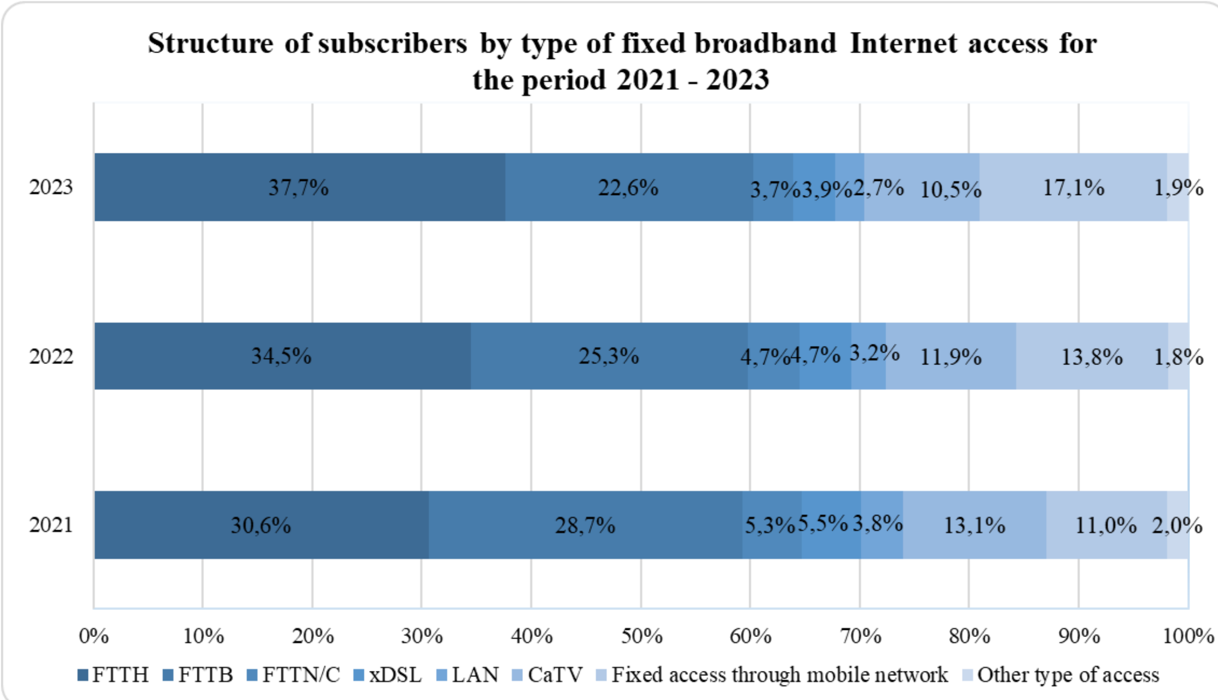
The indicators "penetration of fixed broadband Internet access by households", "penetration of fixed broadband Internet access by population" and "penetration of mobile Internet access by population" again registered an increase from the previous year by 3.8; 2 and 2.8 percentage points, respectively.

The breakdown of subscribers by type of fixed Internet access for the period 2021 - 2023 is shown in Figure 27.

[31] This indicator was calculated as the ratio between the number of subscribers of fixed access as of 31.12.2023 and the number of population as of 31.12.2023, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2023_ZYBLHGJ.pdf).

[32] The indicator was calculated as the ratio between the number of residential subscribers of fixed access as of 31.12.2023 and the final data on the number of households as of 07.09.2021, published by NSI (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_Households.pdf).

[33] These include: subscribers of bundled services with mobile Internet access included (including subscribers of data transfer bundles purchased in addition to voice plans), subscribers of stand-alone services via data cards or modems, as well as subscribers of mobile Internet access services provided without an individual subscription. This indicator was calculated as the ratio between the number of subscribers to fixed access as of 31.12.2022 and the number of population as of 31.12.2023, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2023_ZYBLHGJ.pdf).



Source: Data submitted to CRC

Figure 27

At the end of 2023, the majority of subscribers to fixed Internet access in Bulgaria used mainly access via fibre-optical networks (FTTH,[34] FTTB and FTTN/C) – 63.9%, registering a slight drop by 0.6 percentage points versus 2022.[35] This is mainly due to the strong growth of subscribers to fixed access through mobile networks reported in the last three years (from a share of 11% in the total number of fixed access subscribers in 2021 to 17.1% at the end of 2023). The trend towards increase in the share of FTTH access subscribers, at the expense of the shares of FTTB and FTTN/C access subscribers, was preserved. In absolute terms, the number of subscribers using access via fibre-optical networks continued to increase, although at a slower pace - by 4.3% over the one-year period and by 10.2% compared to 2021.

With their 37.7% share, FTTH access subscribers confirmed the leadership position they have been holding over the last three years ahead of FTTB (a share of 22.6%) in the structure of fixed broadband Internet access subscribers; the growth they registered was by 3.2 percentage points. Compared to the end of the previous year, the number of subscribers to this type of access grew by 15.1%, and for the period 2021 - 2023, the increase was by 37.2%.

Both in the previous and in this reporting period, fixed access through mobile networks occupied third position with a share of subscribers of 17.1% in the total number of fixed broadband access subscribers. In 2023, the share of subscribers using fixed access through mobile network rose by 3.3 percentage points and, for the period 2021 - 2023, the registered growth was by 6.1 percentage points. Compared to 2022, subscribers to this type of access increased by 30.4% in absolute terms, and compared to 2021, a growth of as much as 73.7% was recorded. The main

[34] Includes FTTH and FTTx bitstream access subscribers.

[35] The data for 2022 have been updated. Subscribers to fixed access through mobile networks are excluded from the total number of subscribers to Internet access via "other type of access" and are allocated to a separate access category.

reason for this significant growth is rooted both in the widespread coverage of LTE networks nationwide and in the ongoing large-scale deployment of 5G NR networks.

The fourth place was occupied by CATV access subscribers (based on transmission and/or distribution of radio and TV programmes networks and DOCSIS standard), as they registered a decline for the third year in a row - by 1.4 percentage points versus 2022. The CATV subscribers using the DOCSIS 3.0 protocol through which the maximum speed to the subscriber may reach up to 200 Mbps increased by 0.1 percentage points, to arrive at 98.8% of the total number of CATV access subscribers.

The downward trend in the subscribers of xDSL access, provided only by Vivacom Bulgaria, continued in 2023 as well. Compared to the end of the previous year, the number of subscribers of that type of access dropped by 13.7% in absolute terms, and for the period 2021 - 2023, the decline was by 21.2%. At the end of the reporting period, the share of xDSL access subscribers in the total number of subscribers of the undertaking was 12.0%, or by 3.0 percentage points less than the year before. Subscribers using VDSL[36] decreased by 1.1 percentage points from 2022 to 6.7% in the total number of subscribers of the undertaking. The migration of subscribers to optical access in Vivacom Bulgaria also continued, with an increase of 9.2% registered in the number of subscribers using fibre-optical networks over the one-year period. At the end of the reporting period, the share of optical access subscribers in the total number of subscribers of the undertaking reached 67.0%, compared to 66.4% at the end of 2022.

In 2023, the share of LAN[37] access subscribers continued to decline, reaching 2.7% of the total number of fixed broadband access subscribers, with a registered drop of 0.5 percentage points. The share of subscribers to "Other type of access"[38] in 2023[39] was 1.9%, registering a slight increase of less than 0.1 percentage points compared to the previous year. The largest share in the total number of subscribers of "Other type of access" was held by RLAN access with a share of 80.3%, followed by access via leased lines and dedicated access with 17.6%, and access via satellite networks with 2.1%, respectively.

At the end of 2023, the number of fixed broadband access subscribers using high-speed access via NGA networks reached 94.9%[40] of the total number of fixed broadband Internet access subscribers, with their share up by 1.1 percentage points compared to the end of 2022.[41] As a result of this upward development, the speed of Internet services offered is also increasing. The figure below presents the breakdown of the number of subscribers to fixed broadband Internet access according to the international download speed[42] for the three-year period 2021 - 2023.

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[36] VDSL subscribers are included in the total number of subscribers to Internet access via xDSL technology.

[37] The data for 2022 have been updated.

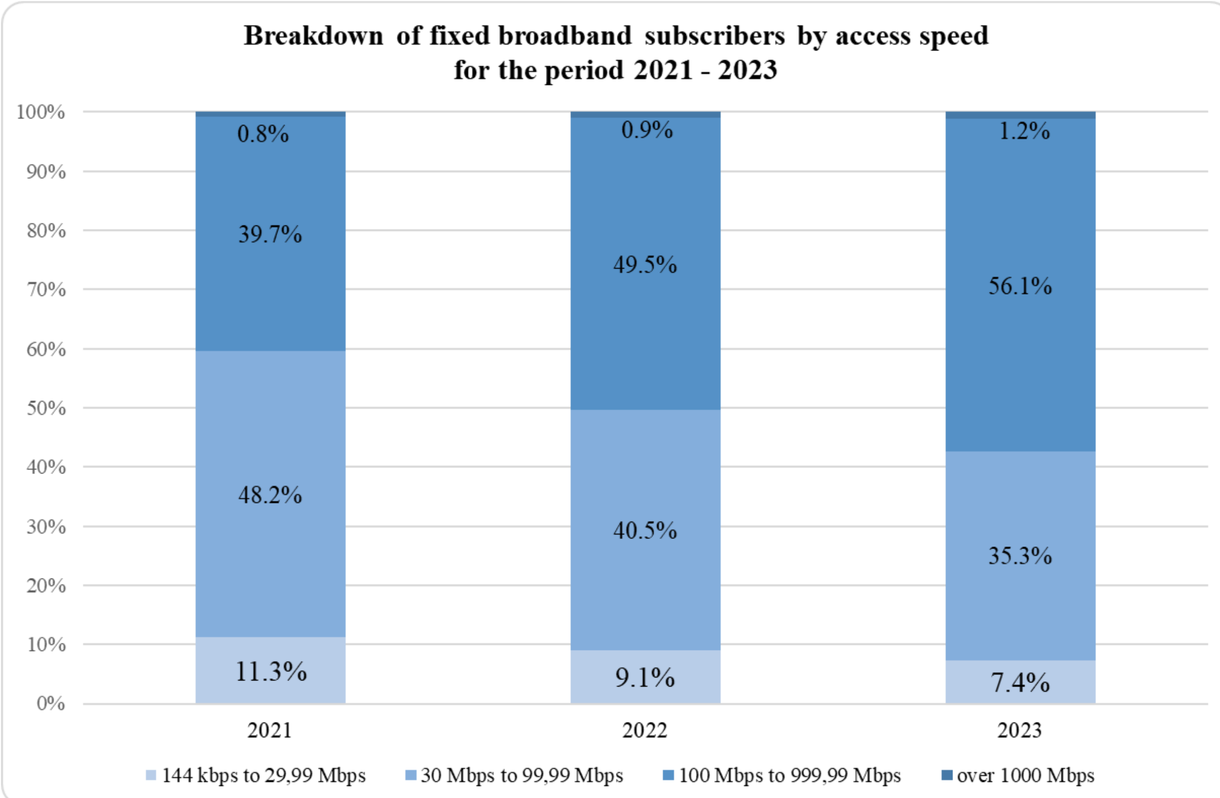
[38] Subscribers to fixed access through mobile networks are excluded from the total number of subscribers to Internet access via "Other type of access" and are allocated to a separate category of access. As of 2022, 'other type of access' includes the following types of access: RLAN access, access via satellite networks, and access via leased lines and dedicated access. The data for the previous years have been updated.

[39] The data for 2022 have been updated.

[40] Including subscribers to optical networks (FTTB, FTTH and FTTx bitstream access), cable networks according to DOCSIS 3.0 standard, and hybrid fibre-optical networks (FTTN/C with a minimum speed of 30 Mbps), LAN and RLAN access with a minimum speed of 30 Mbps, VDSL access, satellite access with a minimum speed of 30 Mbps, access via leased lines and dedicated access with a minimum speed 30 Mbps, as well as fixed access through mobile networks with a minimum speed of 30 Mbps.

[41] The data for 2022 have been updated.

[42] The data for 2022 have been updated.



Source: Data submitted to CRC

Figure 28

The number of subscribers using Internet access at a minimum speed of 30 Mbps continued to increase in 2023 as a result of the growing number of subscribers using optical connectivity, DOCSIS 3.0 cable access protocol and fixed access through mobile networks. At the end of 2023, 92.6% of subscribers use a minimum speed of 30 Mbps, the reported increase being 1.7 percentage points compared to 2022. For the second consecutive year, in the structure of subscribers distributed by speed intervals, the leadership position was occupied by users of ultra-high-speed access (at least 100 Mbps) with a share of 57.3%. The reported growth was by 6.9 percentage points compared to 2022. The lowest share, but the highest growth in absolute terms were reported by subscribers who used speeds of 1000 Mbps and above. Their share in the total number of subscribers increased by 0.3 percentage points over the one-year period and reached 1.2% of the total number of fixed broadband access subscribers.

The relative share of subscribers who used high-speed access with international download speed from 30 Mbps to 99.99 Mbps decreased to 35.3% at the end of 2023, with a registered decline of 5.2 percentage points. They are followed by subscribers using speeds up to 29.99 Mbps whose share was reduced to 7.4%.

As stated, the highest growth in absolute terms compared to 2022 was observed in subscribers of speeds of 1000 Mbps and above, as they increased by more than 40% over the one-year period. The number of broadband access subscribers using speeds ranging from 100 to 999.99 Mbps also reported an increase. Compared to 2022, 19.4% more subscribers used access in this speed range. Over the one-year period, there was an 8.3% drop in absolute terms in the number of subscribers using speeds from 30 to 99.99 Mbps, whereas subscribers using speeds up to 29.99 Mbps experienced a decline of 14.8%.

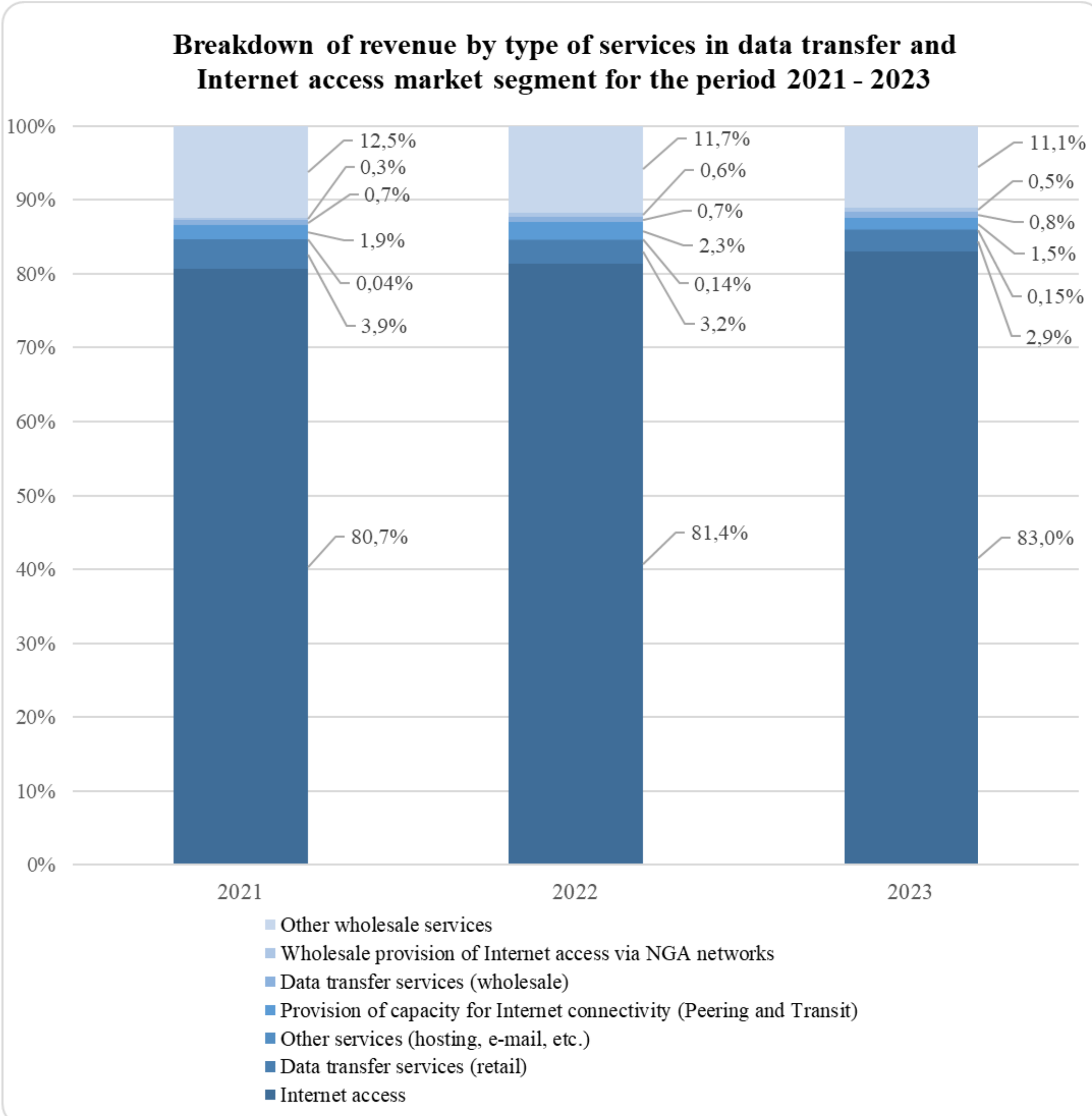
Revenue from data transfer and Internet access

In 2023, compared to 2022,[43] revenue[44] from the data transfer and Internet access segment reached BGN 1,953.036 million. The registered increase of 16.7% compared to the 2022 data was mainly due to the increased revenue from retail services which reported a growth of 18.6%. The total amount of revenue from retail services was BGN 1,680.680 million, 96.5% of which was revenue from Internet access services (BGN 1,621.160 million). Revenue from wholesale services amounted to BGN 272.356 million, preserving its upward rate since 2019. The total amount of revenue from retail services accounted for 86.1% of the revenue from the data transfer and Internet access segment, while that from wholesale services made up 13.9%.

Figure 29 presents the breakdown of revenue generated for the period 2021 - 2023.

[43] The data for 2022 have been updated.

[44] Including revenue from standalone services for retail fixed and mobile Internet access, retail data transfer services and wholesale services (capacity for Internet connectivity, wholesale access services, wholesale provision of Internet access via next-generation access (NGA) networks, wholesale data transfer services and revenue from Internet access (fixed and mobile) provided bundled with other electronic communication services.



Source: Data submitted to CRC

Figure 29

In 2023, there was no significant change in the overall revenue structure in the segment. The highest relative share (83.0%) continued to be held by revenue from retail Internet access services which recorded an increase of 19.1% absolute terms in the past year compared to 2022. Traditionally, the total revenue from the provision of mobile Internet access continued to grow, with the rate of change decreasing over the one-year period compared to the 2022 data, as the registered increase was 17.2%. Revenue from the provision of fixed Internet access at retail level rose by 24.8% compared to the 2022 data. A growth of 24.7% compared to 2022 was reported in revenue from bundled services related to the mobile Internet access[45] service, and for the period

[45] The part of revenue relating to mobile Internet access included in the package.

2021 - 2023, this revenue increased by 61.2%. In the revenue from bundled services related to fixed Internet access,[46] the growth was 29.9% for the one-year period and 66.1% compared to 2021.

Summary

The trends observed in the data transfer and Internet access segment in recent years have largely remained the same in the past year 2023. Compared to 2022, the following was reported:

- The total number of subscribers to fixed and mobile Internet access continued to grow;
- The share of subscribers using ultra-high-speed Internet access,[47] including those who use gigabit speeds, in the total number of fixed Internet access subscribers, is increasing due to the ongoing migration to NGA networks;
- The share of FTTH access subscribers in the total number of fixed Internet access subscribers is increasing;
- There was an increase in the share of subscribers to fixed access through mobile networks in the total number of subscribers to fixed Internet access, both due to the wide national coverage of LTE networks and to the continued deployment of 5G NR networks;
- The number of 5G subscribers and their share in the total number of mobile Internet access subscribers is significantly increasing;
- A growth was again reported in the total volume of revenue in this segment;
- Following the above-mentioned acquisition and merger transactions carried out by Vivacom in 2023, the undertaking's position in the market segment of retail fixed Internet access grew stronger, and this is expected to continue in the following year;
- There was no shift in the positions of undertakings providing retail mobile Internet access by market shares based on the number of subscribers and revenue. For all three undertakings, market shares reported minor changes compared to the previous year.

5. Transmission and/or distribution of radio and TV programmes services

In 2023, the volume of the "transmission and/or distribution of radio and TV programmes services" market segment reached BGN 541.424 million, registering a growth of 14.2% since 2022.[48]

Summarised information on the number of undertakings that provided transmission and/or distribution of radio and/or TV programmes services, the number of their subscribers/users, and on the volume of revenue generated from them, along with the structure of the segment, is presented in Table 12 and in Figure 30.

[46] The part of revenue relating to fixed Internet access included in the package.
[47] With download speed from the international space at least 100 Mbps.
[48] The data for 2022 have been updated.

Table 12

Number of undertakings, number of subscribers/users and revenue by type of transmission and/or distribution of radio and TV programmes services in the segment provided in 2023

Service	Number of undertakings providing the service in 2023	Number of subscribers/users as of 31.12.2023		Revenue (in millions BGN excl. VAT)	
		Total[1]	incl. bundled services subscribers	Total[2]	incl. from bundled services[3]
1. Retail distribution of radio and TV programmes services[3]	**250**	**2,006,407**	**851,606**	**501.991**	**193.521**
1.1. Cable TV[4]	207	432,194	252,332	102.546	60.908
1.2. Satellite TV[4]	4	693,007	97,843	182.061	24.256
1.3. IPTV[4]	84	881,206	501,431	217.384	108.356
2. Terrestrial broadcasting of radio and TV programmes	**54**	///	///	///	///
3. Transmission and/or distribution of radio and TV programmes	**13**	///	///	**39.433**	///
3.1. Transmission of radio and TV programmes services	7	///	///	3.558	///
3.2. Distribution of radio and TV progrrames services, incl wholesale service (via IPTV and/or DVB-C method	9	///	///	35.875	///
Total	///	///	///	**541.424**	///

[1] Including subscribers of bundled services.

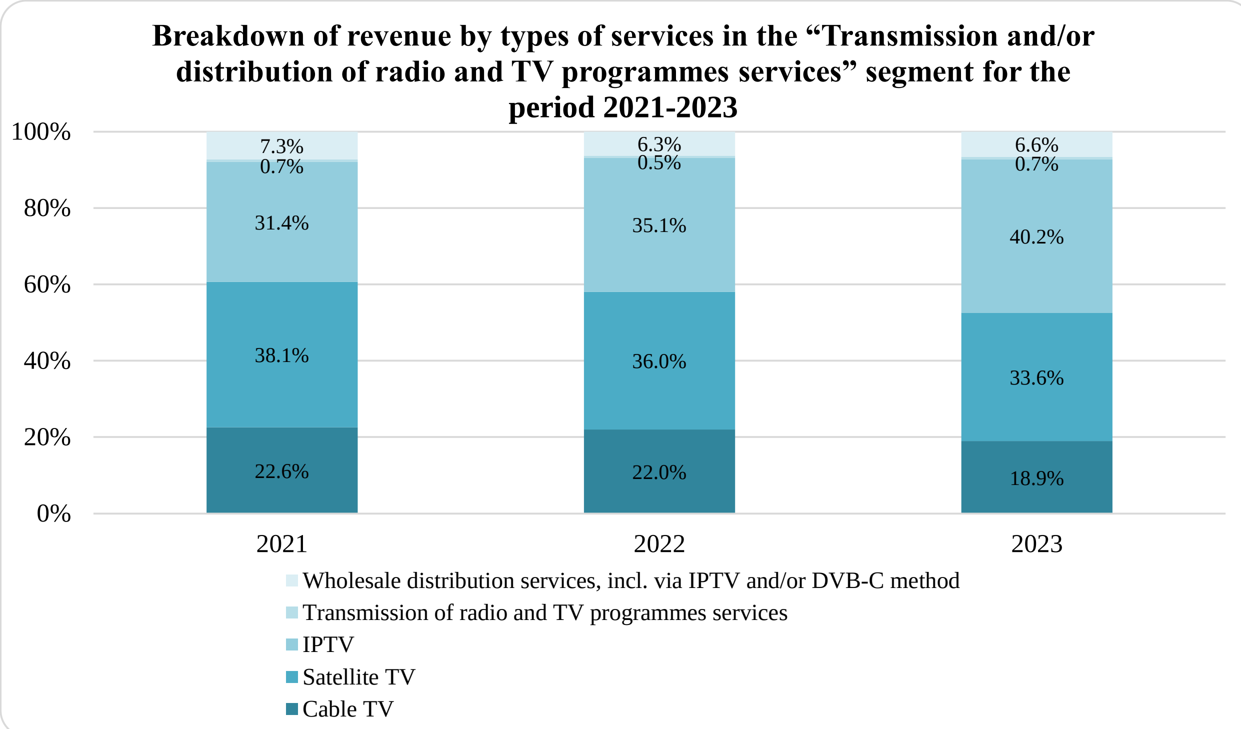
[2] Including revenue from bundled services.

[3] Revenue from bundled services by TV platforms was measured on the basis of the distribution of subscribers of bundled services by platforms.

[4] The data on the total number of subscribers and the revenue from retail distribution of radio and TV programmes is valid as of 25.04.2024 on the basis of information received from 91% of registered undertakings.

Source: Data submitted to CRC

According to the data submitted by the undertakings, in 2023, a growth was registered by revenue from all services included in the segment, with the exception of cable TV revenue which decreased by 1.7% compared to 2022. The revenue generated from the rest of the services in the segment increased over the one-year period considered, with the biggest growth recorded in the revenue from wholesale transmission of radio and TV programmes services – 39.3%, followed by the revenue from IPTV with 30.7%. Revenue from wholesale distribution of radio and TV programmes services, including wholesale services via IPTV and/or DVB/C method, increased by nearly 20% year-on-year. An increase was also observed in the amount of revenue from satellite television – by 6.6% compared to 2022.



Source: Data submitted to CRC

Figure 30

In 2023, the largest share in the total volume of the segment (92.7%) continued to be occupied by revenue from the provision of retail radio and TV programmes services (Figure 30): cable television, satellite television and IPTV. In 2023, revenue from IPTV continued its upward development and already occupies the highest share in the total volume of the segment, as this share grew by more than 5 percentage points over the one-year period in relative terms to arrive at 40.2%. The share of revenue from satellite TV ranked second, as it declined by 2.4 percentage points to 33.6%, followed by that of cable TV revenue which fell to 18.9% of the total volume of the segment in 2023.

5.1. Retail distribution of radio and TV programmes

Market players

The number of undertakings providing services related to retail distribution of radio and TV programmes services increased by 2.5% (or by 6 undertakings) to arrive at 250[49] in 2023 (Table 13).

As of 31.12.2023, the total number of undertakings actually providing cable TV amounted to 207 (up by 1 compared to 2022). TV operators providing cable TV maintained the trend of offering their subscribers IPTV as well, as at the end of 2023, the number of undertakings offering both cable TV and IPTV grew by 4 compared to the previous year to reach 42 undertakings.

[49] Including undertakings that notified CRC for suspension of their activity in 2023 and declared revenue during the year.

The undertakings that declared to have provided the satellite TV service in Bulgaria in 2023 remained 4 – Bulsatcom, Vivacom, A1, and Neosat.

As of 31.12.2023, 84 undertakings actually provided the IPTV service, up by 9 compared to the previous year.

The table below presents the relative shares of the first three undertakings, calculated based on the number of subscribers and the revenue from the provision of retail television services, including the part of revenue from bundled services with television included, for the period 2022-2023.

Table 13

Market shares of undertakings providing retail pay TV for the period 2022-2023

Undertaking	2022		2023	
	Share based on number of subscribers	Share based on revenue	Share based on number of subscribers	Share based on revenue
VIVACOM BULGARIA	32.9%	27.6%	36.3%	32.7%
A1 BULGARIA	26.4%	29.8%	27.3%	28.9%
BULSATCOM	26.7%	29.2%	22.2%	26.0%
All others	14.0%	13.3%	14.2%	12.5%

Source: Data submitted to CRC

In 2023, there was once again a redistribution of market shares among the three largest undertakings providing pay TV. The reason for this is again the even more significant decrease in the number of subscribers reported in the annual report for 2023 by Bulsatcom compared to the previous annual report – 18%, with a growth of 1% in the revenue from the provision of the service compared to the previous year. As a result, Bulsatcom is already the third largest undertaking, as its share continues to decline, by 4.6 percentage points based on the number of subscribers and by 3.3 percentage points based on revenue, respectively, covering 22.2% of the total number of pay TV subscribers and 26% of the revenue from the service in 2023.

Vivacom remained the market leader based on the number of subscribers in this market segment in 2023. Over the one-year period, the undertaking's share grew by 3.4 percentage points based on the number of subscribers and by 5 percentage points based on revenue, occupying shares in terms of both indicators of 36.3% and 32.7%, respectively. This growth is also the result of the concentrations carried out in the past year.

In 2023, a decision of[50] the Commission for Protection of Competition (CPC) allowed concentration through acquisition by Vivacom of direct sole control over Telnet, Networx-Bulgaria, TVN Distribution, and indirect control over Online Direct. As a result, the capital of Networx-Bulgaria, respectively, TVN Distribution (which is a participant in the market of distribution of radio and TV programmes at retail level) was acquired by Vivacom, and Telnet merged into the incumbent undertaking. TVN Distribution is the fourth largest undertaking which owns a share of 1.5% based on the number of pay TV subscribers as of 31.12.2023 and 1.3% based

[50] CPC Decision No. 633 of 29.06.2023.

on revenue from the provision of the service. Based on this, Vivacom's aggregate share would be 37.8% based on subscribers and 34% based on revenue.

In addition, it should be noted that, at the end of 2023, by its decision,[51] CPC started an in-depth study on the intention of United Group Bulgaria EOOD to acquire direct sole control over Viva Corporate Bulgaria EOOD and indirect sole control over Bulsatcom and its subsidiaries. By Decision No 114/01.02.2024, CPC sanctioned the concentration. In view of the fact that the economic group to which United Group Bulgaria EOOD belongs, controls Vivacom, the incumbent undertaking would further increase the aggregate market share with that of the acquired undertaking Bulsatcom.

As a result of the expected redistribution of the shares of the three largest undertakings in this market segment, as noted by CRC in its annual report for 2022, A1 is already the second largest undertaking based on the number of pay TV subscribers and on the basis of revenue from the provision of the service. In 2023, the share of the undertaking on the basis of subscribers rose by 0.9 percentage points, whereas it decreased by 0.9 percentage points on the basis of revenue, covering 27.3% of pay TV subscribers and 28.9% of the revenue generated.

Since the beginning of the second quarter of 2023, Yettel has been a participant in the pay TV market in Bulgaria. The undertaking started providing pay TV through its 5G network and ranked among the first 15 by number of subscribers thanks to the subscriber base accumulated during the year.

All other participants in the market segment, outside the top three, covered 14.2% of subscribers (a growth of 0.2 percentage points) and 12.5% of revenue (a decline of 0.8 percentage points).

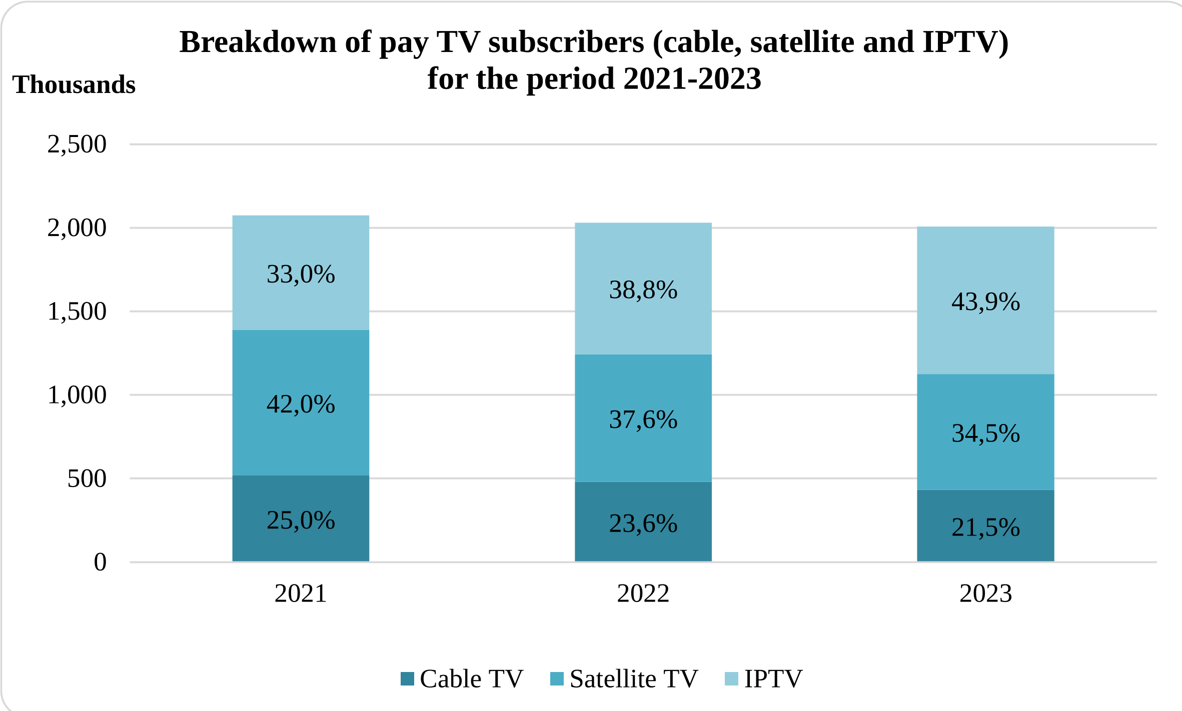
Subscribers of retail distribution of radio and TV programmes services

As of 31.12.2023, the number of subscribers to retail pay TV registered another drop by 1.2% compared to the end of the previous year and amounted to 2.01 million subscribers.[52]

The figure below presents the shares of subscribers by platforms in the total number of pay TV subscribers for the period 2021-2023.

[51] CPC Decision No. 1356 of 21.12.2023.

[52] Including subscribers of bundled services who amounted to 804,817 as of 31.12.2023.



Source: Data submitted to CRC

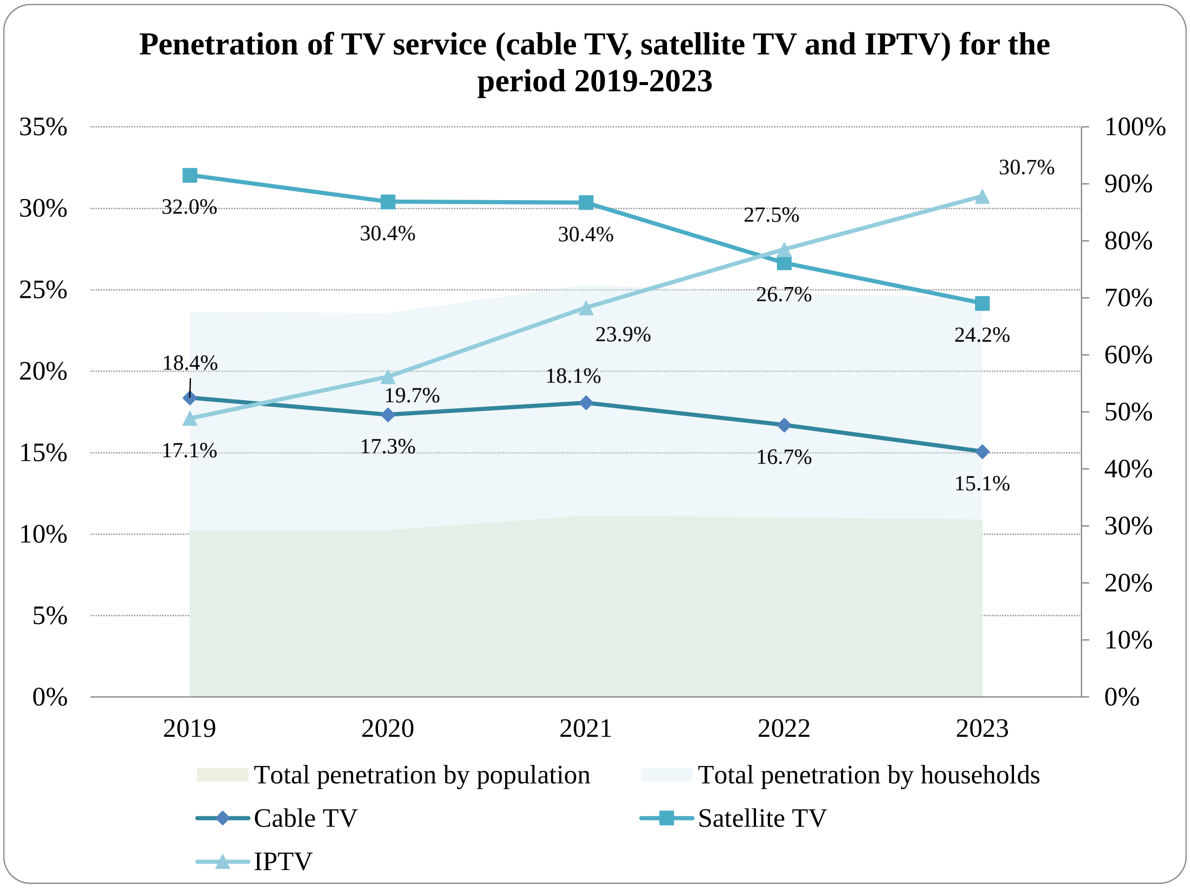
Figure 31

At the end of 2023, the number of IPTV subscribers continued to grow compared to the previous reporting period - by 11.9%, with its share registering a growth of 5.1 percentage points and already accounting for 43.9% as of 31.12.2023, reaffirming its position as the platform with the largest share in the subscriber structure of the pay TV market. Fourteen undertakings started providing IPTV in 2023, including Yettel, with the share of subscribers of these undertakings in the total number of IPTV subscribers as of 31.12.2023 amounting to 0.8%. Although there has been an increase in the number of subscribers to arrive at 65% of all other undertakings providing IPTV, the growth in the total number of subscribers to this TV platform during the one-year period is mainly due to the reported increase in the number of subscribers of Vivacom, Bulsatcom, and A1 that make up 94% of the IPTV subscribers in the country.

The share of subscribers to satellite TV registered a decline for yet another year - down by 3.1 percentage points for the one-year period. This negative trend, as well as the significantly increased share of IPTV, left satellite TV second with a share of 34.5% (Figure 31). In absolute terms, the number of subscribers to satellite TV decreased by 9.3% compared to 31.12.2022, which, as mentioned above, is mainly due to the registered decline in the number of subscribers of Bulsatcom which retained its leading position in the provision of satellite TV in 2023, followed by the share of Vivacom. Taking into account these consolidation processes, it is expected that the aggregate share of Vivacom’s satellite TV subscribers (including Bulsatcom’s) will be around 80% next year.

A decline was also registered in the number of cable TV subscribers, as this decline was by 9.8% in the current reporting period as well, and their share in the total number of pay TV subscribers dropped by 2 percentage points to 21.5%.

During the period under consideration, the penetration[53] of pay TV among households in Bulgaria did not report a significant change compared to the previous reporting period. As of 31.12.2023, there was a decrease of 0.9 percentage points, and the value of this indicator reached 70%. The penetration of cable and satellite TV fell by 1.6 and 2.5 percentage points, respectively, compared to 2022. IPTV continued its upward development and, toward the end of 2023, the penetration of the service among households exceeded 30% (30.7%), marking an increase of 3.3 percentage points compared to the previous year (Figure 32). The penetration of pay TV among the Bulgarian population[54] remained at almost the same level as in the previous reporting period and amounted to 31.1%, reducing its value by only 0.4 percentage points compared to 2022.



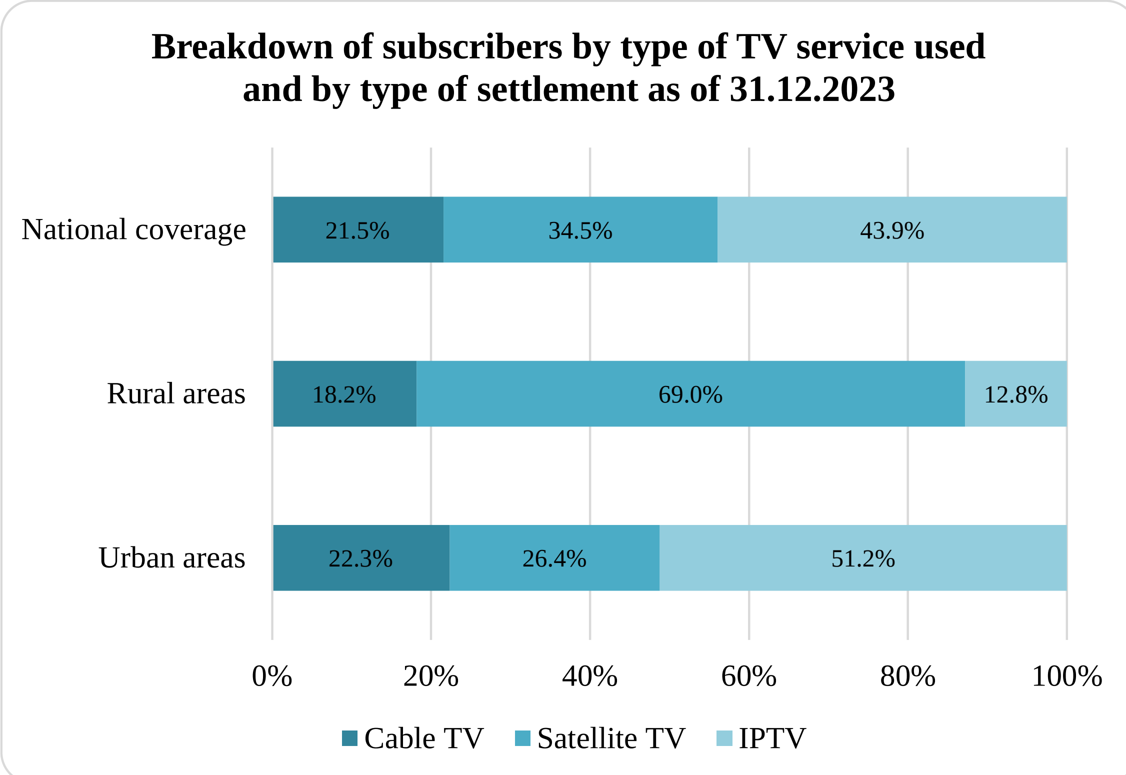
Source: Data submitted to CRC

Figure 32

Figure 33 displays the breakdown of subscribers of pay TV according to the settlement where they use this service as of 31.12.2023.

[53] This indicator was calculated as the ratio between the number of subscribers to pay TV as of 31.12.2023 and the number of households according to the census carried out by NSI in 2021 (2,866,657 households). https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_Households.pdf).

[54] The indicator was calculated as the ratio between the total number of pay TV subscribers as of 31.12.2023 and the number of population as of 31.12.2023 according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2023_ZYBLHGJ.pdf)); to calculate the indicator for 2022, the NSI data on the number of population as of 31.12.2022 were used. (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf).



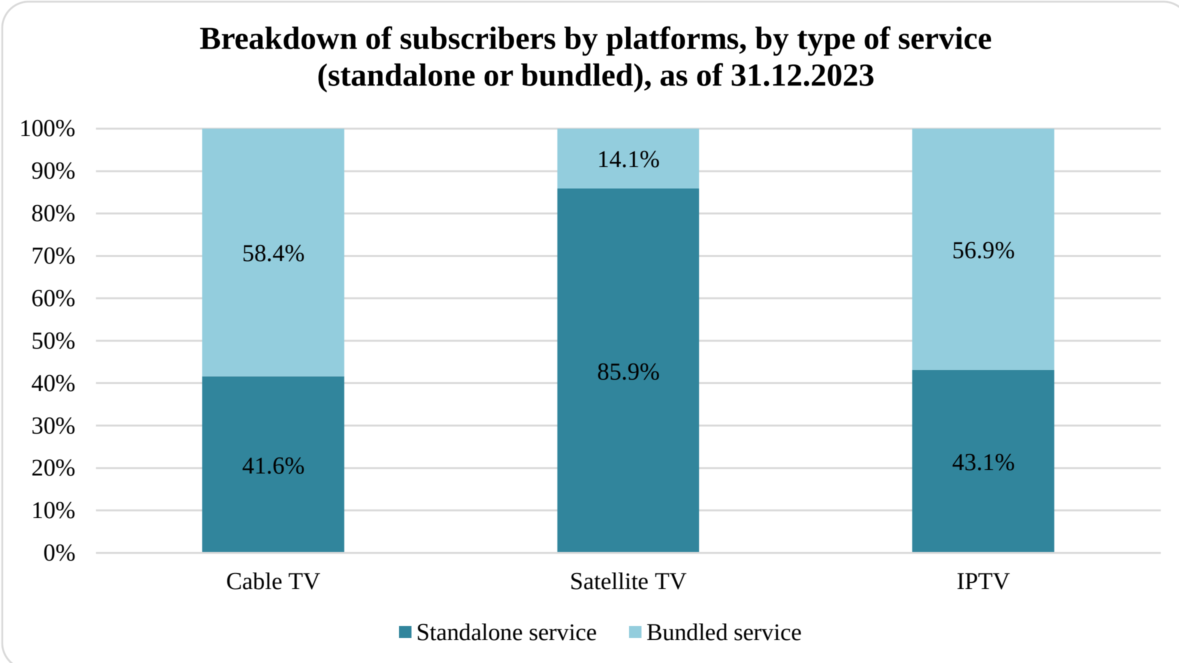
Source: Data submitted to CRC

Figure 33

For yet another year, the share of satellite TV subscribers in rural areas, which was times as much as the shares of the remaining two platforms, declined, as it fell by 3.3 percentage points to 69%. As a result of the launch of IPTV in 264 new villages and the reported growth in subscribers of this platform in more than 1,500 villages compared to 2022, at the end of 2023, the number of IPTV subscribers in rural areas rose by 26%. This growth also affected its share which increased from 9.8% in 2022 to 12.8% at the end of the period considered. Despite the decline registered in the number of cable TV subscribers in rural areas – by a little over 1%, the share it occupies in the total number of pay TV subscribers outside the cities grew by 0.3 percentage points to reach 18.2% as of 31.12.2023.

In the cities, IPTV subscribers accounted for the highest share, with an increase of 5.5 percentage points in relative terms compared to their share at the end of 2022, reaching 51.2% of the total number of pay TV subscribers in urban areas. The shares of subscribers to the other two platforms continued their downward trend in 2023 as well, with the share of cable TV subscribers falling by 2.6 percentage points to 22.3%, and that of satellite TV down by 2.9 percentage points to 26.4%, in line with the overall decline observed at national level (Figure 33).

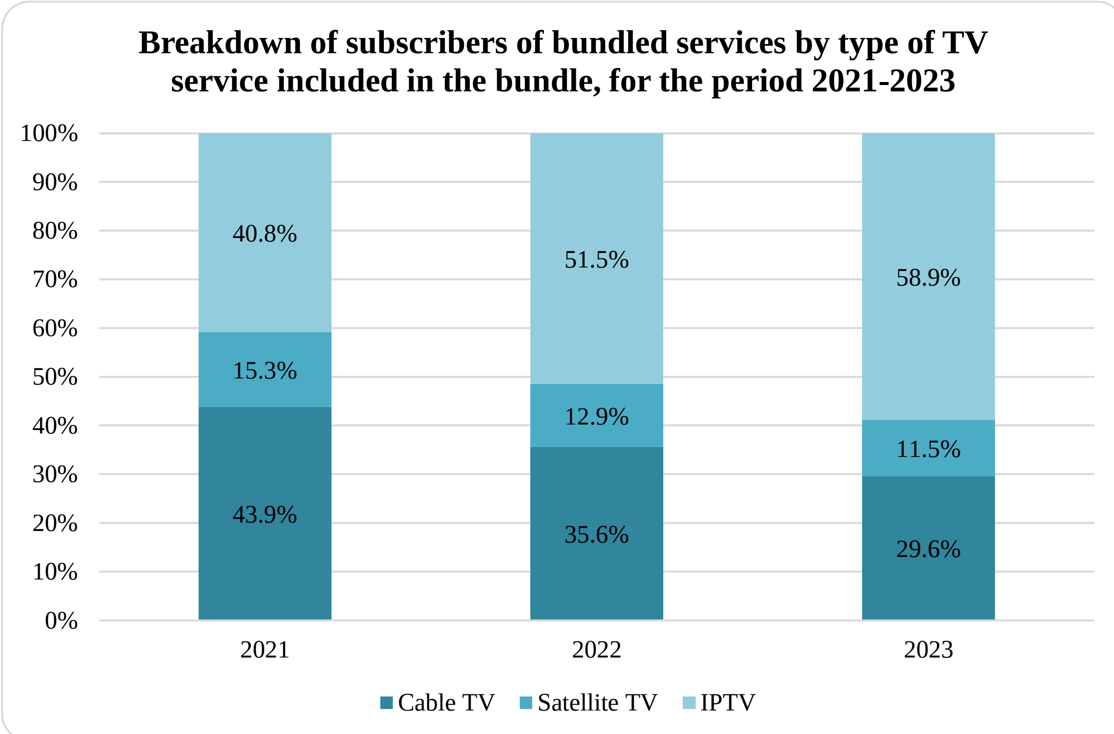
The number of subscribers to bundled services with a TV service included continued to increase and, in 2023, compared to the year before, the reported growth was 6%, and the share it covers in the total number of pay TV subscribers grew by almost 3 percentage points to arrive at 42.4%. The figure below shows the share of subscribers to bundled services with a TV service included in the total number of subscribers distributed by platforms, as of 31.12.2023.



Source: Data submitted to CRC

Figure 34

Over the one-year period under consideration, there was no significant change in the structure of subscribers by type of service used. As compared to the end of 2022, the share of IPTV subscribers who used the service in a package increased by 4.3 percentage points to 56.9%. Over the same period, the relative share of subscribers to bundled services with satellite TV included increased by 0.5 percentage points, reaching 14.1%, and the share of subscribers with cable TV included decreased by 1.5 percentage points to 58.4% of the total number of subscribers to the respective platform (Figure 34).



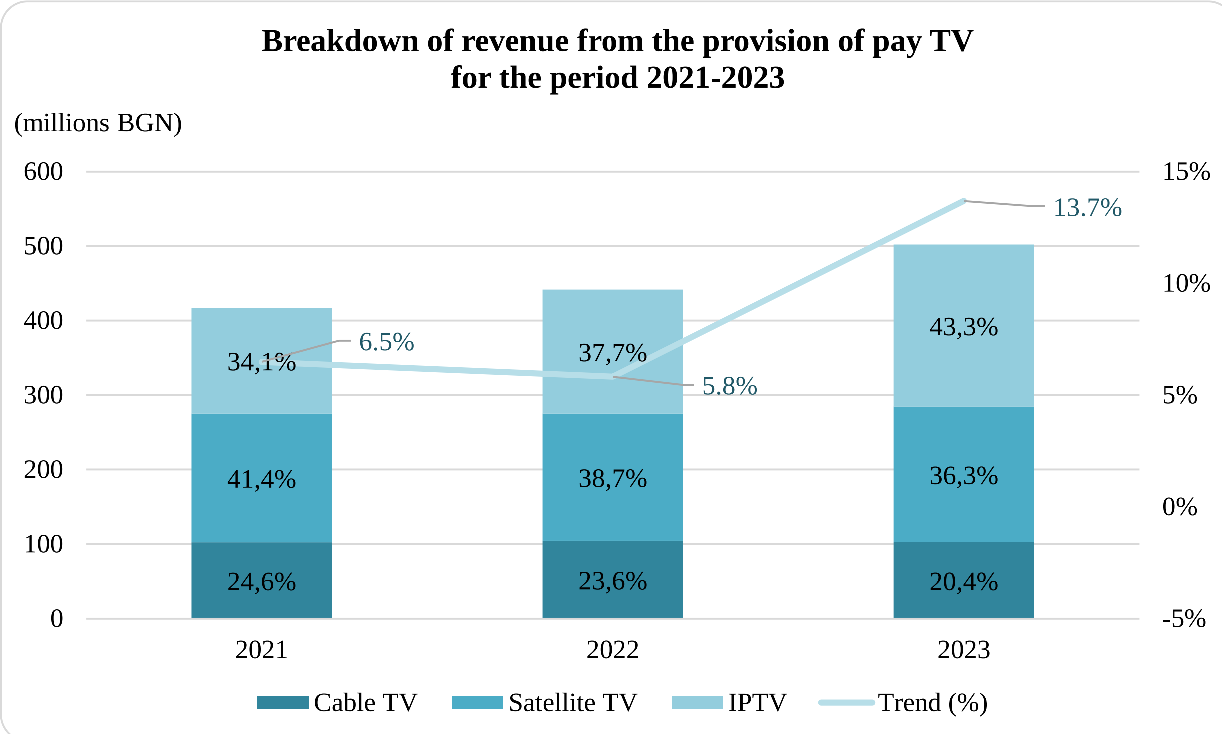
Source: Data submitted to CRC

Figure 35

As of 31.12.2023, compared to the previous year, there was a growth in the number of subscribers of packages with IPTV included - by 21%, as well as in its share in the total number of subscribers of TV service in a package which, for the one-year period, grew by 7.4 percentage points to cover 58.9% (Figure 35). At the end of 2023, the share of subscribers to bundled services with cable TV included amounted to 29.6%, registering a decrease of 6 percentage points over the one-year period, and the share of subscribers to bundled services with satellite TV included fell to 11.5%, with the number of subscribers to this platform in a package falling by 6% in absolute terms.

Revenue from retail distribution of radio and TV programmes services

The volume of total revenue, including revenue from bundled services with pay TV included, continued to grow and amounted to BGN 501.991 million in 2023, registering the most significant growth since 2018 - by 13.7% compared to the previous one-year period (Figure 36). The figure below presents the breakdown of revenue from the provision of pay TV by platforms in the total volume of the retail segment.



Note: *The presented data on revenue from cable television, satellite television and IPTV includes revenue from bundled services with television included, calculated based on the breakdown of bundled services subscribers with television included, by platforms, for each undertaking.*

Source: Data submitted to CRC

Figure 36

Revenue from both satellite and IPTV grew in 2023 compared to the previous year, up by 6.6% and 30.7%, respectively, year-on-year. The share of revenue from IPTV also increased - by 5.6 percentage points, reaching 43.3% and replacing from the top position in the total volume of the retail segment the share of revenue generated from satellite TV provision. Despite the reported growth in revenue from satellite TV in absolute terms, its share in the total volume of the retail market segment decreased by 2.4 percentage points to 36.3%. A decrease was observed in both absolute and relative terms in the revenue from cable TV. Over the one-year period, by 1.8% less revenue was generated from this platform, and its share in the total market segment volume decreased by 3.2 percentage points to 20.4%.

The share of revenue from the provision of bundled services with television[55] included fell by 0.5 percentage points compared to the previous year down to 38.6% of the total volume of the retail segment. In terms of revenue generated from a standalone service, an increase was observed in all TV platforms. Over the past year, this growth was 3.3% for cable TV, reaching BGN 41.638 million, 6.1% for satellite TV, reaching BGN 157.804 million, and 36% for IPTV to arrive at BGN 109.028 million

[55] The part of revenue relating to the television service included in the package.

5.2. Wholesale transmission and/or distribution of radio and TV programmes and IPTV

In 2023, the total number of undertakings providing wholesale transmission and/or distribution of radio and TV programmes services, including via wholesale IPTV and/or DVB-C method, was 13, as it remained unchanged compared to 2022.

Detailed information on the number of undertakings which in 2023 provided wholesale transmission and/or distribution of radio and TV programmes services, the number of users of these services and the volume of revenue generated from them, is displayed in Table 14 below:

Table 14

Number of undertakings, number of subscribers/users and revenue from the provision of wholesale transmission and/or distribution of radio and TV programmes services in 2023

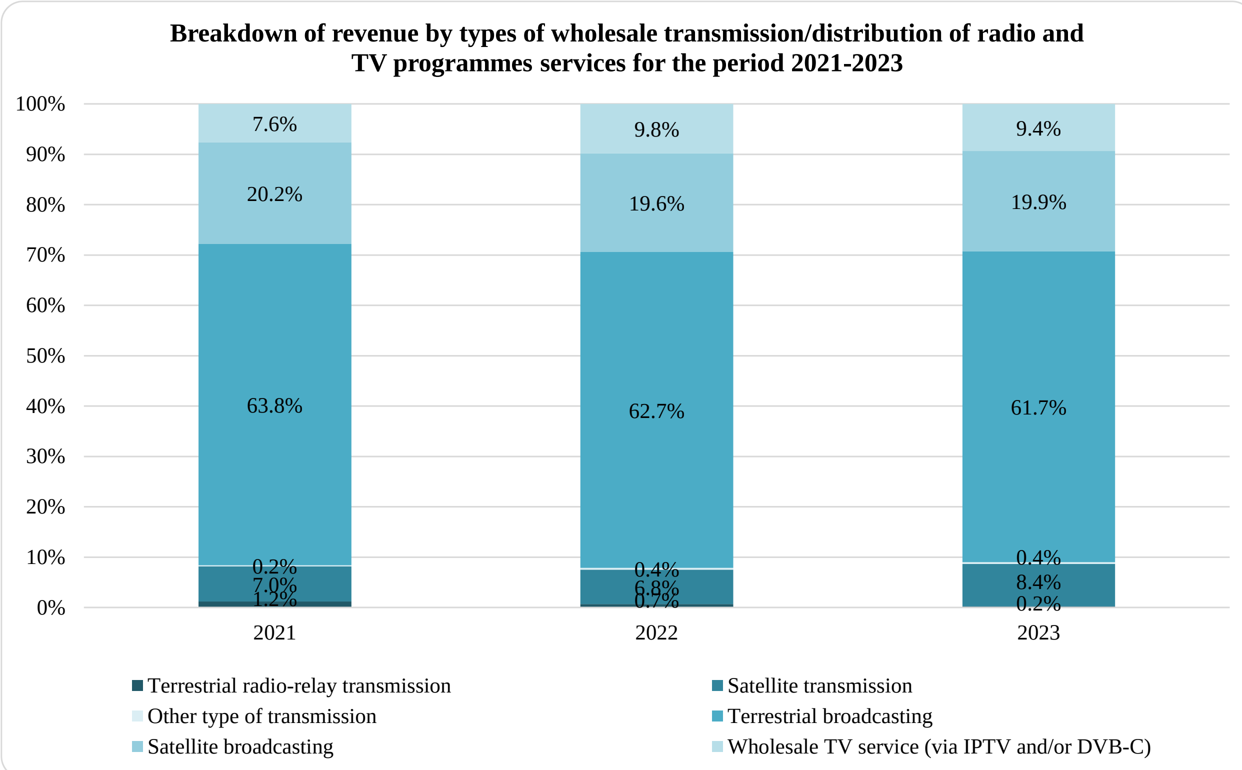
Types of wholesale transmission and/or distribution of radio and TV programmes services	Number of undertakings providing the service in 2023	Number of users of the service as of 31.12.2023	Revenue from the service in 2023 (in millions BGN, excl. VAT)
1.1. Transmission of radio and TV programmes services	7	///	**3.558**
1.2. Distribution of radio and TV programmes services	4	///	**32.180**
1.3. Wholesale TV service (via IPTV and/or DVB-C method) provided to other undertakings for resale purposes	5	55	**3.695**
Total	**13**	///	**39.433**

Source: Data submitted to CRC

In 2023, the number of undertakings providing transmission of radio and TV programmes services, as well as wholesale TV service via an IPTV and/or DVB-C method, remained unchanged from the previous year, with their number amounting to seven and five undertakings, respectively. Distribution of radio and TV programmes services in 2023 were provided by four undertakings, by one less than the year before

The revenue from the provision of wholesale transmission and distribution of radio and TV programmes services amounted to BGN 39.433 million, up by 21.4% compared to the previous year. Over the one-year period, a growth was observed in all revenue generated in 2023 from the provision of wholesale services: wholesale transmission of radio and TV programmes – by 39.3%, wholesale distribution of radio and TV programmes services – by 20.3%, and wholesale TV service provided via IPTV and/or DVB-C method – by 16%.

The following figure shows the breakdown of revenue by type of wholesale transmission/distribution of radio and TV programmes services for the period 2021-2023.



Source: Data submitted to CRC

Figure 37

The data presented in Figure 37 shows that, in 2023, the largest share in the total volume of revenue from the provision of wholesale transmission and/or distribution of radio and TV programmes services continued to be occupied by terrestrial broadcasting – 61.7%, registering a decrease of 1 percentage point compared to the previous year and 2.1 percentage points compared to 2021. A growth in relative terms was observed in the share of revenue from satellite transmission and satellite radio broadcasting, which increased by 1.6 and 0.3 percentage points to arrive at 8.4% and 19.9%, respectively. In the case of other wholesale services, there were no significant changes in the shares compared to the previous reporting period.

5.3. Terrestrial broadcasting of radio programmes – VHF broadcasting

At the end of 2023, the number of undertakings holding registration with CRC for the provision of services for terrestrial broadcasting of radio programmes remained unchanged compared to 2022 - 56, with 54 of them actually providing the service in 2023. The undertakings with national coverage as of 31.12.2023 remained two – Bulgarian National Radio and Darik Radio AD.

Summary

In 2023, the following changes were observed in the “transmission and/or distribution of radio and TV programmes services" segment versus 2022:

- Increase in the total volume of revenue from the segment, mainly as a result of the reported increase in revenue from the provision of satellite TV and IPTV;

- Decrease in the number of retail subscribers and in the penetration of the television service among households and the population;
- Growth in the consumption of bundled services with retail television included;
- Growth in the revenue from wholesale transmission and/or distribution of radio and TV programmes services.
- In 2023, there was a new redistribution of market shares among the three largest undertakings providing pay TV, with Vivacom remaining the leader in terms of market share based on number of subscribers, followed by A1, which replaced Bulsatcom from the second position. The concentrations carried out between major competitors in the pay TV market in 2023 strengthened Vivacom's positions in this market segment.

6. Prospects for development of the Bulgarian electronic communications market

The Bulgarian electronic communications market is dynamic and constantly evolving. It has established itself permanently as one of the most stable markets in the structure of the Bulgarian economy, with electronic communications services successfully contributing to the functioning of a number of vital areas of the country's social and economic life.

The market's development is clearly seen in the continuous development of undertakings providing electronic communications services that continue both with the deployment of next-generation access networks (NGA networks), providing higher speeds and connection quality, and with the accelerated pace of development of 5G NR networks, which are expected to provide a strong impetus for the development of digital services, unlocking new opportunities for consumer and industrial services – the Internet of Things (IoT), artificial intelligence (AI) solutions, machine learning (ML), cloud-based solutions, autonomous vehicles, smart cities, etc.

It should be noted that the Bulgarian electronic communications market keeps pace with the rapid transformations in the sector, the trends, technological changes, and changing consumer behaviour. The electronic communications sector in Bulgaria has all the necessary prerequisites to maintain its upward pace of development, introduce innovations and positive socio-economic impact which would position our country as one of the digital leaders in the region.

The trends that were observed in 2023 and are expected to continue in the future can be summarised as follows:

- The established persistent trend of decline in the consumption of fixed voice service by end-users continues and this reduction can be expected to continue, as the preferences of end-users of voice services will continue to focus on the use of mobile services and on Internet applications for interpersonal communication in the coming year;
- Mobile voice service consumption has reached its saturation point in Bulgaria and the decrease in the total volume of outgoing mobile network traffic in the country registered in the last two years is expected to continue next year. The main factors for this are the increasing spread and use of mobile Internet access among the population and on-line applications for calls and instant messages over the Internet. The application of new, reduced wholesale prices for voice call termination on mobile networks from 1 January 2024, combined with expectations for a decrease in the consumption of mobile voice

service will also negatively affect the total volume of revenue which mobile undertakings will earn from the provision of the service next year;

- The share of subscribers using ultra-high-speed Internet access, including those who use gigabit speeds, in the total number of fixed Internet access subscribers, continues to increase due to the ongoing migration to NGA networks;
- The share of subscribers to fixed access over mobile networks in the total number of subscribers to fixed Internet access also continues to grow, both due to the wide national coverage of LTE networks and to the continued deployment of 5G NR networks which allows mobile operators to exercise an increasingly intensive competitive pressure on the providers of fixed broadband Internet access;
- The share of 5G networks subscribers in the total number of mobile Internet subscribers continues to grow;
- IP television remains the dominant television platform which continues to determine the development of the pay TV segment in Bulgaria. With the development of 5G technology, the possibility of more widespread IPTV, including in rural and sparsely populated areas, is growing. With the entry to the market of Yettel's pay TV, the competition in the provision of IPTV in a package with 5G Internet access is expected to increase; in the past year, they were already provided by all three mobile operators on the Bulgarian market. Another factor that would influence the dynamics of the competition is the transaction approved in 2024 by CPC for direct sole control by United Group Bulgaria EOOD over Viva Corporate Bulgaria EOOD and indirect sole control over the largest satellite TV provider in Bulgaria in 2023 – Bulsatcom. Considering the fact that United Group Bulgaria EOOD controls Vivacom, it is expected that the realisation of this transaction will have an impact on the market positions of the main pay TV providers;
- The following trends have been preserved in the bundled services over the last several years – the consumption of double- and triple-play packages increases at the expense of quadruple-play packages; the most preferred bundled services are those that include mobile service with mobile voice and mobile Internet included; the growth in the total volume of revenue from bundled services is mainly due to the increase in revenue generated from packages with mobile Internet access included and revenue from packages with TV service included.

7. Provision of the universal service

7.1. Degree of satisfaction from the universal service provision

On the basis of an analysis and assessment of the obligations to provide the universal service[56], by its Decision No 350/30.09.2021, the Commission abolished the obligation imposed on Bulgarian Telecommunications Company EAD, currently Vivacom Bulgaria EAD (Vivacom), to provide services from the scope of the universal service. The assessment of the need of the imposed obligations was carried out on the basis of the annual reports of CRC for the period 2010-2020. The analysis took into account both the technological progress in the sector and the consumer

[56] Pursuant to § 7 of the Law on Electronic Communications.

attitudes toward services within the scope of the universal service. In view of the results of the analysis and the factors mentioned, CRC has concluded that it should abolish the obligation to provide the universal service. The results of the public consultations carried out by CRC with Decision No 221/17.06.2021 has confirmed the Commission's conclusions on the abolishment of the obligation.

At present, Vivacom continues to provide public payphones and/or other public access points to voice telephone services of a certain quality that had been installed prior to the date of Decision No 350/30.09.2021, in order to safeguard the customer's interests, including those of users with disabilities.

In 2023, the telephone density by households[57] registered a decline of 2.1 percentage points since the previous year, as a result of the steady downward trend in the number of residential subscribers of Vivacom.

7.2. Bringing the regulatory framework in compliance as regards the universal service

In connection with the change in the scope of the universal service, the process for amending the relevant regulatory framework was completed in 2021 with the adopted LASLEC in 2023.

On 31.03.2023, the State Gazette promulgated Ordinance No 4 of 21 March 2023 on the terms and conditions for provision of the universal service under the Law on Electronic Communications issued by the Minister of Transport and Communications and the Minister of Electronic Governance on a proposal of CRC, adopted with Decision No 223/30.06.2022. The Ordinance lays down the rules for determining the need to assign the obligation to provide services within the scope of the universal service in part or throughout the country.

Separately, by Decree No 36 of the Council of Ministers of 10.03.2023, the Methodology for determining the prices and price packages of the universal service under Article 195 of LEC based on a draft prepared by CRC and approved with Decision No 320 of 29.09.2022 was submitted to the Ministry of Transport and Communications (MTC), approved at a meeting of the Council of Ministers, was adopted. The adoption of the Methodology ensures the application of price regulation with regard to the provision of the universal service, including determining affordable prices for people with special social needs and people with low income.

In addition, on 8 April 2023, the Rules for calculating the net cost of providing universal service were promulgated, as they were adopted after public discussion by CRC`s Decision No 91 of 23.03.2023.

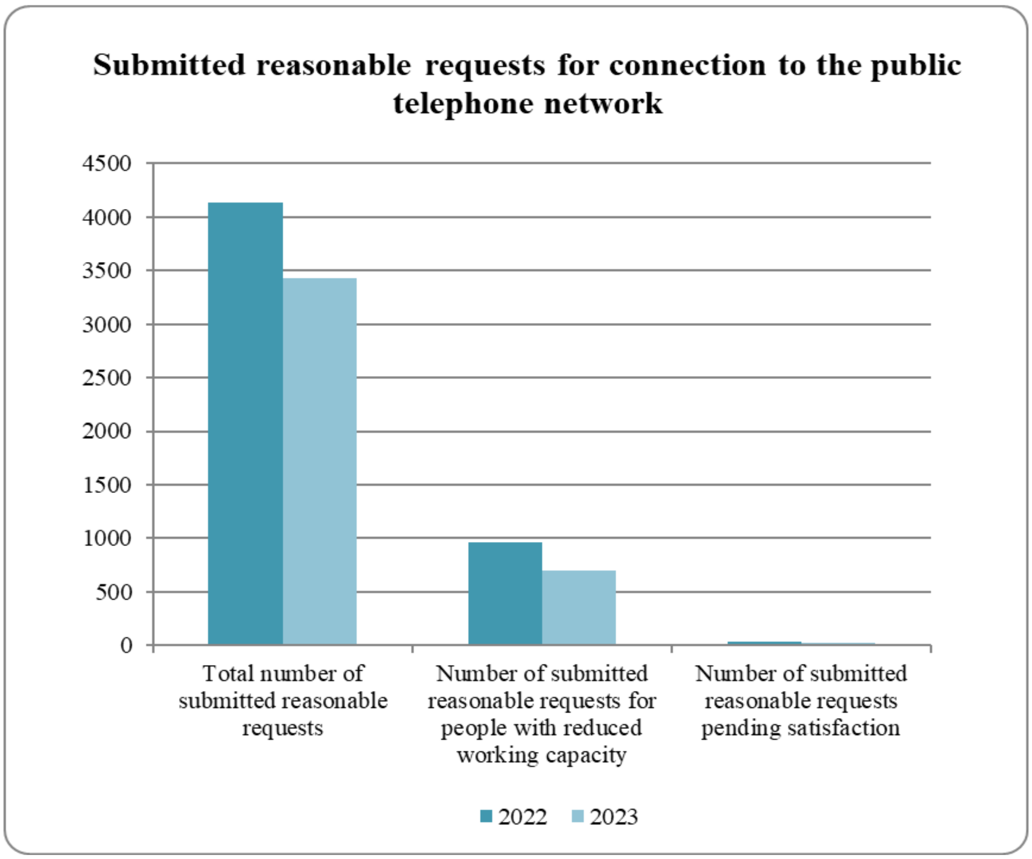
With Decision No 367 of 30.11.2023, CRC has started a public consultation procedure under Article 37 of the LEC to determine the appropriate broadband Internet access service as part of the universal service, pursuant to Article 182(4) of the LEC.

The changes in the legal framework concerning the provision of the universal service have been implemented in view of the technological developments and current market conditions, as these changes aim to ensure equal treatment of consumers and affordability of the universal service or of part of it.

[57] The "density by households" indicator is measured by dividing the total number of residential lines by the number of households in the country (based on data from the last official census carried out by NSI in 2021).

7.2.1. Access to and provision of the universal service

As of 31.12.2023, the total number of reasoned requests for connection submitted remains unchanged as a percentage. The reported decrease compared to the previous year was 17 %, as shown in Figure 38 below. In the applications for connection submitted by people with disabilities, there was a significant decrease of 27.1% in 2023 compared to the previous year 2022. One of the reasons for the reported decline is the widespread distribution of the mobile voice service and the subscription plans with included minutes for calls to national networks, which will continue to be essential to the rapidly fading interest in the use of a fixed voice service. In addition, mobile operators in turn offer advantageous pricing conditions to people with disabilities and low income for mobile packages that are more convenient to request and use.



Source: Data submitted to CRC

Figure 38

In 2023, there was a decrease of 13% in the number of pending applications compared to the previous period. The share of rejected applications for connection in the total number of applications submitted remains unchanged for 2023, amounting to 9%. In 2022, the predominant reason for rejection of applications was the decreasing interest by customers, with the trend continuing in 2023 and the share of these applications being 77%.

7.2.2. Access to public payphones, ensuring telephone directory and provision of enquiry services

With Decision No 350/30.09.2021, CRC abolished the obligations imposed so far for the provision of services within the scope of the universal service.[58]

In order to ensure access to telephone services for consumers, the above-mentioned decision provides for a 2-year transitional period prior to the overall abolishment of the obligation to ensure public payphones, which is limited to the main points of entry in the country, places with increased traffic of users and in the places referred to in p. 2.5 of Vivacom's license, namely:

- airports, ports, railway and bus stations serving international destinations;
- motorways;
- hospitals and police stations.

The deadline for provision of public payphones by Vivacom in the above-mentioned places expired on 30 September 2023, which led to complete abolishment of the obligation to provide public payphones.

In order to ensure the public interest and in implementation of Decision No 350/30.09.2021, CRC has carried out an analysis of Vivacom's performance of its obligations during the transitional period, examining the use of public payphones and/or other points of public access to voice telephony services of a certain quality, taking into account market trends, consumer preferences, as well as the technological progress and developments in the electronic communications market. The data analysis covers the period 2020-2022, with the findings pointing to a significant reduction in the usability of the service as a whole, which is caused by a lack of interest from end-users, as well as the technological developments in the sector, which fully supports the abolishment of the obligation. The accelerated entry of new technologies has shifted customer needs to services providing access to the global network, which is the reason that the provision of public payphones no longer contributes to the social inclusion of citizens in society.

The conclusions of the analysis confirm the lack of importance for consumers and the strong limitation of the use of these services by end-users, which in turn confirms CRC's reasons to abolish the obligation to provide public payphones as services within the scope of the universal service.

In 2023, the number of public payphones did not decrease over one-year period, as free-of-charge calls to the national emergency numbers and to the single European emergency number 112 can be made from all public payphones.

Although the obligation to provide a telephone directory has been abolished, Vivacom continues to provide an electronic telephone directory. The telephone directory is available at the undertaking's official website[59].

As of 31.12.2023, Vivacom fulfils its obligation to provide free-of-charge calls to emergency numbers. The downward trend in traffic generated to them continued, as it was 32%

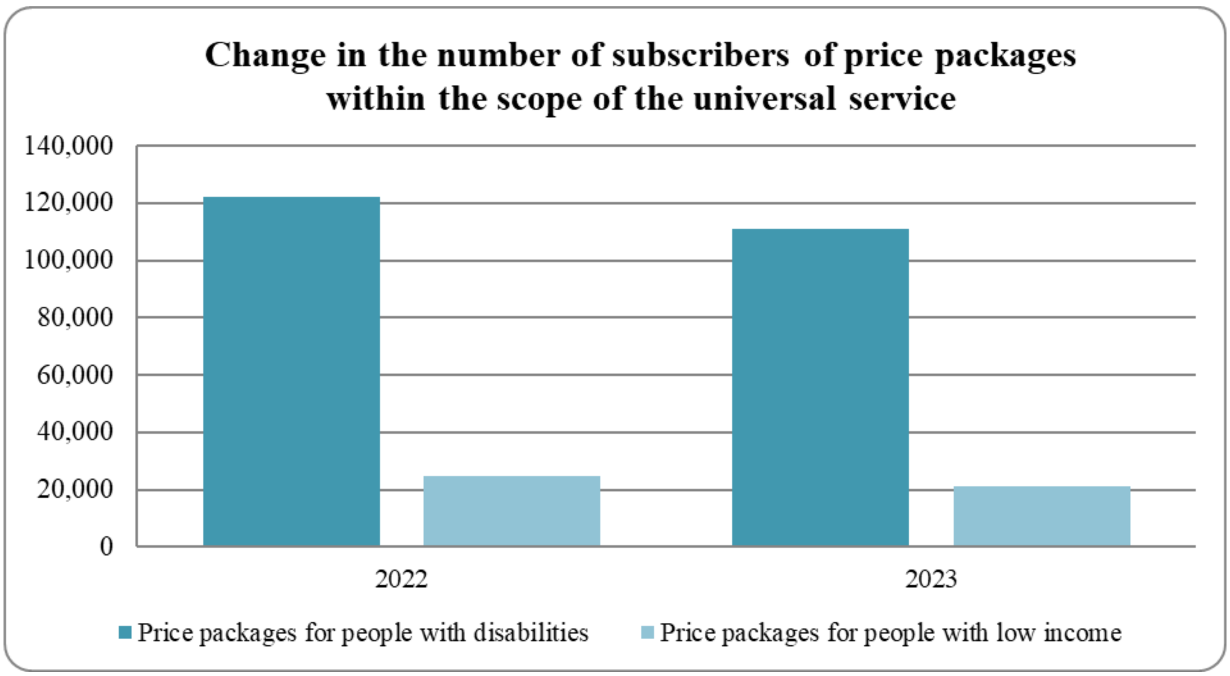
[58] Provision of public payphones and/or other points of public access to voice services of a certain quality, ensuring telephone directory and provision of telephone enquiry services.
[59] http://www.vivacom.bg/online/cgi-bin/wpd.cgi?temp=home.html&ls=0

less than in 2022, with the number of calls to emergency numbers also decreasing considerably – by 36% compared to 2022.

7.2.3. Affordability of tariffs of the universal service

In 2023, in fulfilment of its obligations to provide price packages within the scope of the universal service at affordable[60] prices, Vivacom continued to offer, without any change either in prices or in conditions, price packages intended for users who are: people with low income (”Limited” plan, as named by Vivacom); with over 90% impaired work capacity or capacity for social adaptation (“Handicap 160” plan, as named by Vivacom); with over 50% impaired work capacity or capacity for social adaptation (“Handicap 300” plan, as named by Vivacom); people with special social needs admitted to social or health institutions (“Social and health institutions” plan, as named by Vivacom).

At the end of 2023, the subscribers of price packages within the scope of the universal service decreased by 10% compared to 2022. The chart below displays the trend in the number of subscribers of price packages within the scope of the universal service for 2022 and 2023.



Source: Estimates based on data submitted to CRC

Figure 39

The number of subscribers of price packages for people with low income and price packages for people with disabilities decreased in 2023 compared to 2022 by 15% and 9%, respectively, which confirmed the long-term downward trend in the use of price packages within the scope of the universal service. The data presented in the figure above do not include the number of subscribers using price packages for people with special social needs, because its value was

[60] Stipulated in the Methodology for determining prices and price packages for the universal service adopted with Ordinance No 254 of the Council of Ministers of 23.10.2008, prom. SG, no. 94 of 31.10.2008.

below 0.3% of the total number of subscribers of price packages within the scope of the universal service.

7.3. Quality of the universal service provision

The Quality of Service parameters of the universal service provision are stipulated in Ordinance No 6, as the target values of the parameters were adopted with Decision No 345/31.03.2011 of CRC and are publicly accessible at the Commission's official website.[61] According to the data submitted by Vivacom,[62] in 2023, the operator reported fulfilment of all target values.

7.4. Compensation of net costs accrued due to the universal service provision

In 2023, Vivacom did not submit to CRC a request for compensation of the unfair burden from the universal service provision within the statutory deadline - 30.06.2023. Thus, during the last year, the amount of net costs was not calculated and CRC did not make an assessment whether these expenditures represent an unfair burden for the incumbent.

As regards the amendment of the Rules of activity of the Universal Service Compensation Fund in order to bring it into compliance with the current regulatory framework, adopted by Decision No 1 of 30.03.2021, in 2023, no meeting was held due to the absence of a request for compensation of net costs by the incumbent.

7.5. Complaints and complaint resolution

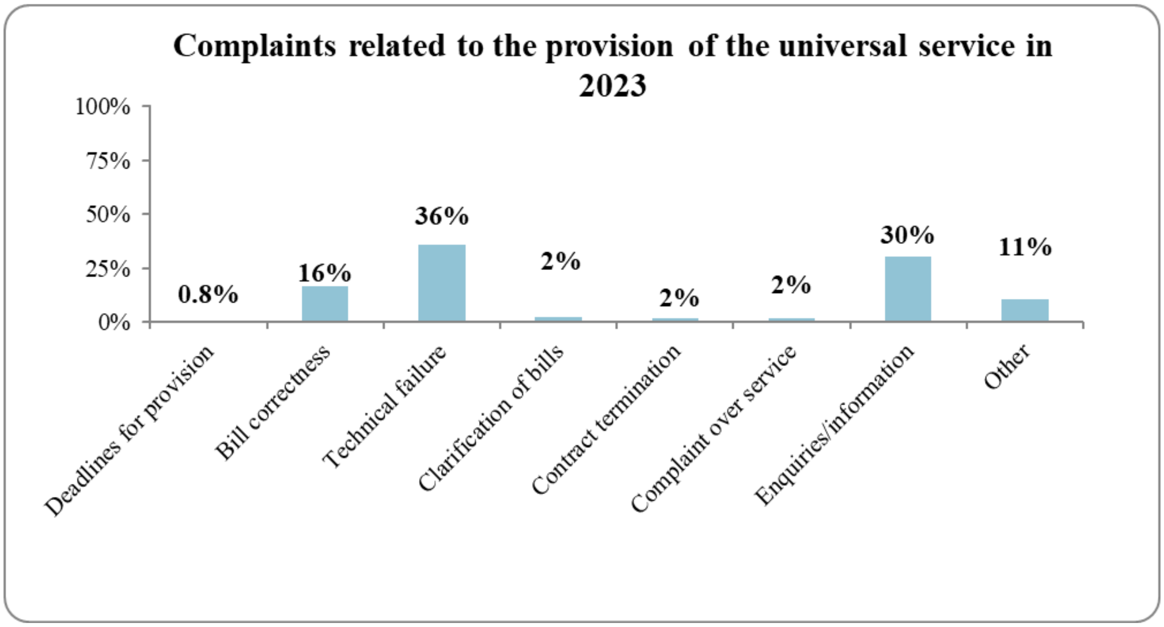
According to the General Terms and Conditions governing the relations between Vivacom and the end-users, the undertaking gives options to the users to individually track and control their costs through: the provision of itemised bills free of charge;[63] selective limitation of outgoing calls free of charge, and deferred payment when connecting to public telephone networks.

In 2023, the number of complaints filed by Vivacom regarding the provision of the universal service have dropped significantly - by 32% compared to 2022. Most often, the complaints disputed technical failures and enquiries/information concerning clarification of monthly bills. The causes for filing complaints are illustrated in Figure 40.

[61] http://www.crc.bg/section.php?id=904&lang=bg

[62] Through CRC's electronic system for on-line questionnaires

[63] The content of the itemised bill is defined in Art. 260, Para 3 of the LEC.



Source: Data submitted to CRC

Figure 40

As of 31.12.2023, there was an increase in the percentage distribution of consumer complaints over enquiries and information, complaints over service and contract termination. A significant increase in the number of complaints filed was reported for complaints over enquiries/information. As compared to 2022, their number increased by 7% for 2023. In the distribution of the remaining customer complaints concerning technical failure, correctness of the monthly bills, time limits for the provision of universal service and other reasons for complaint, a minimal decline was observed. In 2023, the percentage of unsatisfied complaints amounted to 66% of the total number of complaints filed, registering an increase of 14 percentage points compared to 2022.

7.6. Prospects for development of the universal service

The adopted changes in the regulatory framework reflect the modified concept of universal service, and set out the procedure for its award.

Ordinance No 4 of 21 March 2023 on the terms and procedure for the provision of the universal service under the LEC issued by the Minister of Transport and Communications and the Minister of Electronic Governance regulates the scope of the universal service, the preparation of an assessment of the need and procedure for its award. The Methodology for determining the prices and price packages of the universal service adopted by Decree No 36 of 10.03.2023 under Art. 195 of the LEC sets out the procedure for determining the affordability of the prices of services within the scope of the universal service in accordance with the amended requirements of the LEC. In addition, the Rules on the calculation of the net cost of universal service provision published on 8 April 2023 specify how to determine the net costs on the basis of which to assess the existence of an unfair burden on the operator entrusted with the obligation to provide the universal service or part thereof.

The modification of the scope of universal service and the inclusion of broadband Internet access at an appropriate speed ensures that consumers have equal access to a larger set of services in line with the reported technological progress in the sector. Ensuring broadband Internet access at an affordable price will provide consumers with more communication and connectivity opportunities.

Before carrying out an analysis on the need to impose obligations to provide appropriate broadband Internet access pursuant to Article 182(4) of the LEC, CRC determines the appropriate broadband Internet access service as part of the universal service. In determining the appropriate service, the Commission should consider the national conditions and the minimum frequency band used by most users on the territory of the Republic of Bulgaria and take into account BEREC's report on best practices so as to ensure a bandwidth that is required for the participation of citizens in social and economic life. In this regard, by Decision No 367 of 30.11.2023, CRC has launched a public consultation procedure under Article 37 of the LEC to determine the appropriate broadband Internet access service as part of the universal service, pursuant to Article 182(4) of the LEC. If it is established that those services are absent under the ordinary commercial conditions throughout the country or in different parts of the country, the Commission will accept a binding decission to award the universal service in accordance with the provisions of the LEC.

At present, the information provided to CRC on services within the scope of the universal service indicates a trend of decline in the consumer interest which continues in 2023, including interest in price packages with preferential conditions for vulnerable social groups.[64]

II. LEGAL AND REGULATORY FRAMEWORK

1. EU regulatory framework for electronic communications

Regulation (EU) 2022/612 of the European Parliament and of the Council of 6 April 2022 on roaming on public mobile communications networks within the Union (the Roaming Regulation) revised the European legal framework for the use of roaming services in the Community.

Commission Delegated Regulation (EU) 2021/654 of 18 December 2020 supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council set a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination rate.

2. Legal and regulatory framework in Bulgaria

In 2023, a Law on Amendment and Supplement of the Law on Electronic Communications (LAS of LEC, prom. SG, no. 58 of 2023) was adopted, which introduced into the national law the requirements arising from the Roaming Regulation. The amendments to the LEC laid down sanctioning provisions for non-compliance with the Roaming Regulation, which create guarantees for its effective operation.

Provisions of Art. 33 of the LEC were also amended. The changes distinguish more precisely the procedures for registration of transceiver stations and notification, for short-range wireless access points.

3. Important regulatory decisions of CRC in 2023

- By Decision 16/12.01.2023, CRC adopted a Position of the Communications

[64] Price packages intended for people with reduced working capacity or reduced capacity for social adaptation; people accommodated in social and healthcare facilities; or those with low income.

Regulation Commission on criteria for the designation of on-line platforms as postal operators;

- By Decision 44/09.02.2023, CRC adopted a Regulatory policy for the use of numbering resources for the provision of electronic communications;
- By Decision 91/23.03.2023, CRC adopted Rules for calculation of the net costs for the provision of the universal service;
- By Decision 119/20.04.2023, CRC added to the List of reserved numbers to harmonised services of social value number 116 016 – "Helpline for victims of violence against women";
- By Decision 139/11.05.2023, CRC amended and supplemented the Rules for free use of radio spectrum;
- By Decision 161/01.06.2023, CRC gave binding instructions to VIVACOM BULGARIA EAD not to apply indexed prices and to supplement the Pricing Mechanism from the General Terms and Conditions for access to and/or joint use of passive infrastructure;
- By Decision 172/15.06.2023, CRC gave binding instructions to VIVACOM BULGARIA EAD to amend the General Terms and Conditions for access to and/or joint use of passive infrastructure (underground duct network);
- By Decision 170/15.06.2023, CRC amended the General requirements for the provision of public electronic communications;
- By Decision 192/22.06.2023, CRC adopted an Annual Report on the implementation of Regulation (EU) 2015/2120 for 2022;
- By Decision 193/29.06.2023, CRC adopted a report "Analysis of the postal market" for 2022;
- By Decision of 29.09.2023, CRC adopted a Report on the analysis and assessment of the implementation of the existing obligations for the provision of public payphones and/or other points of public access to voice telephony services of a certain quality as part of the services within the scope of the universal service;
- By Decision 316/02.11.2023, CRC adopted a Position of the Communications Regulation Commission on the provision of interconnection based on an Internet protocol.

4. Provision of electronic communications

4.1. Authorisations for the use of individually assigned scarce resource

In connection with new and amended regulations setting out the conditions for the use of a scarce resource, as well as with the amendment of the Tariff of fees collected by CRC under the LEC, the process of bringing the issued authorisations for the use of a scarce resource in compliance has been completed.

Table 15 lists the number of authorisations issued during the year for the use of a scarce resource, the number of amendments and/or supplements to the authorisations issued, the number of authorisations terminated, revoked and transferred, and the number of authorisations expired.

Table 15

Authorisations for 2023 under the Law on Electronic Communications				
Electronic communications network	**Amendments/Supplements (number)**	**Authorisations issued (number)**	**Terminated/Revoked/ Expired (number)**	**Transfers (incl. partial) / Lease (number)**
Electronic communications networks for terrestrial digital broadcasting of TV signals with national and local coverage	3	-	-	-
Electronic communications networks for terrestrial analogue broadcasting of radio signals with national and local coverage	57	1	7	7
Terrestrial networks in the 700 MHz frequency band	-	3	-	-
Terrestrial networks in the MHz frequency band	-	3	-	-
Terrestrial networks in the 1800 MHz frequency band	3	-	-	-
Terrestrial networks in the 2 GHz frequency band	3	-	-	-
Terrestrial networks in the 2.6 GHz frequency band	3	-	-	-
Terrestrial networks in the 3.6 GHz frequency band	3	-	-	-
Terrestrial networks in the 26 GHz frequency band	4	-	-	-

Use of radio spectrum in the 26 GHz band	2	-	-	-
Electronic communications networks from a mobile radio service – PMR/PAMR	50*	30*	21	4
Electronic communications networks from the aeronautical mobile radio service	1	-	-	-
Electronic communications networks from the fixed radio service of the “point-to-point” type	17**	-	1	-
Authorisations for the use of numbering resources	26	1	-	-
Electronic communications networks from satellite radio services	17***	3***	-	-
Position on geostationary orbit with the relevant radio frequency spectrum assigned to the Republic of Bulgaria	1****	-	-	-
Temporary authorisations	-	9*	-	-
TOTAL:	**190**	**50**	**29**	**11**

* The total number of assigned radio frequencies for these authorisations was 66;

** Amendments and supplements to the technical data of a total of 1,321 radio links, including assigned radio frequency spectrum for new 870 links.

*** The authorisations issued and amended assign spectrum for ground stations to connect to 21 satellite systems

**** The coordinated satellite system BULSAT-30B-1.9E has been added to the authorisation

4.2. Notifications for the provision of public electronic communications networks and/or services

The activities related to the notifications submitted in 2023 for the provision of public electronic communications and/or services are presented in Table 16.

Table 16

Type of activity	2023 (number)
Processed notifications for provision of public electronic communications networks and/or services	73
Processed notifications for termination of the provision of public electronic communications	89
Issued certificates for entry in the Registry	11
Undertakings entered in the Registry	41
Undertakings deleted from the Registry	79

4.3. Provision of electronic communications through radio equipment from the amateur radio service

The authorisations, certificates and licenses for radio amateur capacity issued during the year are presented in Table 17.

Table 17

Type of activity	2023 (number)
Issued authorisations for radio amateur capacity	319
Issued HAREC certificates	29
Issued CEPT licenses	46
Assigned call signs	327

In 2023, 9 amateur radio exams were held in the cities of Sofia, Plovdiv, and Gabrovo. 292 people were examined.

4.4. Interconnection and access

On 24 November 2023, the transitional period of the specific obligations on access, transparency and equal treatment laid down in CRC decisions No 265/23.07.2020 and No 266/23.07.2020 expired. The transitional period also refers to the specific obligation of undertakings to provide access with a view to ensuring IP interconnection, subject to the requirements laid down in Decision No 355 of 6 August 2015.

In this regard, and in order to ensure a predictable regulatory approach, by Decision No 316 of 2 November 2023, CRC adopted a Position of the Communications Regulation Commission on the provision of access for the purpose of interconnection based on an Internet protocol (Position). Section I the Position provides chronological information on the obligation to provide access to ensure IP interconnection. Section II describes the existing conditions for the provision of access to ensure IP interconnection, sections III and IV describe measurements for the detection of an interconnection point and/or interconnection line related to the quality of transmission and measurement of service quality parameters.

In 2023, CRC did not receive any requests for assistance or for giving binding decision in case of a dispute in accordance with Article 54 of the LEC.

III. ACTIVITIES UNDER THE LAW ON ELECTRONIC COMMUNICATIONS, THE LAW ON ELECTRONIC DOCUMENT, ELECTRONIC TRUST SERVICES AND THE LAW ON ELECTRONIC COMMUNICATIONS NETWORKS AND PHYSICAL INFRASTRUCTURE

1. Activities in implementation of the CRC's priorities

1.1. Effective management of scarce resources

1.1.1. Radio frequency spectrum

Radio spectrum is a key factor in the development of electronic communications networks and services. The proper management of radio spectrum is vital for increasing competitiveness and innovation in Bulgaria. The ever-increasing need for access to radio spectrum which is scarce in its nature, calls for its optimal and efficient management. The global development and introduction of new technologies enabling the satisfaction of the needs of the business and the population of cutting-edge, technologically efficient and quality communication and information services at affordable prices require the provision of the relevant harmonised frequency resource. In accordance with its legal competences and the Regulatory Policy for the management of radio spectrum allocated to civil needs, CRC provides conditions for optimal distribution, effective and interference-free use of spectrum in accordance with the requirements of the decisions and recommendations of the International Telecommunication Union (ITU[65]), the European Commission and the Electronic Communications Committee (ECC[66]) of the European Conference on Postal and Telecommunications (CEPT[67]), respecting the principles of transparency, equality, predictability, proportionality, objectivity and publicity. The provision of timely access to spectrum in response to the relevant needs facilitates the technological development and favourable conditions for investment, innovations development, industry, geographical regions and the satisfaction of the needs of Bulgarian citizens. Radio spectrum remains a key factor in achieving the objectives of the Digital Decade 2030 and a key asset for achieving universal broadband coverage and digital transformation.

Over the past year, experts took part in the preparation of the official position of the Republic of Bulgaria on the agenda items of the World Conference on Radio Communications in 2023 (WRC-23), in accordance with the competence of CRC. On the basis of the analysis of European Common Proposals (ECP), the preliminary positions of the European regional group CEPT and the ITU studies, an opinion was drawn up on the items on the WRC-23 agenda on the possibilities of implementing the proposed options to address the issues which will be considered depending on the national characteristics of the Republic of Bulgaria. As part of the official delegation of the Republic of Bulgaria, the representatives of CRC contributed to defending and

[65] International Telecommunication Union
[66] Electronic Communications Committee
[67] European Conference of Postal and Telecommunications Administrations

protecting the interests of our country with regard to the use of radio spectrum, taking into account the national interest. The relevant regulatory conditions for the use of radio spectrum for international mobile telecommunications (IMT) were set at WRC-23. For Region 1, which also includes our country, the 6 GHz band was designated for IMT, provided that protection of existing networks is provided. After setting the relevant conditions, this scope may also be used for wireless access systems, including local radio networks (WAS/RLANs). The conditions for the use of radio spectrum for space research were also amended, which will contribute to the development of science and technology worldwide. Additional radio spectrum and conditions for its use for satellite Earth research service to transmit environmental data were also set. Additional radio frequency bands and conditions for their use for ground stations on the move, connected to geostationary and non-geostationary satellite systems, were also assigned. A number of procedural and technical conditions for the use of radio spectrum from geostationary and non-geostationary satellite systems were amended in order to make effective and optimal use of scarce resources. Amendments to provisions in the Radio Regulations, existing resolutions and recommendations concerning radio spectrum management were adopted.

In the past year, CRC continued to manage radio spectrum for civil needs in accordance with the European radio spectrum policy, taking into account the national interests and specificities in order to fulfil the main objectives of the LEC to create the necessary conditions for the development of connectivity and access to high capacity wireless networks, promoting the effective, efficient and coordinated use of radio spectrum.

In carrying out its activities related to the management of radio spectrum, CRC follows the provisions of the main documents related to the management of the frequency resource in our country - the Regulatory policy for the management of radio spectrum for civil needs, the Updated policy in the field of electronic communications, the Updated state policy on radio spectrum planning and allocation in the Republic of Bulgaria.

Following public consultations, CRC adopted a Position on the prospects and conditions for use of the free resource in the 700 MHz and 800 MHz frequency bands. The communication on the issue of three authorisations for the provision of a 2x10 MHz frequency resource in the 700 MHz band each and three authorisations for the provision of a 2x10 MHz frequency resource in the 800 MHz band each was published on the CRC's website, on the Public Consultations Portal and in the State Gazette (no. 90 of 27.10.2023).

As a result of the spectrum assignment procedure, CRC issued authorisations for use of spectrum in the 700 MHz and 800 MHz bands for a terrestrial network allowing the provision of electronic communications services with national coverage for a period of 15 years as follows:

- Decision No 343/28.11.2023 issued Authorisation No 02550/28.11.2023 for the 700 MHz band and Authorisation No 02553/28.11.2023 for the 800 MHz band to A1 Bulgaria EAD;
- Decision No 344/28.11.2023 issued Authorisation No 02551/28.11.2023 for the 700 MHz band and License No 02554/28.11.2023 for the 800 MHz band to Vivacom Bulgaria EAD;
- Decision No 345/28.11.2023 issued Authorisation No 02553/28.11.2023 for the 700 MHz band and Authorisation No 02555/28.11.2023 for the 800 MHz band to Yettel Bulgaria EAD.

With the issuance of the authorisations, CRC completed Milestone 139 of Reform 2 C7.R2. Efficient use of the radio spectrum from the National Recovery and Resilience Plan and Decision No 699 of 04.10.2023 of the Council of Ministers to take action to ensure the possibility of using radio spectrum in the 700 MHz and 800 MHz bands for civil needs and creating organisational measures to ensure the safety of flights of the Air Force of the Republic of Bulgaria.

With a view to meeting the objectives set out in Decision (EU) 2022/2481 of the European Parliament and of the Council establishing the Digital Decade Policy Programme 2030 and the tasks set out in the Regulatory Policy for the management of radio spectrum for civil needs, and in order to comply with the principles of transparency, publicity and consultation, at the end of the year, public consultations were held on a draft Position on the prospects for use of the free resource in the 1.5 GHz, 2.6 GHz, 3.6 GHz and 26 GHz bands. An analysis of the opinions submitted in the framework of the public consultations is yet to be made.

Over the past year, the Register of transceiver stations on terrestrial networks that allow the provision of electronic communications services, the activities referred to in Article 151, paragraph 1, item 16 of the Spatial Planning Act and short-range wireless access points, and the Register of the rights granted for use of the radio spectrum based on registration for point-to-point networks in the 71-76 GHz/81-86 GHz range were put in real operation. The commissioning of the two registers facilitated both the deployment of 5G base stations on the territory of the country and the regime for granting rights for the use of radio spectrum, with the application for and assignment of radio spectrum being carried out entirely electronically.

This will help achieve the objectives set out in Decision (EU) 2022/2481 all end users at a fixed location to be covered by a gigabit network up to the network termination point, and all populated areas to be covered by next-generation wireless high-speed networks with performance at least equivalent to that of 5G, in accordance with the principle of technological neutrality and the objectives of the Regulatory Policy for the management of radio spectrum for civil needs.

Allocation, planning, assignment and efficient use of the frequency spectrum

In connection with Decision No 188 of 16.03.2023 of the Council of Ministers amending the National Radio Spectrum Allocation Plan (NRSAP), which designates the 401-402 MHz frequency band for use by the Space Operation Service in the Space to Earth direction, following a notification to the European Commission (EC), the Rules on the use of radio spectrum for electronic communications networks by satellite radio services after authorisation were amended and supplemented. This ensured conditions for the development of communications through small satellites and encouraged the introduction of new technologies, enabling undertakings to apply for and obtain the appropriate radio spectrum authorisation for these networks.

Following a public discussion, CRC adopted an amendment and supplement to the Rules on the free use of radio spectrum, which transposed into the Bulgarian legislation the provisions of ECC decisions on the harmonised use of radio spectrum, as well as the provisions of the following EC decisions:

- Commission Implementing Decision (EU) 2022/2307 of 23 November 2022 amending Implementing Decision (EU) 2022/179 as regards designating and making available the 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz frequency bands in accordance with the technical conditions;
- Commission Implementing Decision (EU) 2022/2324 of 23 November 2022 amending

Decision 2008/294/EC to include additional access technologies and measures for the operation of mobile communications services on aircraft (MCA services) in the Union.

The amendment to the Rules on the free use of radio spectrum defined the technical conditions for use of the 5470-5725 MHz frequency band by allowing limited use of WAS/RLAN in road vehicles operating in slave mode, controlled by a fixed WAS/RLAN device with dynamic frequency selection functionality (DFS), operating in basic mode. Conditions for the use of the 1710-1785 MHz and 1805-1880 MHz frequency bands on aircraft by 5G NR networks with non-active antenna systems (non-AAS) were also created.

In 2024, CRC adopted the results of the public discussion of a draft amendment and supplement to the Rules on the free use of radio spectrum. In implementation of Directive (EU) 2015/1535, the draft was notified to the European Commission. The Rules will be finally adopted after the end of the period for submission of opinions by the Member States and the EC agencies, and so the provisions of decisions and recommendations of ECC to CEPT will be introduced in the Bulgarian legislation.

In line with the amendments of and supplements to the above regulations in the frequency information system of the European Communications Office - EFIS (ECO Frequency Information System), the data on the use of the frequency resource in the Republic of Bulgaria were updated.

In 2023, CRC brought into compliance with the new regulations 610 authorisations for use of scarce resource.

Mobile radio service

The possibility of applying a flexible approach to the creation and configuration of networks from mobile radio service, such as PMR/PAMR networks, is a reason for their use both for large groups of users, mainly in the public sector (energy, transport, health, environmental protection, municipal voluntary formations, etc.), and also for small and medium-sized groups of users, mainly in the private sector (taxi, construction and security services, service providers, etc.). Depending on the objectives of the users, hierarchically structured networks with local, regional or national coverage can be created.

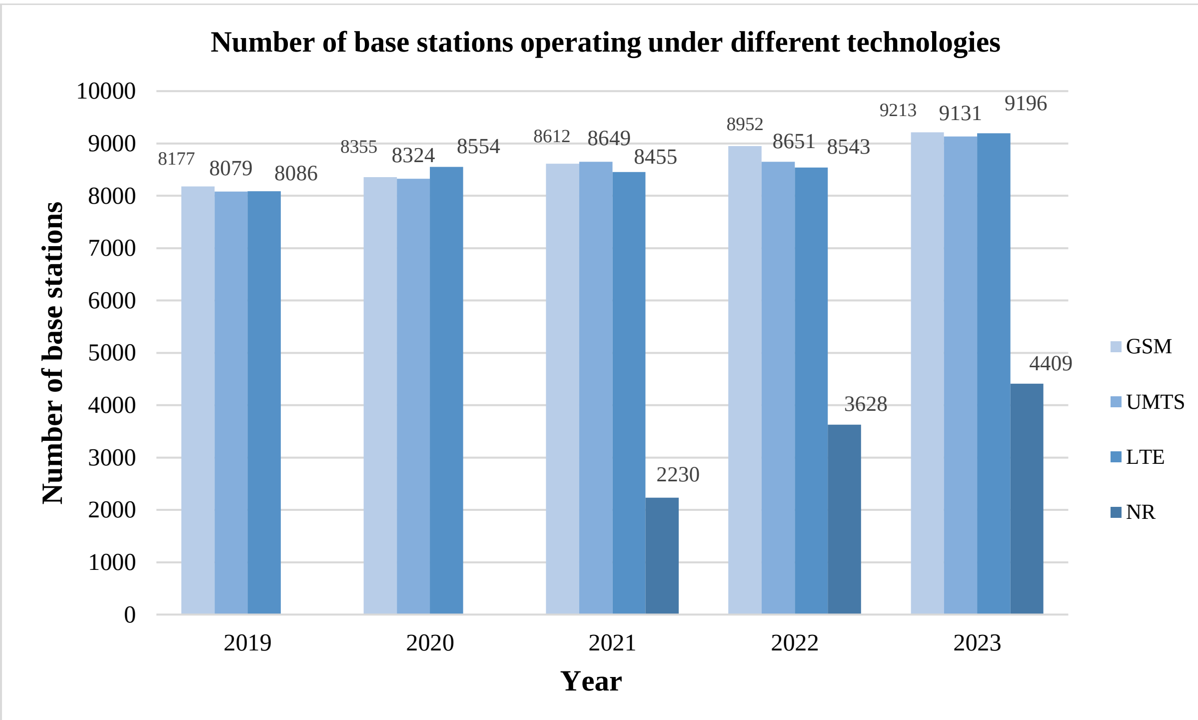
Over the past year, there has been a growing interest in the use of radio spectrum for the needs of Precision Agriculture – an innovative approach for the efficient management of processes in the farm. Thirteen authorisations were issued.

Demand for PMR/PAMR network frequency resource has been relatively constant in recent years. Following an analysis of the radio frequency spectrum provided for use and a national coordination and agreement of radio frequencies and frequency bands with all state authorities, departments and agencies concerned, 128 radio frequency channels were provided to undertakings, of which 53 radio frequencies were for the construction of 37 new radio networks for the provision of electronic communications for private needs through an electronic communications network from a mobile radio service.

One of the objectives set out in Decision (EU) 2022/2481 of the European Parliament and of the Council establishing the Digital Decade Policy Programme 2030 is for all end users at a fixed location to be covered by a gigabit network up to the network termination point, and all populated areas to be covered by next-generation wireless high-speed networks with performance at least equivalent to that of 5G, in accordance with the principle of technological neutrality.

9,257 transceiver stations and 732 short-range wireless access points are entered in the Register of transceiver stations on terrestrial networks allowing the provision of electronic communications services, the activities under Article 151, paragraph 1, item 16 of the Spatial Planning Act and the small-range wireless access points.

As it is clear from the chart presented in Figure 41, the number of 5G base stations operating under the NR technology is increasing at the highest rate.



Source: CRC

Figure 41

Fixed radio service

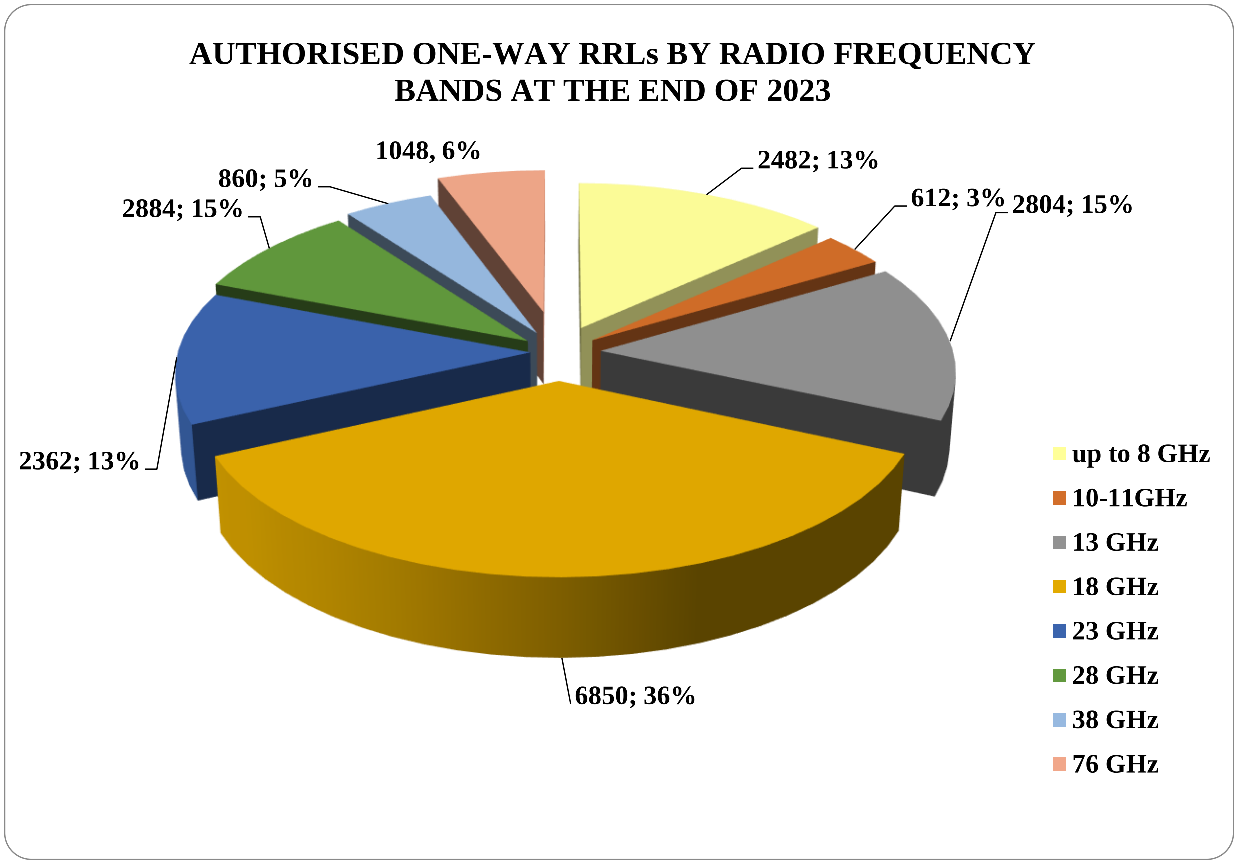
In 2023, amendments and supplements were made to 17 authorisations for the use of frequency spectrum, for the provision of electronic communications via electronic communications network of the point-to-point type concerning the technical data of a total of 2,191 radio relay links (RRLs). They assigned radio spectrum for 870 new links, and so their total number reached 20,354.

In 2023, the largest number of newly built links were registered in the 18 GHz band. They are immediately followed by the 23 GHz and 13 GHz bands in terms of new RRLs. The number of RRLs in the 13 GHz, 18 GHz and 23 GHz bands made up 2/3 of all authorised RRLs. This shows which bands are preferred by undertakings for the development of networks on the territory of Bulgaria.

A reduction in the total number of RRLs in the 8 GHz, 28 GHz and 38 GHz bands was reported due to the specific technical parameters of the RRLs and to an increase in the capacity of transmitted information.

As of 31 December 2023, 490 RRLs were registered in the electronic system for registration of the granted rights for the use of radio spectrum in the 71-76 GHz and 81-86 GHz bands, of which 35 use XPIC/CCDP technologies. A 5% increase was observed.

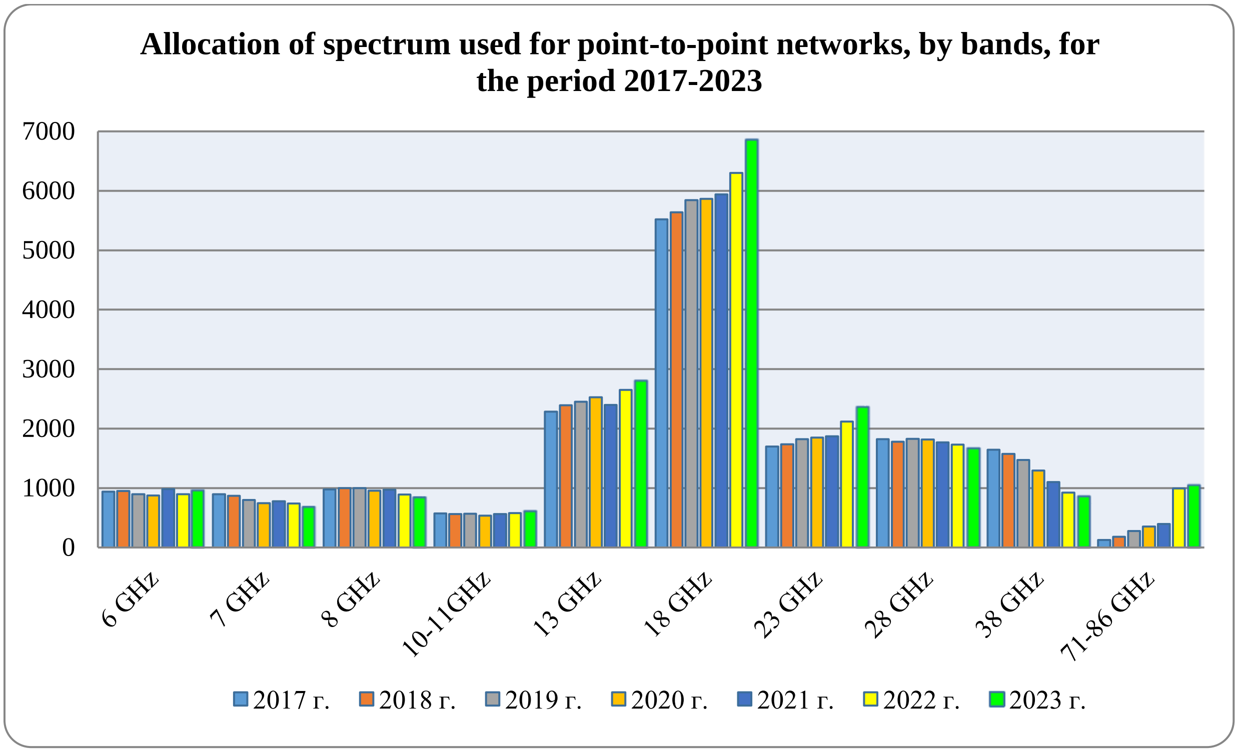
Figure 42 presents information on the share distribution of the active RRLs by radio frequency bands assigned with authorisations for the use of frequency spectrum, for electronic communications network of the point-to-point type, at the end of 2023, by percentage.



Source: CRC

Figure 42

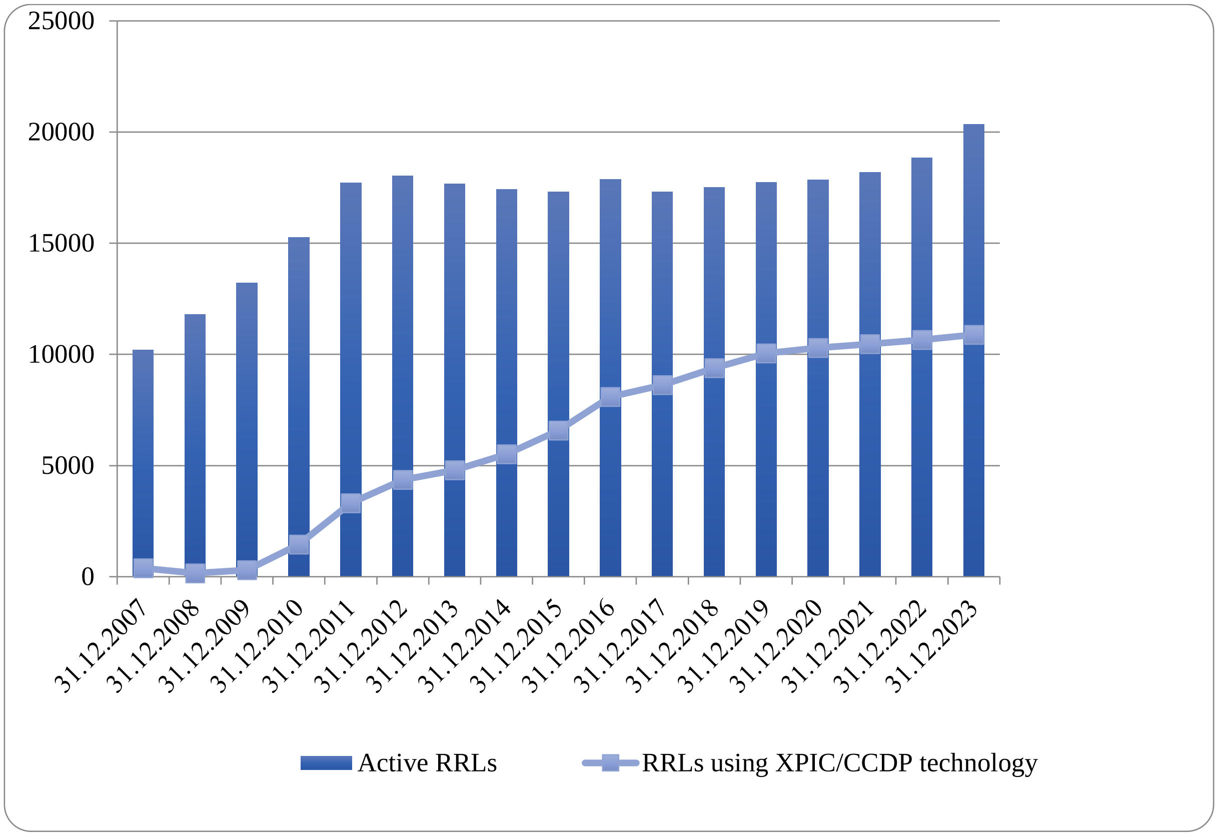
Figure 43 presents the allocation of spectrum used for point-to-point networks, by bands, for the period 2017-2023.



Source: CRC

Figure 43

Figure 44 displays the active RRLs by years, compared with the part of them which uses XPIC/CCDP technologies.



Source: CRC

Figure 44

With the development of 5G networks and the offering of new services, there is a need to increase the transmission capacities. Therefore, in 2023, the number of RRLs using new technical solutions for higher transmission speeds increased:

- using two radio frequency bands in one direction (band channel aggregation (BCA) or super dual band (SDB));
- using two adjacent channels in one direction (channel aggregation (CA));
- using both polarisations in a single RRL (cross-polar interference canceller/co-channel dual polarisation (XPIC/CCDP)).

The trend towards migration of the RRLs with a bandwidth of 3.5 MHz, 7 MHz and 14 MHz to 28 MHz, 56 MHz and 112 MHz bands was maintained. The number of links using XPIC/CCDP technologies reached 10,886 in 2023 (compared to 10,650 in 2022). The amendments to the authorisations reflect the increased need of undertakings to use higher transmission capacity, which in turn leads to an increase in the frequency band used in the various directions.

The radio relay network can be defined as supporting and complementing other networks providing electronic services. There is a constant development of radio relay networks of operators, and modern equipment is aimed at using new technologies to ensure high-speed connectivity of all types of networks through the use of less energy resources with better technical characteristics.

Satellite radio services

In 2023, the activities related to the regulation of satellite radio services continued to focus on coordinating and protecting the national positions on the geostationary orbit with the relevant radio spectrum and the radio spectrum used by non-geostationary satellite systems. The purpose of this process is to prevent potential interference to the Bulgarian planned and non-planned systems located at 1.9°E (BSS) and 56.02°E (FSS) and satellite systems located on non-geostationary orbit.

The activities of enabling Bulgarian undertakings to operate geostationary and non-geostationary satellite systems and thus to increase Bulgaria's presence on the satellite services market continued. Two requests for preliminary publication and one request for coordination of new Bulgarian satellite systems on non-geostationary orbit were submitted. A request for notification was also submitted for a satellite system on non-geostationary orbit.

In 2023, three radio spectrum authorisations were issued for the use of radio spectrum for electronic communications networks by satellite radio services, and so spectrum was assigned to ground stations that connect to three satellite systems.

The coordination activities continued through analyses of the biweekly circulars (BR International Frequency Information Circular - BRIFIC) issued by the Radiocommunication Bureau of the International Telecommunication Union. As a result of the analyses of all biweekly circulars for 2023, the relevant objections were sent in view of performing the regulatory functions of CRC in terms of the efficient use and effective management of the frequency spectrum.

In addition, an analysis was also made of the proposals received from other administrations to conclude agreements with a view to the successful coordination of the Bulgarian satellite systems.

Broadcasting

In 2023, with regard to a request of the Council for Electronic Media (CEM) for the assignment of free frequency resource to 19 cities concerning open procedures to hold competitions, technical analysis and frequency planning were performed for the assignment of frequency resources and the relevant technical parameters (admissible capacities, points of broadcasting as well as other technical information). In accordance with the provisions of the LAS, information was provided to CEM on:

- the lack of free frequency resource needed for terrestrial analogue broadcasting on the territory of the following cities: Dobrich, Lovech, Svilengrad, Pomorie, Ihtiman, Botevgrad, Belogradchik, Gorna Oryahovitsa, Blagoevgrad, Sliven, Momchilgrad, Yablanitsa, Tsarevo, Gabrovo, Vratsa, Pleven and Pernik;
- The technical parameters necessary for analogue terrestrial broadcasting of radio programmes on the territory of the cities of Montana and Targovishte, including free radio frequencies, admissible capacities for broadcasting, possible points of broadcasting, and other necessary technical information.

In 2023, a total of 81 technical parameters of electronic communications networks for terrestrial analogue broadcasting of radio signals in the VHF band (87.5-108.0 MHz frequency band) were examined and analysed, of which 23 were of undertakings authorised to use radio frequency spectrum from electronic communications network for terrestrial analogue broadcasting with national coverage, and 58 were of undertakings authorised to use radio frequency spectrum from electronic communications network for terrestrial analogue broadcasting with local coverage.

In connection with an authorisation for use of radio spectrum from the electronic communications network for terrestrial digital broadcasting of VIVACOM BULGARIA EAD, 3 technical parameters were examined and analysed.

A temporary authorisation for a short-term event (ensuring event commentary) was issued for the use of 4 frequencies from the VHF band.

National and international coordination

In 2023, in the Advisory Council for National Coordination and Agreement to CRC, 2,337 radio frequencies and frequency bands were coordinated and agreed. National coordination and agreement with all state authorities, departments and agencies concerned is carried out with the goal to ensure the aeronautical and maritime safety, the protection of national security, and the efficient use of the radio frequency spectrum.

In connection with the international coordination of terrestrial networks, requests were sent to the Radio Communications Bureau for the addition of 14 radio frequency assignments of Bulgarian VHF radio stations under the terms of the Regional Agreement on the use of the 87.5-108.0 MHz frequency range for VHF (FM) sound broadcasting, Geneva, 1984 (Geneva 1984).

A request for the entry of one Bulgarian radio frequency assignment in the Plan to the Geneva-84 Agreement was submitted.

Upon requests received from other administrations, international coordination of 3 radio frequency assignments with the appropriate technical parameters was carried out, in accordance with the Regional Agreement relating to the use of the 87.5-108.0 MHz frequency range for VHF (FM) sound broadcasting, Geneva, 1984 (Geneva 1984), while coordination was refused for 2 radio frequency assignments due to probable interferences with Bulgarian radio stations.

As a result of the processed and analysed publications in the biweekly BRIFIC circulars for terrestrial radio services, over the past year, 187 radio frequency assignments to foreign administrations with their respective technical parameters were coordinated under the terms of the Regional Agreement on the use of the 87.5-108.0 MHz frequency range for VHF (FM) sound broadcasting, Geneva, 1984.

In accordance with the terms of the Regional Agreement on the introduction of terrestrial digital radio and television broadcasting in the 174-230 MHz and 470-862 MHz frequency bands (Geneva 2006), one Bulgarian assignment was filed for entry in the 2006 Geneva Plan.

In accordance with the procedures under Art. 12 of the Radio Regulations of the International Telecommunication Union, 225 (116 in season A and 109 in season B) frequency assignments for terrestrial analogue and digital broadcasting of radio signals within the short-wave bands were coordinated.

Radio frequency assignments for satellite networks from the biweekly BRIFIC circulars for satellite radio services were processed and analysed. In order to protect the Bulgarian positions on geostationary and non-geostationary orbits and the assignments for fixed radio service from interferences, CRC sent 121 written objections and 124 objections, through specialised software products of ITU, to ITU and to the administrations whose satellite networks might potentially affect the Bulgarian networks. As a result of the performed examinations of the technical parameters and the further calculations, correspondence was exchanged with ITU and the relevant foreign administrations which had filed their requests in the biweekly circulars. In order to protect the Bulgarian satellite systems on geostationary and non-geostationary orbit as well as the assignments for terrestrial radio service from interferences, CRC sent objections, in accordance with the procedural rules of the Radio Regulations, to ITU and to the administrations whose satellite networks might potentially affect us, as follows:

Written objections

- in coordination of satellite networks from the fixed-satellite radio service emitting in Space to Earth direction and a possible interference to the feeder link of a satellite from the broadcasting-satellite radio service, pursuant to Art. 7 of Appendix 30A of the Radio Regulations – 11 objections;
- coordination between a satellite network on planned position from the broadcasting-satellite radio service and non-planned satellite network, pursuant to Art. 7 of Appendix 30 of the Radio Regulations – 10 objections;
- comments under Art. 9.3 of the Radio Regulations on planned satellite systems on non-geostationary orbits - 61 comments;
- coordination of a non-planned satellite station potentially affecting another non-planned satellite station, pursuant to Article 9.7 of the Radio Regulations - 27 objections;

Objections submitted via specialised ITU applications

- coordination of a satellite network on non-planned position from the broadcasting-satellite radio service and non-planned satellite network, pursuant to Art. 4 of Appendix 30A of the Radio Regulations – 1 objection was made for 1 satellite system;
- comments under Art. 9.3 of the Radio Regulations on planned satellite systems on non-geostationary orbits - for 90 satellite systems, and written notifications to the respective administrations were sent;
- coordination of satellite station using non-geostationary orbit and satellite system on geostationary orbit, pursuant to Art. 9.12A of the Radio Regulations – objections were made for 12 satellite systems;
- coordination of emitting satellite station and receiving station from fixed radio service included in the table of frequency assignments, pursuant to Art. 9.14 of the Radio Regulations – objections were made for 19 satellite systems;

Electromagnetic compatibility

During the year, electromagnetic compatibility analyses of 70 Bulgarian and 103 foreign VHF radio broadcasting stations with the aeronautical systems ILS, VOR and COM were carried out.

Due to the identified possible interference while carrying out analysis for electromagnetic compatibility with aeronautical radio services, 39 radio frequency assignments were submitted for measurement under the Methodology for measuring A1 type intermodulation products generated by the operation of closely situated VHF-FM radio transmission stations.

1.1.2. Numbering resources

At the end of 2023, the total number of undertakings authorised to use numbering resources was 24. All authorisations were brought in compliance with the type authorisation for the use of numbering resources.

During the year, one authorisation for the use of numbering resources was issued to UNIVERSAL TRADING GROUP LTD.

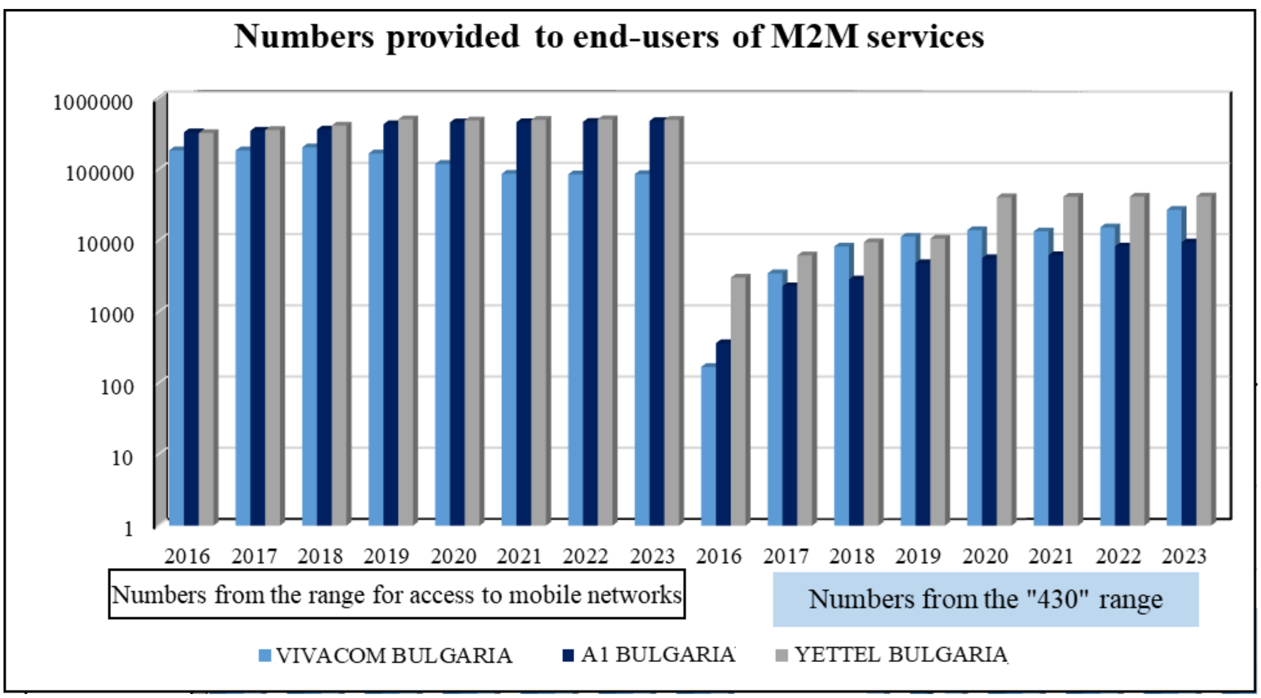
In 2023, 1,100 geographic numbers were provided for use. The total number of geographic numbers provided at the end of the year was 8,799,300. Due to optimisation of networks and services of the undertakings in 2023, the following numbering resources were released:

- 2,400 geographic numbers;
- 100 numbers from the “700” range;
- 100 numbers from the “800” range.

Numbering resource within the “430” range – for access to services using Machine-to-Machine (M2M) communication - was assigned to three undertakings:

- A1 BULGARIA EAD (A1);
- Vivacom Bulgaria EAD (Vivacom);
- Yettel Bulgaria EAD (Yettel).

In 2023, a slight increase was reported for all three undertakings in the numbers within the “430” range provided to end-users. The trend of using more numbers from the mobile network access ranges in the provision of M2M services continued.



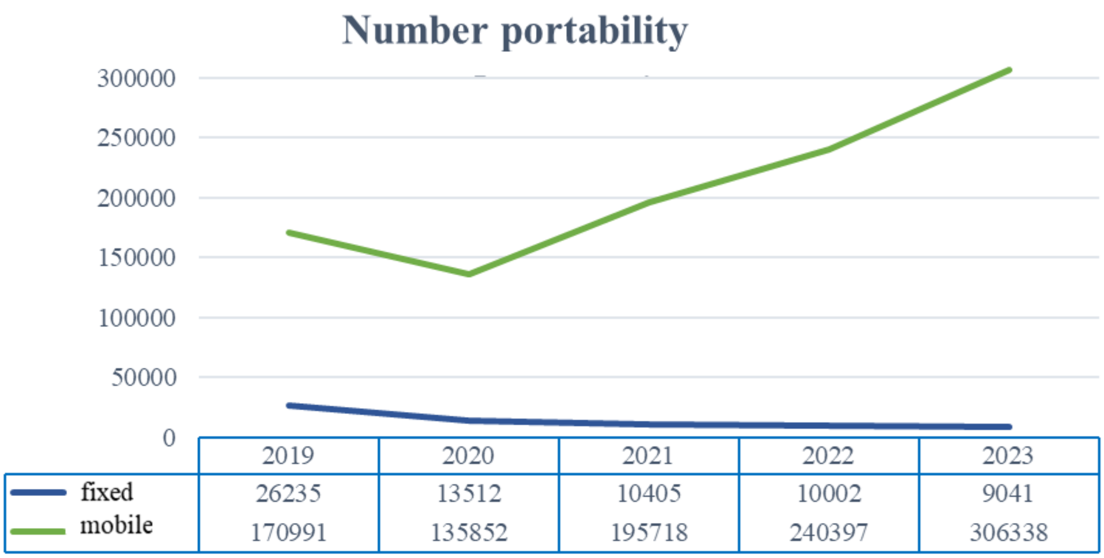
Source: CRC

Figure 45

Number portability

In 2023, an increase was observed, compared to 2022, in the number of end-users who took advantage of their right to retain the number used when changing the mobile service provider. The fixed service retained the tendency to reduce the number of ported numbers in 2023.

The trend for the porting of more numbers in mobile networks than numbers in fixed networks was preserved. Data on numbers ported over the last five years are presented in the following figure:



Source: CRC

Figure 46

Electronic trust services

In fulfilment of its powers under the Law on Electronic Document and Electronic Trust Services, in 2023, CRC confirmed the qualified status of the trust services providers Borica AD, Evrotrust Technologies AD, InfoNotary EAD, Information Services AD and of the trust services provided by them.

CRC maintains an up-to-date national trust list that contains information about the qualified trust services providers and about the services provided by them. In 2023, three new certification services were entered, designated at national level to the providers Evrotrust Technologies AD and InfoNotary EAD.

Summarised data on the trust services provided in the last four years is presented in Table 18.

Table 18

Trust service	2020	2021	2022	2023
	number	number	number	number
Issued qualified certificates for electronic signature	566,689	1,002,763	1,395,881	1,888 322
Issued qualified certificates for electronic seal	161	167	189	267
Issued qualified electronic time stamps	28,134,161	219,610,192	526,426,850	855,553,914
Issued qualified certificates for website authentication	253	234	318	309
Issued electronic evidence for qualified validation of electronic signature/seal	482,825	2,233,080	2,399,804	2,138,936
Qualified electronic signature/seal storage service	45,550	7,064	189,864	223,010
Issued electronic evidence of a qualified service for an electronic registered mail	-	218,802	503,163	861,461

1.2. Regulation and monitoring of the electronic communications markets

One of the main objectives of CRC is encouragement a sustainable competitive market and consumer protection. To achieve this, the Commission monitors and analyses the competitive environment of the markets for electronic communications networks and services and if necessary, amends existing regulatory measures or imposes new ones. In 2023, the CRC's activity for the implementation of this objective was aimed at:

1.2.1. Regulation of the electronic communications markets

In 2023, CRC received notified from undertakings providing electronic communications that the competitive environment is likely to be violated as a result of a number of acquisitions in recent years of active and passive infrastructure of undertakings[68] by one[69] of the participants in the electronic communications market. In addition, the Commission was approached with a number of requests for binding instructions under the Law on Electronic Communications Networks and

[68] Net Is Sat EOOD, Net 1 EOOD, ComNet Sofia EAD and Digital Cable TV OOD (N3)
[69] Vivacom Bulgaria EAD

Physical Infrastructure (LECNPI) on the occasion of an increase in the prices for access to the duct network of the incumbent undertaking.

The access to passive infrastructure (duct network) is a significant factor in the deployment of electronic communications networks, including very high capacity networks, without which the provision of retail services such as Internet access and TV, including IPTV, to end-users is not possible. The construction of passive infrastructure, including the duct network, is an essential cost element for the deployment of these networks. In this regard, and in order to facilitate the connectivity process, access to passive infrastructure is critical. Providing the possibility to deploy high-speed electronic communications networks creates conditions for the development of infrastructure competition and the provision of various services of better quality, which is of great public interest and protects the interests of end-users.

Given the importance of access to passive infrastructure for the technological development of networks and considering that the provision of ubiquitous connectivity through these networks is a key objective in the current regulatory framework CRC, by its Decision No 156/25.05.2023, collected information from undertakings that form a total market share of 76.3% (number of subscribers) on the market of Internet access at a fixed location in order to assess the state of competition on the market and the exercise of the powers under Article 42c of the LEC. As a result, CRC found that it should take action, in accordance with the provisions of Article 42a(1) of the LEC, to define a market different from the markets indicated in the applicable EU Recommendation for the relevant markets for *ex ante* regulation, namely defining and analysing an individual wholesale market for passive (physical) infrastructure access, in order to establish the need for regulatory intervention to ensure a sustainable competitive environment and protect the interests of end-users. In view of the above, by Decision No 215/20.07.2023 of CRC, all undertakings which had declared to CRC their intention to carry out activities for the provision of electronic communications networks and/or services were obliged to provide information about passive infrastructure in populated areas and fibres network owned and/or used by them for the period 2018-2022 and their intentions to build passive infrastructure for the next 5-year period. Based on the information provided and summarised, the work on the definition, analysis and assessment of the wholesale market for passive (physical) infrastructure access, which expected to be complete in 2024, was started.

1.2.2. Monitoring of the electronic communications market

In accordance with Art. 40 of the LEC, as well as Art. 15 of the Methodology for the terms and procedures of relevant markets definition, analysis and assessment (the Methodology), CRC regularly collects information from the undertakings providing electronic communications on the basis of a set of parameters for which data is collected by means of special-purpose questionnaires. By Decision No 381/14.12.2022, CRC approved the model forms and instructions to them concerning the undertakings' reports on their activity in the provision of public electronic communications in 2023. For yet another year, the undertakings submitted their annual reports through the CRC's electronic system for on-line questionnaires that has been in operation since 2020.

In 2023, in order to ensure the activities, described in item 1.2.1., two targeted questionnaires were also developed to collect information on access to and use of a duct network by undertakings providing electronic communications, appendices to Decisions NoNo 156/25.05.2023 and 215/20.07.2023 on the collection of information for the purposes of analysis and assessment of the competitive environment in relation to access to passive infrastructure.

1.3. Development and technical support of the National Radio Frequency Spectrum Monitoring System

In the past year 2023, the development of the National Radio Frequency Spectrum Monitoring system (NRFSMS) under the Development Plan for the period 2021÷2025 continued. Four fixed radio monitoring stations of the "compact radio monitoring systems" type were delivered; they are intended to expand the possibilities for radio monitoring on the territory of the cities of Veliko Tarnovo, Varna, Stara Zagora, and Pleven in the frequency range from 20 MHz to 6 GHz. One mobile radio monitoring station in the range from 20 MHz to 26.5 GHz, provided for use in the region of Southeastern Bulgaria, and two new specialised systems for measurements of the coverage and quality of mobile services provided by terrestrial GSM/UMTS/LTE/5G networks, intended for use in the region of Eastern Bulgaria, were commissioned.

To ensure the control and monitoring activities of electronic communications networks using radio spectrum, activities related to technical maintenance of the specialised technological equipment of fixed and mobile radio monitoring stations, as well as of the portable specialised measuring equipment of the NRFSMS, including calibration (where applicable), were regularly carried out.

At the end of 2023, for the implementation of its control functions, CRC had at its disposal the following main measurement systems:

- 23 (twenty-three) fixed stations for RFS monitoring (1 (one) manned and 22 (twenty-two) unmanned RMS), of which: 15 (fifteen) in the bands from 20 MHz to 3000 MHz and 8 (eight) in the bands from 20 MHz to 6000 MHz;
- 4 (four) mobile stations for RFS monitoring in the bands from 20 MHz to 3 GHz;
- 1 (one) mobile station for radio monitoring, detection and localisation of radio interference in the bands from 20 MHz to 6 GHz;
- 2 (two) mobile stations for radio monitoring in the bands from 20 MHz to 26.5 GHz;
- 3 (three) combined mobile stations for radio monitoring, detection and localisation of radio interference in the bands from 20 MHz to 6 GHz and measurements of the coverage and quality of mobile services provided by terrestrial GSM/UMTS/LTE/5G networks;
- 1 (one) dedicated mobile station for measurements of the coverage and quality of mobile services provided by terrestrial GSM/UMTS/LTE/5G networks;
- 1 (one) portable system for measurement of the coverage and quality of services provided by GSM/UMTS/LTE/5G networks;
- 6 (six) portable measurement systems for measurement of the coverage and quality of the DVB-T networks;
- 7 (seven) transportable measurement systems in the bands from 1 GHz to 26.5 GHz;
- 7 (seven) portable measurement systems for measurement in the bands from 9 kHz to 3

GHz;

- 14 (fourteen) portable measurement systems:
  - 4 (four) systems in the bands from 8 kHz to 8 GHz;
  - 7 (seven) systems in the bands from 9 kHz to 20 GHz;
  - 3 (three) systems in the bands from 20 MHz to 31 GHz;
  - 4 (four) systems in the bands from 680 MHz to 32 GHz.

According to the NRFSMS Development Plan for the period 2021÷2025, the future development is aimed at further expanding the functional and technological capabilities of the radio monitoring system in the following aspects:

1. Enabling the efficient and interference-free use of radio spectrum by lawful users, preventing the illegal use of spectrum and controlling the quality of services provided to end-users.

2. Construction of new fixed radio monitoring stations of the "compact systems" type in order to ensure greater territorial coverage of the country and effective regular monitoring by the Commission of higher frequency ranges.

3. Providing systems for measurement of the coverage and quality of mobile networks in connection with the use of new frequency bands and 5G networks in the Republic of Bulgaria.

4. Enabling the control of the quality of services provided through terrestrial digital broadcasting, as well as preventing the illegal distribution of digital radio and TV programmes.

The development of a modern and effective system for radio spectrum monitoring for civil needs requires investment of serious financial resources for its development and maintenance.

The funds provided in 2023 contributed to the development of the NRFSMS and the expansion of the territorial and frequency coverage of the performed radio spectrum monitoring for civil needs, thus increasing the efficiency of the Commission's control over electronic communications networks using radio spectrum.

1.4. International activity of CRC in 2023

In 2023, CRC continued to take an active part in the activities of specialised organisations in the field of electronic communications and postal services at global, European and regional level with the purpose of maintaining an effective and fruitful international cooperation. This has led to the implementation of good regulatory practices, exchange of experience and better functioning of the internal market for electronic communications networks and services.

Participation in the work of European structures

For yet another year, CRC cooperated actively with the European structures whose aim is to protect the interests of the country through a consistent and coherent national position regarding the EU legislation.

In 2023, CRC participated actively at a management and expert level in the work of the Independent Regulators Group (IRG) and the Body of European Regulators for Electronic Communications (BEREC), contributing to the development of common regulatory practices. Within the framework of the four IRG General Assemblies and BEREC Plenary meetings held during the year, as well as meetings of the Contact Network, a number of documents were discussed and adopted in implementation of the BEREC Work Programme 2023, which are directly reflected in the CRC's work, more important of which are:

- BEREC Report on comparison tools and accreditation;
- BEREC Report on competition amongst multiple operators of NGA networks in the same geographical region;
- BEREC Report on the regulatory treatment of business services;
- BEREC Report on practices and challenges of the phasing out of 2G and 3G;
- BEREC Report on interoperability of number-independent interpersonal communication services (NI-ICS);
- BEREC Report on the impact of Artificial Intelligence (AI) solutions in the telecommunications sector on regulation;
- BEREC Report on sustainability indicators for electronic communications networks and services;
- BEREC Report on secure 5G networks;
- BEREC Report on the current cybersecurity challenges and dependencies in electronic communication networks;
- Periodic BEREC reports on intra-EU communications, international roaming, the implementation of the Open Internet Regulation and the practice of regulatory accounting for 2023;
- BEREC Report on weighted average cost of capital (WACC) parameters for 2023;
- BEREC Guidelines on very high capacity networks;
- BEREC's feedback to the European Commission's draft implementing decision setting out key performance indicators for the 2030 Policy Programme "Path to the Digital Decade";
- BEREC Opinion on the review of the intra-EU communications regulation.

In 2023, an extraordinary Plenary meeting of the BEREC Board of Regulators and two extraordinary meetings of the Contact Network were held in connection with BEREC Opinion on the draft European Commission's Gigabit Connectivity Recommendation , BEREC input to the European Commission's exploratory consultation on the future of the connectivity sector and its infrastructure, and BEREC's Analysis of the European Commission's legislative proposal for Gigabit Infrastructure Act.

The Commission was also represented at the BEREC Stakeholder Forum which addressed issues related to the BEREC Work Programme 2024 and discussed stakeholder engagement during the preparation process of the Work Programme. Panel discussions were held on the accessible future for end-users with disabilities and the future of regulation in the digital age, and a presentation was made on the EU Regulation on harmonised rules on fair access to and use of data.

In addition, during the reporting period, the Commission participated in the two Plenary meetings of the European Regulators Group for Postal Services (ERGP) and the meetings of the

Group's Contact Network. The most important documents that were adopted during the meeting of the ERGP are as follows:

- ERGP Work Programme 2024 and report on the public consultation of the draft ERGP Work Programme 2024;
- ERGP Report on the powers of the NRA;
- ERGP Report on the effects of the modernisation / adaptation of the universal postal service (UPS);
- ERGP Report on quality of service, consumer protection and consumer service;
- ERGP Report on core indicators of postal services;
- Report on practices for environmental sustainability in the postal sector;
- ERGP Decision on the selection of the co-chairs of the working subgroups for the period 2024-2025;
- ERGP Decision for the allocation of subgroups and tasks in 2024;
- Project requirements documents for the activities of working subgroups in 2024;
- ERPG Communication Plan for 2024;
- List of ERPG's meetings in 2024;
- Report on the future of ERGP.

Before the second Plenary meeting for 2023, a workshop with stakeholders was held, during which the following was discussed:

- the most important areas for postal undertakings where measures should be taken to increase sustainability;
- activities that could be undertaken by the undertakings to increase sustainability;
- consumer awareness and behaviour;
- development of parcel delivery cabinets and their advantages to ensure environmental sustainability.

In 2023, CRC's representatives also participated in three meetings with representatives of the Competition Committee and the mission of the Regulatory Policy Committee of the Organisation for Economic Cooperation and Development (OECD) in connection with the process of the accession of the Republic of Bulgaria to the OECD. Questionnaires were completed in connection with the technical review of digital economy policy within the OECD Committee on Digital Economy Policy.

Representatives of the Commission also took part in the work of the Digital Services Working Group of the European Commission and the relevant ICT subgroup of the Digital Services Working Group dealing with issues related to the implementation of Regulation (EU) 2022/2065 and the information exchange system under Article 85 of the Regulation. A CRC's representative participated in meetings of the informal network for cooperation and coordination of future digital services coordinators established in accordance with the Recommendation[70] of the European Commission (EC) of 20 October 2023 on coordination of responses to incidents arising in particular from the dissemination of illegal content, before the full entry into force of Regulation (EU) 2022/2065.

With its active participation in the work of BEREC and ERGP, CRC contributed to the preparation and adoption of a number of documents in implementation of the European Electronic Communications Code (EECC).

Over the past year, Bulgaria became a member of the Forum of European Supervisory Authorities for trust service providers (FESA). CRC experts, as representatives of the authority supervising the trust service providers in the Republic of Bulgaria and responsible for the creation, maintenance and publication of the national trust list, took part in the work of the FESA and the joint 21st and 22nd meetings of an ENISA expert group under Article 19 of Regulation (EU) No 910/2014 – ENISA ECATS EG. The meetings adopted a guidance document on actions for withdrawal of devices for the creation of qualified electronic signatures/seals (SSCD/QSCD) from the European list of certified devices, and discussed amendments to standards of the European Telecommunications Standards Institute (ETSI), ENISA's documents, and the inclusion of the requirements of the NIS 2 Directive[71] in the audit of trust service providers carried out by the conformity assessment body.

CRC's experts also participated in the Trust Services and eID Forum and CA-Day. The latest developments in eIDAS 2[72] were reviewed, in addition to the trust services under the NIS 2 Directive, the forthcoming implementation of the European Union's (EU) Digital Wallet as a technological solution for the provision of secure on-line services to EU's citizens, and issues related to auditing of cloud trust services and to what extent there are requirements for them that can be met and verified as set out in the NIS 2 Directive, ETSI and ISO[73] standards.

In addition, in connection with the forthcoming introduction of an early warning system for the population in our country, CRC's experts participated in the expert group on the Exchange of Experts in Civil Protection Programme, where they got acquainted with the Cell Broadcast system for early warning of the population which is currently operating in Romania.

Participation in the activity of specialised international organisations

In 2023, CRC participated in a number of forums organised by the International Telecommunication Union (ITU), the European Conference of Postal and Telecommunications Administrations (CEPT), the European Telecommunications Standards Institute (ETSI), the Network of French-speaking telecommunications regulators (FRATEL[74]), etc.

Representatives of the Commission participated in the World Summit on the Information Society (WSIS 2023). The annual WSIS Forum is a global multi-stakeholder platform that facilitates the implementation of WSIS Action Lines to advance sustainable development. It is

[70] https://ec.europa.eu/newsroom/dae/redirection/document/99468
[71] Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity in the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive)
[72] Regulation (EU) 2024/1183 of the European Parliament and of the Council of 11 April 2024 amending Regulation (EU) No 910/2014 as regards the establishment of a European Digital Identity Framework
[73] International Organization for Standardization
[74] Réseau francophone de la régulation des télécommunications

jointly organised by the ITU, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Development Program (UNDP) and the United Nations Conference on Trade and Development (UNCTAD), in close cooperation with all organisations supporting the implementation of WSIS Action Lines and other UN organisations. In 2023, the event was held under the title WSIS Action Lines for Advancing the Achievement of Sustainable Development Goals (SDGs). The event was attended by ministers and high-level politicians, leaders of international organisations, heads of regulators, representatives of the business, civil society, and academia from more than 150 countries to exchange ideas, share experiences for a common objective of using information and communication technologies to advance sustainable development. The main topics discussed during the event are related to digital cooperation and partnership for inclusive sustainable development, WSIS+20 and the future of WSIS after 2025, overcoming the digital divide, building trust and security in the use of ICT, access to information and knowledge for all, digital economy and trade, digital governance and capacity building, accelerating innovation and entrepreneurship for digital development.

The Commission also took part in the annual Global Symposium for Regulators (GSR), which was organised by the ITU in cooperation with the Government of Egypt. During the GSR-23, more than 700 representatives of ICT regulatory and policy-making bodies in the field of ICT and other digital technology stakeholders from more than 100 countries shared their views and experience on the most pressing regulatory issues facing the ICT sector. During the sessions of the leadership segment included in the event’s programme, the issue of how policies and regulatory innovations can stimulate universal and significant connectivity and sustainable digital transformation as well as issues related to reliable digital infrastructure, the spectrum for tomorrow, on-line protection of children and young people, digital accessibility, providing affordable devices for the unconnected, early warning systems to the public in emergencies, how to go green with the digital transformation and the use of metaverse capabilities were discussed. Within the framework of the GSR-23, the Heads of Regulators Executive Roundtable was held, which adopted GSR-23 Best Practice Guidelines on "Regulatory and economic incentives for an inclusive sustainable digital future." Strategies and approaches to promote cross-sectoral and interregional cooperation in the digital space were discussed, taking into account the fact that, in the digital transformation, ICT regulators are required to render effective cooperation at national, regional and global level and in all sectors of the economy in order to solve issues related to investments, connectivity and access to ICT, and to enhance the inclusiveness, competitiveness and innovation potential in digital markets.

The Commission was represented at a management level in the Ministerial Programme of the Mobile World Congress (MWC), organised by the Association of mobile network operators from around the world (GSMA). The event is organised annually and gathers industry leaders, regulators and representatives of ministries from all over the world. MWC is the largest global event for the mobile industry, organised by GSMA and held in Barcelona. It brings together the latest innovations and state-of-the-art technologies from leading companies around the world. The GSMA Ministerial Programme is a high-level forum, which annually gathers ministers, heads of regulatory bodies, senior employees of mobile industry companies, representatives of data protection organisations and international organisations to share knowledge and discuss key developments in technology and trends in mobile sector policy. In 2023, more than 1,800 delegates from 151 countries participated in the event, including 68 ministers and 106 heads of regulatory bodies. Topics related to consumer privacy in the metaverse and the humanitarian impact driven by data, network investments, 5G expansion, digital inclusion, radio spectrum policy, etc. were discussed. The BEREC-GSMA Roundtable was also held within the framework of the Ministerial Programme, during which the members of BEREC and high-level representatives of European mobile operators in three sessions addressed issues related to the impact of inflation and the energy crisis on the sector and the consequences, arising from an increased focus on the European sovereignty, digital objectives and investment shortages, and digital transition and sustainability. During the congress, representatives of the big tech companies demonstrated to the participants the latest achievements in the field of mobile communications.

Representatives of CRC, as part of the official delegation of the Republic of Bulgaria, also took part in the ITU World Radiocommunication Conference (WRC-23). During the event, issues concerning the conditions for the use of radio spectrum for terrestrial and satellite networks were discussed, amendments to provisions of the Radio Regulations and existing resolutions and recommendations were adopted. The relevant regulatory conditions for the use of radio spectrum for international mobile telecommunications (IMT) were defined. For Region 1, which also includes our country, the 6 GHz band was designated as IMT, provided that protection of existing networks is provided. The conditions for the use of radio spectrum for space research were also amended, which will contribute to the development of science and technology worldwide. Additional radio spectrum and conditions for its use for Earth exploration satellite radio service to transmit environmental data were also defined. A number of procedural and technical conditions for the use of radio spectrum by geostationary and non-geostationary satellite systems were amended in order to make effective and optimal use of scarce resources. The decisions taken by WRC-23 will contribute to the achievement of the digital transformation goals and will enable people to connect to the Internet from anywhere in the world. One of the most important issues discussed during the WRC-23 is the setting of agenda items for the following two conferences – in 2027 (WRC-27) and in 2031 (WRC-31). Of particular interest to the European countries is the inclusion of the item for explorations until 2027 relating to the allocations for Earth exploration satellite radio service (passive) for the measurement of sea water temperature, as well as an overview of the use of spectrum for the needs of broadcasting applications and mobile radio service, considering possible regulatory actions in the 470-694 MHz frequency band in the preliminary agenda for 2031.

The Commission also participated in the extraordinary Congress of the Universal Postal Union (UPU), which examined and approved a report on assistance and support to the postal sector of Ukraine, a proposal to amend certain articles of the Postal Convention, proposals to amend the functions of the Administrative Council and the Postal Operations Council, report on the opening up of the Union to wider postal sector players, including Union opening up models, restrictions and funding, new models for postal services provision, green transformation of the sector, Union reform, financial services and agreement on postal payment services.

The Commission was also virtually represented at the 21st Annual Meeting of the NRA network in the field of electronic communications (FRATEL) by the Member States of the International Organisation of Francophonie, which discussed the subject “Why and how to involve the user in regulation?” Within the event, divided into three round tables, the different types of users were discussed, in the interest of which regulation is exercised and what is applied to satisfy their needs, ways to improve the effectiveness of information actions in relation to different categories of users and issues of support to the general public in the face of technological developments. During the annual meeting, the new Coordination Committee for 2024 was elected.

CRC also participated in the regular and extraordinary meetings of the General Assembly of ETSI and the meetings of the National Standards Organisations for ETSI, which were held virtually and physically. These meetings mainly discussed and took decisions regarding the modification of the internal rules and procedures for work resulting from the amendment of Regulation (EU) 1025/2012 on European standardisation, which entered into force on 09.07.2023. The list of national standardisation bodies has been updated in accordance with Article 27 of the Regulation. For the Republic of Bulgaria, these bodies are the Bulgarian Institute for Standardisation – fulfilling the obligations of a national body for CEN and CENELEC, and the Communications Regulation Commission (CRC) – for ETSI.

In connection with the activities related to the participation in the preparation of the official position of the Republic of Bulgaria for WRC-23, representatives of CRC took part in the meetings of the Conference Preparation Group (CPG) at CEPT. In 2023, the European Common Proposals (ECP) were finally adopted as items on the WRC-23 agenda.

Radio spectrum experts took part in the 62nd Plenary meeting of the Electronic Communications Committee (ECC). It was agreed to publish draft CEPT report on devices using ultra-wide band (UWB) technology connected to the 6-8.5 GHz frequency band, CEPT reports related to short-range devices (SRD). The following drafts were adopted for public consultation:

- An updated ECC decision for radio determination devices in the 116-260 GHz band;
- CEPT Report on the European Commission decisions on SRD;
- CEPT Report on radio determination devices in the 116-260 GHz band;
- Amendment to ERC/REC 70-03, Annex 6 for radio determination devices;
- An updated ECC decision on reserving the national numbering range beginning with "116" for harmonised numbers for services of social value;
- An updated ECC decision on reserving the national short message service (SMS) numbering range beginning with "116" for harmonised SMS numbers for harmonised services of social value.

A CEPT Report on UWB below 10.6 GHz, an ECC Recommendation on international coordination in the 26 GHz frequency band, and an ECC Decision on the use of the 40.5-43.5 GHz frequency band for "fixed-satellite" and "broadcasting-satellite" radioservices were finally approved for publication.

CRC experts also took part in the meetings of the ECC Working Group Numbers and Networks (WG NaN). In connection with Commission Implementing Decision (EU) 2023/468 of 25 November 2022, which added number 116016 to a new service "Helpline for victims of violence against women", draft amendments to decisions have been adopted for public consultation, concerning the maintenance of the national numbering range beginning with "116" for harmonised numbers and SMS numbers for harmonised services of social value, as well as draft amendments to ECC/REC/(17)02 "Harmonised European Management and Assignment Principles for E.212 Mobile Network Codes (MNC)", and ECC Recommendation on "Measures to handle incoming international voice calls with suspected spoofed national E.164 numbers";

The following were finally adopted:

- Amendment to Recommendation "Harmonised European Management and Assignment

Principles for E.212 Mobile Network Codes (MNC)";

- ECC Recommendation on "Measures to handle incoming international voice calls with suspected spoofed national E.164 numbers";
- ECC Report on "Defining and Calculating Availability of Space in Cable Ducts";
- Recommendation "Extra-Territorial Use of E.164 Numbers – High level principles of assignment and use";
- Recommendation "Numbering and Addressing in Machine-to-Machine (M2M) Communications".

Bilateral cooperation

In 2023, CRC also continued the practice of developing and deepening the bilateral cooperation.

CRC representatives took part in the ITU Regional Regulatory Forum for Europe on: "Universal Connectivity in Europe: The Current State and the Future Prospects", which was organised by the Agency for Electronic Communications and Postal Services of Montenegro (EKIP), together with the ITU Office for Europe, within the ITU Regional Initiative for Europe on "Digital Infrastructure Development". During the event, representatives of ministries, regulators, electronic communications operators, experts from international organisations and institutions discussed topics related to the development of broadband access in the region, the future of regulation in the digital age, market and technological trends, and consumer rights protection. Topics on roaming between the EU and the Western Balkan countries, market analyses, regulatory measures, development of new applications and promotion of competition and investment efficiency were also discussed.

The Commission also participated in the 14th International Electronic Communications Regulators Conference organised by the Information and Communication Technologies Authority of Türkiye (ICTA/BTK[75]), which discussed the new generation regulatory approaches and the prospects for Türkiye in the light of the challenges we face as a result of the new technologies - the new digital services and cybersecurity issues. The Conference addressed the introduction of artificial intelligence, including the legal and ethical dimensions, as well as a demonstration was made of the use of artificial intelligence Sena to answer various questions, including the question: "Is there a need for international regulations in the field of artificial intelligence?" A presentation was made of the radio monitoring system and the work on radio interference in modern conditions in new types of signals and next-generation radio services with a view to effective and efficient use of the radio spectrum. Visits were organised to the latest project implemented by ASELSAN, the largest defense electronics company of Türkiye, for the needs of BTK - the National Radio Monitoring Control Centre, as well as the Centre for Cybersecurity and Communications Surveillance in the country. The challenges for national regulators related to new digital services and cybersecurity issues were presented, and the future prospects for the development of telecommunication companies in the Republic of Türkiye were discussed. The issue of environmental protection was also discussed, with particular attention being paid to disaster risk reduction and management, and stakeholder's commitment.

[75] Bilgi Teknolojileri ve İletişim Kurumu

The Commission also participated in a workshop on spectrum monitoring/engineering jointly organised by the Turkish regulator ICTA and ASELSAN, together with representatives of NRAs from 9 countries in the region: Azerbaijan, Bulgaria, Croatia, Kosovo, Montenegro, North Macedonia, Palestine, Romania and Serbia. During the event, issues related to the localisation of narrow-band signals in multipath propagation, spectrum monitoring and signal localisation through drone formation, monitoring and analysis of signals on mobile terrestrial networks, two-dimensional and three-dimensional coverage and patterns of signal propagation, drones and navigation systems, identification and jamming of signals, protection against navigational jamming, mission critical communications and 5G/6G technologies were discussed.. Within the workshop, a visit to the production complex of ASELSAN in the town of Gölbaşı was organised - it is one of the five ASELSAN complexes where ground, air, sea, space and radar systems, specialised combat systems and unmanned vehicles for business and defense forces are being developed, manufactured and tested.

Radio spectrum experts also participated virtually in the following peer review forum on:

- a selection procedure for the assignment of spectrum in the 3600 MHz band (non-assigned frequencies) and the 26 GHz band for wireless electronic communications networks in Austria, where the legal framework and general information were presented on the tender procedure which is to take place in the first quarter of 2024, as well as an overview of the market situation in the country, the objectives set and the conditions provided for in the authorisations was made.
- the process of preparing the selection procedure for the reassignment of 900 MHz and 2100 MHz frequency bands in Slovakia, where the state of the telecommunications market, the existing operators, the current spectrum allocation, the selection procedure process, the duration of authorisations, the obligations and commitments envisaged are presented.

In order to achieve its strategic objectives at a national and international level, the Commission will continue to develop its international cooperation on the basis of multilateral dialogue and bilateral partnership with other NRAs.

1.5. Information technology for 2023

The provision of suitable information service of CRC and the maintenance of the electronic administrative services offered is of significant importance for the efficient performance of its regulatory and monitoring functions. The Commission has set the following priorities for the development of information services:

- Maintenance of existing business and citizen-oriented electronic services and development and maintenance of internal electronic services;
- Creating an organisational, communication and information environment for efficient and at the same time transparent functioning of the CRC administration.

In 2023, CRC performed the following project related to e-governance:

- Conduct of a public procurement procedure, contractor selection and conclusion of a contract with subject: "Upgrade of the ‘Licensing and Registers’ information system and the portal for electronic administrative services of CRC".

In 2023, CRC fulfilled the following projects related to improving the information and communication environment:

- Ensuring post-warranty support of the "Licensing and Registers" information system which assists the management of information processes for maintenance of the public registers of the Commission and the provision of public access through the Internet, in compliance with the requirements laid down in the LEC, the Law on Electronic Document and Electronic Trust Service (LEDETS) and the Postal Services Act (PSA).
- Delivery and configuration of disaster recovery centre equipment, providing redundancy of the cluster system in CRC;
- Renewal of anti-spam and web filter licenses, as well as providing an additional e-mail protection license;
- Update of licensed Oracle software;
- Providing licenses for the protection of end-devices by using WithSecure;
- Providing licenses for a multi-factor authentication system for employees in CRC and for external contractors when making a VPN access to the systems supported by them;
- Improvement of the technical and communication procurement and related services:

➢ Conducting a procurement with subject: "Delivery of communication equipment";

➢ Conducting a procurement with subject: "Delivery of computer equipment";

➢ Engineering assistance for communication equipment and active directory;

➢ Commissioning a new server and installation of ICS Manager and HTZ Communication;

➢ Provision of post-warranty service of existing communication equipment and ensuring DNA licenses.

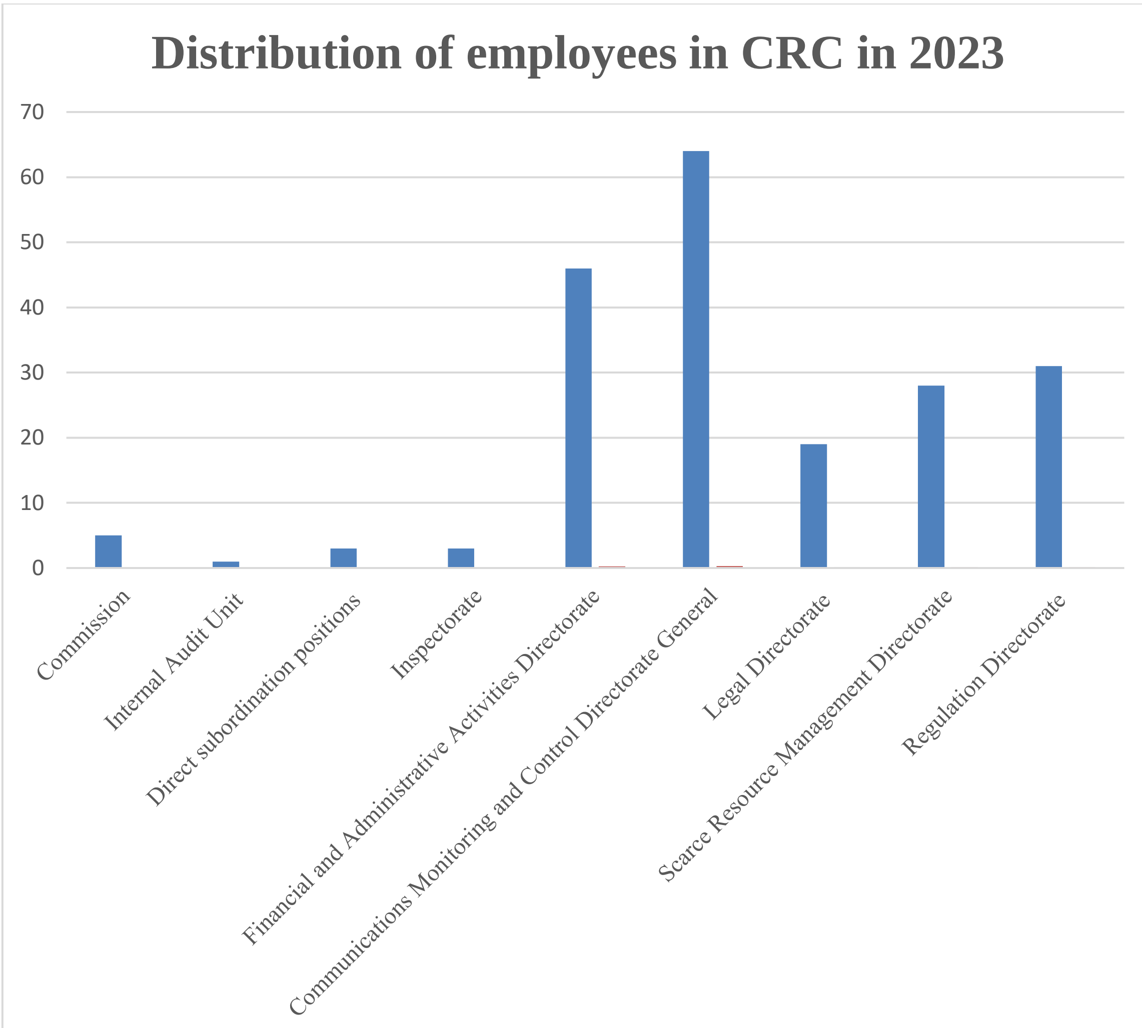
1.6. CRC's administrative capacity

One of the main components of the human resource management system is related to the creation of prerequisites for training and development of the personnel. The process of training the CRC's employees covers several main areas, namely study and identification of training needs, training planning, conducting training, evaluation of the training results, system for research, collection, storage and dissemination of knowledge.

In 2023, CRC performed its activity with the following distribution of employees:

• Committee	5
• Internal Audit Unit	1
• Direct subordination positions	3
• Inspectorate	3
• Financial and Administrative Activities Directorate	46
• Communications Monitoring and Control Directorate General	64

- Legal Directorate 19
- Scarce Resource Management Directorate 28
- Regulation Directorate 31

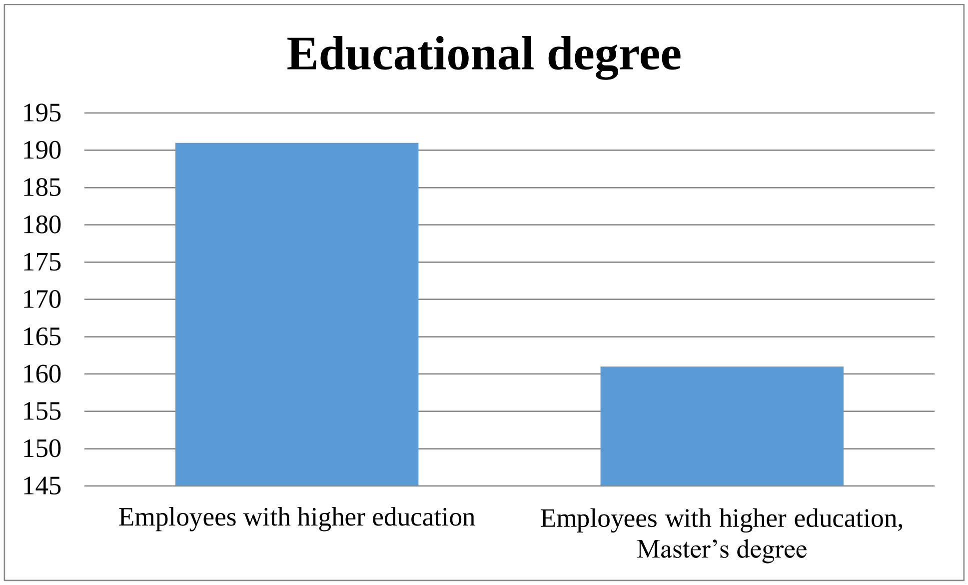


Source: CRC

Figure 47

The total number of CRC's staff was 255 full-time employees.

Of the total number of CRC employees, 191 had higher education, as 161 of them had an educational and qualification degree "Master".



Source: CRC

Figure 48

The employees at the CRC administration had education in the following areas – technical sciences; legal sciences; economic sciences; humanitarian sciences and others. The highest share was held by the technical, followed by the economic sciences, which is in line with the specifics of the Commission's activities.

The employees at the CRC administration are appointed and dismissed in accordance with the provisions of the Law on Civil Servants, the Ordinance on the conduct of competitions and the selection for mobility of civil servants and approved internal rules.

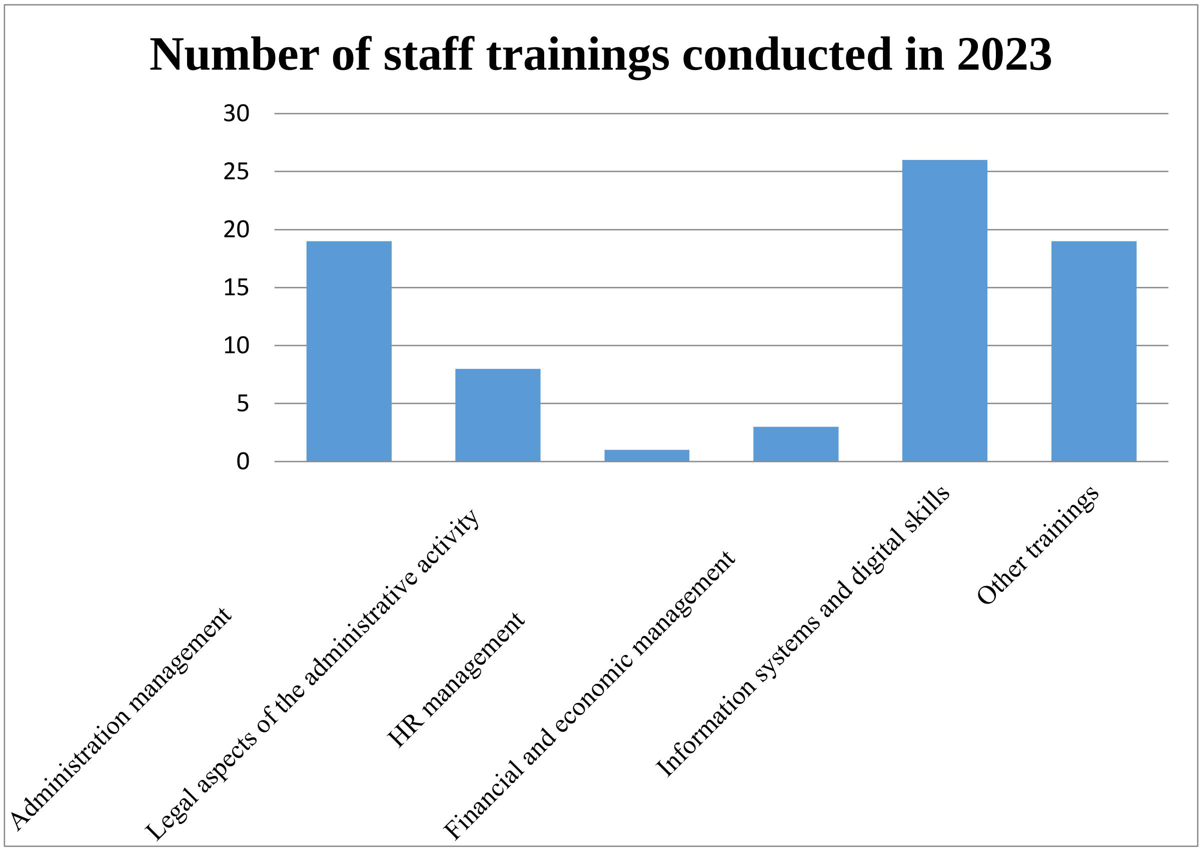
In 2023, a total of 23 (twenty-three) competition procedures were organised and conducted, resulting in 15 (fifteen) new employees being appointed by the end of the year. The employees accepted from other administrations under the conditions of Art. 81a of the LCS were 3 (three). Terminated legal relationships on different legal grounds for the same period – 22 (twenty-two).

In 2023, in order to improve the administrative capacity of the employees of the CRC administration, to maintain up-to-date the knowledge already acquired and to acquire new knowledge, with regard to the need of fulfilling the new functions assigned to CRC, participation in specialised trainings and seminars were organised, by areas and number, as follows:

Table 19

Area of training	Number of trainings conducted	Number of trained employees
Administration management	19	80
Legal aspects of the administrative activity	8	31

Human resource management	1	1
Financial and economic management	3	7
Information systems and digital skills	26	293
Specialised training	19	192



Source: CRC

Figure 49

In order to increase the effectiveness and efficiency of trainings, the needs for participation in new trainings were studied and trainings are planned and provided according to the specifics and financial opportunities.

Getting feedback on the degree of satisfaction, the practical usefulness of the conducted trainings, as well as tracing the effect of the conducted trainings is a good practice in CRC.

To receive feedback from the employees of the CRC administration who attended trainings in 2023, as well as to study the areas that are important for their development in the next calendar year, three e-surveys were sent to all employees.

The results of the surveys were systematised and, based on them, an analysis of the needs and planning of participation in new trainings was prepared.

Ensuring health and safety at work is part of the process for improving the working conditions at CRC. The Commission's management is aimed at continuously improving the organisation and management of the activity to ensure health and safety at work. Regular medical examinations for all CRC employees were organised for yet another year for health prevention purposes. Measurement of illumination, resistance of protective grounding systems and objects in CRC was organised. New personal protective equipment was provided to the employees of the Communications Monitoring and Control Directorate General, given the specifics of the functions they perform.

2. Other important activities

2.1. Standardisation

In 2023, Regulation (EU) 2022/2480 of the European Parliament and of the Council on European standardisation (the Regulation) entered into force, amending Regulation (EU) No 1025/2012 on European standardisation. In this regard, ETSI made changes to its decision-making processes to ensure that decisions relating to the Standards Request of the European Commission are taken by the national standardisation bodies of the EU Member States. CRC participated in the regular and extraordinary meetings of the General Assembly of ETSI, as well as in meetings of the National Standards Organisations Group (NSOG) for ETSI, which discussed and made changes to the Institute's internal rules and procedures of voting on draft standards and WorkItems identified in the Standardisation Request proposed by the EC. A separate Member States' National Standardisation Bodies Group (NSBG) was established with rules and procedures for work in accordance with the requirements of the Regulation.

The list of national standardisation bodies, as referred to in Article 27 of the Regulation, was updated. For the Republic of Bulgaria, these bodies are the Bulgarian Institute for Standardisation – fulfilling the obligations of a national body for CEN and CENELEC, and the Communications Regulation Commission (CRC) – for ETSI.

In 2023, in fulfilment of its obligations, CRC continued to provide access through its website to all stakeholders in the Republic of Bulgaria to provide opinions and comments on the draft European standards of ETSI. The Commission was involved in all ETSI public consultation procedures and ensured the introduction of approved and published European standards as national. Together with the Bulgarian Institute for Standardisation (BDS), 28 European standards of ETSI were introduced as national standards.

In 2023, CRC participated, through its representatives, in the work of four technical committees (TCs) for standardisation of BIS (TC 47, TC 57, TC 75, TC 80), which dealt with electronic communications.

2.2. Performance of obligations related to Chapter 15 of the LEC

On 8 June 2023, Chapter 2 of the Rules on minimum security requirements for public electronic communications networks and services and risk management methods (the Rules) entered into force. In this regard, during the year, inspections were carried out on undertakings providing mobile voice service, mobile Internet access and services using machine-to-machine communication, satellite services and own submarine cables to comply with the security measures taken by the undertakings according to the Rules. Preliminary data show that the undertakings inspected have taken the necessary proportionate security measures. In 2024, CRC will continue to monitor the implementation of the Rules' provisions by undertakings providing Internet access.

Security incidents that occurred in 2023 concerned lack of mobile services, lack of satellite TV and difficult access to email. In light of the deteriorated weather conditions in the periods from 18.11.2023 to 21.11.2023 and from 25.11.2023 to 29.11.2023, about 211,700 users of mobile services were affected during the first period and 536,000 users of mobile services during the second period. The lack of mobile services was due to power cuts in individual base stations in a number of areas in the country. The case was inspected and no breaches of obligations on the part of the undertakings were found. In fulfilment of its obligation under Art. 243b (5) of the LEC, CRC sent the above information to the EC and to the European Union Agency for Cybersecurity (ENISA).

In 2023, A1 Bulgaria EAD, Vivacom Bulgaria EAD and Yettel Bulgaria EAD provided the annual reports on fulfilment of the Multivendor Strategy developed by them.

2.3. Electronic trust services

In fulfilment of its powers under the Law on Electronic Document and Electronic Trust Services, in 2023, CRC confirmed the qualified status of the trust service providers Borica AD, Evrotrust Technologies AD, InfoNotary EAD, Information Services AD and of the trust services provided by them.

CRC maintains an up-to-date national trust list that contains information about the qualified trust services providers and about the services provided by them. In 2023, three new trust services, designated at national level, to the providers Evrotrust Technologies AD and InfoNotary EAD were entered in the national trusted list.

Summarised data on the trust services provided in the last four years are presented in Table 20.

Table 20

Trust service	2020	2021	2022	2023
	number	number	number	number
Issued qualified certificates for electronic signature	**566,689**	**1,002,763**	**1,395,881**	**1,888,322**
Issued qualified certificates for electronic seal	**161**	**167**	**189**	**267**
Issued qualified electronic time stamps	**28,134,161**	**219,610,192**	**526,426,850**	**855,553,914**
Issued qualified certificates for website authentication	**253**	**234**	**318**	**309**

Trust service	2020	2021	2022	2023
	number	number	number	number
Issued electronic evidence for qualified validation of electronic signature/seal	**482,825**	**2,233,080**	**2,399,804**	**2,138,936**
Qualified electronic signature/seal storage service	**45,550**	**7,064**	**189,864**	**223,010**
Issued electronic evidence of a qualified service for an electronic registered mail	**-**	**218,802**	**503,163**	**861,461**

2.4. Communications control

CRC carries out effective control on the compliance with the requirements of the Law on Electronic Communications and the regulations in the field of electronic communications. For the fulfilment of its control functions, the Commission has built a territorial structure - a central unit in the city of Sofia and five territorial units in the cities of Vratsa, Veliko Tarnovo, Varna, Burgas and Plovdiv.

During the communications control and monitoring carried out in 2023 regarding compliance with the LEC and the secondary legislation requirements in the area of electronic communications on the territory of the Republic of Bulgaria, CRC focused on protecting the interests of end-users in accordance with the principles of legality, equality and transparency.

2.4.1. Monitoring and control of the radio frequency spectrum for civil needs

CRC carries out its main activities for monitoring and control of the RFS for civil needs through the established and continuously developing NRFSMS.

The regular preventive monitoring of the spectrum from the radio monitoring stations of NRFSMS ensures appropriate conditions for the provision of electronic communications to the lawful spectrum users and guarantees a certain quality of services provided through them to end-users.

On the other hand, the need for sufficient free spectrum is increasingly deepened by the introduction of new technologies and the continuous improvement of electronic communications, which is also essential for the development of competition in the sector.

To ensure the normal operation in the constantly increasing workload of the spectrum, it is necessary to carry out continuous monitoring and control in order to timely locate and eliminate the sources of interference and identify illegal radio broadcasting means.

With the development of modern technologies and the continuous improvement of electronic communications, the number of users of services provided through the use of RFS is constantly increasing and the essential role of monitoring and control in its effective management is also growing.

In 2023, the main activities in the area of RFS monitoring and control were:

2.4.1.1. Protection of the interests of end-users

A main task of the performed preventive and follow-up monitoring and control of RFS is to set up conditions for the normal work of lawful users of frequency spectrum for civil needs; guarantee a certain quality of services provided to end-users, as well as prevent the occurrence of illegal broadcasting.

In 2023, as a result of regular scheduled monitoring, the undertakings were provided electronically with results for 8,781 measurements from the conducted monitoring of the main technical parameters of radio transmission stations on the territory of the country.

In 2023, as a result of the preventive control, the steady trend towards maintaining the technical parameters of broadcast radio signals within norms and reducing the generated out-of-band and intermodulation emissions, including in the range of the aeronautical service, was preserved.

2.4.1.2. Control regarding conformity with the rules for the use of radio frequency bands for civil needs

In 2023, daily scheduled monitoring in the 20÷3000 MHz frequency band was carried out through the fixed (manned and unmanned) radio monitoring stations from the NRFSMS on the territory of their serviced zones, and through the mobile radio monitoring stations – periodic control and monitoring on the territory of the whole country.

On the territory of the cities of Sofia, Plovdiv, Burgas, Varna, and Veliko Tarnovo, the monitored frequency band was expanded to 6 GHz through the new fixed stations of the "compact radio monitoring systems" type.

2.4.1.3. Monitoring and control of the conformity of the established broadcasting stations for analogue terrestrial broadcasting of radio signals and digital terrestrial broadcasting of television signals with the approved technical parameters

- ***under CRC decisions*** – measurements of basic technical parameters of 40 transmission stations for analogue terrestrial radio broadcasting of radio signals and digital terrestrial television broadcasting for fulfilment of CRC decisions and for assessment of their compliance with the approved technical characteristics were carried out;
- ***compliance with the conditions of the authorisations issued*** – in connection with inspections for compliance with the conditions of authorisations issued, measurements of basic technical parameters of two transmission stations for analogue terrestrial radio broadcasting of radio signals were made, and both inspections found a deviation of the technical parameters for which prescriptions were given;
- ***fulfilment of prescriptions given*** – two inspections were carried out in connection with prescriptions given and it was established that the prescriptions have been fulfilled within the specified time limit.

2.4.1.4. Monitoring for evaluation of the electromagnetic environment

- ***VHF frequency ranges for radio and television broadcasting for evaluation of the electromagnetic environment and cross-border interferences***

In 2023, special attention was paid to the monitoring in the VHF frequency bands for radio and television broadcasting in the border areas of the country for evaluation of the electromagnetic situation and cross-border penetration from neighbouring countries of the Republic of Bulgaria. On the territory of 29 (twenty-nine) settlements, specialised measurements were carried out to evaluate the electromagnetic situation and register cross-border penetration from the territories of the neighbouring countries. The results were summarised and documented in the prepared 345 measurement reports. All data obtained from the measurements were analysed for compliance with the protection ratio between the EMF intensity of broadcasting transmission stations (under Rec. ITU-R BS. 412 and ITU-R BT.1368 of ITU). The electromagnetic environment and cross-border penetration on the Bulgarian Black Sea coast was carefully monitored during the summer months when the penetration due to the influence of the environment (air temperature, sea water temperature and the state of the sea surface) is intensified.

To evaluate the electromagnetic situation in support of spectrum management, in 2023, measurements were also carried out in 22 (twenty-two) settlements from the interior of the country, included in 381 measurement reports.

- ***monitoring of frequency ranges intended for mobile PMR networks*** - evaluation of the actual RFS occupancy and registration of illegal broadcasting.

On the territory of 19 (nineteen) settlements, through the radio monitoring stations (fixed and mobile), monitoring of frequency ranges intended for mobile PMR networks was conducted, and the results were summarised in 266 measurement reports.

- ***evaluation of the electromagnetic compatibility of VHF/FM radio broadcasting stations in the 87.5÷108.0 MHz band and the radio navigation and communication equipment of the aeronautical services*** operating in the 108.0÷137.0 MHz frequency band.

In order to ensure the electromagnetic compatibility and trouble-free operation of the radio navigation and communication equipment of the aeronautical services, 11 (eleven) measurements were carried out on 10 (ten) radio transmission sites according to the Methodology for measurement of intermodulation products of type “A1”, obtained when operating at nearby VHF radio transmission stations.

- ***spectrum monitoring to support spectrum management in connection with the provision of frequency resources in the 700 MHz and 800 MHz bands***

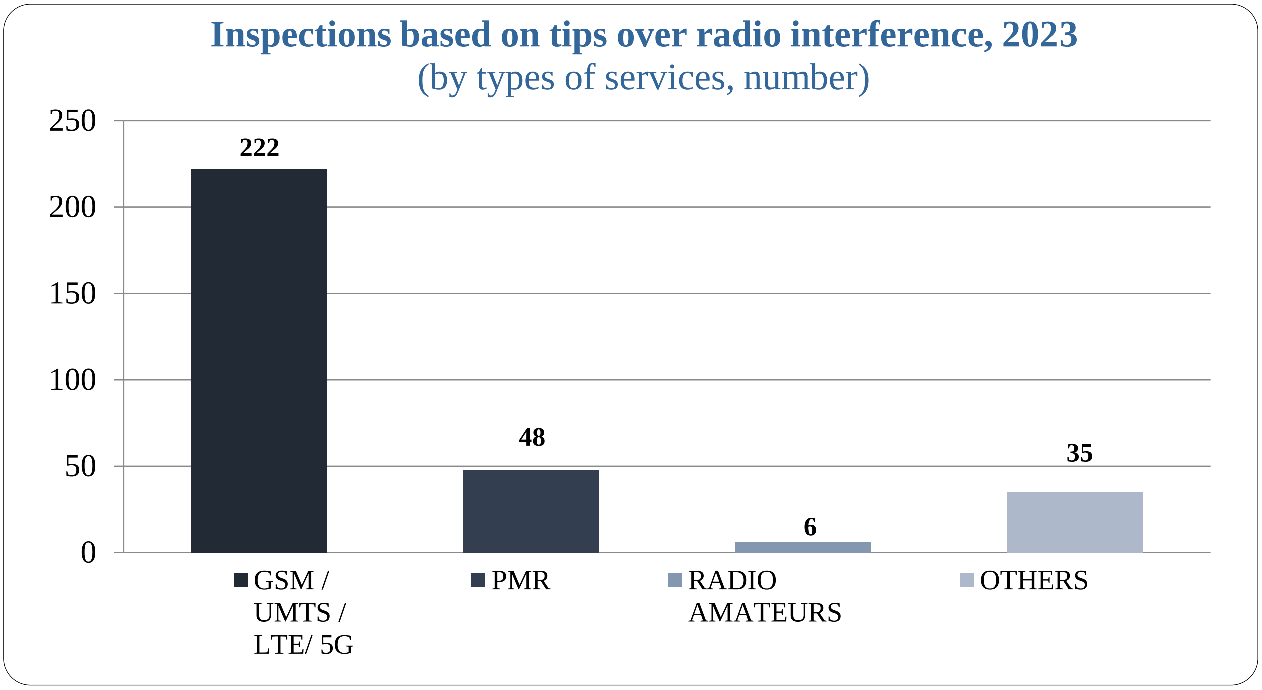
Four tests were conducted at Bezmer Airport to establish the mutual influence between the Air Force’s radio electronic equipment and the undertakings for the provision of mobile telecommunications services in the 700 MHz and 800 MHz frequency bands. The results of the monitoring were documented in 35 measurement reports.

2.4.1.5. Monitoring and control over the quality of provided services with a view to the protection of public and end-user interest

- ***monitoring with regard to tips over radio interference received*** from lawful spectrum users, citizens, organisations and agencies.

In 2023, 227 (two hundred twenty-seven) cases of radio interference were investigated and 311 measurement reports were drafted for the results (Fig. 50). The necessary measures for quick localisation and elimination of interfering sources were timely undertaken. The interferences from

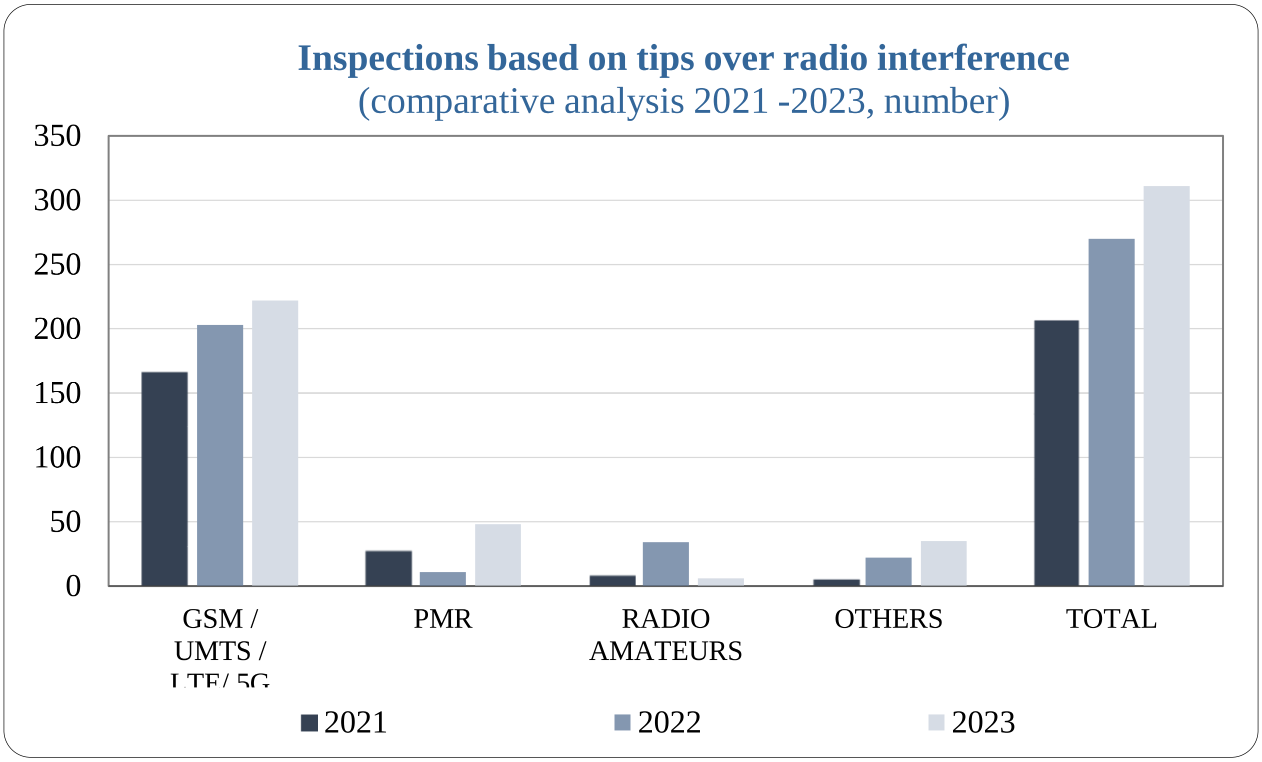
GSM/UMTS/LTE/5G repiters transmitting in frequency ranges intended for public electronic communications through mobile terrestrial networks had a relatively high share in 2023 as well. They are followed by cases of detected interference transmissions from short-range RFID devices (operating according to the US standard) and defective (domestic and network) radio equipment. It is reported that the share of recorded interference transmissions resulting from the use of radio jammers has decreased significantly.



Source: CRC

Figure 50

A comparative analysis of the studied cases of interference in connection with inspections related to the received tips, by types of services for the period 2021-2023, is presented on Fig. 51.



Source: CRC

Figure 51

- monitoring and inspections with relation to tips received regarding ***coverage provided by mobile terrestrial networks, terrestrial digital television networks under the DVB-T standard***.

In 2023, 44 (forty-four) tips concerning problems with the coverage from mobile terrestrial networks, DVB-T terrestrial digital television networks were investigated, and 130 measurement reports were drawn up for the results:

– coverage of ***mobile terrestrial networks*** - in connection with 34 (thirty-four) tips received for lack of coverage of mobile terrestrial networks (GSM/UMTS/LTE/5G), in 2023, an analysis of the declared coverage was made and the necessary measurements were carried out, documented in 115 measurement reports; scheduled measurements of the ensured coverage and quality of the provided GSM/UMTS/LTE/5G mobile terrestrial networks in 37 settlements and 14 routes from the Republican road network were carried out, and the results were included in 235 measurement reports;

– coverage of ***terrestrial digital television under the DVB-T standard*** - in connection with 10 (ten) tips received, inspections and measurements were carried out on the territory of the country, included in 15 measurement reports; scheduled inspections of the coverage and quality of the services provided by DVB-T networks on the territory of all settlements with a population of over 30,000 people were also carried out and the results were included in 41 measurement reports.

The results of the monitoring and control of the RFS carried out in 2023 are summarised in a total of 5,780 measurement reports, as 4,530 measurement reports were drawn up for the conducted scheduled monitoring, with data from the conducted monitoring by the fixed and mobile radio monitoring stations of the NRFSMS on the territory of the whole country.

2.4.2. Inspection activity

In 2023, in connection with the CRC's control functions related to electronic communications provision pursuant to the LEC, 2,459 inspections were carried out.

In 2023, the main focus was again on compliance with the requirements of the LEC in terms of protection of the interests of end-users, as the more important groups of inspections carried out in connection with tips received from users of electronic communications services are as follows:

- ***compliance with the requirements of Chapter 14 of the LEC*** concerning the contracts signed with undertakings providing electronic communication services:

– ***prices of the services offered*** – in 2023, there was a significant increase in the tips received in relation to price packages or tariffs (and terms of their use), details of individual contracts offered, unilateral amendment of contracts by undertakings, general terms and conditions of individual contracts, etc. – 167 inspections were carried out (by about 48% more than in 2022);

– ***dispute of bills and charged penalties*** - in 2023, there was a certain decline in the number of complaints received in connection with disputed bills and charged penalties in using mobile services - a total of 27 inspections were carried out (by about 13% less than in 2022).

For ascertained violations of Chapter 14 of the LEC, in 2023, 4 (four) administrative offence acts (AOAs) were drawn up.

- ***problems with the use of mobile roaming services*** – in 2023, a certain reduction in the received tips regarding problems with the use of mobile roaming services was observed – 117 inspections were carried out (by about 40% less than in 2022) in connection with tips received over problems with mobile roaming services; no violations of the LEC were found during the inspections.

In 2023, the majority of inspections on incoming consumer tips continued to be related to problems with the use of mobile roaming services and problems with contracts signed with undertakings.

- ***compliance with the requirements of Chapter 15 of the LEC*** on confidentiality of communications and data protection of users – 131 inspections were carried out (by about 100% more inspections since 2022):

– ***sending of unsolicited messages for the purposes of direct marketing and advertising without the prior consent of the users*** as well as problems in the use of value-added services - amounts charged when registering in games, quiz games, purchase of information and entertainment contents and other Information Society Services;

In 2023, the number of inspections based on tips over receiving unsolicited messages for direct marketing and advertising increased significantly – 91 inspections were carried out (by about 116% more than in 2022).

– free-of-charge ***provision of itemised bills*** for services used – 40 inspections were carried out;

In connection with the inspections carried out in 2023 for compliance with Chapter 15 of the LEC, 5 (five) administrative offence acts were drawn up.

- ***quality of the services provided*** – problems with the quality of the services provided, non-provision of services, provision of universal voice service, speed of fixed Internet, failures, etc. – 49 inspections were carried out (by about 44% less than in 2022); one act for non-provision of "universal voice service" was drawn up.
- compliance with ***the general requirements for carrying out public electronic communications*** – 260 inspections were carried out, 241 of them were inspections of undertakings ***that have not provided information*** or have provided incomplete or inaccurate information to CRC about their activities in 2022, or about their activities related to Internet access provision.

In connection with ascertained violations regarding compliance with the general requirements for carrying out public electronic communications, 15 (fifteen) administrative offence acts for non-provision of information to CRC were drawn up.

- problems in carrying out ***number portability*** in case of change of the telephone service provider - in 2023, 47 inspections were carried out (by about 30% more than in 2022) in connection with problems in number portability; no violations of the LEC were found during the inspections.

In 2023, the major share (about 85%) of the inspections on consumer tips received by the Commission were carried out on the three largest undertakings providing electronic communications services (Fig. 52). 559 inspections were carried out in relation to consumer tips from end-users concerning the services offered by undertakings, as follows: A1 Bulgaria EAD - 199 inspections, Vivacom Bulgaria EAD – 214 inspections, and Yettel Bulgaria EAD – 146 inspections.

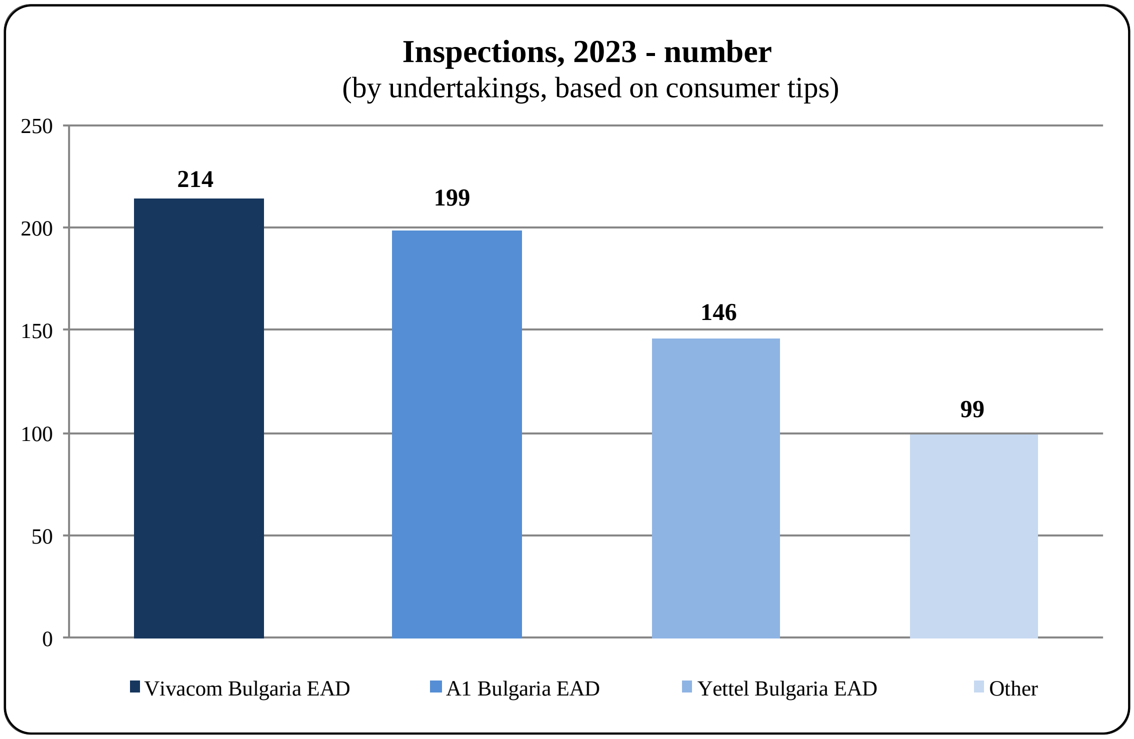


Figure 52

In 2023, 323 inspections (about 13%) were defined on the basis of *risk analysis* – scheduled inspections regarding the provision of electronic communications by undertakings that have submitted notifications to CRC to terminate their activity, inspections regarding the performance of activity after terminated authorisations or expired authorisations, inspections of coverage and quality of DVB-T networks and mobile terrestrial networks. In the case of scheduled inspections, determined on the basis of risk analysis, one administrative offence act was drawn up for carrying out electronic communications after an expired authorisation.

In connection with tips received by CRC regarding the performance of unregulated activity – carrying out electronic communications without an issued authorisation or notification and offences found, during the inspections, 6 (six) AOAs were drawn up.

241 inspections were carried out *for* ***compliance with the conditions of the authorisations and decisions of CRC***, compliance with specific obligations and inspections of electronic communications networks for terrestrial analogue broadcasting for compliance of the transmission stations with the technical characteristics approved by CRC, and for compliance with prescriptions given. No violations of the LEC were found during the inspections.

In 2023, inspections were carried out regarding the provision of information by A1 Bulgaria EAD, Vivacom Bulgaria EAD and Cetin Bulgaria EAD concerning the issued authorisations for mobile terrestrial networks and the information provided in the *CRC information system for registration of the transceiver stations of terrestrial networks and short-range wireless access points* (Register).

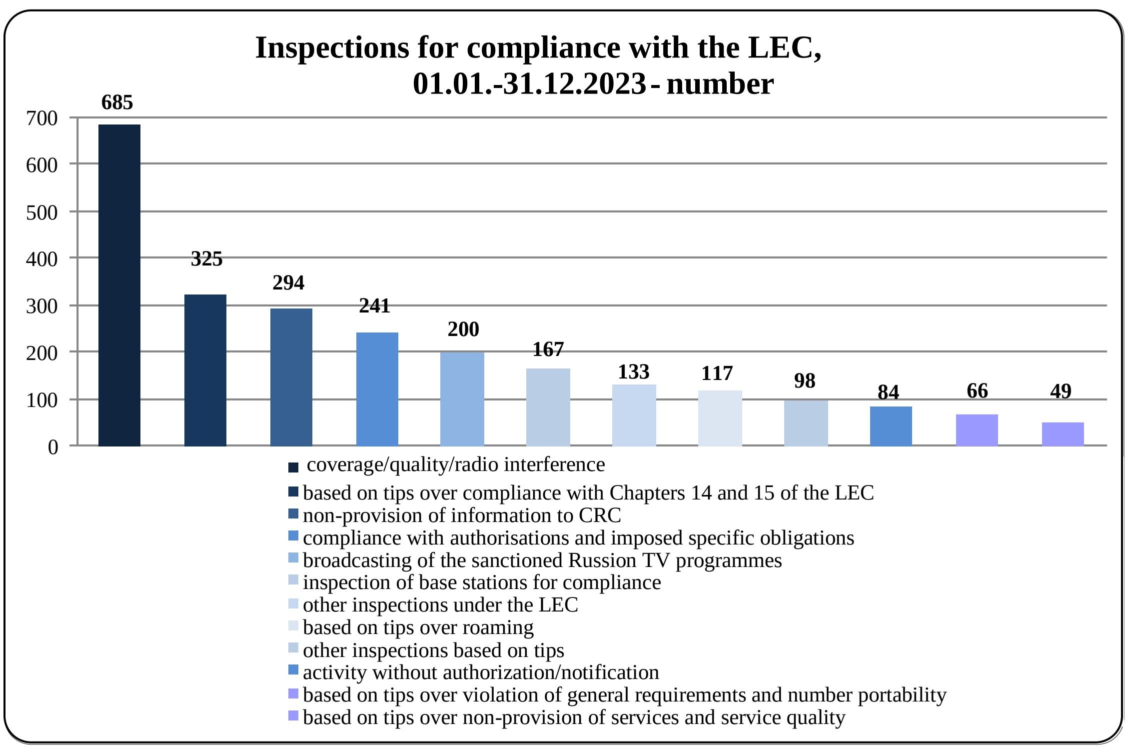
Six municipalities on the territory of the country were randomly selected for inspection, as follows: Breznik Municipality (Pernik District), Polski Trambesh Municipality (Veliko Tarnovo

District), Malko Tarnovo Municipality (Burgas District), Mezdra Municipality (Vratsa District), Valchi dol Municipality (Varna District), and Kaloyanovo Municipality (Plovdiv District). A total of 134 base stations (BS) were inspected, for which a total of 142 records of findings and 175 measurement reports were drawn up in connection with the compliance with the available information in the Register and the effectively built and commissioned BS.

In connection with Council Regulation (EU) No 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine, namely prohibition on the distribution of Russian television programmes, in 2023, 197 scheduled inspections and 3 inspections based on the tips received by CRC were carried out to undertakings providing the *"broadcasting of radio and TV programmes"* services, where no violations for the provision of prohibited TV programmes were found.

Inspections were carried out of 12 undertakings providing electronic communications services for compliance with the *Rules on minimum security requirements for secure public electronic communications networks and services and methods for managing the risk to their security*. During the inspections, the undertakings provided materials and evidence of the security measures they have taken in accordance with Appendix 1 of the Rules.

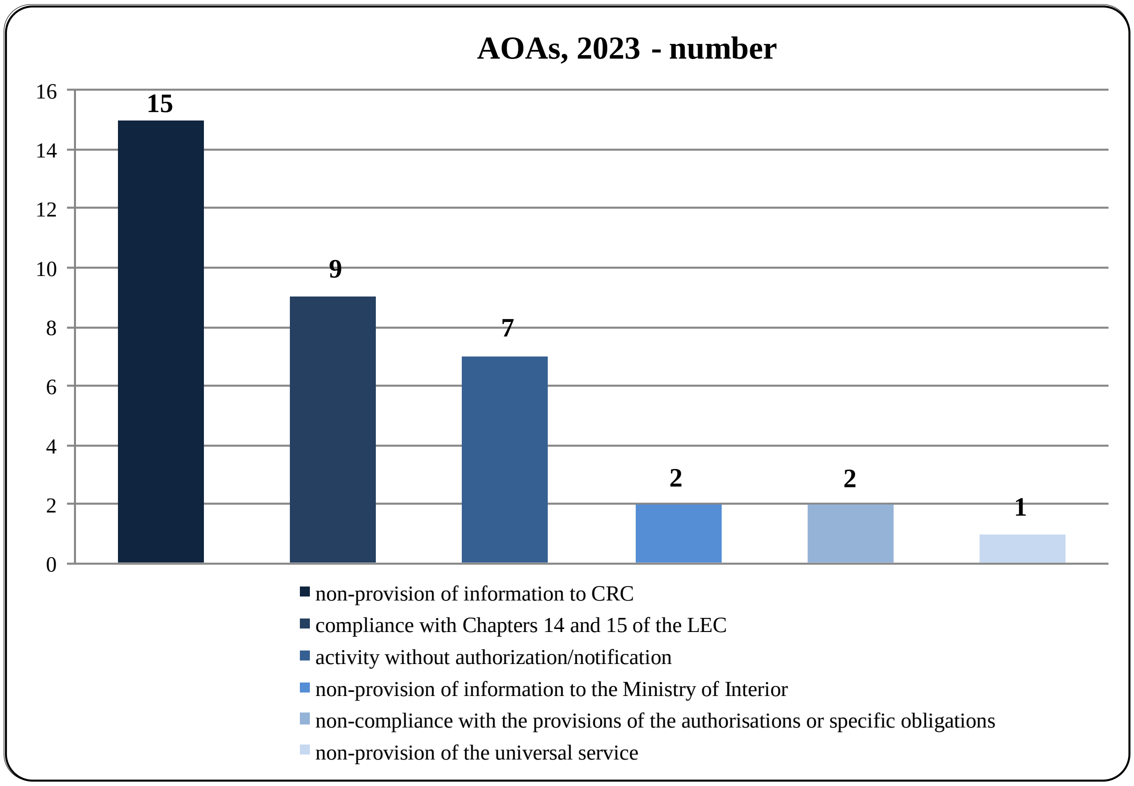
Summarised data for the performed control activity and the engaged administrative and punitive liability in offences of the LEC and secondary regulations in 2023 are displayed in Figure 53 and Figure 54.



Source: CRC

Figure 53

As a result of the inspections, for the administrative offences of the LEC found, 36 **administrative offence acts** were drawn up in 2023, as the main share (72%) was held by non-provision of requested information to CRC and other institutions and for non-compliance with Chapters 14 and 15 of the LEC.



Source: CRC

Figure 54

2.5. Quality of the Internet access service and net neutrality

With regard to the update of the BEREC Guidelines for the application of the Regulation and the new interpretation of Article 3 of the Regulation, following a decision of the Court of Justice of the European Union (EU) on the so-called “zero rating", by Decision No 395 of 24 November 2022, CRC launched a public consultation procedure for setting deadlines to terminate the commercial practice of providing differentiated pricing services. By Decision No 33 of 25.01.2023, CRC adopted the results of the conducted public consultation and set deadlines to terminate this commercial practice as follows:

- termination of the offering of included volume of traffic data from/to certain applications or a group of applications of end-users the respective subscription plans as of 01.02.2023;
- termination of the provision of volume of traffic data from/to certain applications or a group of applications which are part of the conditions of the respective subscription plans up to 31.12.2023;

In determining these deadlines, CRC has taken into account the information submitted by the undertakings and the need to provide for a sufficiently long period for the migration of users to other services or the bringing of the services used by them in compliance with the requirements of the Regulation.

On an annual basis, CRC collects and processes information about the activities of electronic communications service (ECS) providers at retail and wholesale level through the CRC's electronic system for on-line questionnaires. The providers of the retail Internet access service (IAS) are obliged to provide information according to the requirements of Article 3 and Article 4 of Regulation (EU) 2015/2120 (the Regulation) on the measures they apply to ensure access to open Internet, net neutrality, and the quality of the services they provide. For 2023, there were 646 undertakings that provided IAS at retail level. The analysis of the information received from the questionnaires regarding the fulfilment of the requirements of Articles 3 and 4 of the Regulation shows that the requirements of the Regulation have been met, i.e.:

- contracts with end-users do not include restrictions on the services they use;
- providers of IAS do not dedicate capacity and/or manage traffic to ensure the quality of their own content/services or of a contracted content provider;
- there are no network traffic management measures that include blocking or delaying certain categories of users, application/content, ports or protocol, save for the exceptions in accordance with Article 3 of the Regulation;
- quality parameters, traffic management measures and information under Article 4 of Regulation (EU) 2015/2120 for the majority of undertakings are contained in their General Terms and Conditions, in contracts with end-users or are contained in a separate document on their website.

In 2023, the Mechanism for the measurement and monitoring of IAS quality parameters (the Mechanism) which was developed under the project "Building and development of CRC information systems and registers to improve the activities of regulation and control and to raise the quality of administrative services" was available to end-users for measurement on fixed Internet access through the public portal **nettest.crc.bg** and for measurement of mobile Internet access through the **CRC Network Quality** application, available on Google Play and App store. During the year, a total of 2,650 single and a cyclic measurements of IAS quality were performed by end-users. The relatively small number of measurements made is due to the fact that the IAS measurement service was still new to users. The number of successful measurements of IAS quality for mobile Internet access was 953, and for fixed - 1,109.

In addition to being to the benefit of end-users, the Mechanism provides an opportunity to extract statistics for measurements made. For example, most of the measurements were in the range from 30 Mbps to 200 Mbps and above 200 Mbps - 1,246, half of which were in the 50 Mbps - 100 Mbps range, while the measurements up to 30 Mbps were 264. In terms of the location of the measurements made, most of the measurements were made in the capital and in the big cities - Varna, Plovdiv, Burgas, etc. On the basis of this data, it can be concluded that the speeds provided to and used by end-users were in the range that enables high-quality and fast Internet access when using Internet-based services.

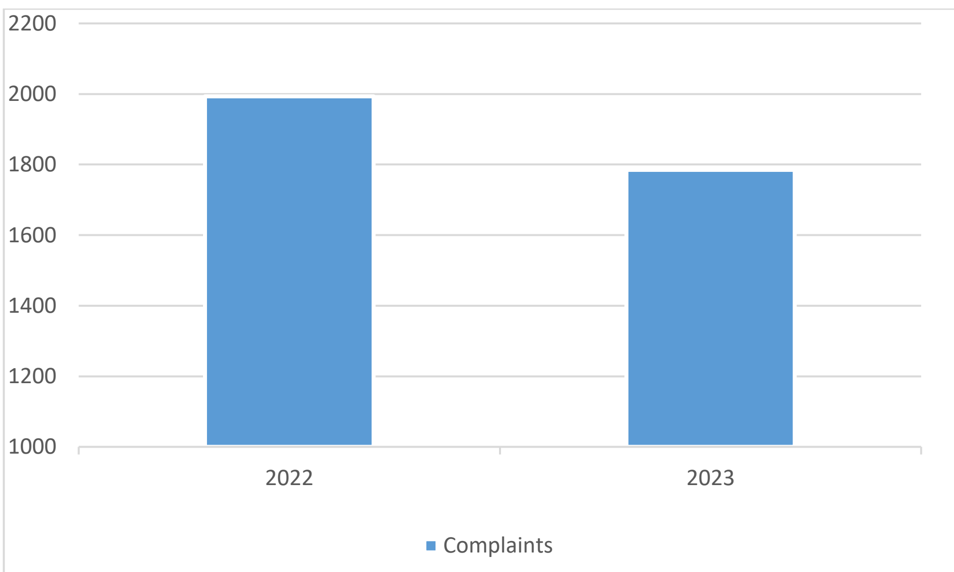
In addition, activities related to Regulation (EU) 833/2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine were carried out. The three amendments and supplements made to the Regulation in 2023 (from 01.02.2023, 10.04.2023 and 01.10.2023) extended the list of the entities creating television programmes set out in Article 2f, which are subject to sanctions and a ban on their broadcasting and distribution. All undertakings registered in the *Register of persons who have notified the commission of their intentions to provide a public electronic communications service* were notified in due time of each package of sanctions and the date on which it becomes effective.

2.6. Protection of the interests of the electronic communication services users

In 2023, CRC received 1,785 complaints from end-users of electronic communication services. To compare with, in 2022, the number of complaints was 1,993. There is a decrease (by nearly 10%) in the tips submitted in 2023 compared to those received by the regulator in 2022. This is due both to the active preventive actions of CRC against the service providers and to the follow-up control for the fulfilment of the legal requirements under Chapter 14 of the Law on Electronic Communications (LEC).

Most of the complaints concern dispute of bills, charging of digital content (information, entertainment and other services for access to paid content), termination of contracts for electronic communications services, and the use of "accidental roaming" (border roaming on the territory of the Republic of Bulgaria).

Complaints received by CRC, 2022 and 2023



Source: CRC

Figure 55

Most of the complaints lodged before CRC were resolved in whole or in part in favour of the consumer concerned: the disputed amounts were returned, the concluded contract was terminated without penalties, the unsolicited services were deactivated, the affected users were granted discounts and other preferences such as compensation, etc.

A number of complaints were forwarded by competence to the respective state control body (the Commission for Consumer Protection, the National Revenue Agency, the Financial Supervision Commission, the Personal Data Protection Commission, the Ministry of Health, etc.).

In the past year, CRC experts held a total of three work meetings with representatives of mobile undertakings. During the meetings, the following issues were discussed:

- the possibilities to restrict the direct carrier billing service by mobile service users concerning the charging of amounts to subscribers' accounts for the purchase of digital content;
- procedure and conditions for the issue and request of detailed statements/bills by the user, including through QES;
- implementation of the new Regulation (EU) No 2022/612 of the European Parliament and of the Council of 06.04.2022 on roaming on public mobile communications networks within the Union;
- amendment of the contracts of users of electronic communications services under Art. 230 of the LEC (unilateral amendment at the initiative of mobile undertakings);
- consumer complaints related to the potential deliberate degradation of traffic from OTT services.

Cooperation with the Commission for Consumer Protection

There is a shared competence between CRC and the Commission for Consumer Protection (CCP) regarding a number of issues related to consumer protection in the area of electronic communications services.

In 2023, CRC and CCP continued their joint work in the framework of the work of the Sectoral Conciliation Committee for the consideration of disputes in the field of electronic communications, established with the provision of Article 182, Para 4 of the Law on Consumer Protection. For the said period, 5 conciliation procedures were completed which were launched before the Sectoral Conciliation Committee for the examination of electronic communications disputes.

Legal representation in cases of CRC

In 2023, procedural representatives of CRC participated in 74 meetings on administrative and criminal cases before the regional and administrative courts of the country. During the year, 49 confirmatory decisions on contested penal decrees of CRC were issued, while the number of revocation decisions was 7. According to the individual administrative acts issued by CRC, 17 complaints were filed before the administrative courts. During the year, 3 CRC decisions were confirmed.

2.7. Activities under the Law on Electronic Communications Networks and Physical Infrastructure (LECNPI)

In 2023, 9 procedures for the giving of binding instructions and 2 procedures for assistance in voluntary dispute resolution under the LECNPI were conducted.

The more important decisions of CRC were related to disputes over requests for binding instructions regarding the prices for access to and/or joint use of the underground duct network of Vivacom. With regard to the one group of requests, CRC ruled, by giving binding instructions to Vivacom to apply the prices before 31.12.2022. By Decision 161/01.06.2023, CRC gave binding instructions to VIVACOM BULGARIA EAD to apply its prices for access to and/or joint use of its passive infrastructure in force as of 31.12.2022, and the 25% increase of the price of the service was thwarted. The decision directly benefits all operators of electronic communications networks, including those with very high capacity, ensuring that the price conditions for access to passive infrastructure in which their networks are located are maintained.

Three procedures were also carried out on requests of operators to give binding instructions to ELEKTRORAZPREDELENIE YUG EAD in connection with taking actions to remove electronic communications networks located on the utility pole network of ERYUG.

2.8. Interdepartmental working group for the preparation of draft Law on amendment and supplement of the Law on Electronic Communications as regards the new requirements of Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on the single market for digital services and amending Directive 2000/31/EC (Digital Services Act)

By Order No RD-07-195/28.04.2023 of the CRC's chairperson, an interdepartmental working group was formed to prepare a draft Law on amendment and supplement of the Law on Electronic Communications (LASLEC) to introduce into the national legislation the requirements of the Digital Services Act.

At present, the prepared draft LASLEC has passed a public discussion[76] under the Law on Normative Acts and is to be adopted by the Council of Ministers and submitted for adoption by the National Assembly of the Republic of Bulgaria.

2.9. Interdepartmental working group on the preparation of a draft Law on amendment and supplement of the Electronic Communications Act to introduce the requirements arising from Regulation (EU) 2022/612 of the European Parliament and of the Council of 6 April 2022 on roaming on public mobile communications networks within the Union (the Roaming Regulation)

CRC representatives took part in the interdepartmental working group formed by Order No RD-08-367/11.07.2022 of the Minister of Transport and Communications with the task of preparing a draft LASLEC to introduce the requirements arising from the Roaming Regulation.

In 2023, on the basis of the prepared draft LASLEC, a Law on amendment and supplement of the Law on Electronic Communications was adopted (LASLEC, prom. SG, no. 58 of 2023)

[76] https://www.strategy.bg/publicconsultations/View.aspx?lang=bg-BG&Id=8035

IV. BUDGET

CRC budget implementation for 2023

The Commission Chairman is a primary budget administrator pursuant to Article 50 of the LEC. Pursuant to Article 37 (1) of the Law on State Budget of the Republic of Bulgaria (LSBRB) for 2023, CRC was allocated with:

- revenue in the amount of BGN 182,935 thousand;
- expenses in the amount of BGN 29,591.4 thousand;
- transfers in the amount of BGN 153,343.6 thousand

The Commission administered revenue pursuant to Article 51 (1) of the LEC.

In 2023, the revenue earned from fees, fines, financial sanctions and interest amounted to BGN 180,984.7 thousand - 99% of the annual plan. The fulfilment was mainly due to one-off spectrum assignment fees in the 700 and 800 MHz bands and annual spectrum usage fees.

In connection with the enforcement of acts for the establishment of public state receivables to be collected and enforced punitive decrees, revenue in the amount of BGN 40.4 thousand were collected in 2023 by National Revenue Agency.

The reported expenses for 2023 amounted to BGN 29,129.5 thousand, which is a fulfilment of 98% of the annual plan.

In 2023, transfers were made to the Ministry of Transport and Communications and the Ministry of Electronic Governance, amounting to BGN 115,007.7 thousand and BGN 38,335.9 thousand, respectively. - the total amount of transfers provided was BGN 153,343.6 thousand, which makes up 100% of the regulated level in Art. 37, Para 1, Art. 25, Para 1, and Art. 26, Para 1 LSBRB for 2023, in implementation of Art. 19, Para 1 of the LEC.

Review of fees collected and administrative costs incurred in 2023

The structure of revenue from fees under the CRC budget for 2023 was as follows:

Table 21

Revenue from fees	Value (BGN’000)
Revenue generated for 2023, incl.:	180,908.1
- one-off fees under the LEC	130,906.1
- one-off fees under the PSA	0.4
- one-off fees under the LECNPI	8.6
- administrative fees under the LEC, including: ✓ administrative annual charge on control under the LEC ✓ one-off fees for administrative services under the LEC	4,530.8 4,509.5 21.3

- administrative annual charge on control under the PSA	875.6
- annual fees for use and temporary use of radio spectrum	37,677.2
- annual fees for the use of the positions on geostationary orbit with the appropriate radio frequency spectrum	138.0
- fees for the use of numbering resources	6,771.4

Additionally earned revenue from fines, sanctions and interest in the amount of BGN 76.6 thousand.

The funds in the expenditure part of the Commission's budget, determined in the LSBRB for 2023, were spent on financing the activities of CRC and its administration, including projects and studies, analyses and expert opinions related to market regulation and liberalisation, for participation in the work of the Body of European Regulations for Electronic Communications and to ensure effective and efficient control.

The Commission's expenditure structure for 2023 was as follows:

Table 22

Type of expenses	Value (BGN'000)	Share (%)
1. Salaries	6,739.5	23.1
2. Social security contributions	1,886.4	6.5
3. Other remunerations and payments	209.0	0.7
4. Operative costs	2,485.6	8.5
5. Taxes and fees paid	40.9	0.2
6. Membership fee	84.8	0.3
7. Capital expenditure	17,683.3	60.7
Total expenditure:	29,129.5	100

According to Section B "Expenditure", Group I "Current Non-Interest Expenditure", p. 3 of the CRC's Profit and Loss Statement for 2023, the amount of the allowances for depreciation for 2023 was BGN 3,458 thousand. The amount of expenditure in Section B "Expenditure and Acquisition of Non-Financial Assets", Group I "Payments for Current Non-Interest Expenditure" of the Cash Fulfilment Statement for 2023 of CRC, was BGN 11,446 thousand.

The amount of the administrative expenses of CRC for 2023, within the meaning of Article 139 (1) of the LEC, is greater than the collected administrative fees. This difference, on the basis of Article 53 (1) of the LEC, leads to the need to increase the amount of the administrative annual charge on control considering the applicable amount of 0.2%.

The budgetary funds spending was carried out in strict compliance with the financial discipline and the principles of legality, appropriateness, effectiveness and efficiency. Projects assigned to CRC by regulatory acts were implemented of priority.

The investment policy of CRC in 2023 included:

- ICT projects - delivery of computer equipment and communication equipment;
- construction of the building of a laboratory for electromagnetic compatibility for testing and control of radio electronic equipment. The laboratory will allow supervision and control of the radio electronic equipment distributed on the market and used in Bulgaria for verification of its compliance, as required by Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility;
- equipment of the National Radio Frequency Spectrum Monitoring System for Civil Needs (NRFSMS) – delivery of mobile radio monitoring stations up to 26.5 GHz; compact radio monitoring and radio location systems for development of NRFSMS, specialised radio monitoring and radio location station; HF cables of antenna-feeder systems for fixed radio monitoring stations, upgrade of the NEMO mobile network measurement system; expansion of the functionalities of radio monitoring stations for radio interference detection; expansion of the functionalities of spectral analysers;
- intangible fixed assets - configuration and functional changes in the electronic system for on-line questionnaires and upgrade of information systems owned by the Commission.

CONCLUSION

In a dynamically developing technological and competitive environment and taking into account the challenges in the sector, in 2023, the Communications Regulation Commission continued to implement its priorities at European and national level, as well as to achieve its objectives set out in the Strategic Plan.

On the basis of the results achieved and reflected in this annual report and taking into account the new realities, problems and challenges in the telecommunications sector, CRC will continue to work for its establishment as a modern and highly efficient state regulatory body, contributing to an effective digital market, providing cutting-edge and quality electronic services to citizens and businesses.

The main focus of CRC's work over the next year remains the synchronisation of the Bulgarian legislation with the EU regulations in the field of digital services.

The activities launched in 2023 at international level for the implementation of the Digital Services Act will continue in 2024. The envisaged future status of the Commission as national digital service coordinator for the Republic of Bulgaria, within the meaning of Regulation (EU) 2022/2065 and the related obligations, is a prerequisite for a dynamic and wide-ranging activity at national level on the implementation of the new regulation for all providers of intermediary services. In this regard, CRC representatives will be actively involved in the activities of the European Council for Digital Services next year.

In 2024, the introduction in the Bulgarian legislation of European Commission (EC) decisions on harmonised use of radio spectrum will continue.

Over the next one-year period, CRC is about to develop and adopt an updated Regulatory policy for radio frequency spectrum management for civil needs which will ensure predictable and transparent conditions related to its use.

The adoption of the Position on the prospects for use of the free resource in the 1.5 GHz, 2.6 GHz, 3.6 GHz and 26 GHz bands as a result of the public consultations is another important activity, which will ensure conditions for new technologies and services in the interest of end-users to enter the market.

Another important priority is the introduction of the decisions of the World Radiocommunication Conference (WRC-23) in the Bulgarian legislation. In this regard, representatives of the Commission will participate in an interdepartmental working group on amendment of the National Radio Frequency Spectrum Allocation Plan.

In fulfilment of its functions as the National Organisation for Standardisation of the European Telecommunications Standards Institute (ETSI), CRC will continue to conduct a public consultation on draft ETSI standards and to participate in adoption of the Work Items identified in the Standardisation Requestproposed by the EC to ETSI for the development of new standards.

Access to passive (physical) infrastructure is critical for the deployment of electronic communications networks necessary for the provision of retail services such as Internet and television in 2024. This, in turn, determines the need for CRC to complete an analysis of the wholesale market of access to passive (physical) infrastructure and to rule on the existence of efficient competition.

In accordance with the current regulatory framework, a fourth review of the wholesale market for the provision of local access at a fixed location is also to be carried out in relation to the regulatory authority's obligations to carry out an analysis of the state of the relevant market within 5 years of the last analysis of the same market.

In 2024, the construction of an EMC laboratory is to be launched to support the control activities of the Commission under the LEC concerning the radio devices and to verify their compliance with the EMC regulatory documents. The construction of the laboratory will allow for a wide range of tests to assess the conformity of products, in relation to the control of the product market with regard to EMC and the provision of conditions for favourable business environment and normal operation, without harmful interference, to the lawful users of radio frequency spectrum.

The information contained in this report gives a reliable idea that the 2023 reporting year is another year of intensive work during which CRC continued to fulfil its mission, contributing to the creation of a predictable and well-functioning regulatory environment in the field of electronic communications.