25 ГОДИНИ
КОМИСИЯ ЗА РЕГУЛИРАНЕ НА
СЪОБЩЕНИЯТА

Годишен доклад 2022

Комисия за регулиране на съобщенията

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COMMUNICATIONS REGULATION COMMISSION

A N N U A L R E P O R T
2022

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INTRODUCTION

In 2022, the electronic communications sector in Bulgaria continued to change and develop in line with the development of information and communication technologies in Europe and in the world. It was also the third year since the beginning of a long and difficult period linked to the COVID-19 pandemic that made these technologies an integral part of people's lives. Today, the Internet is everywhere, and through connectivity, the world is beginning to look smaller and smaller. We witness the development of newer and newer technological solutions that change our surroundings and become the main driver for different areas of our lives. In these years of digital revolution, one of the main challenges facing all participants in the ICT sector is the rapid adaptation to the changing environment and the taking of adequate decisions for its development, contributing to the development and functioning of new technologies in the best possible way, while making them convenient and accessible to all users.

In response to these changes and challenges, in its nearly 25-year history, CRC continues to fulfil the priorities at European and national level in accordance with the dynamically developing market for electronic communications and services. A Strategic Plan for the Commission's activities for the period 2022-2024 was developed and adopted.

The CRC's mission over the next three years was clearly formulated. It is aimed at providing modern and quality electronic communications services to citizens and businesses by creating conditions for the development of the market for electronic communications networks and services, part of the internal market of the European Union, creating coherent conditions for investments in the next generation of electronic communications networks, effective and sustainable competition in the provision of electronic communications networks and services, including infrastructure, network and service security and equal access to services.

Three clear strategic objectives were also set for the next three-year period:

- An efficient and future-oriented regulatory environment;
- Promoting a sustainable competitive market and consumer protection;
- Sustainable institutional development and international partnership.

In fulfilment of its mission and related strategic objectives, the Communications Regulation Commission's vision is to establish itself as a modern and highly efficient state regulatory body, through continuous improvement of the regulatory and control activities, meeting the challenges of the constantly evolving communication environment, to contribute to an effectively functioning digital single market.

On the basis of the adopted three-year strategy and the strategic objectives set, CRC set its main priorities in 2022. The implementation of these priorities was a key task for all employees of the Commission throughout the year, and as a result of the overall work and efforts made, the following more important results achieved during the reporting period can be enumerated.

CRC completed the bringing of the regulatory framework related to the radio spectrum management in line with the provisions of the European Electronic Communications Code (the Code) and the Law on Amendment and Supplement of the Law on Electronic Communications (LAS of LEC), adopted in 2021. The draft rules on the use of radio spectrum were notified to the European Commission (EC) under the procedure in accordance with Directive (EU) 2015/1535 before their final adoption.

A key factor in the work during the year were the activities related to the effective management of scarce resources.

In order to ensure good regulatory conditions for the use of radio spectrum contributing to the development of wireless communications, a predictable environment and the future use of radio spectrum, following a public consultation procedure, the Commission adopted a regulatory policy for the management of radio spectrum for civil needs for the period 2022-2024.

CRC adopted the Ordinance on the content, conditions and procedure for keeping, maintaining and using the register of the transceiver stations of ground networks, the activities under Art. 151, Para 1, p. 16 of the Spatial Planning Act and the small-range wireless access points and the Register itself was created, which also created the conditions for the construction of 5G networks and for the encouragement of investment in infrastructure.

A Register of the rights granted for the use of radio spectrum was also created on the basis of registration, which facilitates the regime for granting rights for the use of radio spectrum.

CRC adopted Rules for determination of the terms and conditions for the provision of information on the user location and end-user data by undertakings providing interpersonal communications services with emergency numbers.

Following a procedure for the assignment of radio spectrum in the 26 GHz band, CRC issued authorisations to Vivacom Bulgaria EAD (Vivacom), Yettel Bulgaria EAD (Yettel) and A1 Bulgaria EAD (A1) and provided the three mobile undertakings with a frequency resource of 1600 MHz in the band, thus implementing measure C7.R2: 'Efficient use of radio spectrum' of the National Recovery and Resilience Plan (NRRP). In implementation of this measure and after an agreement between the Bulgarian Air Force and the undertakings, CRC issued temporary authorisations to A1, Yettel and Vivacom for the joint use of the 703-733 MHz/758-788 MHz and 791-821 MHz/832-862 MHz frequency bands.

An additional frequency resource was also provided in the 1800 MHz and 3.6 GHz bands to Bulgarian Telecommunications Company EAD, Yettel Bulgaria EAD and A1 Bulgaria EAD, which enables undertakings to further develop their networks and provide high-speed data transfer, including those based on 5G networks.

In 2022, the Commission also provided a frequency resource for the operation of earth stations connecting to various non-geostationary orbit satellite systems, including Starlink, OneWeb, which enabled Bulgarian undertakings to operate geostationary and non-geostationary satellite systems and to increase Bulgaria's presence on the satellite services market.

An important stage during the year were also the activities related to the analysis and assessment of the market for electronic communications networks and services. In this regard, the review on the conduct of a third round of analysis and assessment of the wholesale dedicated capacity market (market 2 of European Commission Recommendation (EU) 2020/2245 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation) was completed, as well as on the conduct of a fifth round of analysis of the relevant wholesale markets for call termination on individual public telephone networks provided at a fixed location and for voice call termination on individual mobile networks.

In compliance with the requirements of the LEC, the Commission adopted, by its decisions, Rules on minimum security requirements for public electronic communications networks and services as well as security risk management methods, and approved the Mechanism for measuring and monitoring the quality of internet access service as well as the conditions for carrying out measurements that can serve the purposes of legal protection of consumers.

Through the current information system for online questionnaires, the automated filling-in, sending, receiving and processing of information from operators regarding the annual questionnaires for the activity of undertakings in 2021 and the broadband internet access questionnaire as of 01.07.2022, continued.

In response to the increasing use of new technologies and higher spectrum workload, an important task of the Commission's work were the activities related to spectrum monitoring and control. In this regard, the Plan for Development of the National Radio Frequency Spectrum Monitoring System for Civil Needs (NRFSMS) for the period 2021÷2025 was updated with the newly developed strategic objectives for development of the radio monitoring system, as well as the main aspects of its expansion and modernisation. The roadmap for the period 2023÷2025 was also updated to implement the Plan with the main types of technical devices and systems necessary to achieve the objectives and the respective stages of their provision.

The results reported in the introduction outline only part of the activity carried out in 2022. The achievements of the Communications Regulation Commission in the different fields of activity on the basis of the objectives set and in accordance with its functions and powers are presented in the main part of this Annual Report, which the Commission prepared 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 26.04.2023 from 86.8% of the undertakings registered with CRC as of 31.12.2022. 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 427/14.12.2022. 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[2], 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 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 (prom. SG, no. 32 of 26 April 2022).

1. Volume and structure of the Bulgarian electronic communications market

1.1. Market volume

According to data from the CRC register, as of 31.12.2022, a total of 1,126 undertakings were registered with the intention to provide public electronic communications. In implementation of Art. 4 of the General Requirements[3] and Decision No 427/14.12.2022 of CRC, a total of 977 of the undertakings registered as of 31.12.2022 have submitted to the Commission an annual activity

[1] International Telecommunication Union

[2] Body of European Regulators for Electronic Communications

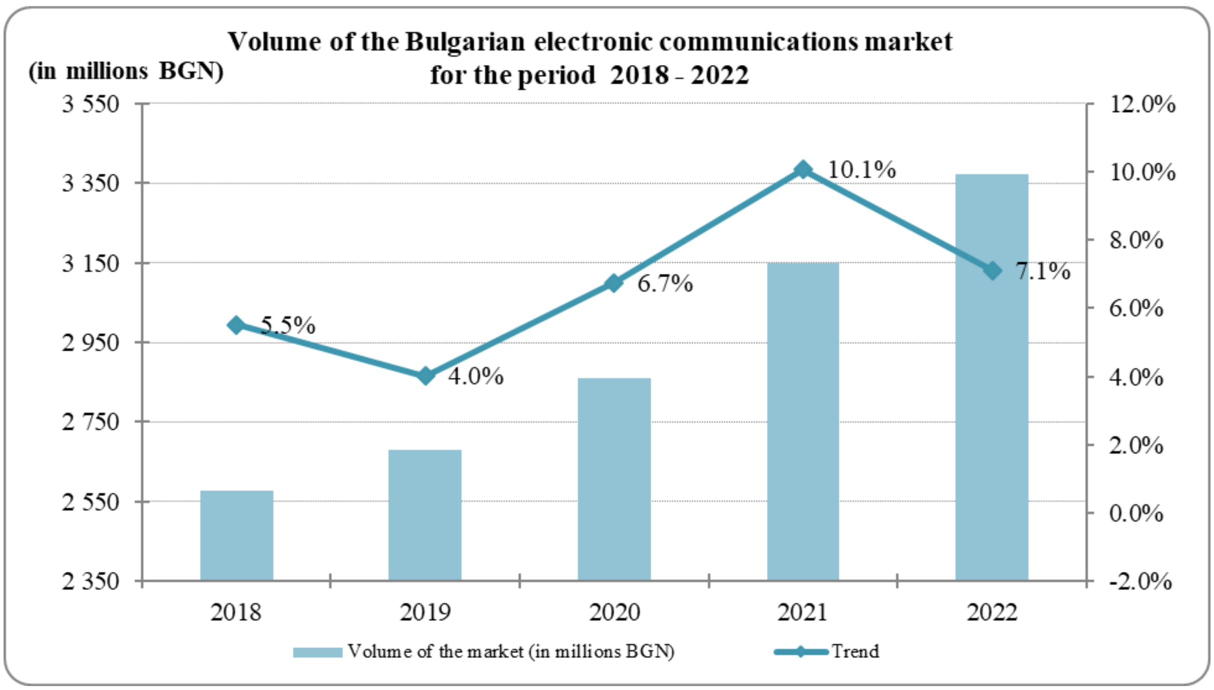
[3] General requirements for the provision of public electronic communications (prom. SG, no. 24 of 4 March 2008, amended SG, no. 102 of 28 November 2008, amended SG, no. 63 of 7 August 2009, amended SG, no. 19 of 8 March 2011, amended SG, no. 105 of 29 December 2011, amended and suppl. SG, no. 63 of 17 August 2012, amended and suppl. SG, no. 4 of 14 January 2014, amended and suppl. SG, no. 54 of 15 July 2016, amended and suppl. SG, no. 90 of 10 November 2017, amended and suppl. SG, no. 90 of 30 October 2018, amended SG, no. 10 of 1 February 2019, amended and suppl. SG, no. 20 of 10 March 2020, amended and suppl. SG, no. 35 of 10 April 2020, amended and suppl. SG, no. 111 of 31 December 2020, prom. SG, no. 108 of 17 December 2021, amended SG, no. 42 of 7 June 2022).

report for 2022 (the share of undertakings having submitted reports makes up 86.8% of those registered as of the said date).

In 2022, 845 undertakings performed their activity, including 7 undertakings which suspended their activity on providing public electronic communications during the year and submitted a report pursuant to Art. 5a of the General Requirements (as of 31.12.2022, those undertakings were removed from the CRC register). In comparison to the previous reporting period (2021), a decline was observed in 2022 both in the number of undertakings registered at CRC for the provision of public electronic communications (by 0.8%) and in the number of undertakings actually carrying out activity during the year (down by 2.1%).

In 2022, the total volume of the electronic communications market in Bulgaria amounted to BGN 3,374 billion (BGN 18,082 million of this revenue were generated by 516 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 7.1% compared to the data for 2021.

Figure 1 presents the dynamics in the volume of electronic communications market in the country for the period 2018-2022.



Note: *The data for 2021 have been updated.*

Source: Data submitted to CRC

Figure 1

The share of the total volume of the public electronic communications market constituted 2.0% of the total GDP[4] of Bulgaria for 2022. Notwithstanding the growth reported in the total

[4] Calculated at current prices. Source: NSI (GDP - Production Method - National level | National Statistical Institute (nsi.bg)).

volume of the public electronic communications market, a decrease of 0.2 percentage points was observed in its share of the total GDP versus 2021, when it amounted to 2.3%.[5]

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 of services provided, including distributed[6] 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 2020 – 2022

Public electronic communications services	Revenue		
	2020	2021 [1]	2022
	(in millions BGN)		
1. Interpersonal communication services	1,149.745	1,149.605	1,064.862
1.1. Fixed voice service through numbers from the NNP and public payphones	93.016	81.588	71.199
1.2. Mobile voice service through numbers from the NNP	1,037.526	1,023.819	946.460
1.3. Other voice services[2]	19.203	44.199	47.204
2. Leased lines services	19.156	24.757	21.321
3. Data transfer and/or Internet access services	1,196.457	1,452.475	1,672.447
4. Transmission and/or distribution of radio and/or TV programmes services	427.422	453.320	473.996
5. Other services[3]	68.734	69.291	141.071
TOTAL	**2,861.514**	**3,149.449**	**3,373.697**

[1] The data for 2021 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 2022, 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.

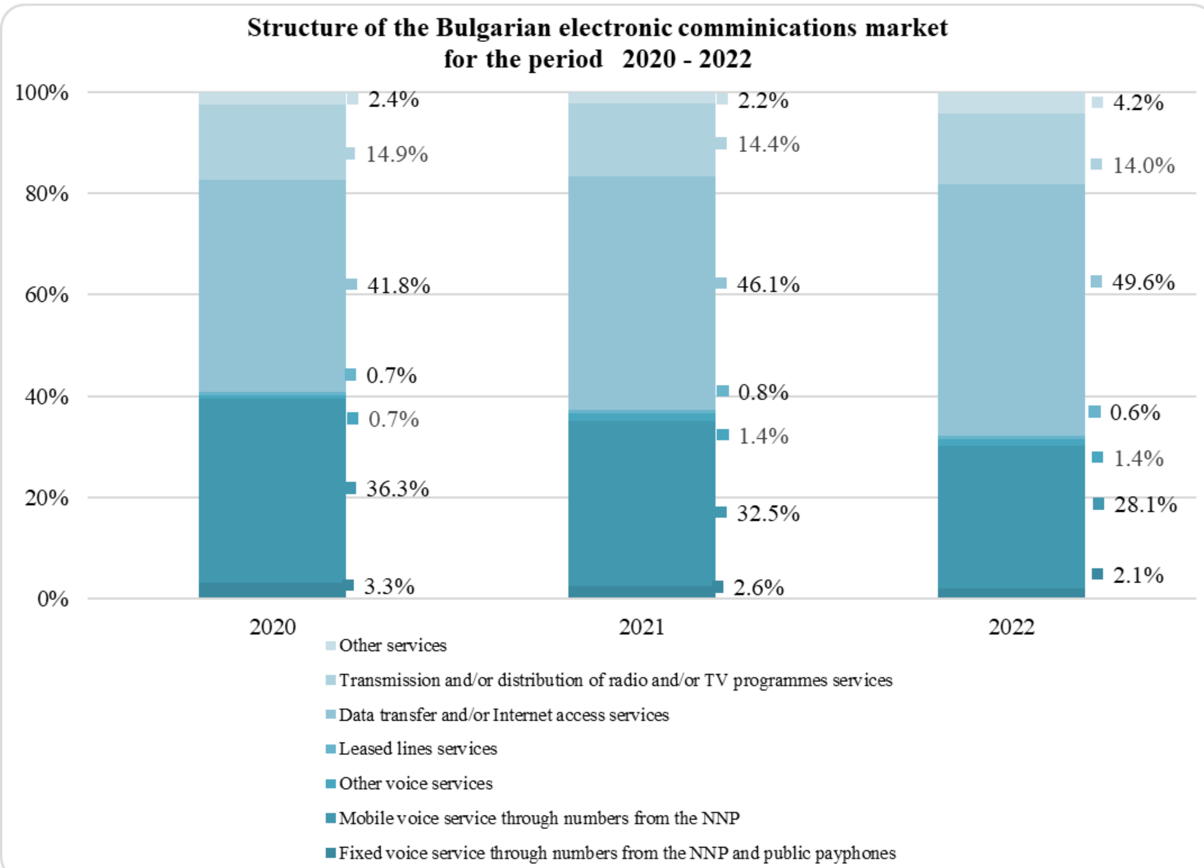
[5] The GDP data for 2021 have been updated. Source: NSI (Gross domestic product in 2021 (updated data) | National Statistical Institute (nsi.bg)).

[6] 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 the 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.

The revenue from data transfer and/or Internet access services holds a leading position with 49.6% share in the total market volume. The relative share of revenue from this market segment within the market structure increased by 3.5 percentage points compared to 2021.

In 2022, the volume of revenue generated from interpersonal communications services (fixed, mobile and other voice services) decreased as compared to the previous year (in absolute terms, the decrease is by 7.4%) and their share in the total volume of the public electronic communications market dropped by 4.9 percentage points down to 31.6%.

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 2020 – 2022.



Source: Data submitted to CRC

Figure 2

As compared to the year before, revenue in the following market segments registered a growth in 2022, namely:

- ”Data transfer and/or Internet access“ – 15.1%; over a one-year period, the relative share of the segment rose by nearly 3.5 percentage points. The growth is mainly due to the ”Data transfer and/or Internet access via mobile terrestrial networks“ group, as its revenue was up by 21.0%;

- “Transmission and/or distribution of radio and TV programmes services” rose by 4.6%. The reported growth of this segment is mainly due to the increase in revenue from IPTV (by 17% compared to 2021).
- “Other services” registered a significant growth of 103.6%. Revenue from the collocation service was up by over 3 times[7] compared to 2021, leading to a growth in the share of the segment by 2.0 percentage points. Revenue from the “Provision of duct access” service, included in this segment, also registered a minimal growth of 1.4%.

The segments that reported a drop in their volume during the period under review are:

- “Interpersonal communications services” – by 7.4% in absolute value, the most significant decrease being observed in the fixed voice service – 12.7%.
- “Leased lines services” - a drop of 13.9% in 2022 as compared to 2021.

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

1.2.1. Bundled services

Revenue from bundled services[8] continued to play a significant role on the electronic communications market in Bulgaria. In 2022, for another consecutive year, consumption of bundled services in Bulgaria increased - as of 31.12.2022, 54% of fixed voice service subscribers, 78% of mobile voice service subscribers, 35% of fixed Internet access subscribers, 84% of mobile Internet access subscribers, and 40% 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 1.609 billion,[9] which represents a growth of 12.4% compared to the revenue the year before.

According to the data submitted to CRC in 2022, six undertakings have launched activity for the provision of a bundled service - in particular, double-play package including fixed Internet access and television. In this way, in 2022, the total number of undertakings providing bundled services amounted to 94, which is by 5 more in comparison with the previous year (89 in 2021).

Subscribers of bundled services

The number of subscribers of bundled services toward the end of 2022, according to the data submitted by the undertakings providing public electronic communications in Bulgaria, increased compared to the previous year by 4.8% to reach 6.979 million. As a result, in the period

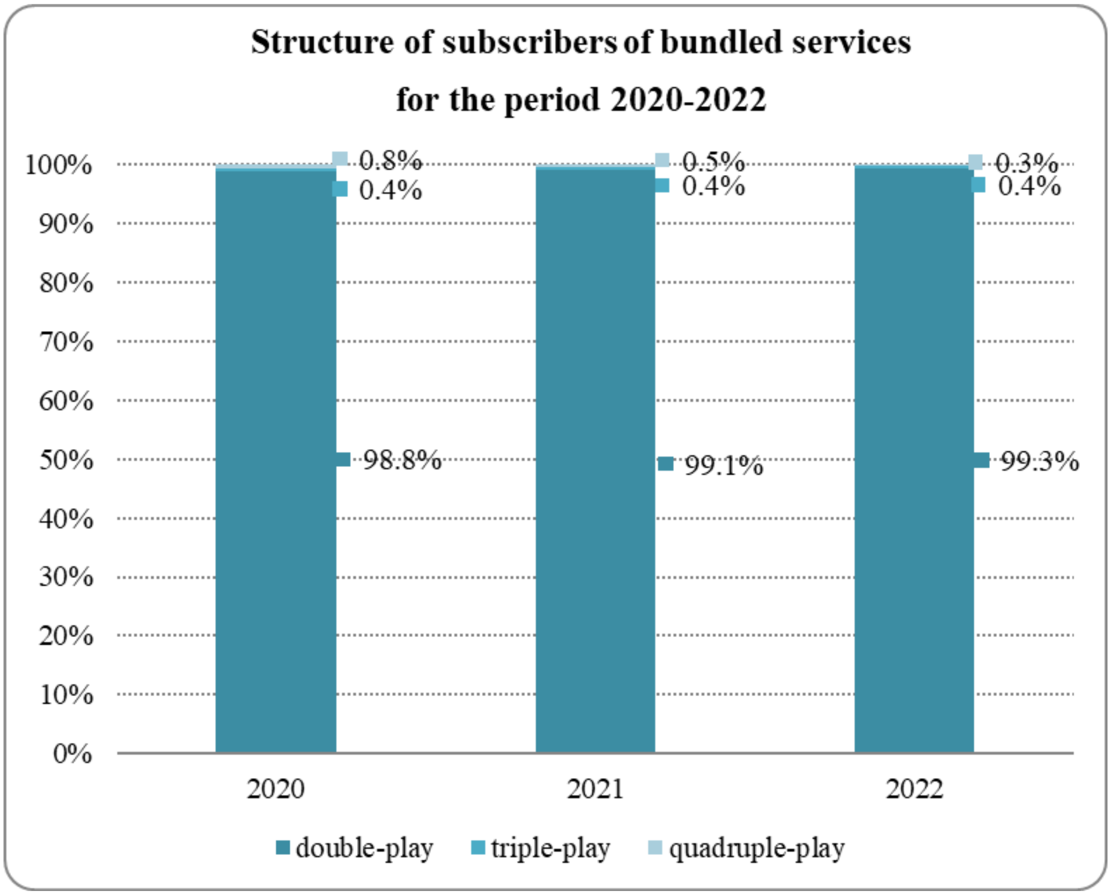
[7] In 2022, A1 TOWERS BULGARIA EOOD (registered on 23.09.2022) and UNITED TOWERS BULGARIA EOOD (registered on 13.10.2022), which reported revenue from collocating, were registered in the “Register of providers of public electronic communications networks and services” of CRC.

[8] “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.

[9] 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.

2021-2022, the value of the "penetration by population"[10] indicator also grew by 6.1 percentage points, thus reaching 108.2 %.

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.



Note: *The data for 2021 have been updated.*

Source: Data submitted to CRC

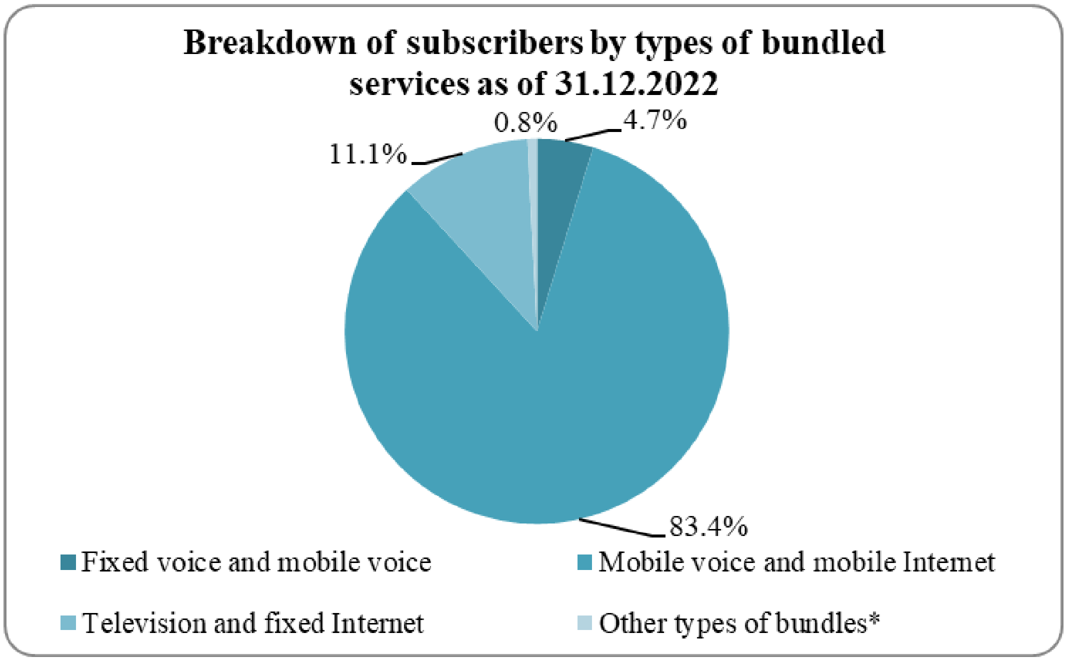
Figure 3

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 2022, double-play packages cover 99.3% 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 5% over a one-year period) and in relative terms (by 0.2 percentage points) compared to the data from 2021. For the first year after a long period of time, interest in triple-play packages has increased, which is evident from the reported higher number of subscribers – by

[10] The indicator is calculated as a ratio between the total number of subscribers of bundled services as of 31.12.2022 and the number of population as of 31.12.2022 according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf); to calculate the indicator for 2021, the final population figures as of 7 September 2021 from the census carried out by NSI were used (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_population.pdf).

11.9% compared to 2021. However, this increase does not significantly affect their share, which registered an insignificant increase of 0.03 percentage points compared to 2021. As in the previous year, in 2022, the number of subscribers of quadruple-play packages dropped significantly (by 43.6%), mainly as a result of the decrease (by 44%) of subscribers of the "Mobile voice service, fixed and mobile Internet access and TV" bundle. This also affects the share of quadruple-play packages which amounts to 0.3%, down by 0.2 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 2022.



Note: *"Other types of bundles" include the subscribers of bundled services, the share of which does not exceed 1% of the total number of subscribers of bundled services.*

Source: Data submitted to CRC

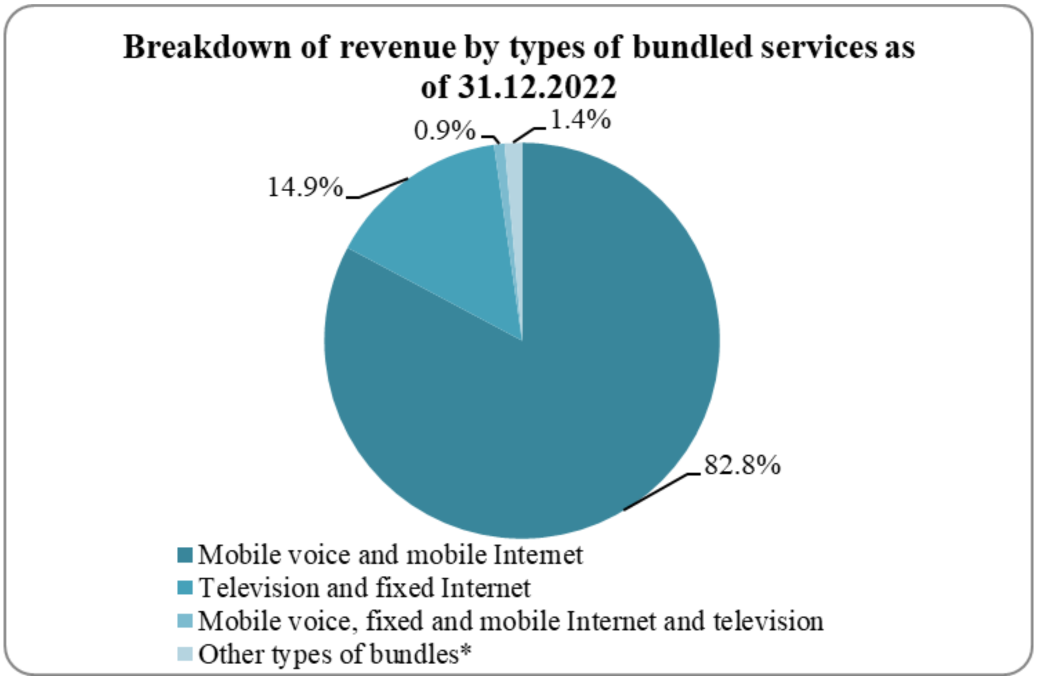
Figure 4

The number of subscribers of the most preferred bundled service – "mobile voice and mobile Internet access" - has increased by 4.6% compared to 2021 to reach 5.822 million at the end of 2022, but there was still a slight decrease in their share (83.4%) 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 2022 amounted to 771 thousand, with an increase of 16.8% in absolute values compared to 2021 and by 1.1 percentage points in relative terms (their share amounted to 11.1%). Fixed voice service and mobile voice service in a bundle, with a relative share of 4.7% of the total number of bundled services subscribers, was used by 330 thousand subscribers (down by 9.3% in absolute value).

Revenue from bundled services

Revenue from bundled services amounted to BGN 1.609 billion in 2022, registering a growth of 12.4% year-on-year. The highest share (98.2%) in the total volume of revenue from these services continued to be held by double-play packages which, as compared to 2021, reported a growth of 12.9% in absolute value and by 0.4 percentage points in relative value. The share of revenue from triple-play, after a continuous decline in the last years, registered a growth in 2022 (by 0.2 percentage points), which is a consequence of the reported 41.3% increase in absolute value. Revenue from quadruple-play packages continued to decline in 2022, by 33.5% compared to 2021, accounting for 0.9% of the total revenue in the segment (by 0.6 percentage points less than in 2021).

Figure 5 presents the breakdown of revenue by types of bundled services in 2022.



Note: *"Other types of bundles" include revenue from packages, the share of which does not exceed 1% of the total revenue from bundled services.*

Source: Data submitted to CRC

Figure 5

In 2022, the share of revenue from the most used bundled service including mobile voice service and mobile Internet access fell by 1.2 percentage points from 2021 to reach 82.8% of the total volume of revenue from bundles, despite the registered growth of 10.8% in absolute value. Revenue from the double-play bundled service “TV and fixed Internet” reported a rise of 27.7% compared to 2021, which reflected on the increase in their share (14.9%), with an increase of 1.8 percentage points. The share of the quadruple-play bundled service “mobile voice, fixed and mobile Internet and television” fell by 0.6 percentage points in 2022. In absolute terms, the revenue from this package decreased by 33.7%. The highest revenue growth in 2022 compared to 2021 was reported in the triple-play package “mobile voice, fixed Internet and television” which, however, represents a growth of 0.3 percentage points in its share (0.3% for 2022) in the total revenue and does not lead to a change in the structure of breakdown of revenue by type of bundled services.

Summary

In 2022, 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 – 88.8% of the total number of subscribers 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 higher revenue generated from bundles with mobile Internet access included and the revenue from bundles with television service included.

1.2.2. Investments

In 2022, 385 undertakings invested funds in the construction and maintenance of public electronic communications networks amounting to BGN 653.636 million, which is by 15% more than the funds invested the year before.

During the year, BGN 128.994 million were invested in fixed networks for the provision of electronic communication services, of which BGN 77.994 million (by BGN 8.071 million more than the previous year) were invested in next-generation access (NGA) networks.

In 2022, the investments in mobile networks amounted to BGN 247.895 million, which represents a 38% 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), telephony service through public payphones, mobile voice service provided through numbers from the NNP (including SMS[11] and MMS[12]) and other voice services (retail provision of VoIP; transit of voice traffic between operators (wholesale VoIP); services provided through non-geographic numbers from the NNP of the "90" range served in networks of other undertakings; telephony services provided through satellite systems, etc.).

Table 2 presents summarised information on the reviewed segment in 2022, namely: the number of undertakings which provided services in this market segment, the number of their subscribers/lines, and the revenue from services provided.[13]

[11] Short message service.
[12] Multimedia messaging service.
[13] 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 2

Number of undertakings, number of subscribers/lines and revenue by type of voice services provided in 2022

Service	Number of undertakings providing the service in 2022	Number of subscribers/lines as of 31.12.2022		Revenue (in millions BGN, excl. VAT)	
		Total[1]	incl. bundled service subscribers	Total[2]	incl. from bundled services
1. Fixed voice service through numbers from the NNP and public payphones	31	663,514*	357,084	71.199	3.913
2. Mobile voice service through numbers from the NNP	3	7,964,361	6,196,735	946.460	560.695
3. Other voice services	18	///	///	47.204	///
Total	**46**	///	///	**1,064.862**	**564.607**

[1] Including subscribers of bundled services.

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

* Number of fixed voice service subscribers.

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

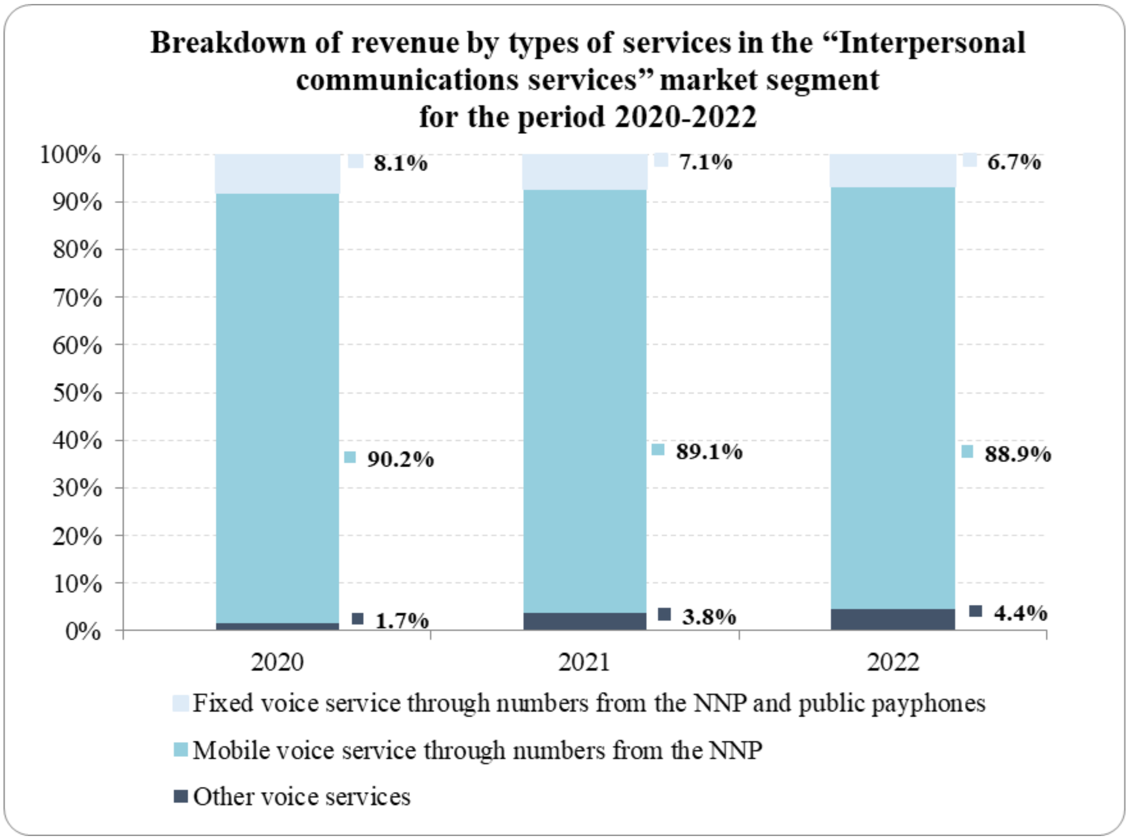
The total number of undertakings that declared activity related to the provision of services included in the “Interpersonal communications service” segment in 2022 amounts to 46. Of these, three undertakings provided services from the group “Mobile voice service through numbers from the NNP”. Undertakings that have declared activity of providing access to fixed voice service through numbers from the NNP and/or wholesale services for interconnection of public telephone networks for 2022 amount to 31, including Vivacom Bulgaria EAD[14] (Vivacom), which provides the service through public payphones/telephone booths as well.[15] The number of undertakings providing other voice services amounted to 18, of which 13 undertakings declared the retail or wholesale provision of VoIP services (transit of voice traffic between operators).

The total volume of the revenue generated from services included in the “Interpersonal communications services” segment amounted to BGN 1,064.862 million in 2022, as a decrease of 7.4% was reported compared to the previous year.

Figure 6 shows the distribution of revenue from different services in the segment volume for the period 2020 - 2022.

[14] As of 05.10.2022, the name of Bulgarian Telecommunications Company EAD changed to Vivacom Bulgaria EAD.

[15] In 2021, the number of undertakings that have declared the activity of providing fixed voice service through numbers from the NNP and through public payphones/telephone booths amounted to 30. Of these, 29 undertakings have declared activity of providing access to public voice service through geographic numbers from the NNP and/or wholesale services for interconnection of public telephone networks. Apart from Vivacom, only one other undertaking has declared the provision of a service through public payphones/telephone booths.



Source: Data submitted to CRC

Figure 6

As shown in the figure above, the structure of this market segment remains unchanged for another consecutive year – the main share (88.9%) is formed from the revenue from the mobile voice service, with a decrease of only 0.2 percentage points for the one-year period. A decrease is also reported in the share of the fixed voice service - by 0.4 percentage points, at 1 percentage point for the previous year. In the group of other voice services, for another consecutive year, the relative share in the overall structure of the segment increased – but by only 0.6 percentage points for 2022, compared to 2.1 percentage points for the previous period.

In absolute terms, revenue generated from the provision of services included in the "Interpersonal communications services" market segment in 2022 changed as follows:

- the mobile voice service reported a decrease of 7.6% in the volume of revenue generated during the reporting year compared to 2021, with a drop of 1.3% in the previous period (2020-2021);
- revenue from the provision of a fixed voice service fell by 12.7% in 2022, compared to a decrease of 12.3% for the previous one-year period;
- a growth of 6.8% in 2022 compared to 2021 was reported in the total revenue from services included in the "Other voice services" group, which is the result of the increase in revenue generated from the provision of VoIP services by 1.3%, as well as from the inclusion in the group of these services of revenue from the provision of satellite access

services that are relevant to voice services.[16]

2.1. Fixed voice service through numbers from the NNP

Market players

As of 31.12.2022, the total number of undertakings authorised by CRC to provide access to fixed voice service through primary assigned resource - groups of geographic numbers and through codes for access to the “carrier selection” service - was 21. A total of 24 undertakings were registered for their intention to provide public electronic communication services through resale of fixed voice service through secondary assigned numbers - by 4 more than their number at the end of 2021.

The total number of undertakings that declared a fixed voice service activity through numbers from the NNP and/or wholesale services for interconnection of public telephone networks in 2022 amounted to 31. 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 of them provided the service through a primary resource provided, 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. Five undertakings have declared activity of providing wholesale services only (“transit” and “interconnection”) which are relevant to the provision of a fixed voice service through numbers from the NNP. In 2022, only one undertaking declared activity of providing voice service through public payphones/telephone booths – Vivacom.

The main providers of fixed voice service through numbers from the NNP for end-users (retail service) are Vivacom, A1 Bulgaria EAD (A1), and Yettel Bulgaria EAD (Yettel[17]). In 2022, they formed 97.8% of the market volume, measured on the basis of the number of subscription lines of fixed voice service and 94.0% of the revenue generated from subscribers of the service provided at retail level.

[16] In accordance with the update of the types of public electronic services in the CRC register, as a result of amendments to the European regulatory framework in the field of electronic communications and the subsequent changes in the LEC, the revenue from satellite access services are allocated according to the type of services provided – voice services, Internet access and/or data transfer services are included in the relevant segment in the structure of the electronic communications market.

[17] As of 01.03.2022, the name of Telenor Bulgaria EAD changed to Yettel Bulgaria EAD

Table 3

Market shares of undertakings providing retail fixed voice service

Undertaking	2021		2022	
	Share based on number of subscription lines	Share based on revenue from subscribers	Share based on number of subscription lines	Share based on revenue from subscribers
VIVACOM BULGARIA EAD	57.6%	83.3%	58.0%	81.9%
A1 BULGARIA EAD	26.5%	6.7%	24.9%	6.3%
YETTEL BULGARIA EAD	13.7%	5.5%	14.9%	5.8%
All other	2.2%	4.6%	2.2%	6.0%

Source: Data submitted to CRC

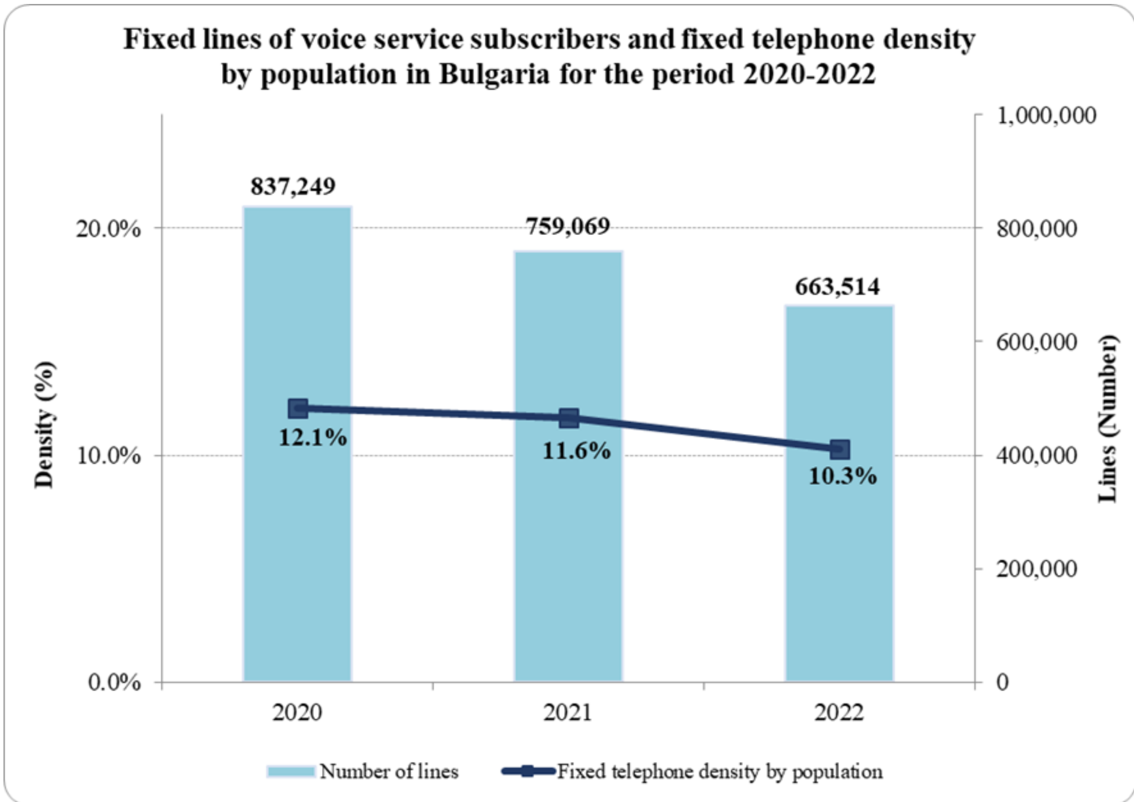
In 2022, Vivacom's market share, calculated on the basis of fixed lines, amounted to 58.0% and its value rose by 0.4 percentage points compared to 2021. Growth was also reported for Yettel – by 1.2 percentage points in 2022 compared to 2021. For both undertakings, the increase in the value of their market shares, calculated on the basis of number of lines, is due to the smaller decrease in the number of fixed lines of their subscribers compared to the decrease in the total number of fixed lines in the segment. In the share of A1, unlike the previous period (with a reported increase of 1.4 percentage points), there was a decrease of 1.6 percentage points in the current period (2021-2022). Fixed lines of subscribers of all other undertakings make up 2.2% of the market, measured on the basis of number of lines.

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 was down by 1.4 percentage points compared to the previous year; A1 also saw a decrease, but at a lower rate – by 0.4 percentage points, while Yettel's market share reported an increase of 0.3 percentage points. The aggregate market share of the remaining market players, calculated on the basis of the total volume of revenue from retail services, increased by 1.4 percentage points - from 4.6% in 2021 to 6.0% in 2022.

Lines of fixed voice service subscribers

As of 31.12.2022, the total number of fixed voice subscribers lines amounted to 663,514, which represents a decrease of 12.6% compared to the same indicator reported at the end of the previous year. The data declared by the undertakings show that, for another consecutive year, the downward trend in the number of fixed lines is maintained, as a result of the decreasing interest of end-users in the fixed voice service. The number of Vivacom lines dropped by 12.0% in 2022, with a decrease of 12.3% for the previous period (2020-2021), and the decrease in the total number of the competing undertakings subscription lines was by 13.4% in 2022 versus 2021, compared to 5.0% for the previous reporting period.

Figure 7 presents information on the variation in the number of fixed lines of voice service subscribers and the fixed density by population for a three-year period.



Source: Data submitted to CRC

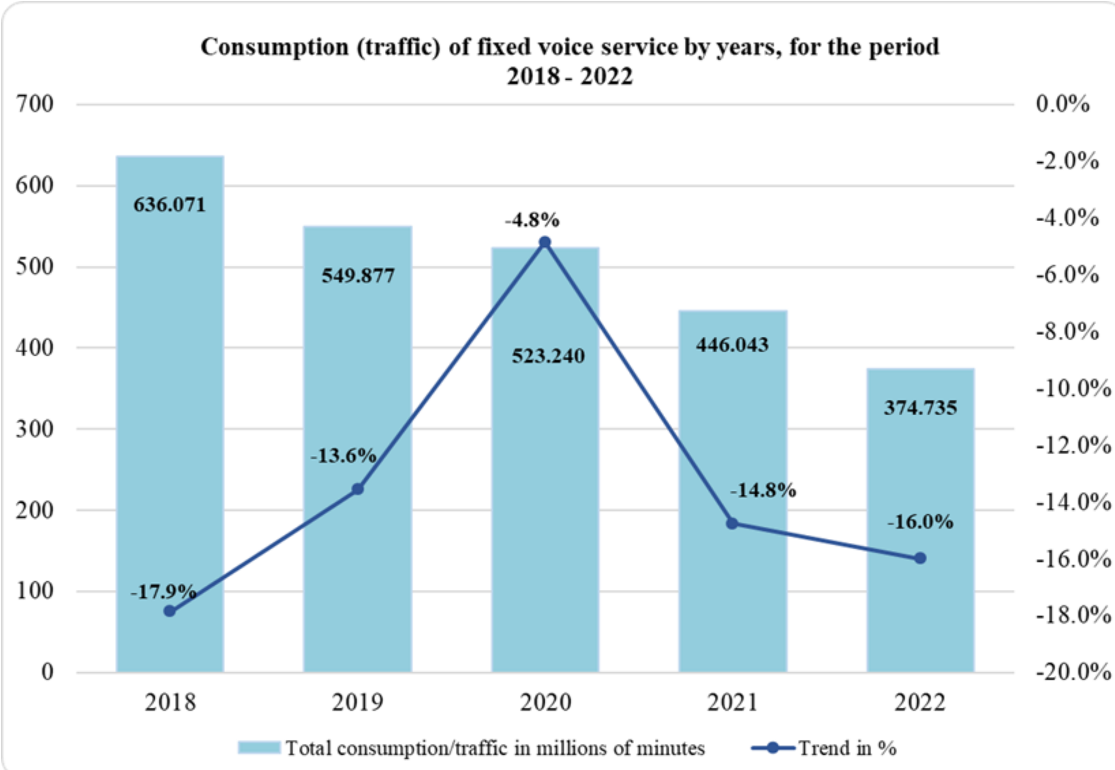
Figure 7

The annual decrease in the total number of fixed lines in absolute value (by 20.8% in 2022, compared to 2020) also affects the value of the "fixed telephone density by population" indicator, which also dropped down to 10.3%[18] in 2022.

Consumption (traffic) of fixed voice service

In 2022, according to data provided by the undertakings, in the implementation of national (local and long-distance calls, calls to mobile terrestrial networks and to non-geographic numbers) and international calls, end-users of fixed voice service generated a total volume of outgoing traffic amounting to 374.735 million minutes. This shows that, for yet another year, there is a decrease in consumption, with a drop of 16.0% in this indicator, which is by 1.2 percentage points more than in the previous period (2020-2021), when a decrease of 14.8% was reported. As shown in the figure below, the data on the volume of the outgoing traffic from calls generated by end-users of a fixed voice service for the period 2018-2022 show a steady downward trend, with the weakest rate of decline recorded in 2020 due to the social isolation caused by the COVID-19 crisis.

[18] The 2022 indicator was calculated as a ratio between the total number of active fixed voice service subscribers lines as of 31.12.2022 and the number of the population as of 31.12.2022, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf); to calculate the indicator for 2021, the final population figures obtained from the NSI census conducted on 7 September 2021 were used (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_population.pdf).

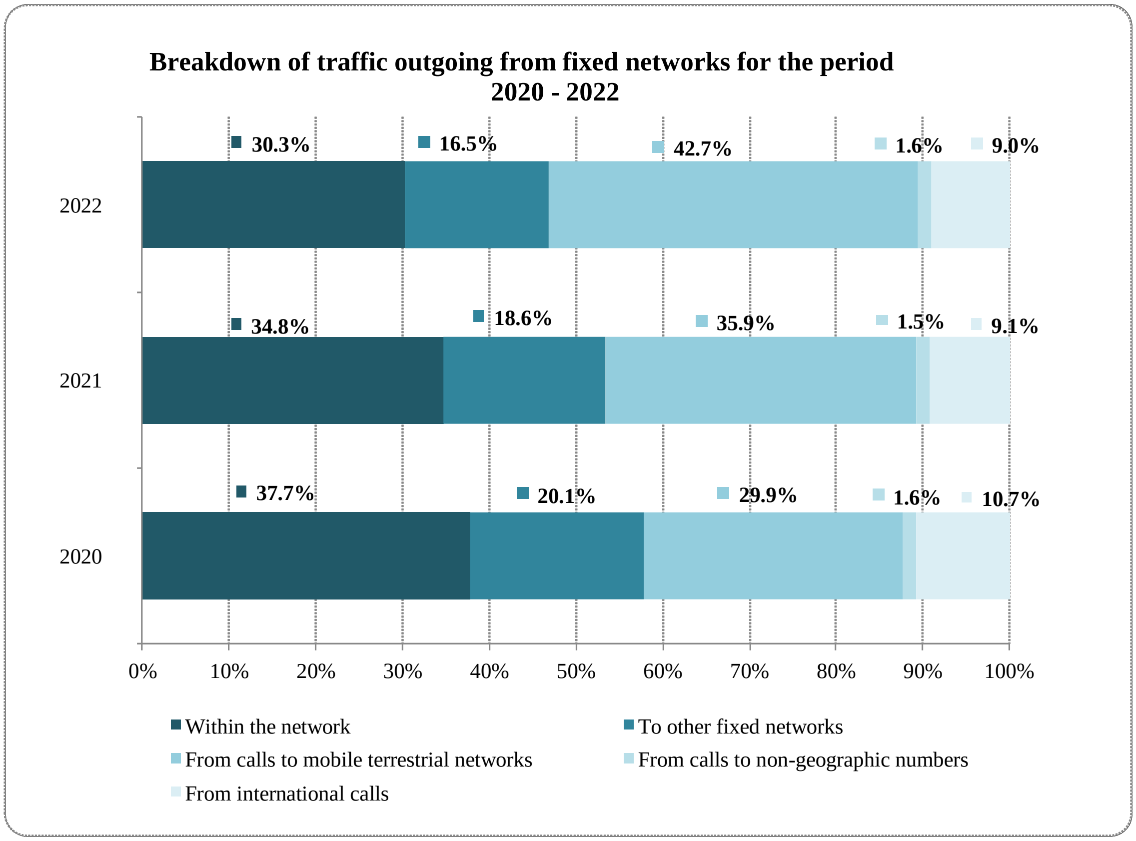


Source: Data submitted to CRC

Figure 8

The share of traffic generated from calls included in subscription plans in 2022 amounts to 89.2%, which indicates that the model of service provision, consisting in the inclusion of a large volume of call traffic in the monthly subscriptions of fixed voice subscribers, continues to apply. As a result, only 10.8% of the total generated traffic is paid by subscribers outside the monthly subscription.

Figure 9 presents the distribution of the total volume of traffic generated by fixed networks in the period 2020-2022, depending on the type of calls by destination.



Source: Data submitted to CRC

Figure 9

In 2022, a reduction was reported not only in the total volume of outgoing traffic generated, but also in all call groups allocated by direction (within the undertaking network (on net), to other fixed networks (off net), to mobile networks, to non-geographic numbers, and to networks abroad). The changes reported by call type in 2022, compared to 2021, both in absolute value and as a share in the total volume, are as follows:

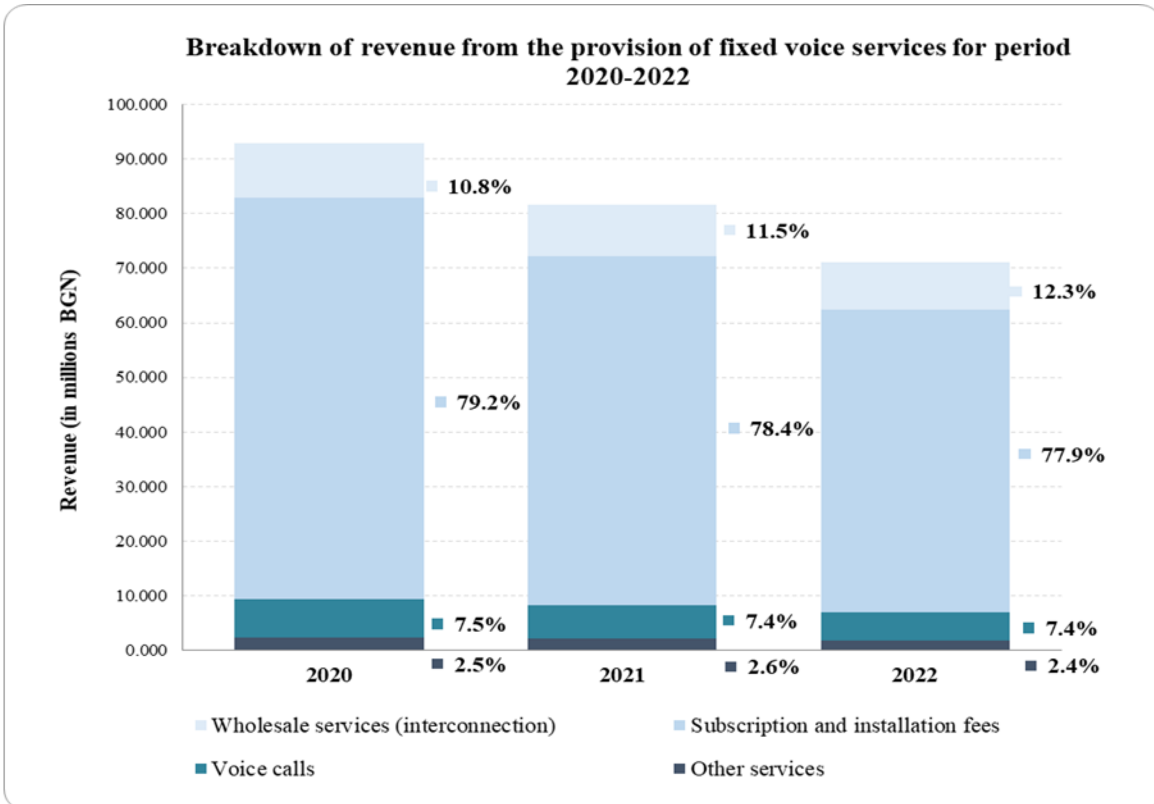
- the volume of traffic within the networks (on net) decreased by 26.9% and the share it forms in the total volume of traffic fell from 34.8% to 30.3%;
- call traffic to other fixed networks (off net) dropped by 25.4%, and its share decreased by 2.1 percentage points to 16.5% year-on-year;
- the decrease in traffic generated from fixed to mobile networks in 2022, compared to 2021, was only 0.3%, but it breaks the reported in previous years trend of growth in traffic from calls to mobile networks. The share of this traffic rose by 6.8 percentage points over a year to make up 42.7% of the total volume of consumption by subscribers of fixed voice service in 2022;
- the consumption of calls to non-geographic numbers for services and short numbers, measured in minutes, registered a drop of 14.8%, but its share in the total volume (1.6%) remained almost unchanged compared to the previous year (1.5%);

- calls to networks abroad account for 9.0% of the total retail traffic, the decrease in the generated traffic is 17.1% in absolute terms.

The outflow of subscribers from the interpersonal communications service through geographic numbers and the reduced consumption also affects the related service of wholesale call termination on fixed networks. According to the data declared by undertakings - service providers - the total volume of the terminated traffic on fixed networks in the country fell by 21.1% in 2022 compared to 2021. Over the same one-year period, the decrease in the volume of traffic generated from networks in the country amounted to 20.3%, with the largest decrease being registered in traffic generated from geographic numbers and terminated in geographic numbers – by 31.7%. For 2022, the traffic terminated on fixed network and generated by mobile networks of other undertakings in the country decreased by 8.0% compared to the previous year. According to the data provided by the undertakings, the decrease in consumption is not limited only within the national traffic – in 2022, compared to 2021, the volume of incoming traffic terminated on fixed networks from calls originating from networks abroad, decreased by 24.8%.

Revenue from fixed voice service

In 2022, the total volume of revenue generated from the provision of a fixed voice service amounted to BGN 71.199 million, which represents a decrease of 12.7% compared to 2021. The figure below shows the distribution of this revenue by main groups of services over a three-year period, showing that there are no significant variations in the structure of their total volume. In 2022, revenue from installation and subscription fees from the provision of a fixed voice service to end-users, including the part of a bundled service, form the main share in the total volume of the service revenue – 77.9%, compared to 78.4% in 2021.



Source: Data submitted to CRC

Figure 10

The main changes, in absolute terms, recorded in respect of revenue from a fixed voice service in 2022, compared to 2021, are very close to those reported for the previous period (2020-2021), as follows:

- drop in the volume of revenue generated from the provision of access to the fixed voice service (installation and subscription fees) of 13.3% in 2022 compared to 2021, at 13.1% in the previous period;
- revenue generated from calls, out of the subscriptions, also decreased by 13.3% in 2022 (compared to 13.6% for the period 2020-2021), which is due to the overall decline in service consumption;
- the decrease reported in the volume of revenue from wholesale services (including interconnection services - origination, termination, transit and interconnection) was 6.9% for 2022, compared to 6.2% for the previous period.

In 2022, wholesale fixed voice termination rates set out in the Delegated Act on single Union-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 provisions of the Delegated Act also concern part of non-traffic interconnection services, given that interconnection ports are included in the termination service as their essential element. Revenue from a monthly interconnection subscription (total for ports and lines) fell by 15.2% in 2022 versus 2020 (the year before the entry into force of the regulation), with the decrease in revenue from monthly interconnection subscriptions being 8.8% for the same period. The relative shares presented on the figures above show that the decrease in absolute value of the revenue from a monthly interconnection subscription does not affect the structure of the total revenue from the provision of a fixed voice service. The value of the relative share of the total revenue from wholesale services (interconnection) in 2022 reported a growth of 1.5 percentage points compared to 2020 due to the higher rate of decline in absolute value of revenue from subscription, installation fees, non-subscription calls, and other services.

Summary

In 2022, no significant changes were reported in the trends already identified with respect to the fixed voice service segment, which is characterised by the following changes:

- the number of lines of subscribers to a fixed voice service follows an annual rate of reduction – for 2022, the drop was by 12.6% compared to the previous year;
- the total consumption of the service, expressed in minutes of traffic from retail calls, continued to shrink. The revenue generated from the provision of the service also decreased, with the main share in their volume being formed by subscription fees;
- calls included in subscriptions continue to form a significant share in the total volume of outgoing traffic generated, as in 2022, subscribers of the service paid 10.8% of the traffic from non-subscription calls.

The annual decline in the number of subscribers of fixed voice service, the high value of the mobile telephone density (penetration) indicator on a population basis,[19] as well as the increasing number of end-users of fixed and mobile Internet access who could benefit from the available internet applications for interpersonal services, including video calls, suggest that the consumption of a fixed voice service will continue to shrink.

2.2. Mobile voice service through numbers from the NNP

Market players

In 2022, a total of three undertakings in Bulgaria provided mobile voice service through numbers from the NNP (mobile voice service) - these are 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 NNP for the provision of mobile voice service).

The reports presented to CRC on the activity of providing public electronic communications in 2022 show that the ” mobile voice service through numbers from the NNP” market segment did not register any shift in the market positions of A1, Yettel and Vivacom since Bulsatcom EOOD left the segment at the end of 2021.[20] As of 31.12.2022, the market shares of the three undertakings, calculated on the basis of the number of subscribers, were respectively: A1 – 36.7%, Yettel – 32.1%

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[19] The indicator is presented in the " Mobile voice service subscribers” part of p. 2.2. “Mobile telephony service through Numbers from the NNP”

[20] The authorisation issued by CRC to Bulsatcom EOOD for the use of the individually assigned scarce resource – radio frequency spectrum (in the 1800 MHz range) for carrying out electronic communications through a terrestrial network capable of providing mobile electronic communications services, expired on 15.12.2021.

and Vivacom – 31.2% (Table 4).[21] The breakdown of market shares on the basis of revenue from the provision of mobile voice service at retail level in 2022[22] was: 38.0% for Yettel, 34.2% for A1, and 27.8% for Vivacom.

Table 4

Market shares of undertakings providing retail mobile voice service

Undertakings	2021		2022	
	Share based on number of subscribers	Share based on revenue	Share based on number of subscribers	Share based on revenue
A1 BULGARIA EAD	37.3%	35.1%	36.7%	34.2%
YETTEL BULGARIA EAD	33.0%	39.5%	32.1%	38.0%
VIVACOM BULGARIA EAD	29.7%	25.3%	31.2%	27.8%
BULSATCOM EOOD*	0.00%	0.002%	///	///

*The undertaking provided mobile voice service until 15.12.2021.

Source: Data submitted to CRC

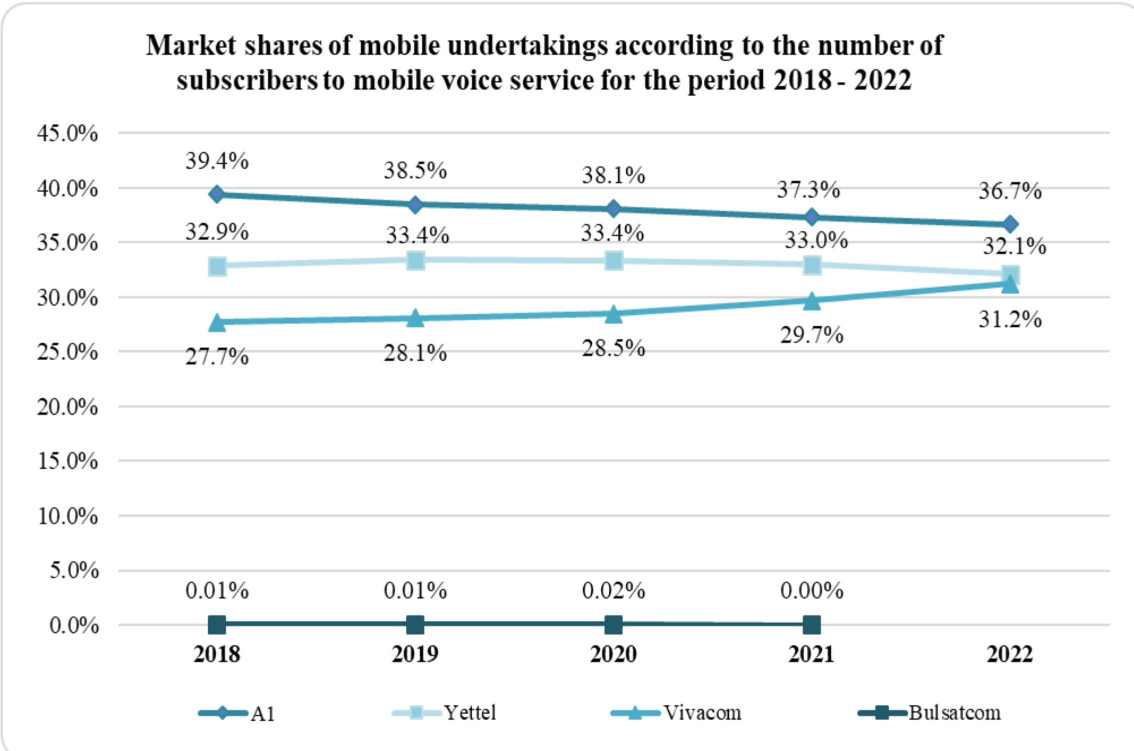
The data shown in Table 4 show that, in 2022, there were no significant changes in the market shares based on the number of subscribers and on the basis of retail revenue from mobile voice service - Vivacom registered a growth in the market share based on the number of subscribers and a more significant growth in the market share based on retail revenue. A1 reported a slight decrease in the market share in both indicators compared to 2021. Yettel saw a slightly larger decline in the market share based on revenue and a slight decline in the share based on number of subscribers. In 2022, compared to 2021, 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 0.6 percentage points, while the one calculated on the basis of revenue dropped by 0.9 percentage points;
- the relative share of Yettel, calculated on the basis of number of subscribers, decreased by 0.9 percentage points, while the one calculated on the basis of revenue was down by 1.5 percentage points;
- the relative share of Vivacom, calculated on the basis of number of subscribers, rose by 1.5 percentage points, while the one calculated on the basis of revenue was up by 2.5 percentage points.

[21] Market shares were calculated based on the number of active SIM cards as of 31 December 2022 enabling the making of voice calls (SIM cards of contract subscribers and prepaid SIM cards from which outgoing or incoming calls have been made at least once in the last 3 months). SIM cards for mobile data transfer without the ability to make calls and for Machine-to-Machine (M2M) mobile data transfer are not included.

[22] 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.

The following two figures present data on the trend of development of the market shares of mobile undertakings over the last five years (2018 – 2022), calculated on the basis of the number of subscribers and revenue from the provision of mobile voice service.

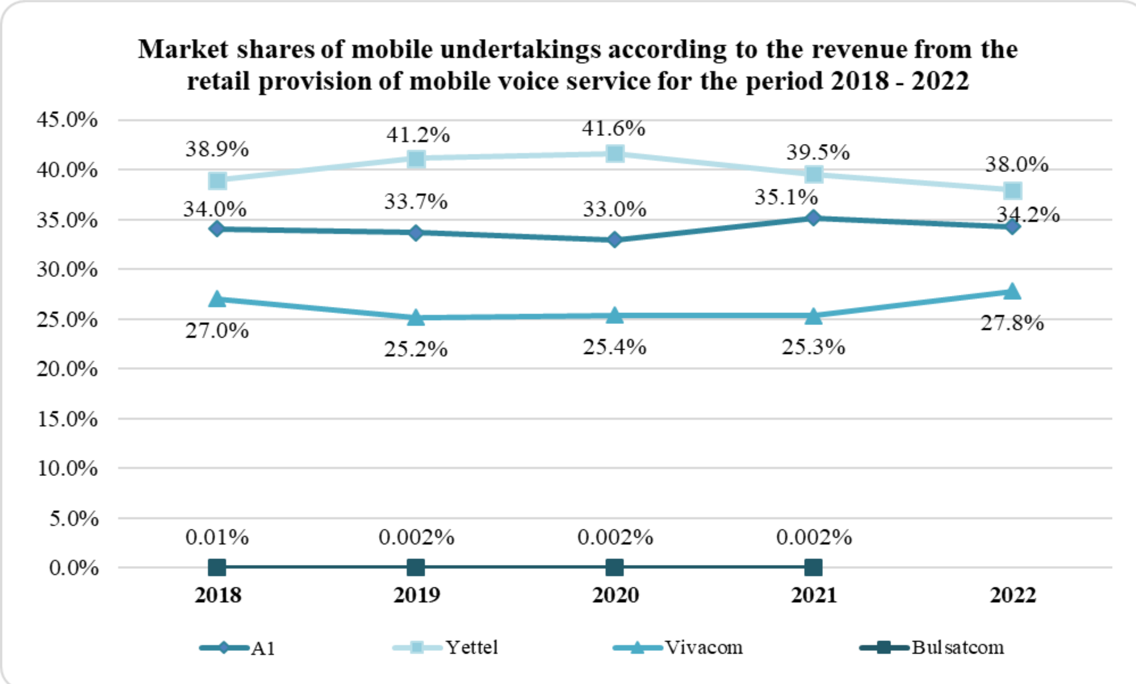


Source: Data submitted to CRC

Figure 11

From the data presented in the figure above, it is evident that, during the period considered, there was a smooth trend of decline in the market share of A1 subscribers - at the end of 2022, it was by 2.7 percentage points lower than as of 31.12.2018. This decline is at the expense of a growth in the relative market share of Vivacom, which has gradually increased since 2018 (by 3.5 percentage points for the period 2018-2022). For the period considered, there was a slight decrease in the Yettel`s market share based on the number of subscribers (by 0.8 percentage points).

In the case of retail revenue-based market shares (Figure 12), for the period 2018-2022, there was a slight fluctuation in the indicator values in all three leading mobile undertakings, but the size is insufficient to reposition the undertakings in the segment. As shown by the data presented in the figure below, the market share values for 2022 in all three mobile undertakings have returned to their levels since the beginning of the period under review – the market share of Yettel was by 0.8 percentage points lower than it was in 2018, and the market shares of A1 and Vivacom increased by 0.2 and 0.8 percentage points, respectively.

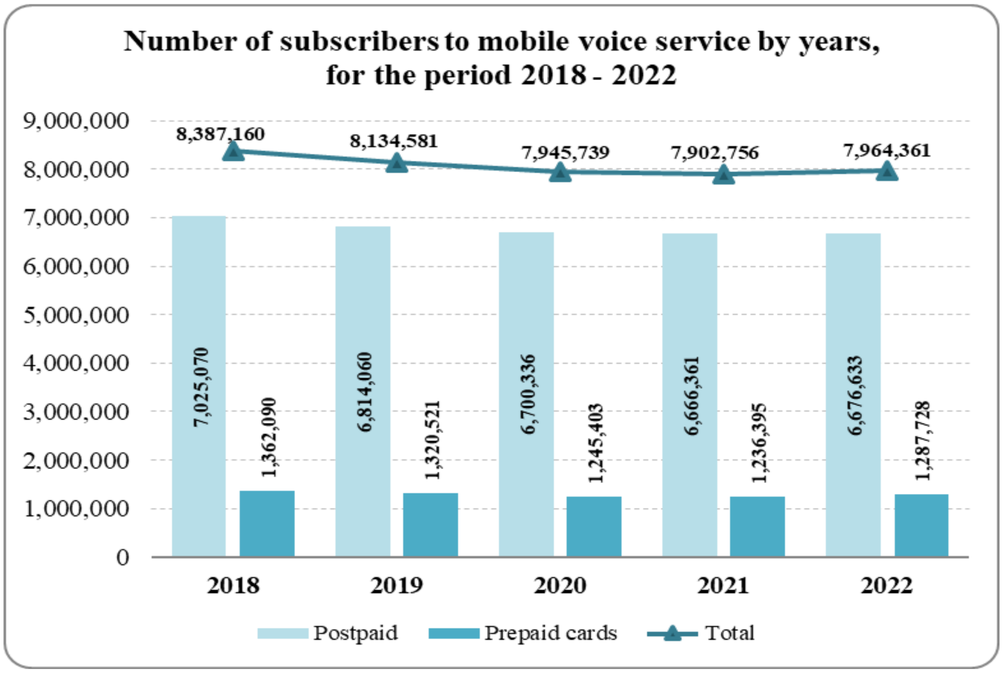


Source: Data submitted to CRC

Figure 12

Subscribers of mobile voice service

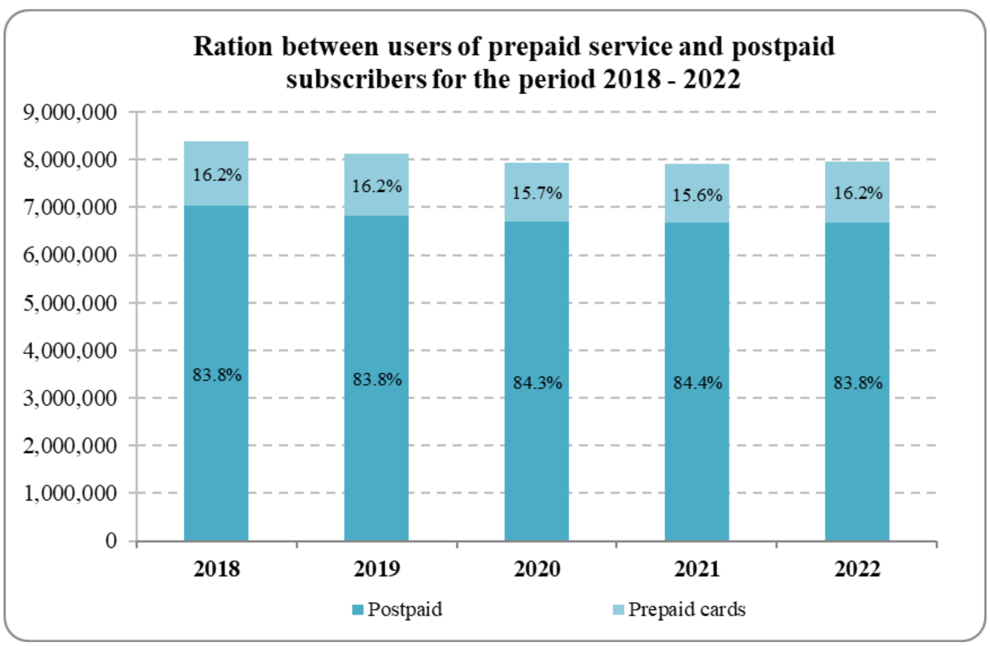
As of 31.12.2022, the number of subscribers of mobile voice service (number of unique SIM cards) amounted to 7,964,361, registering a rise of 0.8% since the previous year 2021 (as of 31.12.2021, the number of subscribers was 7,902,756). The figures presented in Figure 13 show that, compared to the end of 2021, as of 31.12.2022, there was an increase both in the number of postpaid subscribers (by 0.2%) and in the number of end-users of the prepaid card service (by 4.2%). To compare with, in 2021, a drop was registered in both types of users – by 0.5% for subscribers under contract and by 0.7% for those with prepaid cards.



Source: Data submitted to CRC

Figure 13

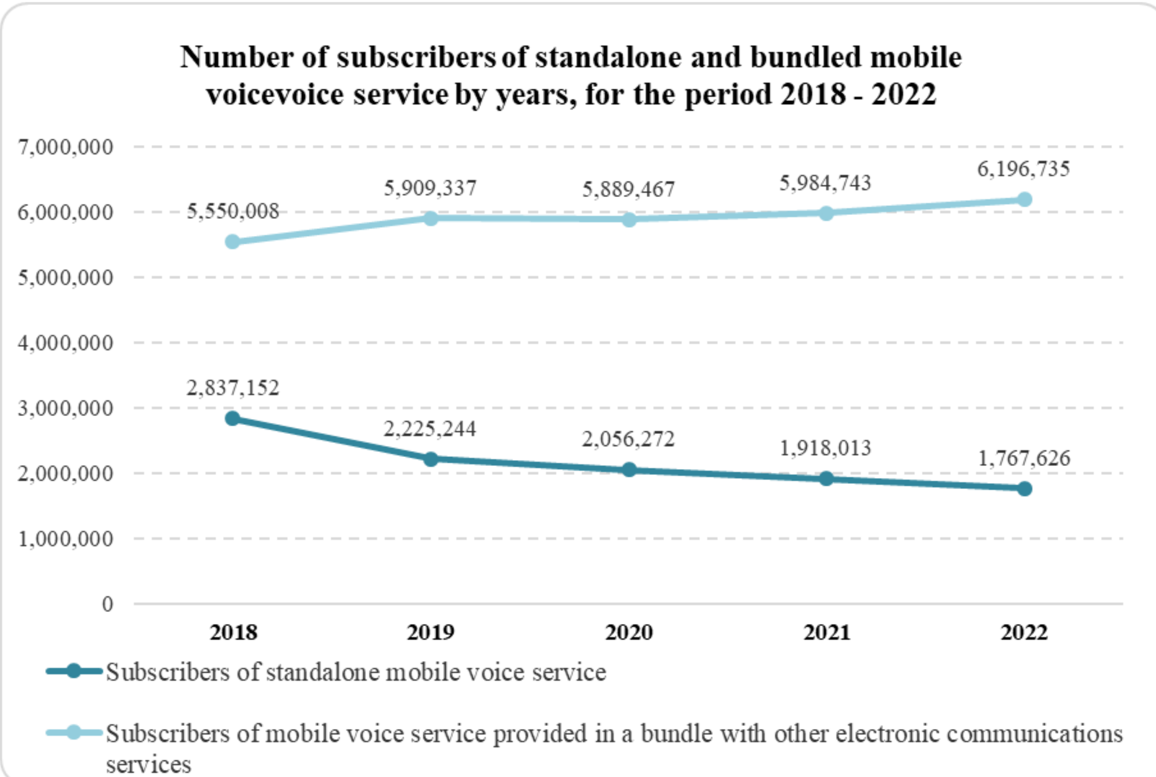
The following figure shows the proportion of subscribers of prepaid mobile voice service and postpaid subscribers – as is evident from its data, as of 31.12.2022, the share of subscribers to a prepaid service (16.2%) increased by 0.6 percentage points and the proportion of the two types of users returned to its level in 2019.



Source: Data submitted to CRC

Figure 14

As is evident from the data presented in Figure 15, the number of subscribers who use a mobile voice service in a package with other electronic communications services continued to grow. At the end of 2022, the number of subscribers to bundled services reached 6,196,735, which represents 77.8% of the total number of subscribers of mobile voice service in Bulgaria as of 31.12.2022. For the last five years (2018-2022), the reported growth in the number of subscribers using the service in a package was 11.7%.

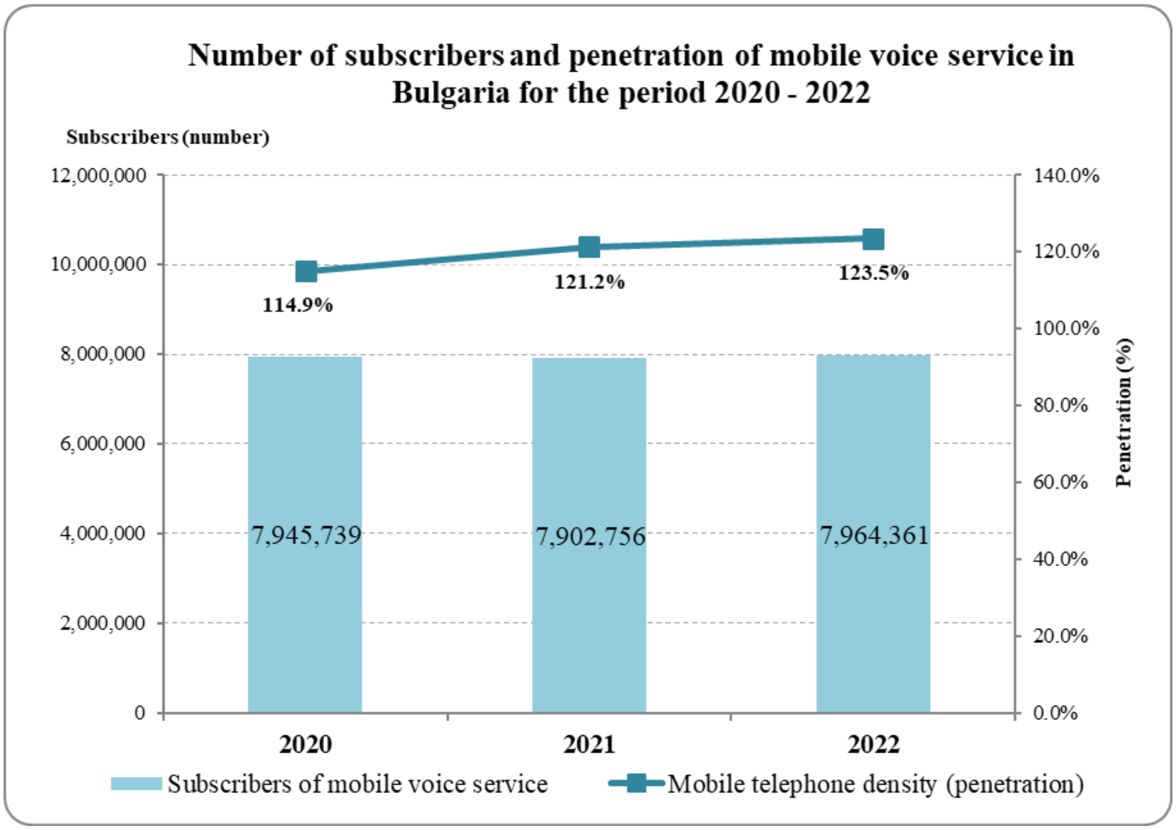


Source: Data submitted to CRC

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 2020-2022.[23] The data show that the penetration of the service among the population in 2022 increased (from 121.2% as of 31.12.2021, it reached 123.5% as of 31.12.2022).

[23] The 2022 indicator was calculated as a ratio between the number of subscribers to mobile voice service as of 31.12.2022 and the number of the population as of 31.12.2022, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf); to calculate the indicator for 2021, the final population figures obtained from the NSI census conducted on 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 the penetration of the mobile voice service in 2022 was by 2.3 percentage points. This is the result of two factors - a drop in the number of population in 2022 and an increase in the number of subscribers using the service.

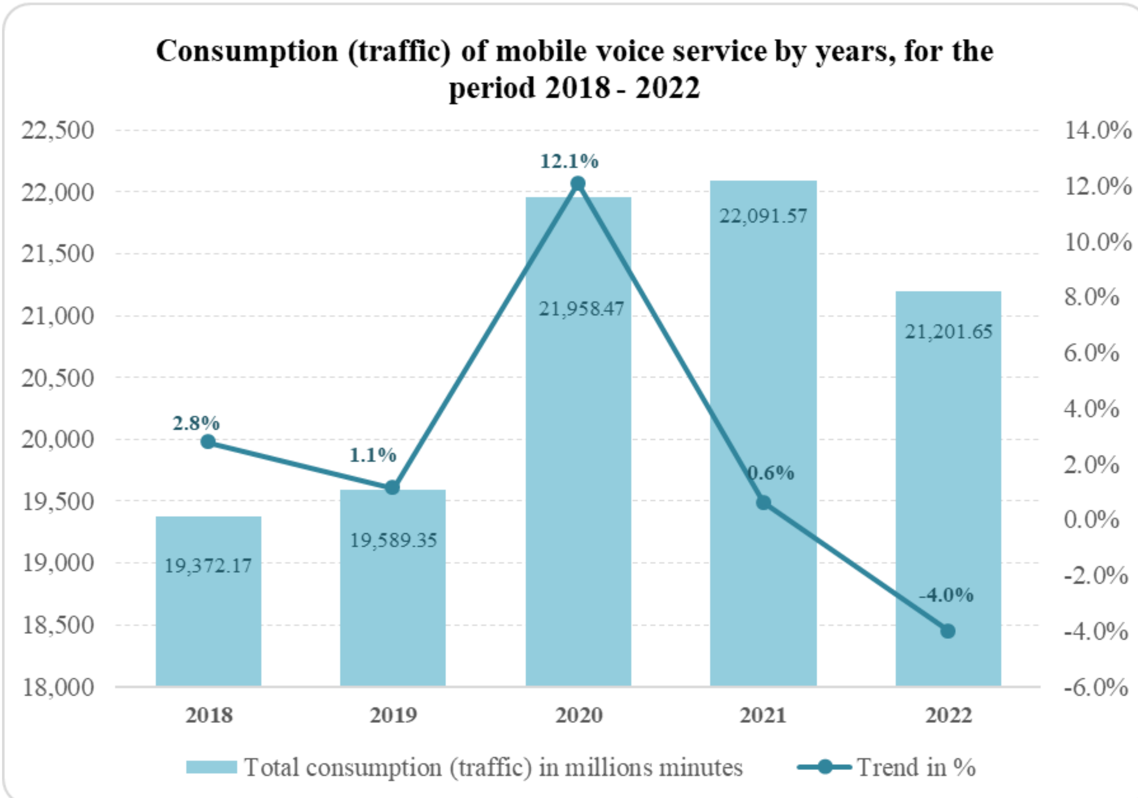
Consumption (traffic) of mobile voice service

The total volume of outgoing traffic from mobile networks in the country[24] for 2022 amounts to 21,201.65 million minutes, which represents a 4.0% drop in the consumption of mobile voice service compared to the previous year 2021. It is a natural result of the attenuation of the COVID-19 pandemic, which had a major positive effect on the country's mobile voice service consumption in the previous two years – in the first year of the outbreak of the pandemic (2020), a record growth of 12.1% was reported in the volume of outgoing voice traffic from mobile networks in Bulgaria, and in the second year – 0.6%.

The decrease in the total volume of outgoing traffic from mobile networks in the country in 2022 is the result of a fall in the number of minutes used from mobile to fixed networks in the country (by 8.7%), to other mobile networks in the country (by 2.8%), to the own mobile network (by 4.9%) and to networks abroad (by 2.1%). Despite the decline, in 2022, the total volume of outgoing traffic from mobile networks in the country was by 8.2% higher than the one reported for the pre-pandemic year 2019 (in 2019, it amounted to 19,589.35 million minutes). This data show

[24] 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.

that the consumption of mobile voice service in the country reached its saturation point in 2021 and that, with the fading of the COVID-19 crisis, the use of the service is starting to decline, as is evident from the following figure.



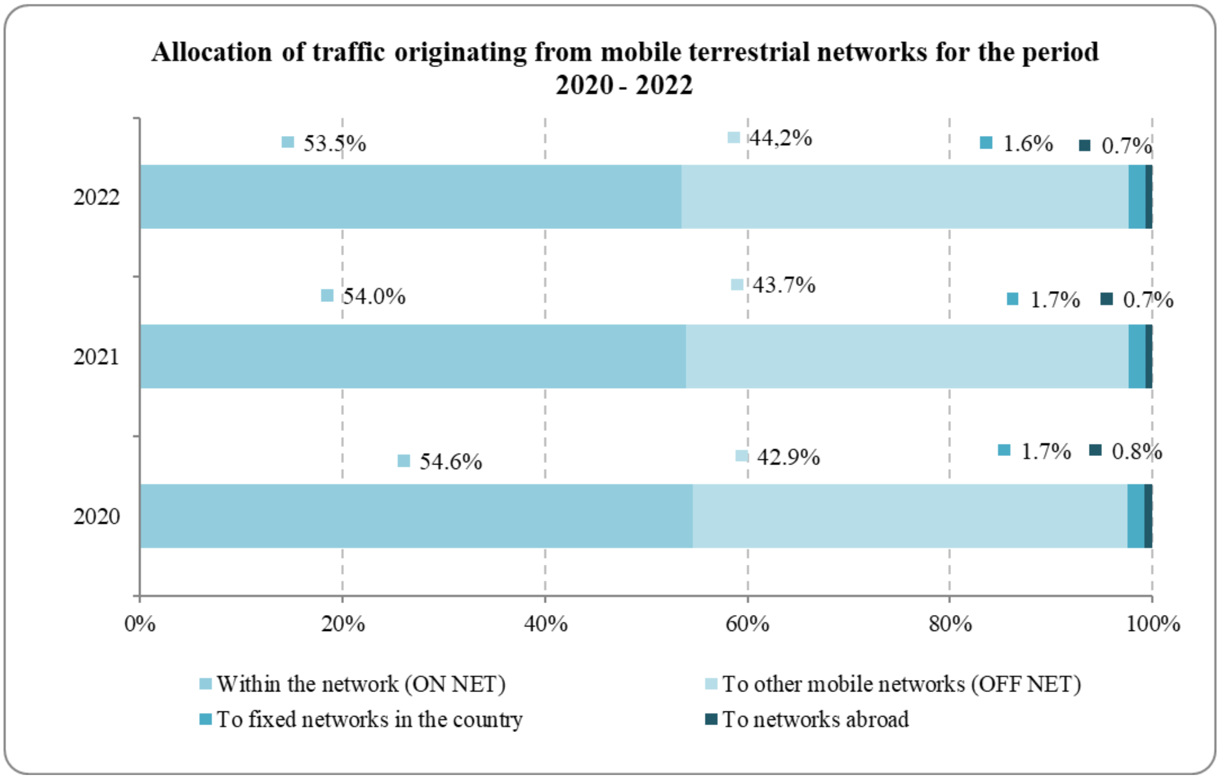
Source: Data submitted to CRC

Figure 17

As was expected, with the fading of the health crisis and the lifting of the restrictive measures for travelling abroad, in 2022, there was a 3.9% increase in outgoing roaming calls from subscribers of Bulgarian mobile undertakings abroad. Incoming roaming calls continued to decline for yet another year – by 4.5% compared to 2021.

The share of consumption (number of minutes used) by subscribers with prepaid SIM cards in the total consumption of mobile voice service in 2022 continued to gradually decrease, reaching 3.3% (vs. 3.4% in 2021). For postpaid subscribers, this share is 96.7%, respectively. In both categories of subscribers there was a decrease in the volume of minutes used in 2022 – for postpaid subscribers, the decrease was by 4.0%, and for subscribers with prepaid cards - by 6.1%.

As is evident from the data on the following figure, the structure of traffic originating from mobile networks in the country remained stable and there was no significant change in the shares of the respective types of traffic in its total volume for 2022: A decrease is reported in the share of traffic within the own mobile network (on net) for yet another year - from 54.0% for 2021 to 53.5% for 2022, and the upward trend in the share of traffic outside the own mobile network (off net) was maintained for yet another year, with its share reaching 44.2% in 2022. On the basis of these data, it can be concluded that, in 2022, the level of competition between mobile voice service providers remained stable and end-users had favourable conditions for calls, not only within but also outside the network of the undertaking to which they are subscribers.



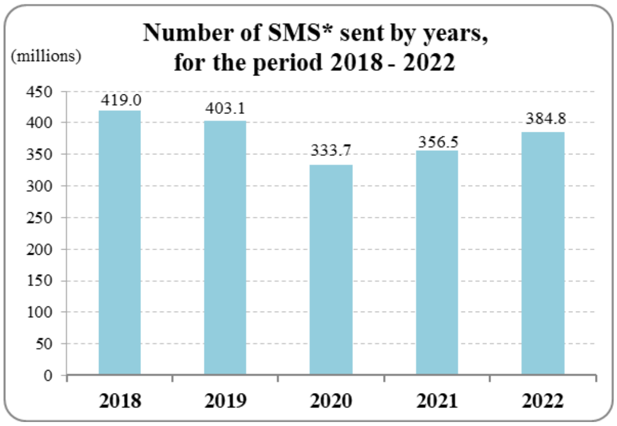
Source: Data submitted to CRC

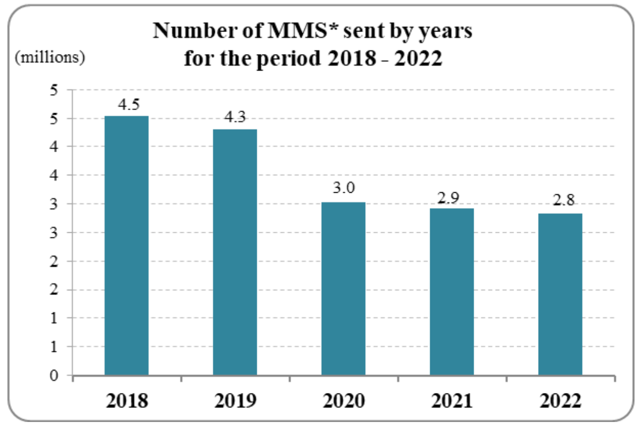
Figure 18

The data on the above figure show that the share of traffic to fixed networks in the country (1.6%) decreased by 0.1 percentage point compared to 2021, and the share of traffic to networks abroad remained unchanged compared to the previous year – 0.7%.

Short multimedia and text messages

In 2022, 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 384.8 million (Figure 19), and the total number of MMS sent amounted to 2.8 million (Figure 20).





**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 second consecutive year, short text messages saw an increase (by 7.9% in 2022), while MMS messages experienced a decrease (by 3.5%) for yet another year. The number of SMS messages sent in roaming in 2022 also grew by 15.1%. In respect of the MMS messages sent in roaming - for 2022, mobile undertakings reported zero values.

Revenue from mobile voice service

In 2022, the total volume of revenue from the provision of mobile voice service amounted to BGN 946,460 million and, for another consecutive year, continued to drop (by 7.6%) compared to the previous year 2021. To compare with, the decline in revenue registered in 2021 was 1.3%.

The volume of revenue from the provision of retail mobile voice service was BGN 795.180 million, while that of revenue from wholesale services amounted to BGN 151.280 million. These data show that the decline in the total revenue from the provision of mobile voice service in 2022 was provoked both by a decrease of 19.7% in the revenue from wholesale services and a decrease of 4.8% in the retail revenue. The observed decline in wholesale revenue was provoked by a decrease of 20.6% in the total revenue from wholesale traffic services, the main reason for which in 2022 were the new, lower rates of wholesale voice termination on mobile networks applied from 1 January 2022 (according to the Delegated Act on single EU-wide voice call termination rates for mobile and fixed networks (Delegated Regulation (EU) 2021/654)). There was an increase of 26.8% in revenue from non-traffic services provided at wholesale level in 2022, compared to the previous year 2021.

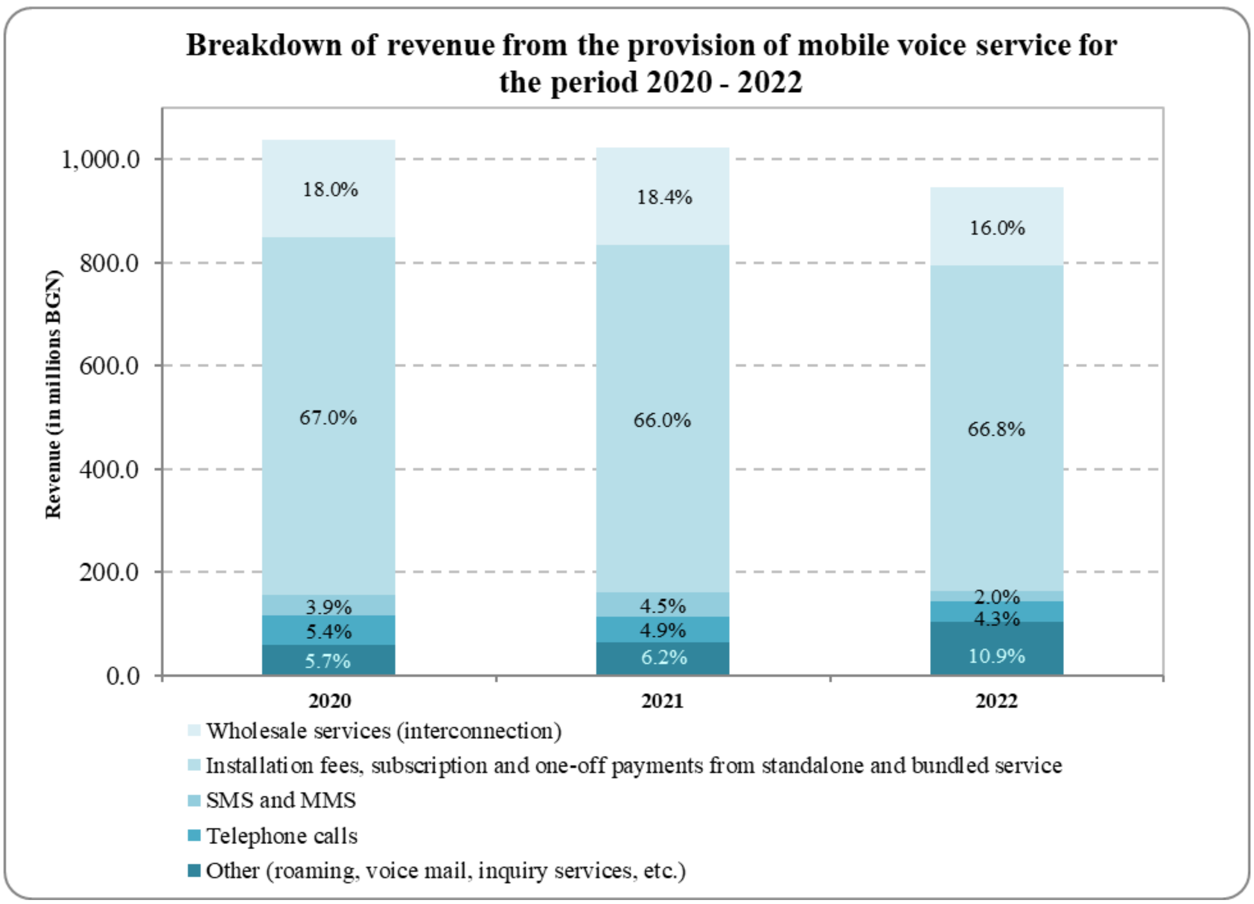
The total volume of non-traffic and traffic revenue from standalone mobile voice service, provided to business subscribers, fell by 8.4% compared to 2021.

The analysis of the data shows that the fall recorded in 2022 in revenue from the provision of mobile voice service at retail level is the result of a decrease in revenue from the provision of the service bundled with other electronic communications services (by 7.4%). Non-traffic[25] and

[25] 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-

traffic revenue from the standalone provision of the retail service reported a growth (by 1.9% for each of the two types of revenue). The decrease in revenue from the provision of mobile voice service in a package was observed for the second consecutive year; in 2022, it was by 6.2 percentage points higher than in 2021 (the decline in 2021 was by 1.2%). According to data provided by mobile undertakings, the decline in revenue from mobile voice services package is a natural result of saturation in the consumption of mobile voice service and the presence of significant growth in the use of mobile Internet – this circumstance is reflected in the distribution of revenue from the package between the two services, where mobile voice service holds the smaller share.

The distribution (structure) of total revenue from mobile voice service by years, for the period 2020-2022, is shown in Figure 21. It is evident that revenue from monthly subscription and installation fees from standalone and bundled provision of mobile voice kept their leading role in 2022 as well, as their share was the largest in the segment (66.8%). The drop in the total volume of wholesale revenue reported in 2022 also led to a decrease of 2.4 percentage points in their share, which shrinks to 16.0%. The share of revenue from mobile calls (4.3%) registered a decline for yet another year - by 0.6 percentage points.



Source: Data submitted to CRC

Figure 21

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).

The share of revenue from SMS and MMS decreased in 2022 (by 2.5 percentage points). The share of revenue from other services increased noticeably in 2022 (by 4.7 percentage points) and reached 10.9% - this growth was provoked by the higher revenue from messages to short network numbers and from international roaming which was reported by mobile undertakings in 2022.

Summary

There was an accelerated rate of decrease in revenue from the provision of mobile voice service in 2022, with the attenuation of the COVID-19 pandemic and the elimination of social distancing measures leading to the weaker consumption of the service in the country. The number of subscribers showed a small increase compared to the previous year 2021, when the negative effect of the pandemic on the indicator was weakened.

An increasing share of mobile voice subscribers use this service bundled with mobile Internet. At the same time, the voice service consumption reached its saturation point, while a significant growth was observed in the demand and use of mobile Internet. This trend affects the distribution of revenue from packages involving both services and the share that mobile undertakings report as revenue from mobile voice services in a bundle is declining.

The new, lower wholesale rates of voice call termination in mobile networks originating from European Union and European Economic Area (EU/EEA) countries that have been applied since 1 January 2022, combined with a lower volume of termination traffic, have a negative effect on the total revenue from the provision of wholesale mobile voice service which registered a decline in 2022 for the first time in four years.

With the removal of the anti-epidemic measures and the restoration of the possibility of travelling abroad in 2022, the consumption of mobile roaming calls has started to slowly increase.

3. Leased lines services

The 2022 figures presented by the undertakings providing the "leased lines" service, including international leased lines, show a decline in revenue and in the number of leased lines. The total revenue from the provision of the service in 2022 amounted to BGN 21.321 million, registering a drop of 13.9% compared to revenue generated the year before.

Summarised information on the number of undertakings that provided leased lines services and on the volume of revenue generated from them is presented in Table 5 below:

Table 5

Number of undertakings, number of lines and revenue by type of leased lines provided in 2022

Service	Number of undertakings, providing the service in 2022	Number of leased lines as of 31.12.2022	Revenue in 2022 (in millions BGN, excl. VAT)
1. Wholesale leased lines	**20**	**2,333**	**16.465**
1.1. National leased lines	18	1,975	12.558
1.2. International leased lines	7	358	3.908
2. Retail leased lines	**12**	**1,826**	**4.856**
Total	**24**	///	**21.321**

Source: Data submitted to CRC

In 2022, compared to 2021, an increase was reported in absolute terms in revenue from retail leased lines by 20.4% and a decrease in revenue from wholesale leased lines by 20.6%.

Market players

According to information submitted to CRC, 24 undertakings (out of 115 that have notified CRC of their intention to provide the leased lines service, entered in the public register as of 31.12.2022) were active in the market segment. Eight undertakings provided the service both in the retail and in the wholesale market, while seven undertakings provided the wholesale international leased lines service.

Tables 6 and 7 present the market shares of the major undertakings providing retail/wholesale leased lines in 2022.

Table 6

Market shares of undertakings providing retail leased lines

Undertaking	2021		2022	
	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	77.0%	60.5%	72.2%	47.5%
A1 BULGARIA EAD	11.5%	21.9%	10.5%	18.6%
NETERRA EOOD	0.6%	1.4%	7.1%	5.6%
All other	10.9%	16.2%	10.1%	28.3%

Source: Data submitted to CRC

In 2022, compared to 2021, the first two undertakings remained leading in terms of market shares based on number of retail lines. In 2022, versus 2021, the total market share (89.9%) on the basis of the number of retail lines of the three main undertakings increased insignificantly by 0.8 percentage points; however, the share of the largest undertaking according to this indicator, VIVACOM BULGARIA EAD, decreased by 4.8 percentage points in favour of the share of the third undertaking, NETERRA EOOD, where a significant increase of 6.5 percentage points was observed compared to the previous year. On the basis of retail revenue, the reported decrease in the share of the three undertakings was 12.1 percentage points, the most significant decrease being in the share of VIVACOM BULGARIA EAD – by 13.0 percentage points.

As a result, the remaining players increased their share by revenue proportionally.

Table 7

Market shares of undertakings providing wholesale leased lines

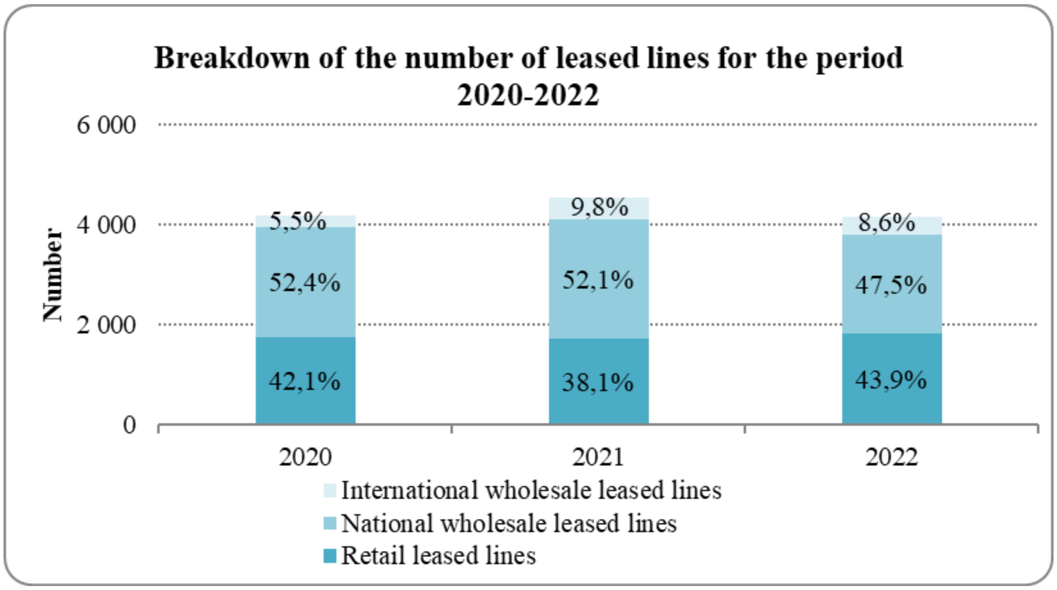
Undertaking	2021		2022	
	Share based on wholesale leased lines	Share based on wholesale revenue	Share based on wholesale leased lines	Share based on wholesale revenue
NOVATEL EOOD	25.6%	29.5%	19.2%	28.9%
NETERRA EOOD	21.2%	29.2%	17.9%	13.6%
CETIN BULGARIA EAD	1.8%	1.0%	14.5%	2.5%
All other	51.4%	40.3%	48.3%	55.0%

Source: Data submitted to CRC

In 2022, as opposed to 2021, the total market share (51.7%) based on number of wholesale lines of the three major undertakings rose by 3.1 percentage points, with an increase registered only in the share of CETIN BULGARIA EAD – by 12.8 percentage points. The reason for the significant increase in the share of CETIN is the infusion of the activities of SOFIA COMMUNICATIONS EAD[26] into the acquiring undertaking in 2022. On the basis of wholesale revenue, the reported decrease in the share of the three undertakings was 14.8 percentage points.

Number of wholesale and retail leased lines

The number of leased lines provided at retail level increased by 5.3% in 2022 compared to the previous year, while the number of leased lines at wholesale level decreased by 17.1% over the same period. The breakdown of leased lines is displayed in Figure 22.

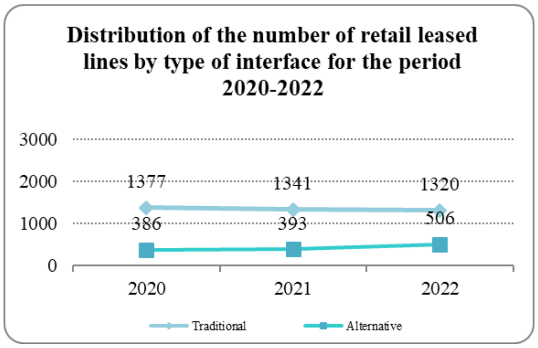


Source: Data submitted to CRC

Figure 22

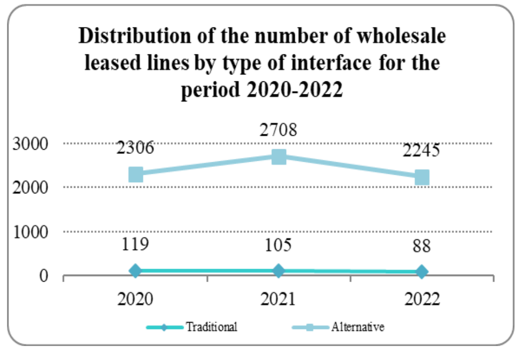
Figures 23 and 24 present the distribution of the number of retail and wholesale leased lines provided for the period 2020–2022 by interface type.

[26] CETIN BULGARIA EAD is the sole owner of the capital of SOFIA COMMUNICATIONS EAD, as of 15.07.2021. In 2022, the undertaking was removed from the register of persons who have notified the Commission of their intentions to provide public electronic communications networks and/or services, pursuant to Article 33, Para 1, p. 1 of the LEC.



Source: Data submitted to CRC

Figure 23



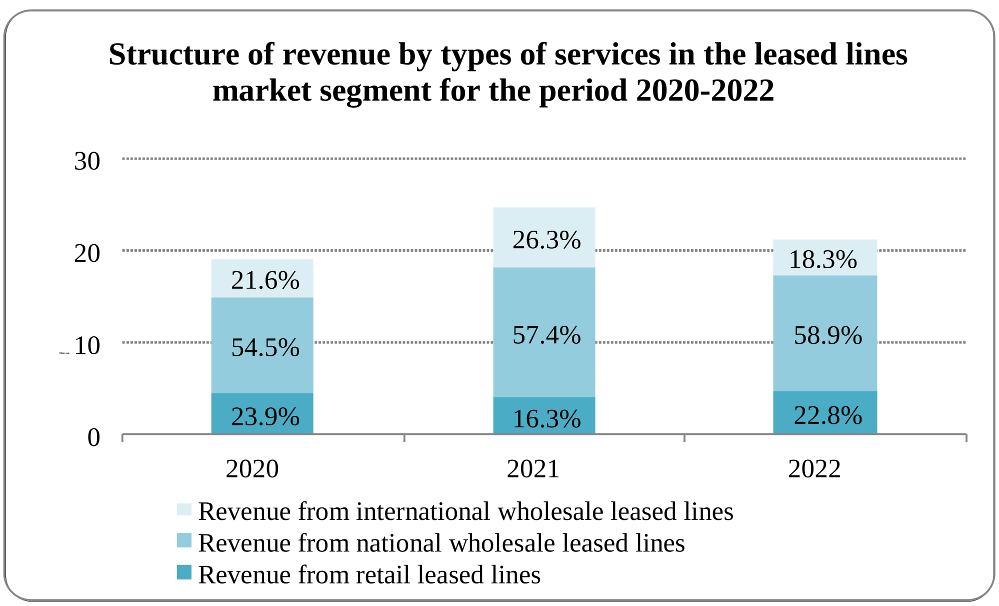
Source: Data submitted to CRC

Figure 24

The decline in traditional retail lines in 2022 was 1.6%, while alternative lines increased by 28.7%. The reported drop in the number of wholesale leased lines is the result of the decrease by 17.1% in the number of alternative wholesale lines and by 16.2% in the traditional wholesale leased lines.

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 2020-2022.



Source: Data submitted to CRC

Figure 25

In 2022, the significant decrease in revenue from international wholesale leased lines (by 39.9% year-on-year) had an effect on the proportion of revenue by types of services in the total volume of the segment.

Summary

In 2022, the leased lines services segment registered as follows:

- a decrease in the number of undertakings providing the leased lines service;
- a significant increase in retail revenue and a decrease in wholesale revenue;
- a decrease in the number of wholesale leased lines, but an increase in retail lines;
- reduction of the number of alternative leased lines and a slight drop in the number of traditional leased lines.

4. Data transfer and Internet access

In 2022, the total volume of revenue generated from the services included in the data transfer and Internet access services was BGN 1,672.447 million, with an increase of 15.1% compared to the previous year 2021.[27]

Table 8 presents summarised information about the number of undertakings which provided services in this market segment in 2022 as well as about the number of their subscribers/users and the revenue generated from them.

[27] The data for 2021 have been updated, as segment revenue for 2021 amount to BGN 1,452.475 million.

Table 8

Number of undertakings, subscribers/users and revenue by type of Internet access and data transfer services provided in 2022

Service	Number of undertakings, providing the service in 2022	Number of subscribers/users as of 31.12.2022		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	**650**	///	///	**1,417.418**	**872.518**
1.1. Internet access[3], incl.:	641	9,359,600	6,648,341	1,361.321	872.518
1.1.1. fixed	641	2,385,223	826,117	341.946	87.805
1.1.2. mobile[4]	3	7,008,151	5,855,998	1,019.375	784.714
1.2. Data transfer services	54	1,132,565	///	53.778	///
1.3. Other services (hosting, e-mail, etc.)	16	3,935	///	2.319	///
2. Wholesale services	**142**	///	///	**255.028**	///
2.1. Provision of capacity for Internet connectivity (Peering and Transit)	101	905	///	37.278	///
2.2. Data transfer services	24	333	///	11.178	///
2.3. Wholesale provision of Internet access via NGA networks	53	394	///	10.028	///
2.4. Other wholesale services	12	29	///	196.544	///
Total	**690**	///	///	**1,672.447**	///

[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 87.8% of the undertakings registered for Internet access and data transfer.

[4] Including mobile access via data cards or modem and bundled services with mobile Internet access included (including subscribers to data packages purchased in addition to voice plans via 3G, 4G and 5G UMTS/HSPA+/LTE+/NR (5G) mobile networks).

Source: Data submitted to CRC

Market players

The number of undertakings actually providing services for Internet access and data transfer in 2022 was 690,[28] down by 18 undertakings compared to 2021.[29] The number of undertakings providing retail services in 2022 was by 16 less than in 2021, [30] falling to 650. The number of undertakings providing wholesale services decreased by 1 over the one-year period, as in 2022, wholesale services were provided by 142 undertakings.

[28] Including undertakings that notified CRC for suspension of their activity in 2022 and declared revenue during the year.

[29] The data for 2021 have been updated.

[30] The data for 2021 have been updated.

The main providers of fixed Internet access for end-users (retail service), both in the previous year and in 2022, were Vivacom, A1 and Bulsatcom.

Table 9

Market shares of undertakings providing fixed Internet access at retail level

Undertaking	2021		2022	
	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	31.4%	24.5%	31.4%	22.1%
A1 BULGARIA EAD	26.9%	18.7%	27.8%	20.4%
BULSATCOM EAD	7.6%	8.0%	6.2%	5.1%
All other	34.2%	48.8%	34.6%	52.3%

[1] Including subscribers of bundled services.

[2] Including revenue from bundled services.

Source: Data submitted to CRC

In 2022, Vivacom Bulgaria retained its market share based on the number of subscribers unchanged compared to the previous year – 31.4%. A1 maintained the trend of increasing its market share and registered an increase of nearly 1 percentage point (0,97 pp) compared to 2021. Bulsatcom kept the negative trend observed in the previous years of reduction in its market share based on number of subscribers, with the reported decline amounting to 1.3 percentage points. In the case of the market share of undertakings based on revenue from fixed Internet access at retail level, including revenue from the provision of fixed Internet access in a bundle with other electronic communications services, Vivacom registered a decline of 2.4 percentage points, while A1 increased its market share by 1.8 percentage points, respectively. The third undertaking, Bulsatcom, once again reported a drop in its share on the basis of revenue from fixed access - by 2.9 percentage points compared to 2021. Undertakings classified as ‘all other’ (all those which are outside the top three of the undertakings with the largest market share) grew both in the market share based on number of subscribers and in the market share based on revenue of 0.3 and 3.5 percentage points, respectively.

In 2022, mobile Internet access was provided by 3 undertakings – A1, Vivacom and Yettel. Table 10 presents their shares in the retail provision of mobile Internet in 2021 and 2022.

Table 10

Market shares of undertakings providing mobile Internet access at retail level

Undertaking	2021		2022	
	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	35.0%	32.2%	36.0%	30.0%
A1 BULGARIA	33.4%	37.0%	32.6%	38.6%
YETTEL BULGARIA	31.6%	30.8%	31.5%	31.4%

[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

As is evident from the data on the market share based on the number of subscribers presented in the table, in 2022, there was no change in the positions of undertakings providing mobile Internet access at retail level compared to the previous year. Among the three undertakings operating in the mobile Internet access market, a slight growth in the subscriber-based market share was observed only in Vivacom - up by 1 percentage point. This slight increase is at the expense of the shares of A1 and Yettel which reported a decrease of 0.9 and 0.1 percentage points, respectively. In the case of market shares calculated on the basis of revenue from the provision of mobile Internet access, there is a shift in positions compared to the previous year, as in 2022, the share of Yettel is already greater than that of Vivacom. A drop of 2.2 percentage points was observed in Vivacom both in 2021 and in 2022, while the market shares of A1 and Yettel rose by 1.6 and 0.6 percentage points, respectively.

Subscribers of Internet access services

As of 31.12.2022, the total number of subscribers of retail Internet services (fixed and mobile Internet access) reached 9.360 million, up by 4.1%, which is close to the growth of 4.2% registered in the previous year. The upward trend in the number of subscribers of bundled services (with fixed and/or mobile Internet access included) was maintained in 2022, with a growth of 5.6% registered in absolute terms in the last year, reaching 6.648 million subscribers of bundled services. The recovery of the growth rate of subscribers of bundled services registered in the last two reporting periods affected their share on the basis of total number of subscribers[31] and, in 2022, they already made up 71%, which is an increase of 1.0 percentage point compared to the previous year.

The total number of subscribers to fixed Internet access (including services provided in a bundle) grew by 5.8%, reaching 2.385 million in the past year. In addition to the significant growth in the 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 13.4%. The share of fixed access subscribers

[31] In order to avoid duplication, subscribers of bundled services with both fixed and mobile Internet access are excluded from the total number of subscribers to the Internet.

in the total number of Internet access subscribers registered an increase of 0.4 percentage points compared to the previous year[32] to reach 25.5%.

In 2022, the number of subscribers using mobile Internet access services[33] reached 7,008 million, as the growth established in 2022 coincided with the growth recorded in 2021 - 3.2%. Subscribers to mobile Internet access in a bundle saw a greater increase and, at the end of 2022, their number reached 5,856 million, registering an increase of 4.2% compared to 2021 (to compare with, the growth in 2021 versus 2020 reached 2.5%). Unlike the previous two years, the number of subscribers using the service standalone (via data cards and/or modem) registered a slight decrease of 1.9% and, at the end of 2022, these subscribers already reached 1,152 million. The number of subscribers to mobile Internet access via LTE[34] recorded a significant increase of 18.6% compared to the previous year and, as of 31.12.2022, they were 5,601 million. The share of subscribers to mobile Internet access via LTE (incl. 5G) in the total number of mobile Internet subscribers is already 79.9%, up by 10.4 percentage points. The share of subscribers using 5G in the total number of mobile Internet access subscribers was 7.4%.

Figure 26 presents penetration of fixed broadband Internet access by population[35] and by households[36] as well as of mobile access[37] by population for the period 2020-2022.

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[32]The data for 2021 have been updated.

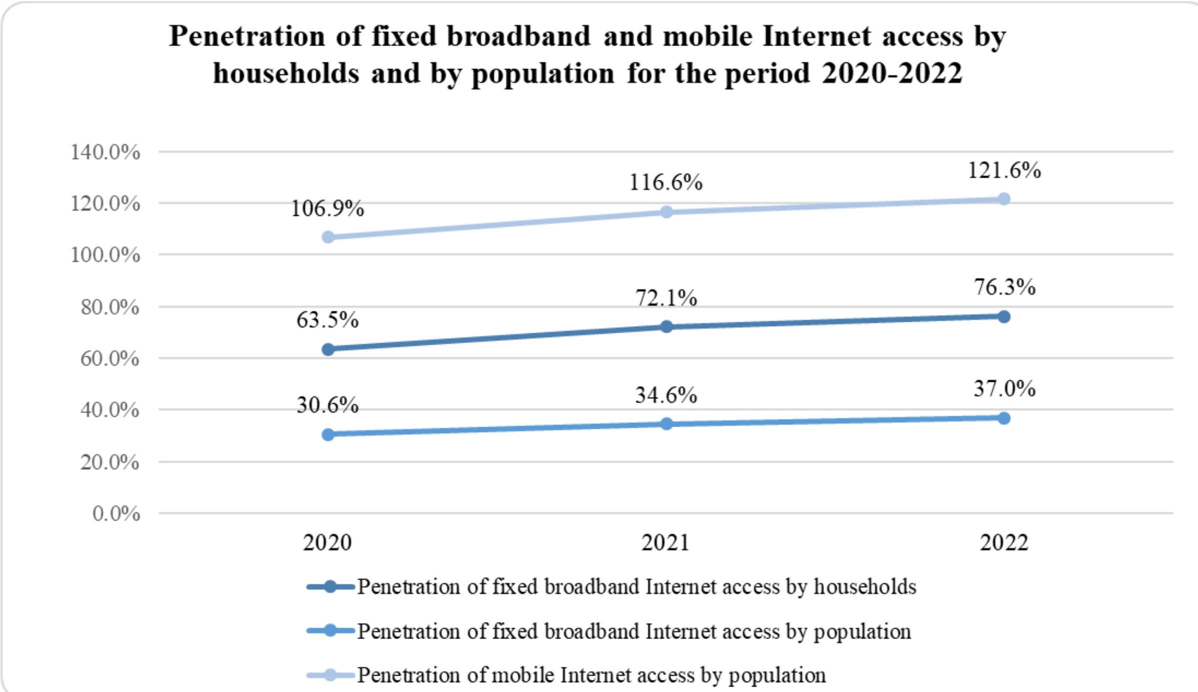
[33] Standalone service via data cards or modems and bundled services with mobile Internet access included, via 3G, 4G and 5G UMTS/HSPA+/LTE+/NR (5G) mobile networks; (including data transfer packages purchased in addition to voice plans).

[34] This includes subscribers to 5G NR networks.

[35] This indicator was calculated as the ratio between the number of subscribers of fixed access as of 31.12.2022 and the number of population as of 31.12.2022, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf).

[36] The indicator was calculated as a ratio between the number of residential subscribers of fixed access as of 31.12.2022 and the number of households as of 07.09.2021 according to NSI data (preliminary assessment of the population census conducted by NSI in 2021: https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_predvaritelna_ocenka.pdf).

[37] 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 of fixed access as of 31.12.2022 and the number of population as of 31.12.2022, according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf).

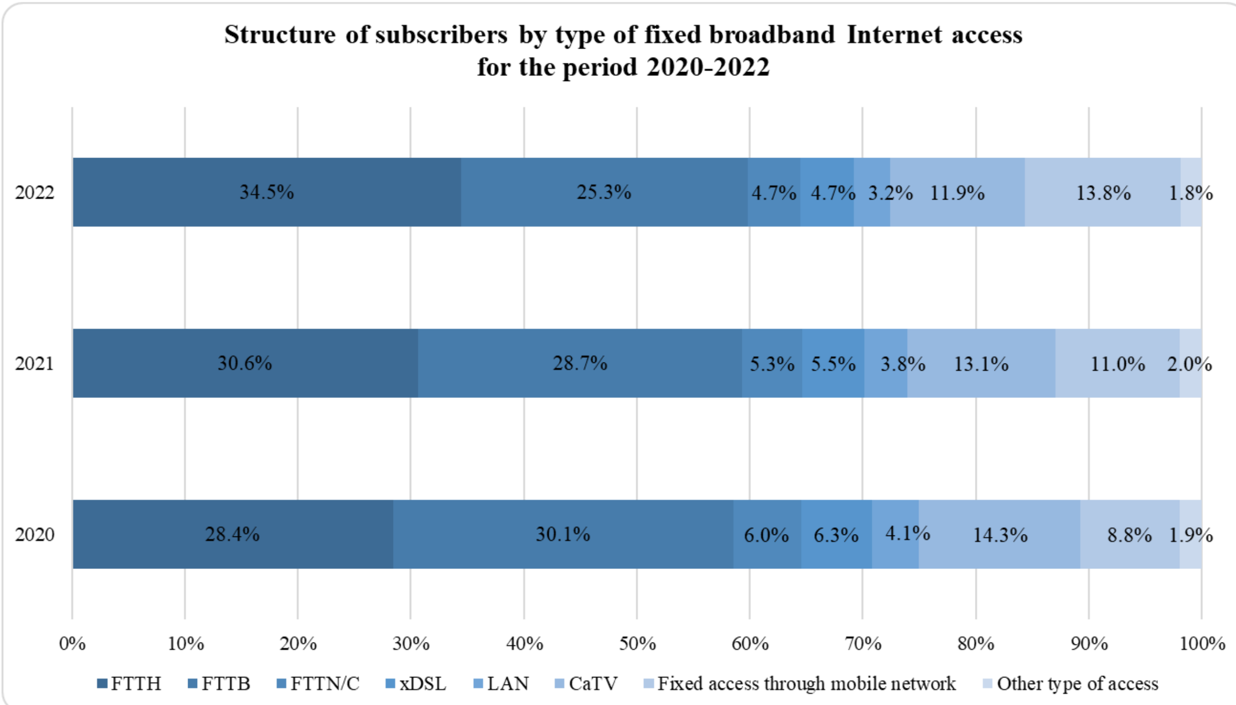


Source: Data submitted to CRC

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" registered an increase from the previous year by 4.1, 2.4 and 5 percentage points, respectively. The growth observed in penetration indicators over the last two years can be explained by two main factors, the first of which is the significant decline in the NSI data on the number of population in Bulgaria and a decline in the number of households, as these data are used in calculating the penetration indicators. In addition, the increase of these indicators is also justified by the upward trends in the development of fixed and mobile broadband access.

The breakdown of subscribers by type of fixed Internet access for the period 2020-2022 is shown in Figure 27.



Source: Data submitted to CRC

Figure 27

At the end of 2022, the majority of subscribers of fixed Internet access in Bulgaria used mainly access via fibre-optical networks (FTTH, FTTB and FTTN/C) – 64.5%. A slight decrease of 0.2 percentage points was reported compared to 2021,[38] mainly due to both the decline of subscribers using FTTB and FTTN/C access and the strong growth of subscribers of fixed access through mobile networks which was reported over the past two years. In absolute terms, the number of subscribers using access via fibre-optical networks increased by 5.5% over the one-year period and by 12.7% compared to 2020.

With their 34.5% share, FTTH subscribers confirmed the leadership position they have been holding since 2021, ahead of FTTB (25.3% share), in the structure of fixed broadband Internet access subscribers; the growth they registered was 3.8%. Compared to the end of the previous year, the number of subscribers to this type of access grew by 19.1% in absolute terms, and for the period 2020-2022, the increase is by 36.9%.

The only change in the structure of subscribers by type of fixed broadband Internet access refers to the third position, where, for the first year, fixed access through mobile networks, with its share of 13.8%, removed from the top three CATV (share of 11.9%) and, together with FTTH access, is the only one to register an increase in the share by type of access based on number of subscribers. In 2022, the share of subscribers using fixed access through mobile network rose by 2.8 percentage points and, for the period 2020-2022, the registered growth was by 5.0 percentage points. Compared to 2021, subscribers to this type of access have increased by 33.2% in absolute terms, and compared to 2020, a growth of as much as 77.2% was recorded. The main reason for

[38]The data for 2021 have been updated. Subscribers of 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.

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

The fourth place, as already mentioned above, was occupied by CATV subscribers (based on the transmission and/or distribution networks of radio and television programmes and the DOCSIS standard) who, for a second consecutive year, recorded a decline of 1.2 percentage points. At the end of 2022, almost all CATV access subscribers (98.7%) used the DOCSIS 3.0 protocol through which the maximum speed to the subscriber can reach up to 1 Gbps. To compare with, at the end of 2021, DOCSIS 3.0 users accounted for 98.4% of CATV access subscribers, with a reported increase of 0.3 percentage points over the period.

The downward trend in the subscribers of xDSL access, provided only by Vivacom, continued in 2022 as well. Compared to the end of the previous year, the number of subscribers of that type of access dropped by 8.7% in absolute terms, and for the period 2020-2022, the decline was 15.5%. The migration of subscribers to optical access in Vivacom is also preserved, albeit at a slower rate than in 2021, with an increase of 6.9% registered in absolute terms in the subscribers using fibre-optical networks over the one-year period. For the period 2020-2022, the growth is equal to 45.4%, with its share in the total number of subscribers of the undertaking reaching 66.4%. The main reasons for this significant growth observed during this period are rooted in the acquisitions and mergers made in 2021 by Vivacom,[39] along with the ongoing trend of migration of subscribers from xDSL to optical access. The share of subscribers of Vivacom Bulgaria who use Internet access via xDSL technology decreased from 17.4% as of 31.12.2021 to 15% at the end of 2022 in the total number of subscribers of the undertaking, while the number of subscribers using VDSL[40] decreased by 0.5 percentage points compared to 2021, down to 7.8% in the total number of subscribers of the undertaking.

In 2022, the share of LAN[41] access subscribers continued to decline, reaching 3.2% of the total number of fixed broadband access subscribers, with a registered drop of 0.6 percentage points. The share of subscribers to ‘other type of access’[42] in 2022[43] fell to 1.8%, registering a slight decrease of 0.1 percentage points compared to the previous year. The largest share in the total number of subscribers of ‘Other type of access’ is held by RLAN access with a share of 80.5%, followed by access via leased lines and dedicated access with 18.2%, and access via satellite networks with 1.4%, respectively.

At the end of 2022, the number of fixed broadband access subscribers using high-speed access via NGA networks[44] reached 93.8% of the total number of fixed broadband access

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[39] Information about the undertakings acquired by Vivacom Bulgaria EAD in 2021 is contained in the Annual Report of the Communications Regulation Commission for 2021.

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

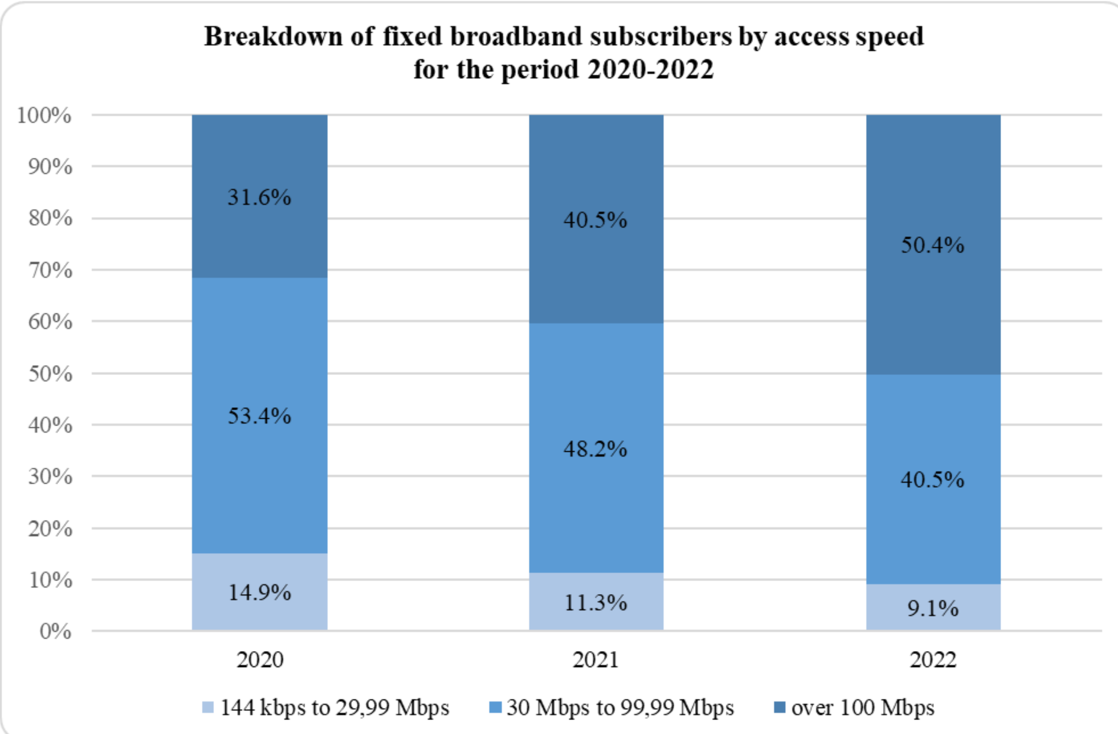
[41] The data for 2021 have been updated.

[42] Subscribers of 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.

[43] The data for 2021 have been updated.

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

subscribers, with their share up by 1.1 percentage points compared to the end of 2021.[45] As a result of this upward development, the speed of Internet services is also increasing. The figure below presents the breakdown of the number of subscribers of fixed broadband Internet access according to the international download speed for the three-year period 2020-2022.[46]



Source: Data submitted to CRC

Figure 28

The number of subscribers using Internet access at speed of 30 Mbps and above, continued to increase in 2022 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 2022, 90.9% of subscribers used speed of 30 Mbps and above, the reported increase being 2.2 percentage points compared to 2021. For the first time in the structure of subscribers distributed by speed intervals, the leadership position is occupied by users of ultra-high-speed access (at least 100 Mbps) with a share of 50.4%, which increased by 18.7 percentage points for the three-year period under consideration and, compared to 2021, the reported growth was 9.9 percentage points.

The relative share of subscribers to fixed broadband access who used high-speed access with international download speed from 30 Mbps to 99.99 Mbps decreased to 40.5% in 2022, with a registered decline of 7.7 percentage points, thus falling from the leadership position in the structure of subscribers distributed by speed intervals. The last place is occupied by subscribers using speeds up to 29.99 Mbps whose share was reduced to 9.1%.

The number of broadband access subscribers using speed of 100 Mbps and above also grew in absolute value. Compared to 2021, 31.8% more subscribers used ultra-high-speed access (at

[45]The data for 2021 have been updated.
[46]The data for 2021 have been updated.

least 100 Mbps). Over the one-year period, there was a 11% 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 15%.

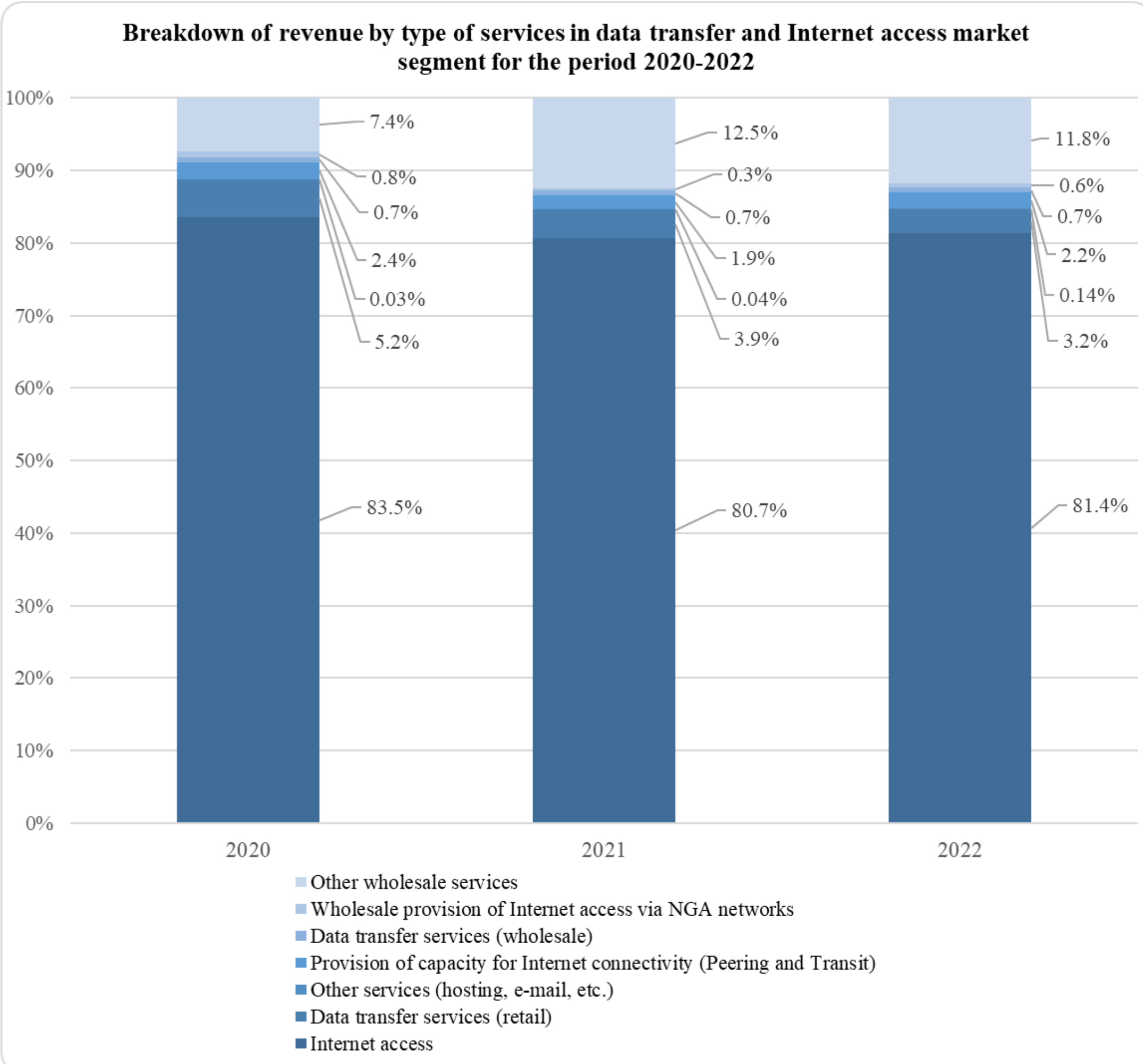
Revenue from data transfer and Internet access

In 2022, compared to 2021,[47] revenue[48] from the "Data transfer and Internet access" segment reached BGN 1,672,447 million. The registered increase of 15.1% compared to the 2021 data was mainly due to the increased revenue from retail services which reported a growth of 15.3%. The total amount of revenue from retail services is BGN 1,417,418 million, 96% of which is revenue from Internet access services (BGN 1,361.321 million). Revenue from wholesale services amounted to BGN 255,028 million, preserving their upward rate since 2019. The total amount of revenue from retail services accounted for 84.8% of the revenue from the "Data transfer and Internet access" segment, while that from wholesale services made up 15.2%.

Figure 29 presents the breakdown of revenue generated for the period 2020-2022.

[47]The data for 2021 have been updated.

[48] 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 networks (NGA), 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 2022, there was no significant change in the overall revenue structure in the segment. The highest relative share (81.4%) continued to be held by revenue from retail Internet access services which recorded an absolute increase of 16.1% in the past year compared to 2021. 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 2021 data, as the registered increase was 21.1%. Revenue from the provision of fixed Internet access at retail level rose by 3.5%, but at a decreasing rate of 2.9 percentage points compared to the 2021 data. Revenue from bundled services including mobile Internet access[49] grew by 29.2% compared to 2021, and for the period 2020-2022, this revenue increased by 66.4%. In the revenue from bundled services

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

including fixed Internet access,[50] the growth was 27.8% for the one-year period and 33.4% 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 2022. Compared to 2021, the following was reported:

- increase in the number of subscribers to both fixed and mobile Internet access which is due to the growth in the number of subscribers to fixed Internet access provided standalone and in a bundle as well as to the growth in the number of subscribers using bundled services with mobile Internet access included;
- increase in the share of subscribers in the total number of fixed Internet access subscribers who use ultra-high-speed access at international download speed of at least 100 Mbps due to the continued migration to NGA networks;
- increase in the share of FTTH access subscribers in the total number of fixed Internet access subscribers due to the continued migration to FTTH networks;
- 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;
- growth in the total volume of revenue from the segment due to the increase in revenue from both retail Internet access services and from wholesale services.

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

In 2022, the volume of the "transmission and/or distribution of radio and TV programmes services" market segment reached BGN 473.996 million, registering a growth of 4.6% since 2021.[51]

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 11 and in Figure 30 below:

[50] The part of revenue relating to fixed Internet access included in the package.
[51]The data for 2021 have been updated.

Table 11

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 2022

Service	Number of undertakings providing the service in 2022	Number of subscribers/users as of 31.12.2022.		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]	**244**	**2,030,517**	**804,817**	**441.515**	**172.339**
1.1. Cable TV[4]	206	478,364	286,597	104.372	64.129
1.2. Satellite TV[4]	4	764,353	103,956	170.802	22,065
1.3. IPTV[4]	75	787,800	414.264	166.341	86.145
2. Terrestrial broadcasting of radio and TV programmes	**54**	///	///	///	///
3. Transmission and/or distribution of radio and TV programmes	**13**	///	///	**32.480**	///
3.1. Transmission of radio and TV programmes services	7	///	///	2.554	///
3.2. Distribution of radio and TV progrrames services, incl. wholesale service (via IPTV and/or DVB-C method)	10	///	///	29.926	///
Total	///	///	///	**473.996**	///

[1] Including subscribers of bundled services.

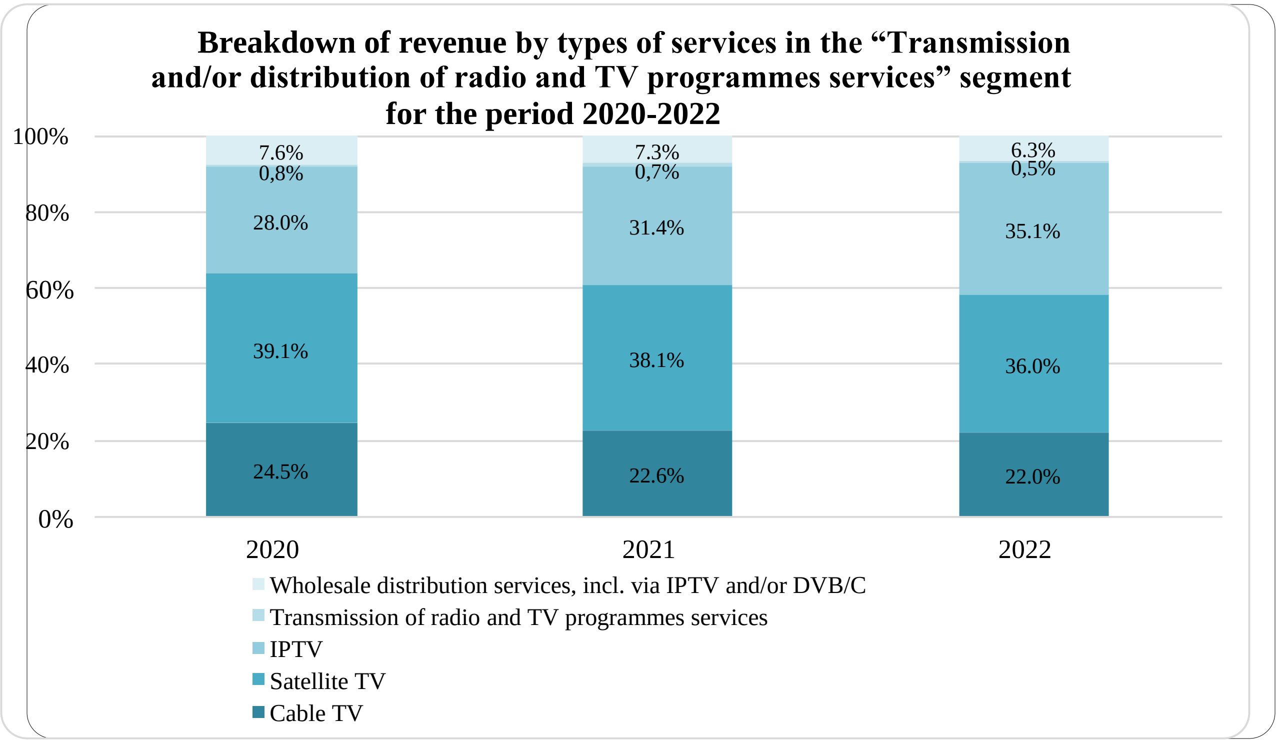
2 Including revenue from bundled services.

[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 are valid as of 27.04.2023 on the basis of information received from 89.5% of registered undertakings.

Source: Data submitted to CRC

According to the data submitted by undertakings, in 2022, there was a growth in revenue from two services included in the segment – IPTV (17%) and cable TV (1.9%) for the one-year period under consideration. Revenue for the remaining services in the segment decreased compared to 2021. A drop was observed in the amount of revenue from satellite television – by 1.1% versus 2021. For another consecutive year, there was a decrease in the revenue from wholesale transmission of radio and television programmes services – 15.6%. Revenue from wholesale distribution of radio and TV programmes services, including wholesale services via IPTV and/or DVB/C method, dropped by 9.4% year-on-year.



Source: Data submitted to CRC

Figure 30

In 2022, the largest share of the total volume of the segment (93%) 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 2022, revenue from satellite TV continued to occupy the highest share in the total volume of the segment, as this share decreased by more than 2.0 percentage points over the one-year period in relative terms, down to 36%. The second place, with an almost equal value of the largest share in the revenue structure, continued to be held by the share of revenue from IPTV which continues its upward development. It was the only one to register a growth compared to the year before – by 3.7 percentage points, reaching 35.1% in the total volume of the segment. The share of revenue from cable TV decreased by less than 1.0 percentage point compared to 2021 to cover 22.0% of the total volume of the segment in 2022.

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 decreased by 2% (or 5 undertakings) to arrive at 244[52] in 2022 (Table 11).

As of 31.12.2022, the total number of undertakings actually providing cable TV amounted to 206 (down by 6 compared to 2021). TV operators providing cable TV maintained the trend of offering their subscribers IPTV as well, as at the end of 2022, the number of undertakings offering both cable TV and IPTV grew by 14 compared to the previous year to reach 38 undertakings.

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[52] Including undertakings that notified CRC for suspension of their activity in 2022 and declared revenue during the year.

The undertakings that declared to have provided the satellite TV service in Bulgaria in 2022 are 4 – Bulsatcom, Vivacom, A1 and Neosat EAD.

As of 31.12.2022, 75 undertakings actually provided the IPTV service, up by 16 compared to the previous year.

The table below presents the relative shares of the first three undertakings, calculated on the basis of 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 2021-2022.

Table 12

Market shares of undertakings providing retail pay TV for the period 2021-2022

Undertaking	2021		2022	
	Share based on number of subscribers	Share based on revenue	Share based on number of subscribers	Share based on revenue
VIVACOM BULGARIA	30.2%	24.3%	32.9%	27.6%
BULSATCOM	31.3%	34.2%	26.7%	29.3%
A1 BULGARIA	25.3%	28.5%	26.4%	29.8%
All other	13.2%	12.9%	13.9%	13.3%

Source: Data submitted to CRC

In 2022, there was once again a redistribution of market shares among the three largest undertakings providing pay-TV. The reason for this is that, in its annual report for 2022, Bulsatcom declared 16% fewer subscribers and 9% less revenue from the provision of the service compared to the year before, which led to the undertaking's ouster from its leading position. Bulsatcom's share continued to decline, by 4.5 percentage points on the basis of number of subscribers and by 4.9 percentage points on the basis of revenue, respectively, covering 26.7% of the total number of pay-TV subscribers and 29.3% of the revenue from the service in 2022.

In 2022, the market leader based on the number of subscribers in this market segment was Vivacom Bulgaria which ousted the long-term leader Bulsatcom from the leading position. Over the one-year period, the share of Vivacom Bulgaria grew by 2.7 percentage points on the basis of number of subscribers and by 3.3 percentage points on the basis of revenue, occupying shares in terms of both indicators of 32.9% and 27.6%, respectively.

A1 remains the third largest undertaking in this market segment based on the number of pay-TV subscribers and the first based on revenue from the provision of the service. In 2022, the share of the undertaking both on the basis of subscribers and on the basis of revenue rose by 1.1 and 1.3 percentage points, respectively, covering 26.4% of pay-TV subscribers and 29.8% of the revenue generated. In relative terms, the number of subscribers of A1 was only 0.3 points behind the share of the second largest undertaking. In the event that the trends in the development of the two undertakings continue in 2023, a new redistribution of the shares can be expected, whereby A1 may oust Bulsatcom from the second position based on this indicator.

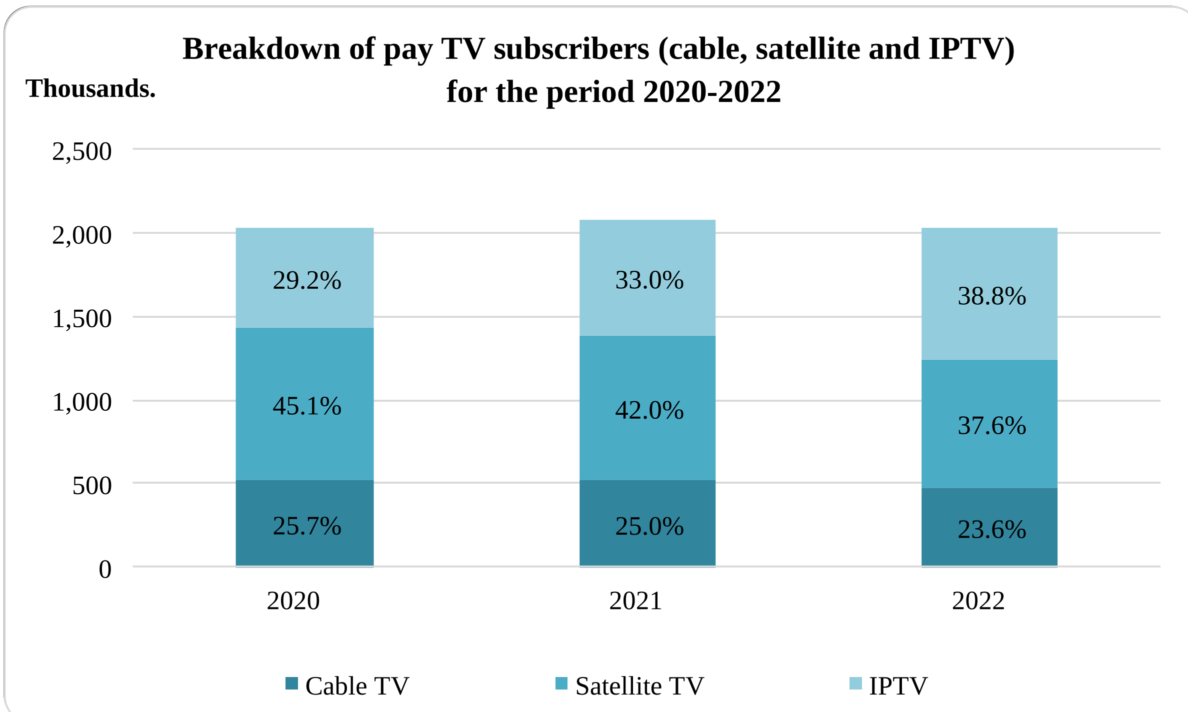
A major role in the redistribution of the shares in the future would be played by the entry of Yettel Bulgaria into this market segment. The undertaking began providing pay-TV via its 5G network from the beginning of the second quarter of 2023 and is expected to quickly build up a subscriber base and enter the top ten.

The observed decline in Bulsatcom's share in terms of both the number of subscribers and the revenue has a positive impact on the aggregate market share of all other players in the market segment who are outside the top three, the reported growth in their share being 0.7 percentage points on the basis of subscribers and 0.4 percentage points on the basis of revenue.

Subscribers of retail distribution of radio and TV programmes services

As of 31.12.2022, the number of subscribers of retail pay-TV fell by 2.1% compared to the end of the previous year and amounted to 2.03 million subscribers.[53]

The figure below presents the shares of subscribers by platforms in the total number of pay TV subscribers for the period 2020-2022.



Source: Data submitted to CRC

Figure 31

In 2022, an increase in the number of subscribers and their relative share in the total number of subscribers to pay-TV was reported only for IPTV. The number of IPTV subscribers continued to grow - by 15% compared to the previous reporting period, with its share registering a growth of 5.8 percentage points and already accounting for 38.8% as of 31.12.2022, making it the platform with the largest share in the subscriber structure of the pay TV market. The growth of the indicator over the one-year period under review is the result of both the presence of 16 new undertakings in

[53] Including subscribers of bundled services who amounted to 804,817 as of 31.12.2022.

the IPTV sector which declared having subscribers at the end of 2022, and of the registered growth in the number of subscribers of almost 70% of all other undertakings providing IPTV.

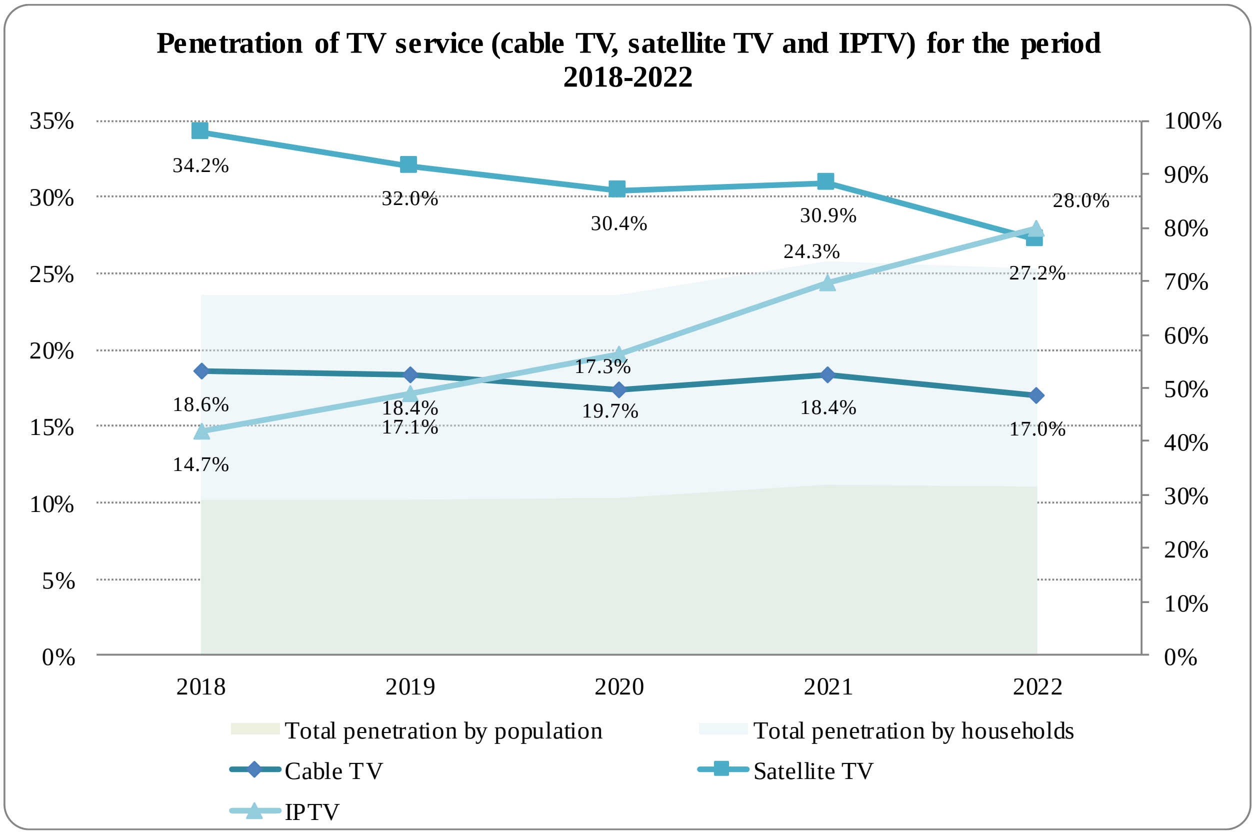
The share of subscribers to satellite TV registered a decline for yet another year - down by 4.3 percentage points. As a result of this negative trend, as well as the significantly increased share of IPTV, as of 31.12.2022, satellite TV subscribers already occupied the second largest share, covering 37.6% of the total number of pay-TV subscribers in the country (Figure 31). In absolute terms, the number of subscribers to satellite TV decreased by 12.2% compared to 31.12.2021, 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 2022.

The trend of decline in the number of subscribers of cable TV continued, with a decrease in the current reporting period of 7.7%, and their share in the total number of pay-TV subscribers dropped by 1.4 percentage points to 23.6%.

During the period under consideration, the penetration[54] of pay-TV among households in Bulgaria did not report a significant change compared to the previous reporting period. As of 31.12.2022, there was a decrease of 1.5 percentage points, and the value of this indicator reached 72.2%. The penetration of cable and satellite TV fell by 1.4 and 3.8 percentage points, respectively, compared to 2021. IPTV continued its upward trend and, as of the end of 2022, the penetration of the service among households reached 28%, marking an increase of 3.6 percentage points compared to the previous year (Figure 32). The penetration of pay-TV among the population[55] of Bulgaria remained at almost the same level as in the previous reporting period and it amounted to 31.5%, reducing its value by only 0.3 percentage points compared to 2021.

[54] The indicator was calculated as a proportion between the number of pay-TV subscribers as of 31.12.2022 and the number of households from the NSI census conducted in 2021 (2,813,847 households according to the preliminary data at the time of preparation of the CRC's annual report for 2022. - https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_predvaritelna_ocenka.pdf).

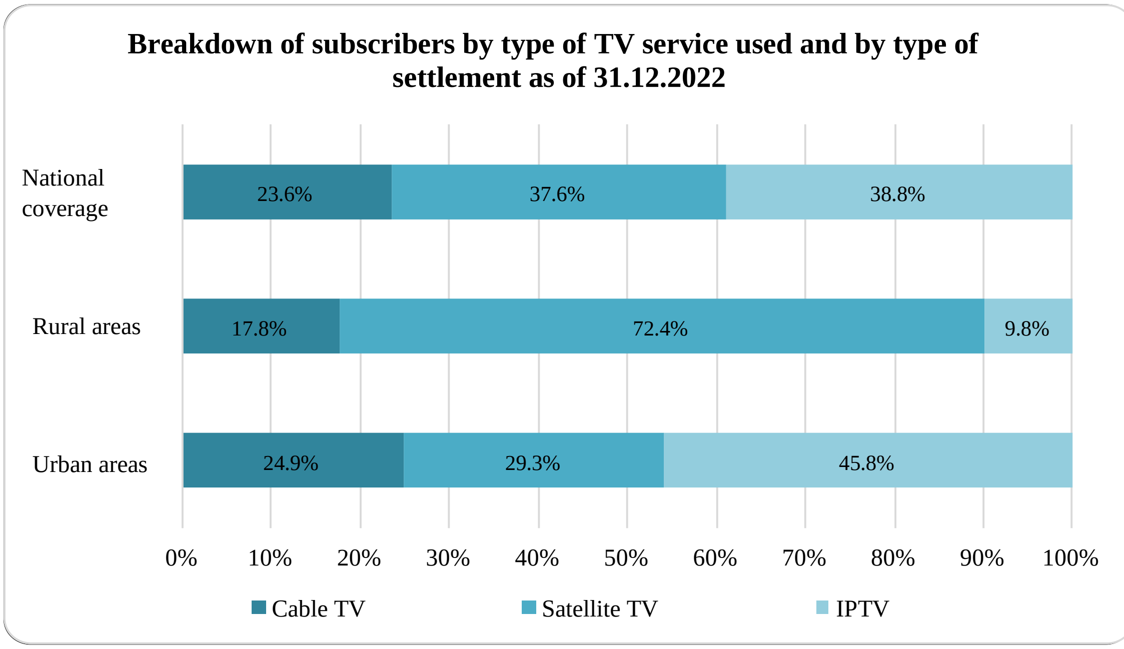
[55] The indicator was calculated as a proportion between the total number of pay-TV subscribers as of 31.12.2022 and the number of population as of 31.12.2022 according to NSI data (https://www.nsi.bg/sites/default/files/files/pressreleases/Population2022_3C3NKZD.pdf); to calculate the indicator for 2021, the final population figures as of 7 September 2021 from the census carried out by NSI were used (https://www.nsi.bg/sites/default/files/files/pressreleases/Census2021_population.pdf).



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 31.12.2022.



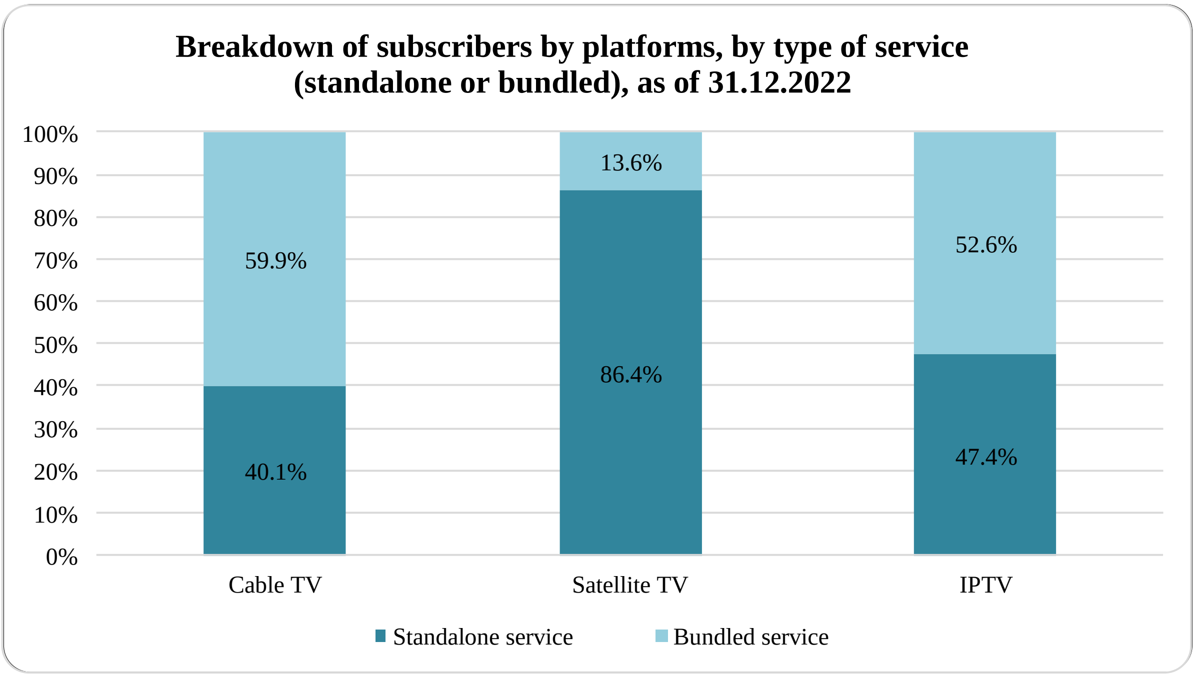
Source: Data submitted to CRC

Figure 33

Usually, the share of subscribers of satellite TV in rural areas is several times greater than the shares of the other two platforms. For yet another year, however, this share is decreasing, with the reported decline being the highest compared to the decrease in the previous three one-year periods – by 4.3 percentage points, at the expense of the share of subscribers of the other two platforms. As a result of the launch of IPTV in 572 new villages and the reported growth in subscribers of this platform in more than 1,800 villages compared to 2021, at the end of 2022, the number of IPTV subscribers in rural areas rose by 40%; this was also reflected on its share which increased to 9.8% over the period considered. The number of cable TV subscribers in rural areas also increased – by a little over 2%, with the share it occupies in the total number of pay-TV subscribers outside the urban areas growing by 1.2 percentage points to reach 17.8% as of 31.12.2022.

In the urban areas, IPTV subscribers hold the highest share, with a relative increase of 6.2 percentage points compared to their share at the end of 2021, reaching almost 46% 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 2022, with the share of cable TV subscribers falling by 2.1 percentage points to 24.9%, and that of satellite TV down by 4.1 percentage points to 29.3%, in line with the overall decline observed at national level (Figure 33).

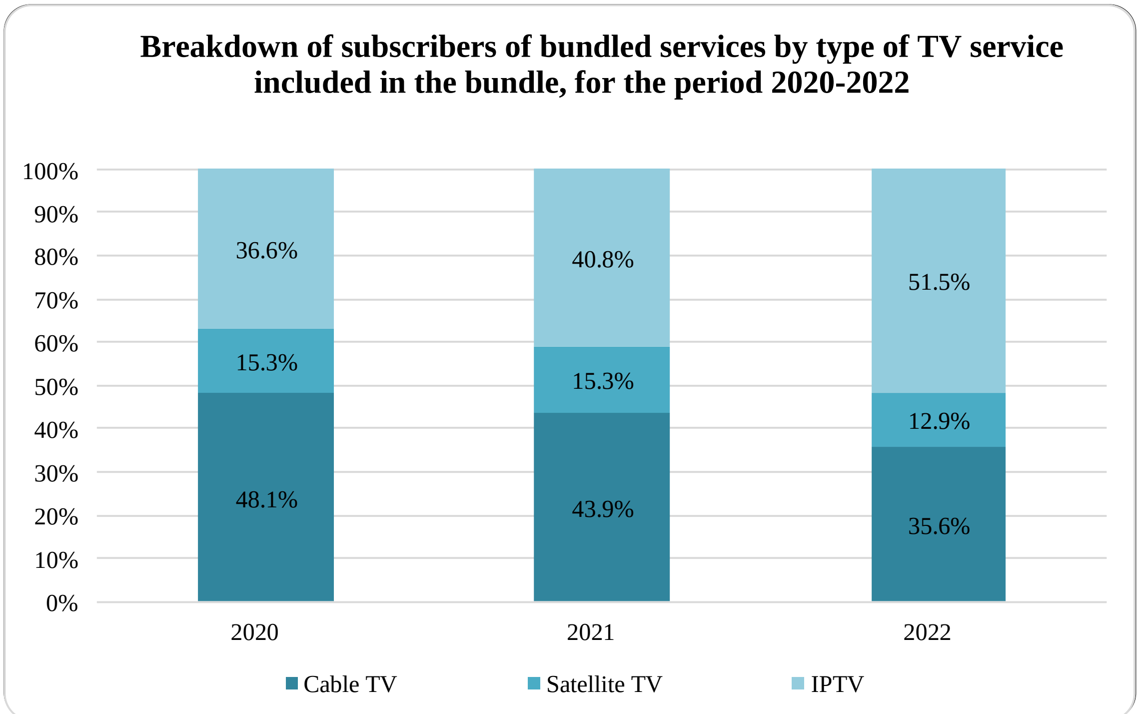
The number of subscribers to bundled services with a TV service included continued to increase and, in 2022, compared to the year before, the reported growth was 14%, and the share it covers in the total number of pay-TV subscribers grew by almost 6 percentage points to arrive at 40%. The figure below shows the share of subscribers of bundled services with a TV service included in the total number of subscribers distributed by platforms, as of 31.12.2022.



Source: Data submitted to CRC

Figure 34

Over the one-year period, a significant change in the structure of subscribers by type of service used was observed only in the proportion of IPTV subscribers. As compared to the end of 2021, the share of IPTV subscribers who used the service in a package increased by 10.6 percentage points to 52.6%. Over the same period, the relative shares of the subscribers of bundled services with satellite and cable TV included rose by 1.2 percentage points in the share of satellite TV and by 0.3 percentage points in the share of cable TV subscribers, reaching 13.6% and 59.9%, respectively, of the total number of subscribers to the respective platform (Figure 34).



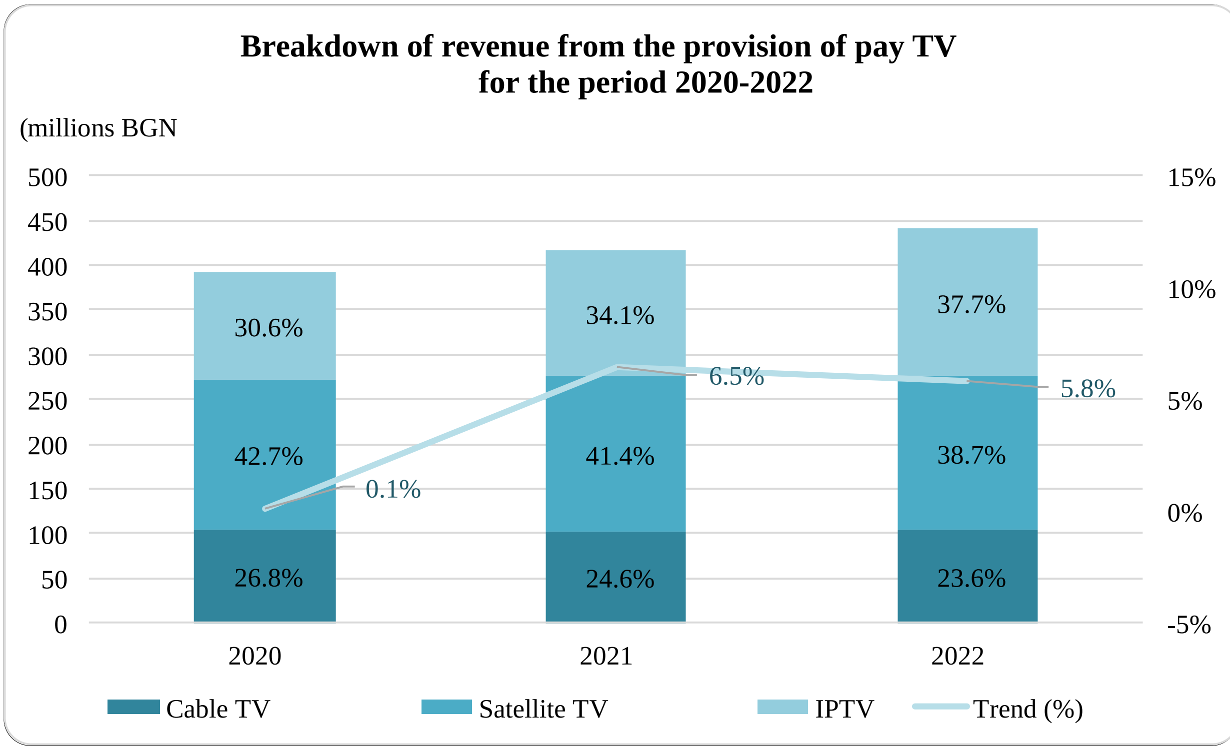
Source: Data submitted to CRC

Figure 35

As of 31.12.2022, compared to the previous year, there was a growth in the number of subscribers of bundled services with IPTV included - by more than 44%, 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 almost 11 percentage points and already covers more than half of the subscribers of bundled services with TV included – 51.5% (Figure 35). At the end of 2022, the share of subscribers of bundled services with cable TV included amounted to 35.6%, registering a significant decrease of 8.3 percentage points over the one-year period, and the share of subscribers to bundled services with satellite TV included fell to 12.9%, with the number of subscribers to this platform in a package down by 3.4% 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 441.515 million in 2022, up by 5.8% compared to 2021 (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 include revenue from bundled services with television included, calculated on the basis of the breakdown of bundled services subscribers with television included, by platforms, for each undertaking.*

Source: Data submitted to CRC

Figure 36

Revenue from both cable and IPTV grew in 2022 compared to the previous year, up by 1.9% and 17%, respectively, year-on-year. The share of revenue from IPTV in the total volume of the retail segment also increased - by 3.6 percentage points, reaching 37.7%. Despite the growth in absolute terms in revenue from cable TV, its share in the total volume of the retail market segment decreased by 0.9 percentage points to 23.6%. A decrease was observed in both absolute and relative terms in the revenue from satellite TV. Over the one-year period, the revenue generated from this platform was less by 1.1%, and its share in the total volume of the market segment dropped by 2.7 percentage points to 38.7%, while the gap between it and the share of revenue from IPTV, which now amounts to only 1 percentage point, continued to decrease.

The share of revenue from the provision of bundled services with television[56] included increased by 4 percentage points compared to the previous year and covered 39% of the total volume of the retail segment. In terms of revenue generated from a standalone service, there was an increase only in revenue from cable TV. Over the past year, there was a growth of 11.6% to BGN 40.243 million from the provision of cable TV. In the revenue from stand-alone satellite TV and IPTV, a decrease was reported compared to the previous year - 2.4% to BGN 148.737 million, and 2.9% to BGN 80.196 million, respectively.

[56] 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 2022, the total number of undertakings providing wholesale transmission and/or distribution of radio and television programmes services, including via wholesale IPTV and/or DVB-C, was by 2 more compared to 2021 and amounted to 13.

Detailed information on the number of undertakings which in 2022 provided wholesale transmission and/or distribution of radio and television programmes services, the number of users of these services and the volume of revenue generated from them, is displayed in Table 13 below:

Table 13

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 2022

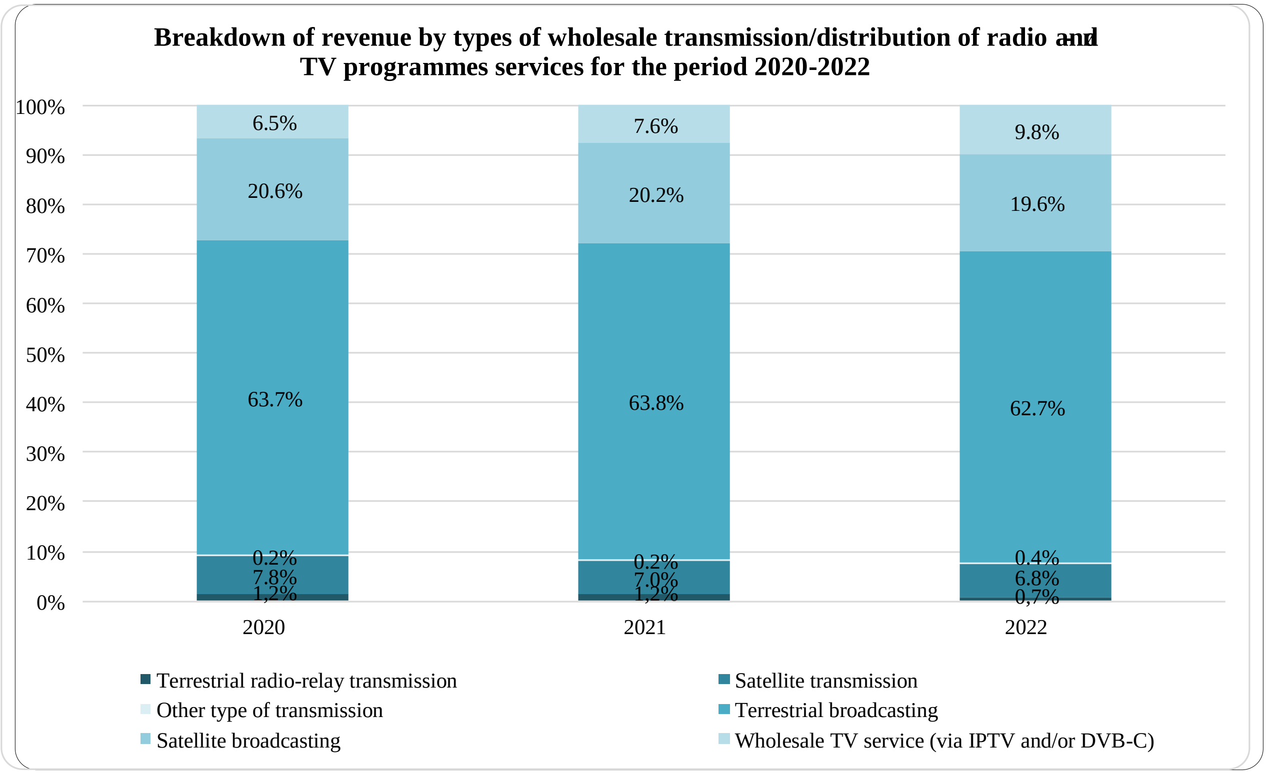
Types of wholesale transmission and/or distribution of radio and TV programmes services	Number of undertakings, providing the service in 2022	Number of users of the service as of 31.12.2022	Revenue from m the service in 2022. (in millions BGN, excl. VAT)
1.1. Transmission of radio and TV programmes services	7	///	2.554
1.2. Distribution of radio and TV programmes services	5	///	26.742
1.3. Wholesale TV service (via IPTV and/or DVB-C method) provided to other undertakings for resale purposes	5	50	3.185
Total	13	///	32.480

Source: Data submitted to CRC

In 2022, 7 undertakings provided transmission of radio and TV programmes services, with an increase of 3 compared to the active undertakings in 2021. The number of undertakings providing distribution of radio and TV programmes services remained unchanged from the previous year and wholesale television services via IPTV and/or DVB-C in 2022 are already provided by five undertakings.

The revenue from the provision of wholesale transmission and distribution of radio and TV programmes services amounted to BGN 32.480 million, decreasing by 9.9% compared to the previous year. This reduction is due to a registered decline in the revenue generated from wholesale transmission of radio and TV programmes services - by 15.6%, and from wholesale distribution of radio and TV programmes services - by 11.7%. These negative changes are mainly the result of the acquisition of NURTS Bulgaria by Vivacom in the second half of 2022, the latter being the main user of the services of NURTS. A positive change in revenue was reported only in the wholesale TV services provided via IPTV and/or DVB-C method – by 16.2%, while the upward trend in the revenue generated from this service remained stable.

The following figure shows the breakdown of revenue by type of wholesale transmission/distribution of radio and TV programmes services for the period 2020-2022.



Source: Data submitted to CRC

Figure 37

The data presented in Figure 37 show that, in 2022, 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 – 62.7%, registering a decrease of 1.1 percentage points compared to the previous year and 1 percentage point compared to 2020. A more substantial growth in relative terms was observed in the share of revenue from wholesale television service via IPTV and/or DVB-C method, which increased by 2.2 percentage points to arrive at 9.8%. 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 2022, the number of undertakings holding registration with CRC for the provision of services for terrestrial broadcasting of radio programmes decreased by 4 compared to 2021 and amounted to 56, with 54 of them actually providing the service in 2022. The undertakings with national coverage as of 31.12.2022 remained two – Bulgarian National Radio and Darik Radio AD.

Summary

In 2022, the following changes were observed in the “transmission and/or distribution of radio and TV programmes services" segment versus 2021:

- Growth in the total volume of revenue from the segment, resulting from the reported growth in revenue from the provision of cable TV, retail IPTV and wholesale TV service provided via IPTV and/or DVB-C method;
- 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;
- Decline in the revenue from wholesale transmission and/or distribution of radio and TV programmes services.

6. Prospects for development of the Bulgarian electronic communications market

The Bulgarian electronic communications market is a dynamic and constantly developing sector, which has established itself as one of the most stable in the structure of the Bulgarian economy, including during the force majeure caused by the global pandemic over the previous two years, ensuring the functioning of a number of vital areas of the social and economic life.

Undertakings and providers of electronic communications services continue both with the deployment of next-generation access (NGA) networks, providing higher speeds and connection quality, and with the accelerated pace of development of 5G NR networks, which are expected to lead to a new 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 and augmented reality.

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

The trends observed in 2022 which are expected to continue next year are as follows:

- The already established trend of decreasing consumption of the traditional fixed voice service provided through geographic numbers from the NNP is expected to continue next year as well. End-users of interpersonal telephony service can benefit not only from the convenience of the mobile voice service, but also from various messaging and video call applications;
- Demand for mobile calls and SMS will continue to be replaced by the growing demand for mobile data, and the upward trend in the number of subscribers using mobile voice service in a bundle with mobile Internet access will be preserved. The application of new, even lower wholesale mobile voice call termination rates from 1 January 2023 (pursuant to Delegated Regulation (EU) 2021/654) is a prerequisite for the decline in the total revenue from wholesale traffic services to become greater in the following year;
- Increase in the share of subscribers in the total number of fixed Internet access subscribers who use ultra-high-speed access at international download speed of at least 100 Mbps;

- Increase in the share of subscribers to fixed access over 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 which will allow mobile operators to exercise a more intensive pressure on the providers of fixed broadband Internet access;
- Continued increase in the share of subscribers to 5G networks in the total number of mobile Internet subscribers due to the development of 5G NR networks both by territory and by population;
- The development of the pay-TV segment will continue to be determined by the dynamics in the development of IPTV. The various technological solutions through which this service is provided increase the possibility of a wider penetration of IPTV among consumers in small settlements where the satellite TV service is usually dominant. Another factor that would influence the development of the segment and the dynamics of competition is the entry of one of the main telecommunication operators in the country - Yettel Bulgaria - on the market of pay-TV, and this is expected to have an impact on the shares of the players in the retail market segment and their distribution;
- The following trends are observed in the bundled services – 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

In fulfilment of the obligation to provide the universal service[57], Vivacom Bulgaria EAD (Vivacom) provides 80% coverage, measured by number of territorial units as of 31.12.2022, and there is no change compared to the year before. The above coverage includes settlements and settlement formations (resorts, etc.), which are included in the Unified Classification of Administrative-Territorial and Territorial Units[58].

In 2022, the telephone density by households[59] registered a decline of 1.8 percentage points since the year before, as a result of the steady downward trend in the number of residential subscribers of Vivacom.

7.2. Bringing the universal service in compliance with the regulatory framework

In accordance with the Law on Amendment and Supplement of the Law on the Electronic Communications which was adopted in 2021 and which implements the European Electronic Communications Code, the universal service concept has been developed by amending the scope of the universal service in the current regulatory framework to include:

[57] Pursuant to § 7 of the Law on Electronic Communications.
[58] https://www.ekatte.com/;
[59] 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 2011, since the official results from the 2021 census are expected to become available at the end of 2022).

1. provision of telephony services by connecting at a fixed location to a public electronic communications network regardless of the technology used, and
2. ensuring adequate broadband Internet access at a fixed location, enabling at least the following services to be supported:

   (a) e-mail;

   (b) search engines and search for any type of information;

   (c) on-line basic learning and education tools;

   (d) on-line newspapers or news;

   (e) on-line purchase or ordering of goods or services;

   (f) job search and job search tools;

   (g) networking communities for professional purposes;

   (h) Internet banking;

   (i) use of electronic administrative services;

   (k) social media and real-time communication through text messages;

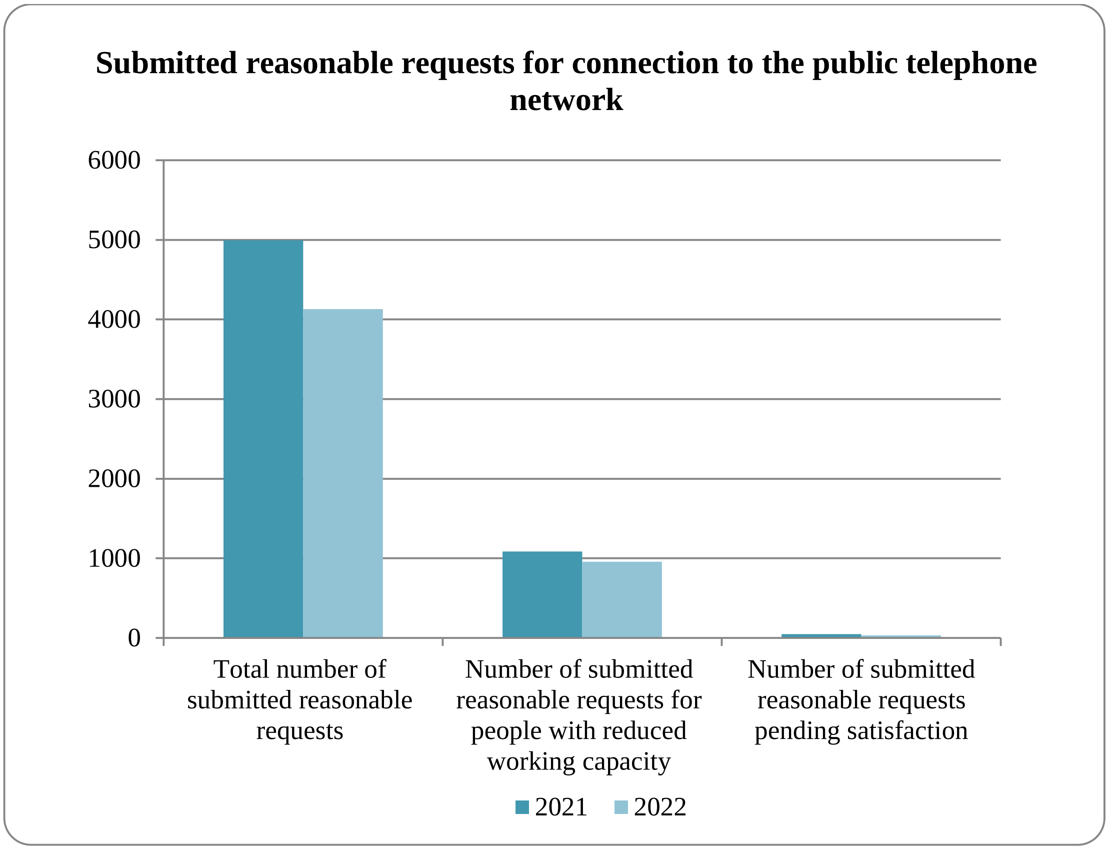
   (l) voice and video calls.
3. provision of services other than those referred to in points 1 and 2 for which universal service obligations are in force.

In connection with the above change in the scope of the universal service, by Decision No 223/30.06.2022, CRC adopted a draft Ordinance on the conditions and procedure for provision of the universal service under the LEC. The draft was sent to the Ministry of Transport and Communications (MTC) and the Ministry of Electronic Governance in accordance with Article 182, Para 5 of the LEC. The draft reflects the change of the services within the scope of the universal service, as well as the removal of part of the obligations in force in accordance with CRC Decision No 350/30.09.2021.

By Decision No 320 of 29.09.2022, a draft Decree for adoption of a Methodology for determining the prices and price packages of the universal service under Article 195 of the LEC was adopted, which, together with the package of documents, was sent to the MTC to be submitted at a meeting of the Council of Ministers. The draft Decree covers the provision of telephony services by connecting at a fixed location to a public electronic communications network regardless of the technology used and the provision of adequate broadband Internet access at a fixed location. It lays down the procedure for determining the affordability of the prices of services covered by the universal service in accordance with the amended requirements of the LEC.

7.2.1. Access to and provision of the universal service

As of 31.12.2022, the total number of reasonable requests submitted for connection decreased by 17.3% compared to the previous year, as shown in Figure 38 below. Unlike the previous period, in 2022, a decrease of 11.8% compared to 2021 was observed in the number of requests submitted for connection by people with disabilities.



Source: Data submitted to CRC

Figure 38

In 2022, there was a slight increase of 3 percentage points compared to the previous period in the number of requests pending satisfaction. The share of rejected requests for connection, compared to the total number of requests submitted, was 9%, which is half less than in 2021, of which the majority - 70% are the result of a ceased interest by the customers.

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

In accordance with the conclusions of the analysis performed in 2021 and taking into account national circumstances, by Decision No 350/30.09.2021, CRC abolished the obligations to provide public payphones and/or other points of public access to voice telephony services of certain quality, ensuring telephone directory and provision of telephone enquiry services imposed as an obligation for the provision of the universal service as part of the services within the scope of the universal service.

In order to ensure access to telephone services for consumers, Decision No 350/30.09.2021 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 and 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.

In accordance with the amended obligation, Vivacom-owned public payphones which are available in the above locations include quality features to provide facilities for hearing impaired and sight impaired users. Part of them are accessible for users in wheelchairs by being installed in suitable locations. There is no change in the quality parameter of the public payphones provided compared to 2021, as it continued to constitute 90% and was in compliance with the target values of service quality parameters set out by CRC Decision No. 345/31.03.2011.

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 a telephone directory in electronic form. The telephone directory is available at the undertaking's official website.[60]

Vivacom fulfils its obligation to provide free calls to emergency numbers. In 2022, the downward trend of traffic generated to them continued, as it fell by 52%, with the number of calls to emergency numbers also decreasing – by 17% compared to 2021.

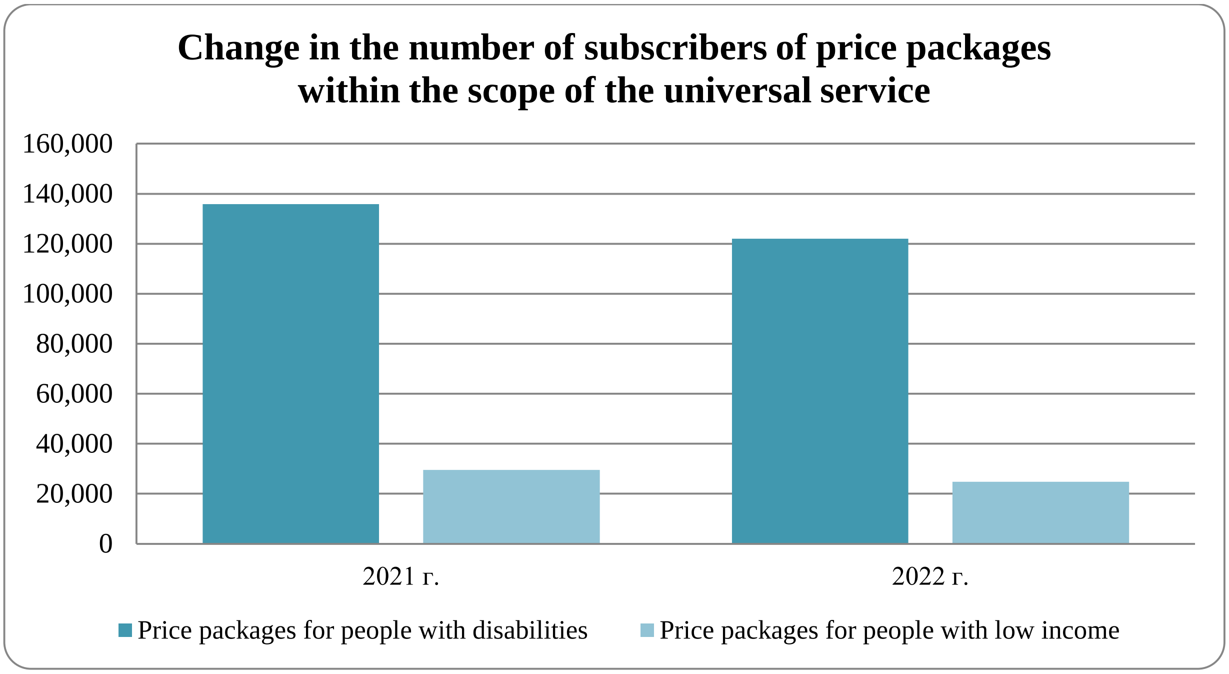
7.2.3. Affordability of tariffs of the universal service

In 2022, in fulfilment of its obligations to provide price packages within the scope of universal service at affordable[61] prices, Vivacom continued to offer, without any change either in prices or in conditions, price packages intended for users: 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 2022, the subscribers of price packages within the scope of the universal service decreased by 11% compared to those in 2021. The chart below displays the trend in the number of subscribers of price packages within the scope of the universal service for 2021 and 2022.

[60] http://www.vivacom.bg/online/cgi-bin/wpd.cgi?temp=home.html&ls=0;

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



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 2022, compared to 2021, by 16% and 10%, 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 it amounted to 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 by Decision No. 345/31.03.2011 of CRC and are publicly available at the Commission's official website.[62] According to the data submitted by Vivacom,[63] in 2022, the undertaking reported fulfilment of all target values.

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

In 2022, Vivacom did not submit to CRC a request for compensation of the unfair burden from the universal service provision within the statutory deadline - 30.06.2022. Thus, during the last year, the amount of net costs was not calculated and it was not established whether these expenditures represent an unfair burden for the incumbent undertaking.

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

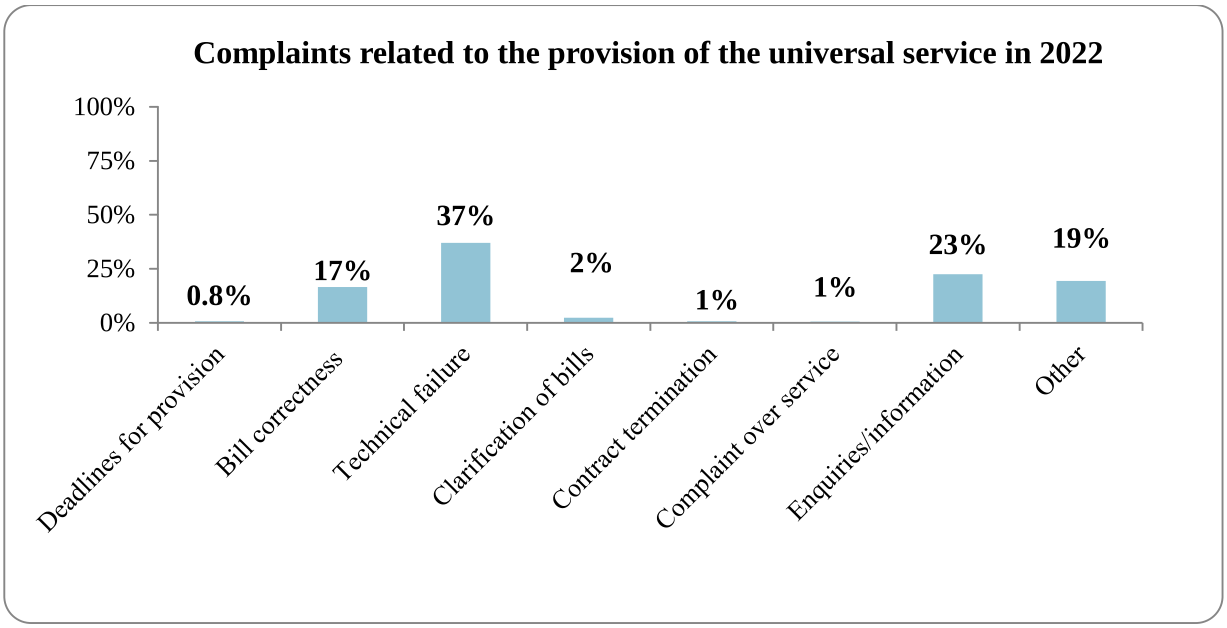
[62] http://www.crc.bg/section.php?id=904&lang=bg
[63] Through the CRC's electronic system for on-line questionnaires

Decision No 1 of 30.03.2021, in 2022, no meeting was held due to the absence of a request for compensation of net costs by the incumbent undertaking.

7.5. Complaints and complaint resolution

According to the General 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;[64] selective limitation of outgoing calls free of charge, and deferred payment when connecting to public telephone networks.

In 2022, the number of complaints filed with Vivacom regarding the provision of the universal service was by 12% less than in 2021. 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.



Source: Data submitted to CRC

Figure 40

As of 31.12.2022, there was an increase in the percentage breakdown of complaints over technical failure, correctness of monthly bills, deadlines for provision of the universal service and other reasons for complaint. On its part, the number of consumer complaints submitted about clarification of bills, contract termination and complaint over service registered a decrease compared to the number of complaints filed in the previous period. In 2022, the percentage of unsatisfied complaints amounted to 52% of the total number of complaints filed, registering a drop of 16 percentage points compared to 2021.

7.6. Prospects for development of the universal service

In 2022, by its Decision No 223/30.06.2022, CRC adopted a draft Ordinance on the terms and conditions for provision of the universal service under the Law on Electronic Communications, which was sent to the Ministry of Transport and Communications and to the Ministry of Electronic

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

Governance in accordance with the requirements of the LEC. The draft reflects the modified concept of the universal service and the procedure of its award. In this regard, after the issuance of the Ordinance by the Minister of Transport and Communications and the Minister of Electronic Governance, a study is about to be conducted on the availability at a fixed location of a service for adequate broadband Internet access and telephony services and whether it can be provided under the ordinary commercial conditions. 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 take actions to award the universal service in accordance with the provisions of the LEC.

At present, the information provided to CRC on services from the scope of the universal service indicates a trend of decline in the consumer interest which continued in 2022, including to price packages with preferential conditions for vulnerable social groups.[65]

II. LEGAL AND REGULATORY FRAMEWORK

1. EU regulatory framework for electronic communications

Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (EECC) constitutes a revision of the applicable sector regulatory framework in the European Union (EU).

Regulation (EU) 2018/1971 of the European Parliament and of the Council of 11 December 2018 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Agency for Support for BEREC (BEREC Office), amending Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009, settles the coordination between the national regulatory authorities within the framework of the common body and regulates intra-EU international calls.

The European Commission also published a Proposal for a Regulation of the European Parliament and of the Council concerning the respect for private life and the protection of personal data in electronic communications and repealing Directive 2002/58/EC. This Directive is not part of the legal framework of the EECC and will be the subject of a separate regulation. The final text of the regulation has not been adopted yet.

2. Legal and regulatory framework in Bulgaria

Following the transposition of Directive (EU) 2018/1972 into the Law on Electronic Communications in 2021, in the past 2022, the law underwent two amendments related to amendments to the Law on Electronic Governance and the Law on Judicial Power. No amendments or supplements related to the matter regulated by the law were implemented.

In fulfilment of the commitments of the Republic of Bulgaria as a EU Member State to bring the Bulgarian legislation into compliance with Directive (EU) 2018/1972, CRC harmonised the secondary regulations adopted on the basis of the Law on Electronic Communications.

3. Important regulatory decisions of CRC in 2022

The total number of CRC decisions adopted in 2021 was 418, the majority of which are in implementation of CRC's powers according to the LEC. Among those decisions, the acts that play

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

a more significant role in ensuring a foreseeable and competitive environment in the sector are as follows:

- By Decision No 3 of 06.01.2022, CRC adopted Rules for the use of radio spectrum from electronic communications networks from broadcasting radio service;
- By Decision No 18 of 13.01.2022, CRC adopted an amendment and supplement to the Rules for free use of radio spectrum;
- By Decision No 19 of 13.01.2022, CRC adopted Rules for the use of radio spectrum from electronic communications networks from a fixed radio service following the issue of an authorisation;
- By Decision No 41 of 26.01.2022, CRC adopted Rules for determining the terms and conditions for the provision of information on the location of users and data about the end-user by the undertakings;
- By Decision No 63 of 17.02.2022, CRC amended and supplemented the Rules for the use of radio spectrum from electronic communications networks from mobile radio service following the issue of an authorisation;
- By Decision No 69 of 24.02.2022, CRC announced its intention to limit the number of authorisations for use of radio spectrum from electronic communications networks for terrestrial digital broadcasting in the 174-230 MHz frequency band;
- By Decision No 91 of 17.03.2022, CRC adopted a draft decision of the Council of Ministers on the conclusion of an "International Agreement between the Administration of the Republic of Bulgaria and the Administration of the Republic of Turkey on the mutual inclusion of their territories in the areas of service of their satellite networks, regulated by Appendix 30B of the Radio Regulations of the International Telecommunication Union";
- By Decision No 94 of 24.03.2022, CRC launched a public consultation on a draft Methodology for determining the amount of the administrative fee for control under Article 141 of the Law on the Electronic Communications (the Methodology). With LASLEC, prom. SG, no. 20 of 9.03.2021, amendments were made to Art. 52, Art. 53, Para 1 and Art. 139 of the LEC. The new revisions to these provisions require CRC to publish in its annual report "*Review of its administrative costs and the total amount of fees collected*", the legal requirement being "*the amount of administrative fees due by the persons carrying out electronic communications in compliance with the requirements of this Law to correspond to the administrative costs of the Commission necessary for international coordination and cooperation, harmonisation and standardisation, market analysis and control, preparation and implementation of regulatory acts and issue of administrative acts and control of their implementation*". In the cases "*of difference between the total amount of the collected administrative fees and the administrative costs of the Commission, the commission shall propose to the Council of Ministers an amendment of the tariff under Article 147 concerning the amount of the administrative fee for control*". The application of the Methodology fulfils the requirement of Art. 139, Para 1 of the LEC, namely: precise determination of the amount of the Commission's administrative costs necessary to ensure the activities under the LEC. CRC has powers, functions and tasks under a number of other laws as

well, therefore a methodology is needed to accurately determine the coefficient of the average engagement of CRC with the activities under the LEC. At present, the draft Methodology undergoes a second public consultation.

- By Decision No 96 of 24.03.2022, CRC adopted a regulatory policy for the management of radio spectrum for civil needs;
- By Decision No 118 of 07.04.2022, CRC adopted a draft Decision of the Council of Ministers on the conclusion of an "International Agreement between the Administration of the Republic of Bulgaria and the Administration of the Republic of Turkey on the mutual inclusion of their territories in the areas of service of their satellite networks, regulated by Appendix 30B of the Radio Regulations";
- By Decision No 135 of 20.04.2022, CRC adopted Rules for use of radio spectrum for radio equipment from amateur radio service;
- By Decision No 162 of 19.05.2022, CRC adopted Rules on minimum security requirements for public electronic communications networks and services and methods for risk management for their security;
- By Decision No 192 of 16.06.2022, CRC amendment and supplemented the Rules for free use of radio spectrum;
- By Decision No 201 of 23.06.2022, CRC adopted an Annual Report of CRC for 2021;
- By Decision No 222 of 30.06.2022, CRC accepted that the dedicated capacity market – market No 2 of Recommendation (EU) 2020/2245 is not subject to ex ante regulation, as the three criteria for determining the relevant market subject to ex ante regulation are not met cumulatively;
- By Decision No 223 of 30.06.2022, CRC adopted a draft Ordinance on the terms and conditions for provision of the universal service under the Law on Electronic Communications;
- By Decision No 244 of 07.07.2022, CRC approved a model form for provision of information by the undertakings which have notified the Communications Regulation Commission about their intentions to carry out public electronic communications through data transfer services (including Internet access) and are entered as of 1 July in the public register under Art. 33, Para 1, p. 1 of the LEC;
- By Decision No 279 of 04.08.2022, CRC adopted Rules on the process of switching the provider of Internet access services;
- By Decision No 280 of 04.08.2022, CRC adopted a draft Decree of the Council of Ministers on the adoption of an Ordinance on the content, conditions and procedure for keeping, maintaining and using the register of transceiver stations of terrestrial networks, the activities under Article 151, Para 1, p. 16 of the Spatial Planning Act and of the notifications of located short-range wireless access points;
- By Decision No 296 of 25.08.2022, CRC announced its intention to limit the number of authorisations for use of radio spectrum in the 26 GHz band by issuing up to 10 (ten) authorisations, within the meaning of Article 90 of the LEC, for use of radio spectrum in the 26 GHz band for terrestrial networks, enabling the provision of electronic

communications services for wireless broadband networks and services with national coverage;

- By Decision No 320 of 29.09.2022, CRC adopted a draft Decree for adoption of a Methodology for determining the prices and price packages of the universal service under Art. 195 of the Law on Electronic Communications;
- By Decision No 333 of 13.10.2022, CRC approved a Mechanism for regulation of communications and measurement and monitoring of the quality of the Internet access service;
- By Decision No 338 of 13.10.2022, CRC announced a sealed-bid tender to issue one authorisation for use of frequency spectrum in the 26 GHz band for a terrestrial network capable of providing electronic communications services with national coverage thus providing for use block M (26700-26900 MHz frequency band);
- By Decision No 349 of 20.10.2022, CRC adopted an amendment and supplement to the Rules for the use of radio spectrum from electronic communications networks from broadcasting radio service;
- By Decision No 352 of 27.10.2022, CRC adopted Rules for interaction and coordination between the Communications Regulation Commission and the Commission for Protection of Competition;
- By Decision No 390 of 17.11.2022, CRC extended the right to use the number “116 000” by Centre Nadya Foundation for the provision of a harmonised service of social significance “Hotline for Missing Children” until 06.12.2032;
- By Decision No 391 of 17.11.2022, CRC continued the operation of the Consultative Council for National Coordination and Harmonisation of Radio Frequencies and Radio Frequency Bands (CCNCH);
- By Decision No 398 of 24.11.2022, CRC determined that the wholesale market for call termination at a fixed location on individual public telephone networks is not subject to ex ante regulation, as the three criteria for its designation as a relevant market subject to ex ante regulation are not met cumulatively and the specific obligations imposed by Decision No 265/23.07.2020 have been abolished, while maintaining the effect of the obligations imposed by p. V.1., p. V.2 and p. V.3 of Decision No 265/23.07.2020 for a 12-month transitional period. The transitional period referred to in the preceding sentence does not apply to the obligation under p. V. 1.1.5 of Decision No 265/23.07.2020;
- By Decision No 399 of 24.11.2022, CRC determined that the wholesale market for voice call termination on individual mobile networks (market No 2 of the European Commission Recommendation 2014/710/EU of 9 October 2014) is not subject to ex ante regulation, as the three criteria for its designation as a relevant market subject to ex ante regulation are not met cumulatively, and it has abolished the specific obligations imposed by Decision No 266/23.07.2020, while maintaining the effects of the obligations imposed by p. V. 1, p. V.2 and p. V.3 of Decision No 266/23.07.2020 for a 12-month transitional period;

- By Decision No 400 of 24.11.2022, CRC adopted an Ordinance on the terms and conditions for access and/or interconnection;
- By Decision No 425 of 14.12.2022, CRC adopted an Ordinance amending and supplementing Ordinance No 1 of 22 July 2010 concerning the rules for use, distribution and procedures for primary and secondary assignment for use, dedication and withdrawal of numbering resources;
- By Decision No 426 of 14.12.2022, CRC launched a public consultation on a draft Regulatory policy for the use of numbering resources for the implementation of electronic communications.

4. Provision of electronic communications

4.1. Authorisations for the use of individually assigned scarce resource

As regards the amendment of the LEC and the rules adopted for the use of radio spectrum, by Protocol Decision No 1 of 12.05.2022, CRC adopted standard authorisations for use of radio spectrum. The process of bringing the issued authorisations for use of radio spectrum and numbering resources into compliance has begun.

Table 14 lists the number of authorisations granted during the year for the use of a scarce resource, the number of amendments and/or supplements to the authorisations granted, the number of authorisations terminated, revoked and transferred, and the number of authorisations expired.

Table 14

Authorisations for 2022 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	2	-	-	1
Electronic communications networks for terrestrial analogue broadcasting of radio signals with national and local coverage	46	2	1	62

Terrestrial networks in frequency band 1800 MHz	7	-	-	-
Terrestrial networks in frequency band 2 GHz	5	-	-	-
Terrestrial networks in frequency band 2.6 GHz	5	-	-	-
Terrestrial networks in frequency band 3.6 GHz	7	-	-	-
Electronic communications networks in band 26 GHz	1	5	-	-
Electronic communications networks from a mobile radio service – PMR/PAMR	345*	16*	38	19
Electronic communications networks from the aeronautical mobile radio service	12	-	-	-
Electronic communications networks from the fixed radio service of the “point-to-point” type	74**	1	4	1
Authorisations for the use of numbering resources	10	1	2	-
Electronic communications networks for fixed wireless access (FWA)	1	-	-	-
Electronic communications networks from satellite radio services	22	14	-	-
Position on geostationary orbit with the relevant radio frequency spectrum assigned to the Republic of Bulgaria	1	-	-	-
Integrated mobile satellite system	2	-	-	-
Temporary authorisations	2	10	-	-
TOTAL:	**542**	**49**	**45**	**83**

** The total number of provided radio frequencies for these authorisations was 140;*

*** Amendments and supplements to the technical data of a total of 2,151 links, including provided radio frequency spectrum for new 1,026 links.*

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

The activities related to the notifications submitted in 2022 for the provision of public electronic communications and/or services are presented in Table 15.

Table 15

Type of activity	2022 (number)
Processed notifications for provision of public electronic communications networks and/or services	50
Processed notifications for termination of the provision of public electronic communications	35
Issued certificates for entry in the Registry	12
Undertakings entered in the Registry	24
Undertakings deleted from the Registry	30

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 16.

Table 16

Type of activity	2022 (number)
Authorisations for radio amateur capacity	290
HAREC certificates	27
CEPT licenses	37
Allocated call signs	475*

**205 of the allocated call signs are temporary.*

In 2022, 9 amateur radio exams were held in the cities of Sofia, Plovdiv, Varna, Gabrovo and Gotse Delchev. 268 people were examined.

4.4. Interconnection and access

The Communications Regulation Commission adopted Ordinance No 1 of 24 November 2022 on the terms and conditions for access and/or interconnection.[66] The Ordinance applies to

[66]https://crc.bg/files/%D0%9F%D0%B0%D0%B7%D0%B0%D1%80%D0%BD%D0%BE%20%D1%80%D0%B5%D0%B3%D1%83%D0%BB%D0%B8%D1%80%D0%B0%D0%BD%D0%B5/Naredba_1_za_dostyp_i_vzaimno_svarzvane.pdf

operators of public electronic communications networks in cases where the networks are used for the provision of public electronic communications services. Chapter Two "Interconnection" contains the provisions for the provision of access for implementation of interconnection with regard to the provision of the “termination” service. Chapter Three “Access and/or interconnection contracts” provides the content of the contractual terms necessary for the implementation of access and/or interconnection. This brings the regulatory framework into line with the latest amendments to the LEC and provides clarity on the basic rules under which undertakings providing public electronic communications networks provide access and/or interconnection.

In 2022, CRC received a request from Inspire Communications EOOD for assistance in reaching an agreement with A1 Bulgaria EAD to finalise the negotiation process and sign a contract for interconnection for termination of voice calls. At the meeting, the parties agreed on how to continue the negotiation process.

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 public resource, the management of which influences the development of important sectors and services of the country’s economy, including mobile, wireless broadband and satellite services, broadcasting of television and radio signals, transport, short-range applications such as remote control devices, hearing aids, radio microphones, medical equipment, local radio networks, non-specific and inductive devices, radio determination devices, etc. The use of radio spectrum is in the basis of scientific activities such as meteorology, Earth observation, radio astronomy and space studies. The easy access to radio spectrum is important for the provision of communications services, for citizens and businesses located in remote and sparsely populated areas. Radio spectrum management therefore has an impact on the development of the country’s economy, safety, health, public interest, culture, science, the social sphere, the environment and the introduction of innovative technologies and services. Another important aspect is ensuring harmonised use of radio spectrum, which contributes to better quality of services and creates economies of scale, as it reduces both the cost of building wireless networks and the costs of users for wireless devices. 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.

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 a public consultation procedure, CRC adopted a regulatory policy for the management of radio spectrum for civil needs (prom. SG, no. 29 of 12 April 2022). It sets out the main objectives, mechanisms and approaches for the management of radio spectrum for civil needs for the period 2022-2024, the implementation of which will contribute to the development of wireless networks and ensure a harmonised and coordinated use of radio spectrum.

In order to implement measure C7.R2: Effective use of the radio spectrum in the utilisation of the funds under the National Recovery and Resilience Plan (NRRP) (code RRP139), the Chairman of CRC coordinates an agreement between the Air Force of the Republic of Bulgaria and the undertakings providing electronic communications networks and/or services for the purpose of carrying out tests to establish the possibility of using 2x30 MHz in the 700 MHz and 800 MHz band for terrestrial networks capable of providing electronic communications services, by checking the impact of the emissions from the base stations of the undertakings on the ground-based military radio navigation and radar systems and vice versa.

In implementation of the Agreement, the Commission issued temporary authorisations to Vivacom Bulgaria EAD (Vivacom), Yettel Bulgaria EAD (Yettel) and A1 Bulgaria EAD (A1) for the joint use of the 703-733 MHz/758-788 MHz and 791-821 MHz/832-862 MHz bands. The temporary authorisations granted the three undertakings the right to conduct tests to establish the mutual influence between the radio electronic equipment of the Air Force and the undertakings, as well as to ensure the technical compatibility of network facilities, the integrity and security of the networks and the quality of the services provided. Depending on the test results, procedure will be carried out in the next year for the issue of permanent authorisations.

In 2022, CRC adopted a draft position on the prospects and conditions for use of the free resource in the 700 MHz and 800 MHz frequency bands and, on the basis of Article 37(1) and (3) of the LEC, launched a procedure for conducting public consultations in order to examine the interest in spectrum acquisition in the 700 MHz and 800 MHz bands, which is one of the steps to implement measure C7.R2 of the NRRP.

A draft intention was drawn up to limit the number of authorisations in the 700 MHz and 800 MHz bands, as well as a draft notification to the European Commission Radio Spectrum Policy Group.

Last year, CRC announced its intention to limit the number of authorisations issued for use of radio spectrum from electronic communications networks for terrestrial digital broadcasting in the 174-230 MHz frequency band; within the set deadline, five intentions were received, and four undertakings subsequently submitted applications. In connection with applications submitted under Article 83 of the LEC for the issue of seven authorisations for use of frequency resource from the 174-230 MHz frequency band, refusal to undertakings for three of them and the impossibility to complete the launched procedure, the Commission sent a letter to the Ministry of Culture, the Ministry of Transport and Communications and the Council for Electronic Media in connection with the need to change the legal framework and take action to amend the Law on Radio and Television.

An additional frequency resource was provided in the 1800 MHz and 3600 MHz bands to Vivacom, Yettel and A1, thus enabling the undertakings to further develop their networks and provide high-speed data transfer, including those based on 5G networks.

In order to ensure conditions for the effective use of radio frequency band 26 GHz and the penetration of new technologies and services onthe market, activities were carried out related to the bringing of two authorisations in compliance with the new regulations and the issue of new authorisations for use of radio spectrum for terrestrial networks capable of providing electronic communications services.

By Decision No 296 of 25.08.2022, CRC launched a public consultation procedure on the basis of Article 90, Para 2, in conjunction with Article 89, Para 1 of the LEC, on the intention to limit the number of authorisations for use of radio spectrum in the 26 GHz band for terrestrial network capable of providing electronic communications services with national coverage for a period of 20 years, and launched public consultations on the issue of 10 authorisations (blocks A, B, D, G, I, L, M, N, O and P), each of 200 MHz. The maximum number of authorisations for which an undertaking can declare an intention is 3 (maximum 600 MHz). When determining the number of authorisations, account has been taken of the need to meet the main objectives of the LEC, the Regulatory policy for the management of radio spectrum for civil needs and the available free resource in the 26 GHz range. By Decision No 337 of 13.10.2022, the results of the conducted public consultation were adopted. As a result, on the basis of Art. 90, Para 4, p. 2 of the LEC, actions were taken to issue authorisations following the submission of applications under Art. 83, Para 5 of the LEC, to A1, Yettel and Vivacom, for the blocks they have requested, as follows: to A1 - for blocks I and L; to Yettel - for blocks A, B and D; to Vivacom - for frequency blocks N and O.

On the basis of Art. 90, Para 4, p. 2, CRC adopted a decision to announce a tender under Article 93 of the LEC for frequency block M (frequency band – 26700-26900 MHz), for which intentions were submitted by A1 and Vivacom. By Decision No 354 of 27.10.2022, tender documents were accepted for a sealed-bid tender for the issue of an authorisation for use of frequency spectrum in the 26 GHz band for a terrestrial network capable ofproviding of electronic communications services with national coverage; An application for participation in the tender was submitted only by Vivacom, therefore the tender was not held and, by Decision No 394/24.11.2022, CRC completed the launched tender procedure.

As a result, the Commission,

- by its Decision No 387/17.11.2022, issued authorisation No 02499/17.11.2022 to A1 for blocks I and L;
- by its Decision No 388/17.11.2022, issued authorisation No 02500/17.11.2022 to Yettel for blocks A, B and D;
- by its Decision No 389/17.11.2022 issued authorisation No 02501/17.11.2022 to Vivacom for blocks N and O;
- by its Decision No 394/24.11.2022 , CRC completed the launched tender procedure and issued authorisation No 02502/24.11.2022 to Vivacom for block M.

By providing a total of 1600 MHz frequency resource to the three mobile undertakings, CRC implemented measure C7.R2: Effective use of radio spectrum while utilising the funds under the NRRP (code RRP138).

In connection with ensuring of conditions for the deployment of 5G networks and with the purpose of encouraging investments in the infrastructure, and in fulfilment of the amendments and supplements to the Spatial Planning Act (SPA) and LASLEC, by Decision No 280 of 04.08.2022, CRC adopted a draft Decree of the Council of Ministers on the adoption of an Ordinance on the content, conditions and procedure for keeping, maintaining and using the register of transceiver stations of terrestrial networks, the activities under Article 151, Para 1, p. 16 of the Spatial Planning Act and of the notifications of located short-range wireless access points (adopted by Ministerial Decree No. 357/04.11.2022), prom. SG, no. 89 of 08 November 2022). The adoption of the ordinance and the creation of the register facilitates the regime for maintenance, further equipment and/or improvement of elements of transceiver stations, as well as their replacement or supplement, under certain conditions, eliminating the need for building permits, reducing the administrative burden and ensuring higher regulatory efficiency.

In the past year, a Register of the rights granted for the use of radio spectrum was also created on the basis of registration, which facilitates the regime for granting rights for the use of radio spectrum. This will allow for the application and assignment of radio spectrum to be carried out entirely electronically.

In 2022, CRC adopted a Position on the use of jammers on the territory of the Republic of Bulgaria, which updated the provisions of the LEC.

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

In 2022, the process of adopting draft regulations continued in order to bring them into compliance with the new amendments to the LEC (LASLEC, prom., SG no. 20 of 9 March 2021, effective as of 13 March 2021).

In this regard, following a public consultation and notification to the European Commission (EC), CRC adopted the following regulatory acts:

- Rules for the use of radio spectrum from electronic communications networks from radio broadcasting service (prom. SG, no. 6 of 21.01.2022);

- Rules for the use of radio spectrum from electronic communications networks from a fixed radio service following the issue of an authorisation (prom. SG, no. 9 of 01.02.2022);

- Rules for the use of radio frequency spectrum for radio equipment from amateur radio service (prom. SG, no. 35 of 10.05.2022).

The adoption of those acts has put an end to the bringing into compliance the regulatory framework concerning the use of radio spectrum in accordance with the LASLEC.

After a public consultation, CRC adopted an amendment and supplement to the Rules for free use of radio spectrum (prom. SG, no. 9 of 01.02.2022 and prom. SG, no. 55 of 15.07.2022) and to the Rules for the use of radio spectrum from electronic communications networks from mobile radio service following the issue of an authorisation (prom. SG, no. 20 of 11.03.2022), which transposed into the Bulgarian legislation the provisions of decisions of the Electronic Communications Committee (ECC) for harmonised use of radio spectrum, as well as the provisions of the following EC decisions:

- Commission Implementing Decision (EU) 2021/1067 on the harmonised use of radio spectrum in the 5945-6425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs);
- Commission Implementing Decision (EU) 2021/1730 on the harmonised use of the

paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio;

- Commission Implementing Decision (EU) 2022/172 amending Implementing Decision (EU) 2018/1538 of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands.
- Commission Implementing Decision (EU) 2022/179 on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of wireless access systems including radio local area networks and repealing Decision 2005/513/EC;
- Commission Implementing Decision (EU) 2022/180 amending Implementing Decision 2006/771/EC as regards the update of harmonised technical conditions in the area of radio spectrum use for short-range devices.

The amendment to the Rules on free use of spectrum allocated an additional 480 MHz for indoor use by low-power devices and for indoor and outdoor use by very low-power devices with a significantly wider data bandwidth; the conditions for spectrum use in the 874.4-880.0 MHz and 919.4-925.0 MHz bands for narrowband railway applications (GSM-R) were updated and conditions, in the form of a block edge mask (BEM), for broadband railway applications (RMR - Railway Mobile Radio, next generation rail mobile radio) were introduced; part of the conditions for use of the 874-876 MHz and 915-921 MHz frequency bands were amended; a definition of 'indoor use' was introduced, changing and specifying the conditions for use of the 5150-5250 MHz band by wireless indoor access systems, including in road vehicles, trains and aircraft and for limited outdoor use; the use of the 5170-5250 MHz band for unmanned aerial systems was allowed; a condition was introduced for the use of the 5250-5350 MHz frequency band only in buildings and the conditions for the use of certain frequency bands by radio determination devices were changed.

In the past year, CRC adopted an amendment and supplement to the Rules for the use of radio spectrum by electronic communications networks from radio broadcasting service (prom. SG, no. 88 of 04.11.2022).

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 2022, CRC brought into compliance with the new regulations 435 authorisations for use of scarce resource.

In connection with the activities related to the participation in the preparation of the official position of the Republic of Bulgaria on the agenda items of the World Radiocommunication Conference 2023 (WRC-23), CRC representatives took an active part in the interdepartmental working group. On the basis of an analysis of the studies conducted by the International Telecommunication Union (ITU) and the possibilities of implementing the proposed options to solve the issues to be addressed at WRC-23, proposals and opinions were drawn up on the WRC-23 agenda items, including the preliminary positions of the Conference Preparation Group (CPG23-6) of the European Conference on Postal and Telecommunication Administrations

(CEPT[67]) contained in the so-called BRIEF's and the European Common Proposals (ECPs), taking into account the national specificities of spectrum use as well.

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.

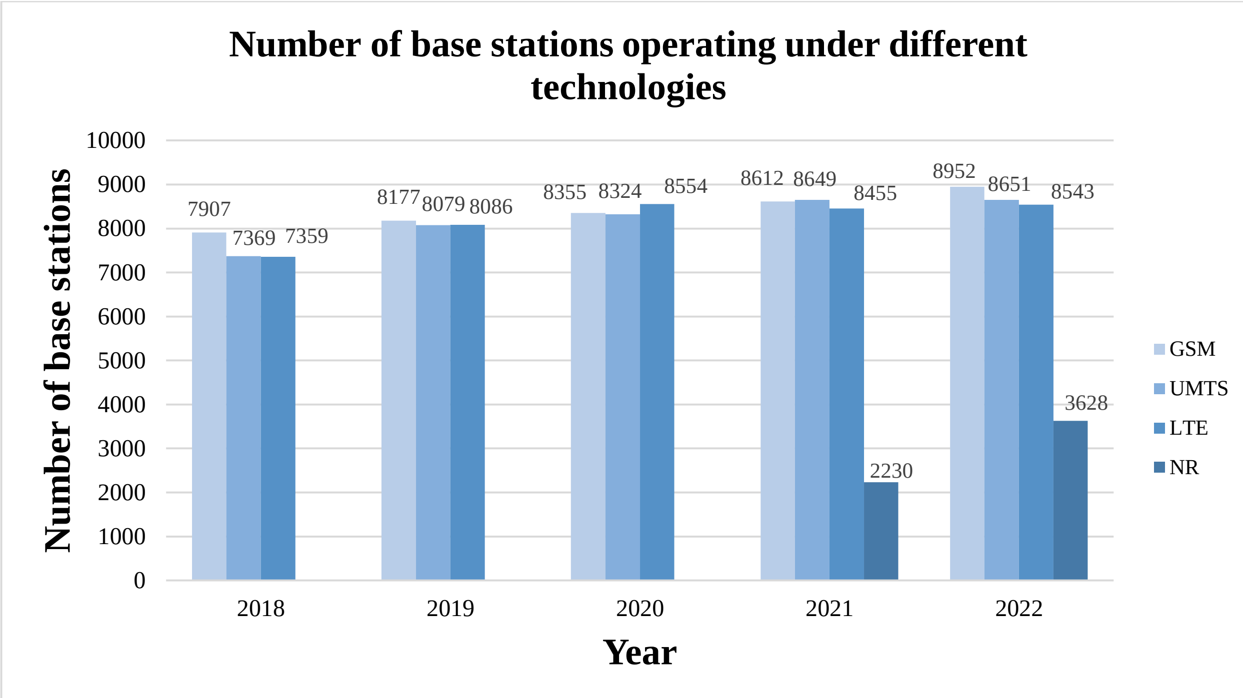
Demand for PMR/PAMR network frequency resource has been relatively constant in recent years. Following an analysis of the radio frequency spectrum provided for use and a national coordination and agreement of radio frequencies and frequency bands with all state authorities, departments and agencies concerned, 133 radio frequency channels (109 simplex and 24 duplex) were provided to undertakings, of which 57 radio frequencies were for the construction of 31 new radio networks for the provision of electronic communications for private needs through an electronic communications network from the mobile radio service.

With the introduction of the 5G mobile technology, we are witnessing a dynamic change in mobile networks that will benefit both consumers and the business and industry. 5G networks will provide infrastructure to connect millions of smart devices that will be able to automatically exchange information with each other. This is expected to lead to market entry of various and customised applications, smart cities, smart homes, autonomous cars, connected industry, etc. A major component in the development of 5G is the use of a large amount of spectrum, respectively wider frequency bands, to maintain higher speeds, greater amounts of traffic and provide better quality services.

As mentioned above, in 2022, CRC provided additional spectrum of 20 MHz to A1, Yettel and Vivacom in the 1800 MHz and 3.6 GHz bands. This provided conditions for efficient use of spectrum and future network development.

As it is clear from the chart presented on Figure 41, all three mobile operators are introducing 5G base stations among other technologies, with the largest increase in the number of 5G base stations operating on NR technology. There is no doubt that the evolution of mobile networks will continue and 5G will play a key role in our lives, providing higher speeds, reliability and connectivity. 5G is set to be the fastest-deployed mobile technology and is expected to reach around 75% coverage[68] of the global population in 2027.

[67] European Conference on Postal and Telecommunications Administrations
[68] Ericsson Mobility Report, November 2021



Source: CRC

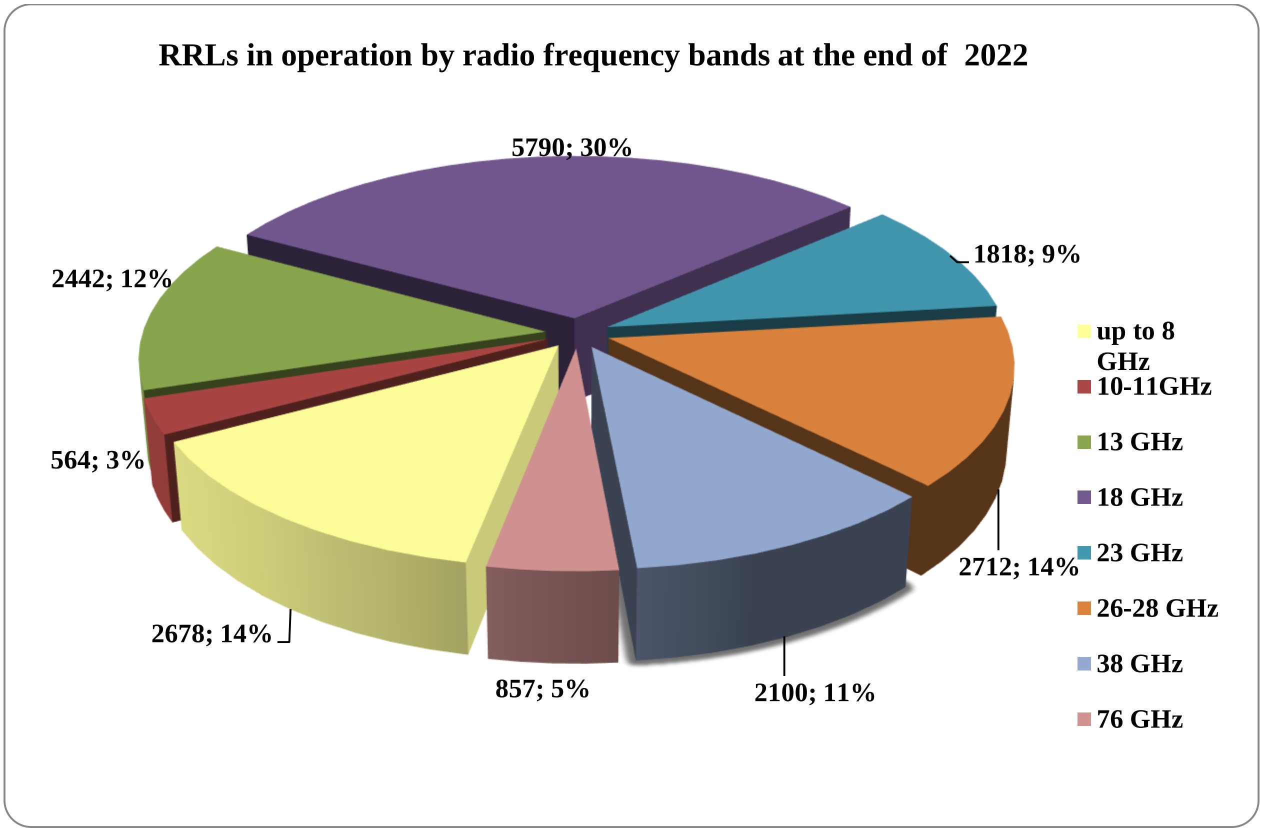
Figure 41

Fixed radio service

In 2022, one authorisation for use of radio spectrum for point-to-point networks was issued and 74 amendments and supplements were made to authorisations concerning the technical data of a total of 3,177 one-way radio relay links (RRLs). They were granted radio spectrum for 1,026 new links, their total number arriving at 19,224 from 18,198 in 2021. The trend of building high-tech digital systems using XPIC/CCDP technology continued, with the number of RRLs using these systems reaching 11,296 in 2022 (vs. 10,460 in 2021). The amendments to the authorisations reflect the increased need of undertakings to use higher transfer capacity, which in turn leads to an increase in the frequency band used in different directions.

A growth in the use of high-frequency bands, compared to the total number of RRLs, was once again registered. In the 18 GHz range, the percentage rose by 1% of the total number of RRLs (34% share of the total number of RRLs at the end of 2022, compared to 33% for 2021). The development of high-density communication networks using the high-frequency bands continued. In 2022, the trend for the increase in the number of RRLs using the paired 71-76 GHz and 81-86 GHz frequency bands for high-capacity RRLs was maintained, with their number reaching 857 at the end of the year, which is an increase of 15% compared to 2021.

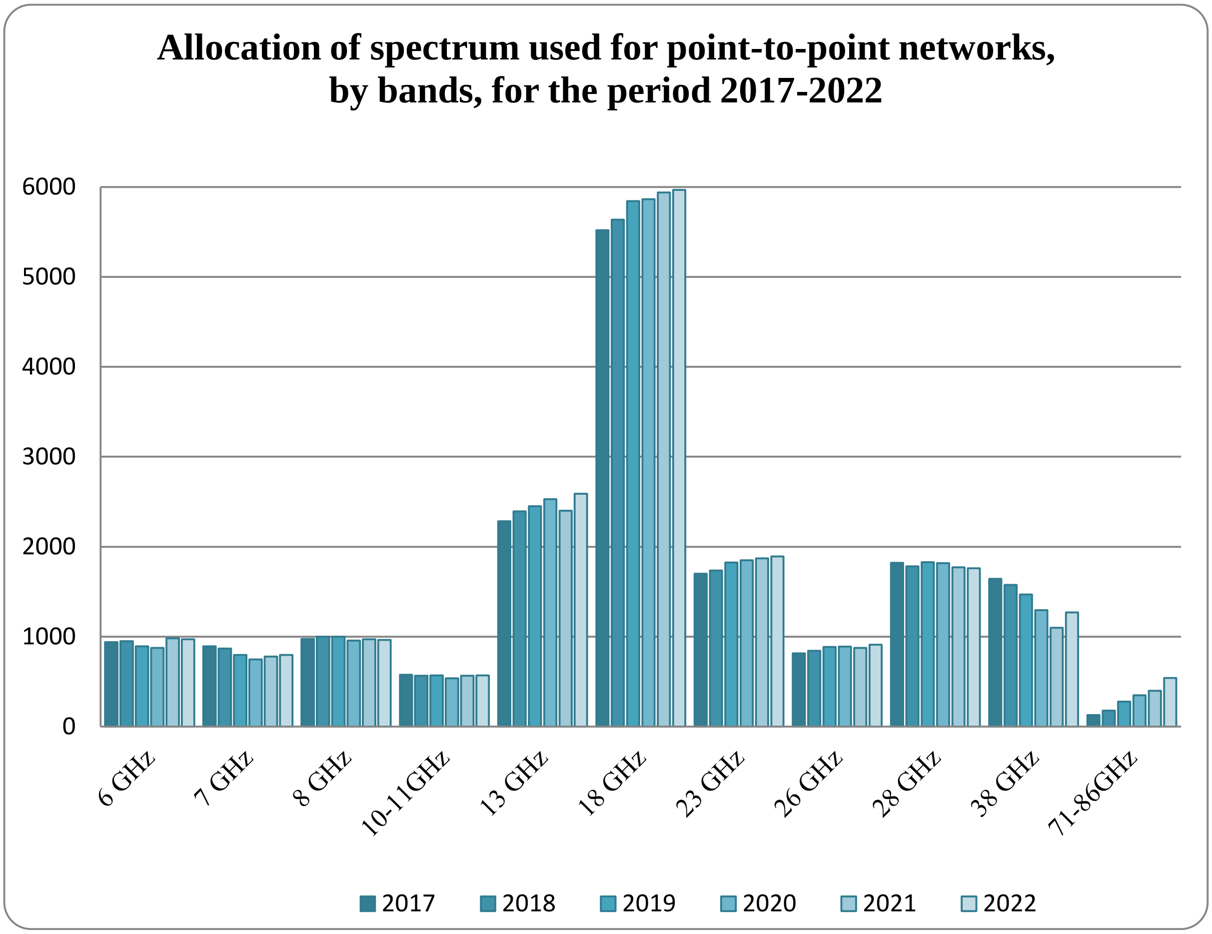
Figure 42 presents information on the share distribution of the active RRLs by radio frequency bands assigned with authorisations for the use of frequency spectrum, for electronic communications network of the point-to-point type, at the end of 2022.



Source: CRC

Figure 42

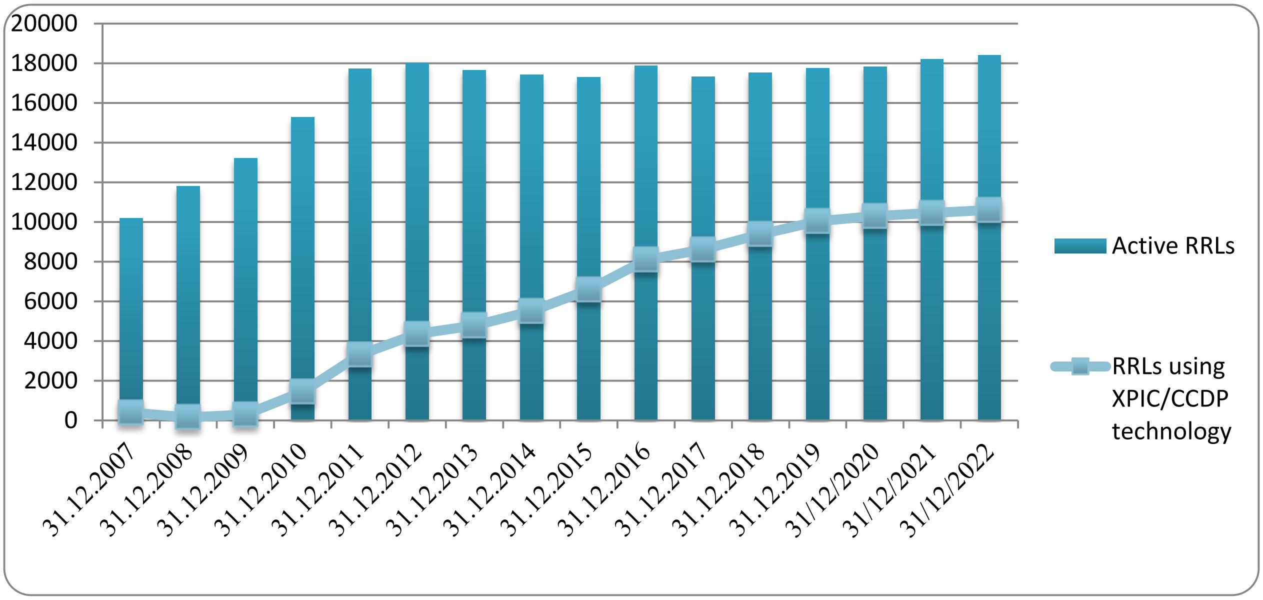
Figure 43 presents the allocation of spectrum used for point-to-point networks, by bands, for the period 2017-2022.



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 and deployment of 5G networks, the challenges for transmission networks and related transmission capacities are increasing. Therefore, in 2022, the number of RRLs using new technical solutions for higher transmission speeds has increased:

- band channel aggregation (BCA) or super dual band (SDB) – using two radio frequency bands in one direction;
- channel aggregation (CA) – using two adjacent channels in one direction.

The trend observed in 2021 for the migration of the RRLs with a bandwidth of 3.5 MHz and 7 MHz to bands of 14 MHz, 28 MHz, 56 MHz and wider continued in 2022. The number of RRLs with a bandwidth of 3.5 MHz and 7 MHz at the end of 2022 decreased to 988 (to compare with, at the end of 2021, their number was 1,519, of which only 10 one-way RRLs with a bandwidth of 3.5 MHz).

In connection with the new regime introduced by LASLEC in 2021 for the granting of rights to use radio spectrum - registration regime, which is more facilitated than the authorisation regime (issuing of an authorisation), in the past year, a temporary register for the provided rights of use of radio spectrum was established on the basis of registration regime.

Satellite radio services

In 2022, 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. One request for coordination of a new Bulgarian satellite system and 9 requests for modifications of satellite systems on non-geostationary orbit, as well as 5 requests for notifications of geostationary data systems of Bulgarian satellite operators Bulgaria Sat and Balkansat were submitted.

In 2022 frequency resource was provided for the operation of 5 earth stations connecting to 23 satellite systems on non-geostationary orbit, including Starlink, OneWeb and one terrestrial station connected to a satellite system on geostationary orbit.

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 2022, 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.

In the second quarter of 2022, the procedure under Article 32 of the Statute of the Council of Ministers and its administration was completed, concerning a draft decision approving the "Agreement between CRC and the Information and Communication Technology Authority of the Republic of Turkey on the reciprocal inclusion of their territories in the areas of service of their satellite networks in the planned frequency bands regulated under Appendix 30B of the ITU Radio Regulations". The Agreement was approved at a meeting of the Council of Ministers by Decision No 343 of 30.05.2022.

Broadcasting

In 2022, in connection with a request of the Council for Electronic Media (CEM) for provision of a free frequency resource for the city of Ruse and city of Plovdiv, concerning open procedures to hold a competition, technical analysis and frequency planning were performed for the assignment of frequency resources and the relevant technical parameters (admissible powers, points of broadcasting as well as other technical information). In compliance with the provisions of the LEC, CEM was provided with information on the lack of free frequency resource needed for terrestrial analogue broadcasting for the territory of the city Ruse and city of Plovdiv.

At the request of undertakings, replanning for 27 frequency assignments was carried out.

In 2022, a total of 63 technical characteristics of electronic communications networks for terrestrial analogue broadcasting of radio signals in the VHF band (frequency band 87.5-108.0 MHz) were examined and analysed, of which 8 were of undertakings authorised to use individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications through electronic communications network for terrestrial analogue broadcasting with national coverage, and 55 were of undertakings authorised to use individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications through electronic communications network for terrestrial analogue broadcasting with local coverage.

A temporary authorisation for short-term events (drive-in cinema sounding in three settlements) was issued for use of radio frequency spectrum from the VHF band.

In order to make texts precise as well as in relation to the current legal framework and to introduce terminology for the type authorisation for terrestrial broadcasting, following a public consultation, by Decision No 349 of 20.10.2022, CRC adopted an amendment and supplement to the Rules for the use of radio spectrum by electronic communications networks from the radio broadcasting service (prom. SG, no. 88 of 4 November 2022).

National and international coordination

In 2022, in the Advisory Council for National Coordination and Agreement to CRC, 2,339 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 4 radio frequency assignments of Bulgarian VHF radio stations under the Regional Agreement on the use of the 87.5-108.0 MHz frequency range for VHF (FM) sound broadcasting, Geneva, 1984 (Geneva, 1984).

As a result of the processed and analysed publications in the biweekly BRIFIC circulars for terrestrial radio services, over the past year, 261 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), 8 radio frequency zones and assignments to foreign administrations were analysed and coordinated to amend the GE06D digital plan with the relevant technical parameters.

In order to launch an international procedure for coordination of channels from 5 to 10 to be used for digital sound broadcasting according to the T-DAB standard, 122 technical characteristics of radio frequency assignments in the 174.0-230.0 MHz band were analysed.

In accordance with the procedures under Art. 12 of the Radio Regulations of the International Telecommunication Union, 280 (164 in season A and 116 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 97 written objections and 123 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 – 7 objections for 8 satellite systems;

- 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 – 3 objections for 4 satellite systems;

- comments under Art. 9.3 of the Radio Regulations on planned satellite systems on non-geostationary orbits - 64 comments;

- coordination of a non-planned satellite station potentially affecting another non-planned satellite station, pursuant to Article 9.7 of the Radio Regulations - 21 objections;

- coordination in exceeding the carrier-to-noise (C/N) ratio for satellite systems from the fixed-satellite radio service in frequency bands 4500-4800 MHz, 6725-7025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz, pursuant to Appendix 30B to the Radio Regulations – 2 objections for 2 satellite systems.

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;

- coordination of non-planned satellite station, potentially affecting another non-planned satellite station, pursuant to Art. 9.7 of the Radio Regulations – objections were made for 21 satellite systems, as written notices were sent to the relevant administrations;

- comments under Art. 9.3 of the Radio Regulations on planned satellite systems on non-geostationary orbits - for 66 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 18 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 17 satellite systems;

Electromagnetic compatibility

During the year, electromagnetic compatibility analyses of 87 Bulgarian and 230 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, 16 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

In 2022, Ordinance No 1 of 2010 on the rules for use, allocation and procedures of primary and secondary assignment for use, reservation and withdrawal of numbering resources was amended and supplemented; the amendment regulates the possibility of issuing authorisations for the use of numbering resources to undertakings providing electronic communications through electronic communications networks for their own needs, where their network is required to be connected to a public electronic communications network, as well as the provision of groups of numbers in case of dropping out of a provider from the domain of non-geographic numbers through which services are provided on a mobile network.

In order to ensure effective management of numbering resources, at the end of 2022, a public consultation procedure was opened for a draft of Regulatory policy for the use of numbering resources for the provision of electronic communications.

At the end of 2022, the total number of undertakings authorised to use numbering resources was 23.

During the year, one authorisation for the use of numbering resources was issued to Betatel OOD. At the request of DUALITY COMMUNICATIONS OOD, the issued authorisation was terminated. The authorisation for the use of numbering resources to TI.COM AD was withdrawn.

In 2022, 7,100 geographic numbers were provided for use. The total number of geographic numbers provided at the end of the year was 8,800,600. Due to optimisation of networks and services of the undertakings or termination of their activities in 2022, the following numbering resources were released:

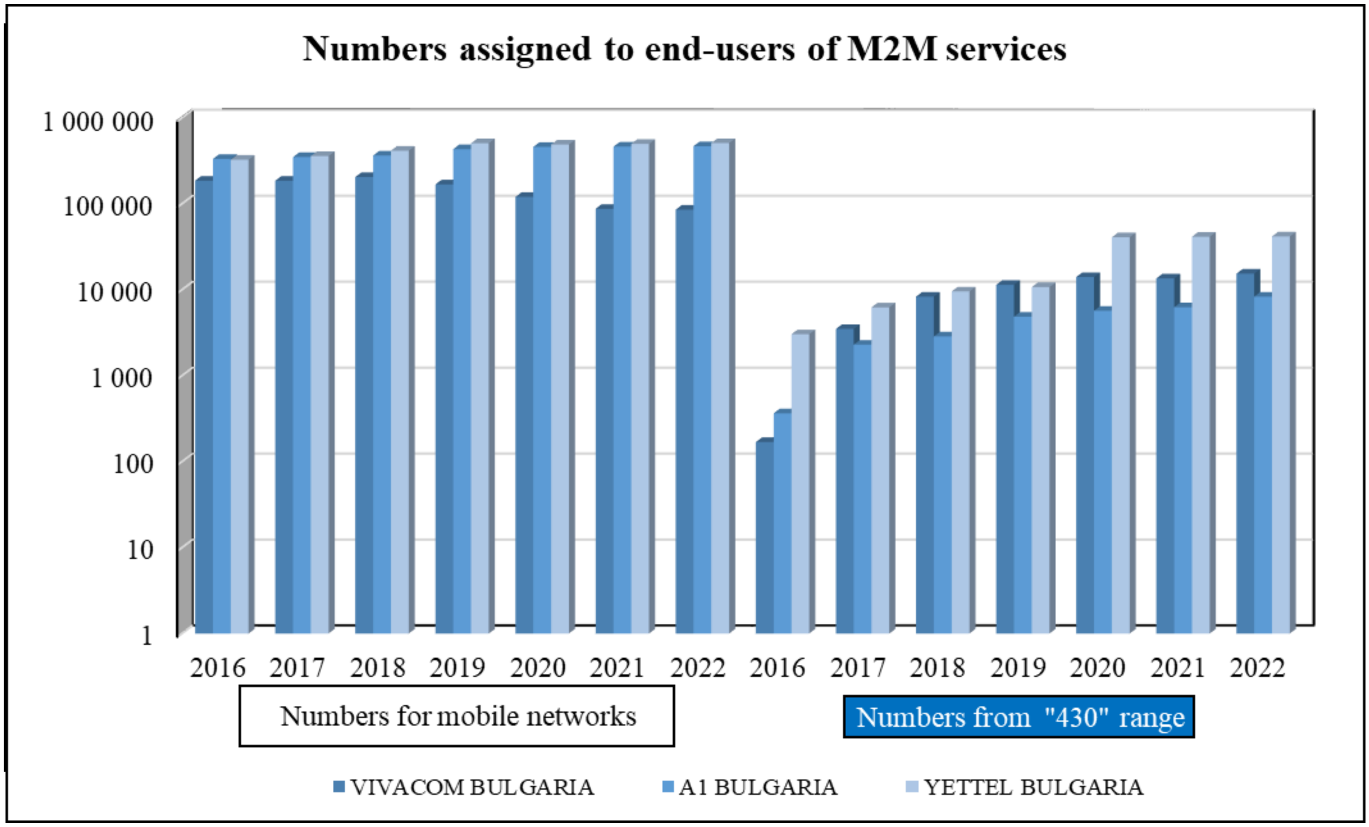
- *42,700 geographic numbers;*
- *1,767,000 numbers for mobile networks;*
- *6 national signaling point codes;*
- *3 international signaling point codes;*
- *2 mobile network codes (MNC);*
- *100 numbers from the "700" range.*

In order to ensure the process of servicing the ported numbers and to protect the right of end-users to continue using their ported numbers, 233,000 numbers from the scope of access to mobile networks were transferred between undertakings.

The 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 2022, an increase was reported in the number within the “430” range provided to end-users. The trend of using higher number from the mobile network access ranges in the provision of M2M services continued. Vivacom reported an increase in the numbers provided to end-users from the “430” range and a decrease in the numbers from the range for access to mobile networks.



Source: CRC

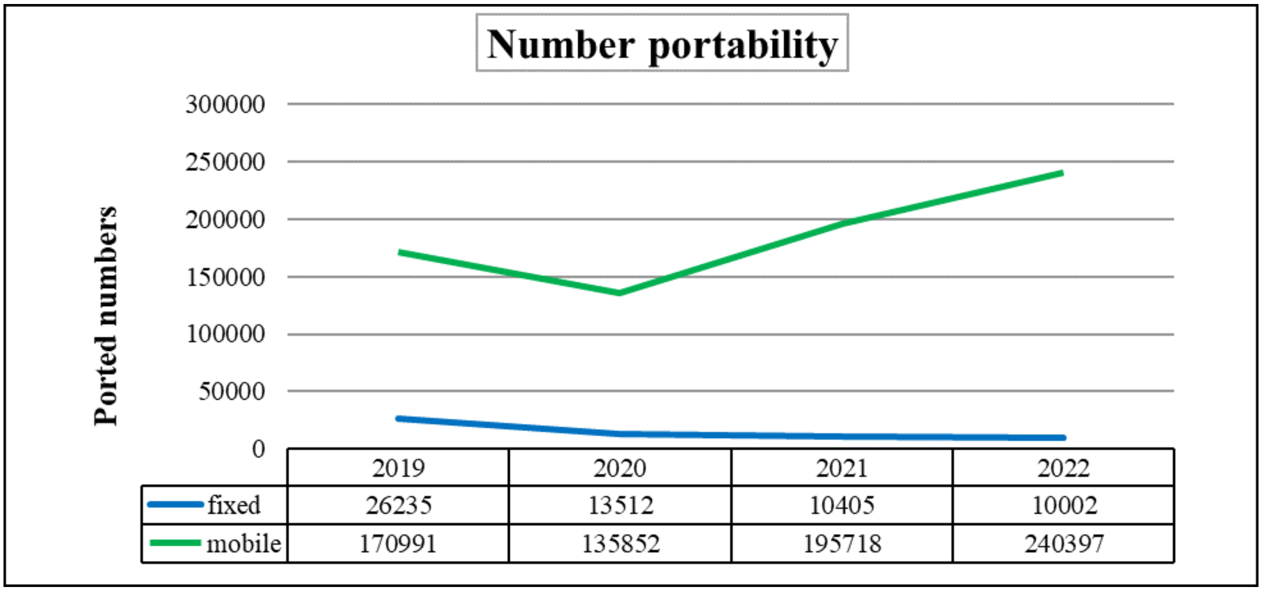
Figure 45

Number portability

In 2022, an increase was observed, compared to 2021, 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 2022 compared to 2021.

In connection with the refusal of Bulsatcom OOD to use a block of 1 million nationally significant numbers after a code for access to mobile network “996” and the dropping of the undertaking from the domain for mobile number portability, the size of the groups which are made available to domain participants in case of dropping out of a provider was determined and activities were carried out in order to provide them to other undertakings.

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 four years are presented in the following figure:



Source: CRC

Figure 46

1.2. Regulation and monitoring of the electronic communications markets

Regulation of the electronic communications markets

In 2022, CRC completed the review on the conduct of a third round of analysis and assessment of the wholesale market of dedicated capacity (Market 2 of European Commission Recommendation 2020/2245/EU on relevant markets of products and services in the electronic communications sector subject to ex ante regulation), having held a public consultation, and adopted a final Decision No 222 of 30.06.2022, according to which the wholesale market of dedicated capacity is not subject to ex ante regulation, as the three criteria for determining the relevant market subject to ex ante regulation are not met cumulatively.

CRC took action in connection with the conduct of a fifth round of analysis of the relevant wholesale markets for call termination at a fixed location on individual public telephone networks and for voice call termination on individual mobile networks (Markets 1 and 2 of Recommendation 2014/710/EU on relevant product and service markets in the electronic communications sector). By Decision No 281 and Decision No 282 of 11.08.2022, public consultation procedures were opened for draft decisions on definition, analysis and assessment of the wholesale market for voice call termination on individual mobile networks and call termination at a fixed location on individual public telephone networks. CRC adopted the results of the public consultations and, pursuant to Decision No 398 and Decision No 399 of 24.11.2022, the relevant wholesale markets for call termination at a fixed location on individual public telephone networks and for voice call termination on individual mobile networks are not subject to ex ante regulation, as the three criteria for determining a relevant market subject to ex ante regulation are not met cumulatively.

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 427/14.12.2022, CRC approved the models of forms and instructions concerning the reports of the undertakings for their activity on the provision of public electronic communications in 2022. The collection of information through the CRC's on-line questionnaire system, which was actually launched in 2020, continued with regard to the activity reports of undertakings for 2022.

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

In 2022, the Plan for Development of the National Radio Frequency Spectrum Monitoring System for Civil Needs (NRFSMS) for the period 2021÷2025 was updated with the newly developed strategic objectives for development of the radio monitoring system, as well as the main aspects of its expansion and modernisation. The roadmap for the period 2023÷2025 was also updated to implement the Plan with the main types of technical devices and systems necessary to achieve the objectives and the respective stages of their provision.

Continued was the started modernisation of mobile radio monitoring stations with the provision of three new modern mobile radio monitoring and measurement stations with advanced monitoring capabilities in the frequency range up to 26.5 GHz and specialised measurements of terrestrial networks for the ensured coverage and quality of the provided mobile services.

Six fixed radio monitoring stations of the compact type systems were also commissioned thus expanding the capabilities for radio monitoring on the territory of the city of Sofia, city of Plovdiv and the city Burgas in the frequency band up to 6 GHz.

Activities were regularly carried out regarding the technical and technological support of the activities relating to the control and monitoring of electronic communications networks using RFS, relating to the maintenance of the specialised technological equipment: fixed, mobile and transportable radio monitoring stations, portable measurement equipment, including calibration, where applicable.

At the end of 2022, for the implementation of its control functions, CRC had at its disposal the following main measurement systems:

- 21 (twenty-one) fixed stations for RFS monitoring (1 manned and 20 unmanned RMS), of which: 15 (fifteen) in the bands from 20 to 3000 MHz and 6 (six) in the band from 20 to 6000 MHz;
- 10 (ten) mobile stations for radio monitoring, detection and localisation of radio interference and specialised measurements of ensured coverage and quality of the mobile services provided by the terrestrial networks;
- 2 (two) portable systems for measurement of the coverage and quality of services provided by the terrestrial 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 1.0 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 non-interference use of radio spectrum by lawful users, preventing the illegal use of spectrum and controlling the quality of services provided to end-users.

2. Continuing the construction of new fixed radio monitoring stations of the "compact radio monitoring systems" type in order to ensure greater territorial coverage of the country and effective regular monitoring by the Commission in a broader frequency range.

3. Providing systems to measure the coverage and quality of mobile networks in connection with the use of new frequency ranges and development of 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 television 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 financial resources that were provided in 2022 allowed for successful implementation during the first two years of the five-year NRFSMS development plan with regard to the expansion of the territorial and frequency range of radio spectrum monitoring in order to increase the efficiency of the control carried out by the Commission.

1.4. International activity of CRC in 2022

In 2022, CRC took an active part in the activities of specialised organisations in the field of electronic communications and postal services at global, European and regional level, maintaining its effective and fruitful international cooperation. This, in turn, 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

In 2022, CRC continued its active cooperation 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 2022, the Commission participated actively at the management and expert level in the work of the Independent Regulators Group (IRG[69]) and the Body of European Regulators for Electronic Communications (BEREC), contributing to the development of common regulatory practices. During the year, four IRG General Assemblies and BEREC Plenary meetings were held,

[69] Independent Regulators Group

as well as meetings of the Contact Network, and a number of documents were discussed and adopted in implementation of the BEREC Work Programme for 2022, which are directly reflected in the CRC's work, more important of which are:

- BEREC report on the regulatory treatment for fixed and mobile backhaul;
- BEREC report on the consistent approach to migration and copper switch-off;
- BEREC report on the Internet Ecosystem;
- BEREC report on satellite connectivity for universal service;
- BEREC report on best practices for ensuring equivalence of access and choice for disabled end-users;
- Updated BEREC guidelines on retail roaming in relation to Regulation (EU) 2022/612 and Implementing Regulation (EU) 2016/2286;
- Updated BEREC guidelines on wholesale roaming pursuant to Article 3 of Regulation (EU) 2022/612;
- Updated BEREC Net Neutrality Regulatory Assessment Methodology;
- Updated BEREC guidelines on the implementation of Regulation (EU) 2015/2120 (the Open Internet Regulation);
- BEREC report on the implementation of the Open Internet Regulation;
- Communication from BEREC in support of the European Internet Service Providers in the application of restrictive measures in fulfilment of Council Regulation (EU) 2022/350 of 1 March 2022;
- BEREC opinion on a draft Delegated Regulation for emergency communications;
- BEREC opinion on the harmonised pan-European helpline (116 016) for victims of violence against women.

In addition to the above-mentioned meetings, CRC representatives participated in a High level workshop of the Belgian national regulatory authority (BIPT[70]), during which practices in Spain, the Netherlands, Denmark, Ireland and Belgium were presented with respect to the latest round of analyses of wholesale broadband markets (wholesale market of local access provided at a fixed location - Market 1 of Recommendation 2020).

The Commission took part in the BEREC Stakeholder Forum. The Forum addressed issues related to the BEREC Work Programme 2023, the European Commission's policy agenda for Europe's digital decade, trends and challenges related to the development of artificial intelligence, the regulation of digital platforms and the impact of electronic communications on the environment.

During the reporting period, the Commission was also actively involved in the work of the European Regulators Group for Postal Services (ERGP). The participation of CRC in the two Plenary meetings and the meetings of the Contact Network of the Group enabled CRC to form positions on the need to change the regulatory framework in the postal sector. The most important

[70] Belgian Institute for Postal Services and Telecommunications

documents that were adopted last year by the ERGP are as follows:

- ERGP Medium Term Strategy 2023-2025 and ERGP Work Programme 2023 with identified main areas of work for the period, given the development of the postal sector and the changed needs of consumers arising from the electronic substitutability of services and e-commerce;
- ERGP analysis on the application of Article 6 of Regulation (EU) 2018/644;
- ERGP report on quality of service, consumer protection and consumer service;
- ERGP report on core indicators of postal services;
- Report on a follow-up report on the impact of on-line platforms in the postal sector;
- Report on environmental sustainability in the postal sector;
- Report on access to the postal network in the context of booming e-commerce.

Immediately before the two plenary meetings, ERGP workshops were held on the topic: "Sustainability, Strategies and Regulation" and "Future of the Universal Postal Service". Within the two events, postal operators and experts from the postal industry and academic world presented their experience and recommendations for further promoting the environmental sustainability in the postal sector and reviewed the universal postal service in the context of the significant drop in the volume of traditional postal items and the parcel boom caused by e-commerce and new consumer attitudes.

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 EECC.

Participation in the activity of specialised international organisations

In 2022, 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 Regulators of Member States of the International Organisation of the Francophonie in the field of electronic communications (FRATEL[71]), etc.

Representatives of the Commission took part as part of the Bulgarian delegation, together with representatives of the MTC, in the following more significant events organised by the ITU:

- The Global Standards Symposium (GSS) and the World Telecommunication Standardization Assembly (WTSA);
- World Telecommunication Development Conference (WTDC) and
- Plenipotentiary Conference (PP).

At the Global Standards Symposium, international standards were discussed allowing for the implementation of digital transformation to achieve the Sustainable Development Goals (SDGs). The main discussions during this event covered a wide range of topics, including smart cities and communities, digital farming, digital inclusion, artificial intelligence for road safety,

[71] Réseau francophone de la régulation des télécommunications

autonomous driving, financial inclusion (scope of financial services), sustainability, accessibility and healthcare in the context of technology-oriented standardisation.

During the World Telecommunication Standardization Assembly (WTSA-20), the work methods, the work programme and the structure of the ITU-T study groups were examined.

The main theme of the World Telecommunication Development Conference (WTDC) was "Connecting the unconnected to achieve sustainable development". The conference was attended by heads of state, ministers and leading industry participants who joined forces to use digital technologies to stimulate global socio-economic development. The conference set out the strategies and objectives for the development of telecommunications/ICT and provided guidance to the ITU Telecommunication Development Sector (ITU-D). A globally agreed Declaration on connecting the unconnected to achieve sustainable development and an ITU-D Action Plan were prepared to achieve the objectives identified to overcome the digital divide in its various aspects.

The ITU Plenipotentiary Conference (PP-22) examined the common policy to achieve the Union's objectives. The Financial and Strategic Plan for the next 4-year period was discussed and approved and the senior management of the Union, the Member States of the ITU Council and members of the Radio Regulations Board was elected. Decisions on the proposals of the member states and of the regional organisations of the ITU were considered and adopted on the resolutions and recommendations to them. Bulgaria was elected as a member of the ITU Council from region C – Eastern Europe and Northern Asia, along with Romania, Azerbaijan, Poland and the Czech Republic. Membership in the Council will enable Bulgaria to actively participate in the decision-making process for the development of the telecommunications sector worldwide and to establish our position as a leading country in the field of technology.

The Commission was also represented at the 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. The 2022 Ministerial Programme included the topics of industry state, spectrum strategy for 4G, 5G, digital inclusion, digital transformation, digital policies to accelerate the post-COVID-19 recovery, climate action and data economy strategies, technology boundary shifts. Within the framework of the Ministerial Programme, a Round table was held, organised between BEREC and GSMA, at which a policy dialogue was traditionally held by members of BEREC and high-level representatives of European telecommunications operators. Within three sessions, issues related to the challenges and opportunities faced by the industry and policy-makers in response to the rapidly evolving Internet value chain, opportunities for cooperation to achieve climate goals, as well as the challenges and opportunities on the way to meeting the goals of the digital decade were discussed.

CRC took part in the 79th and 80th ETSI General Assembly (GA) which were conducted electronically and dealt with key issues related to the European standardisation strategy, issues related to EU, EFTA and CEN/CENELEC, legal and intellectual rights issues. European Commission's proposals to amend Regulation (EU) 1025/2012, as well as proposals to change the Technical Working Procedures, and an amendment to the approval procedures, were considered. A Board report on the ETSI 2023 Strategy was presented, aimed at expanding the areas of standardisation, namely the creation of the SDG separately from the technical bodies; creation of an ISG THz (TeraHertz) group, creation of an Open Source Project TeraFlow SDN to develop an open source for a cloud SDN controller for IP and high-capacity optical networks.

The Commission was also virtually represented at the 20th Annual Meeting of the NRA network of Member States of the International Organisation of the Francophonie in the field of electronic communications (FRATEL), which discussed the issue of network sustainability and security. During the debate on the topic, the measures and technologies that have allowed at events such as the COVID-19 pandemic to reduce the risks of network congestion and improve their resilience, especially with regard to climate issues and emergency response measures, were discussed. The tools to ensure the integrity and security of networks and services were also considered. During the annual meeting, the new Coordination Committee for 2023 was elected, and the Activity Report for 2022 as well as the 2023 FRATEL Activity Plan were adopted.

In 2022, CRC representatives actively participated in the activities of the Committee for ITU Policy (COM-ITU) to CEPT. The Committee's work was fully focused on the preparation of three of ITU's most significant events - WTSA, WTDC and PP. The Commission's expert participation in the preparatory process for these events contributed to strengthening the role and active position of CRC in the process of drafting documents and decision-making within the Union as well as to the election of the Republic of Bulgaria as a member of the ITU Council for the next four years.

In the past year, the Electronic Communications Committee (ECC) held three meetings, one of which was attended by a representative of CRC. The other two sessions were followed based on documents. As a result, decisions on the use of radio spectrum were adopted. Harmonised technical conditions for the use of the 40.5-43.5 GHz frequency band for mobile/fixed communication networks (MFCN) were defined, and a recommendation providing guidelines on the deployment of those networks was adopted, ensuring the use of earth receiving stations in the 40.5-42.5 GHz band and earth transmission stations in the 42.5-43.5 GHz band and the possibility of future deployment of these earth stations. A decision was adopted setting out conditions for the use of technologically neutral ranges for user terminals located on unmanned aircraft. During the meetings, the conditions for use of radio spectrum from earth stations connected to non-geostationary and geostationary satellite systems operating under the control of satellite operators were discussed and alleviated, as a result of which the relevant decisions on their operation were amended. The technical conditions for use of radio spectrum from: short-range radio equipment (intelligent transport systems; devices using ultra-broadband technologies, wireless access systems, including local radio networks, model management devices, etc.); railway applications; mobile communication on board aircraft and vessels, were updated. The conditions for operation of satellite and terrestrial networks in certain frequency bands were changed. Recommendations for cross-border coordination were also updated.

In connection with the activities related to the participation in the preparation of the official position of the Republic of Bulgaria for WRC-23, a representative of CRC took part in the 5th and 6th meeting of the Conference Preparatory Group (CPG) to CEPT. In 2022, a European Common Proposal (CPR), draft preliminary positions of CEPT (so-called BRIEF's) and ECP on the items of the WRC-23 agenda were finally adopted. In 2023, work will continue on their final adoption.

Radio spectrum experts participated in two of the three regular meetings of the Working Group on Frequency Management (WG FM), with the third meeting being followed based on documents. The Working Group approved draft reports, recommendations and new decisions important for the future regulatory approaches. The Recommendation setting out the position of CEPT on the overall spectrum for the operation of the most commonly used short-range devices, such as non-specific short-range devices, alarm systems, inductive devices, radio model control devices, wireless audio PMSE equipment, etc., was amended. The results of the observed spectrum interference in 2021 were analysed and an evaluation of the statistics was published. A report on the use of the 5725-5850 MHz frequency band by WAS/RLAN devices with a maximum power exceeding 25 mW and up to 200 mW e.i.r.p. in the CEPT countries was adopted.

In the past year, the ECC Working Group Numbers and Networks (WG NaN) held its 24th and 25th plenary sessions. Commission experts took part in the meetings. Recommendations and reports of the ECC in the field of regulation in the use of numbering resources, number portability, emergency calls and the application of best European practices in these areas were finally adopted or adopted for public discussion.

Bilateral cooperation

In 2022, CRC also continued the practice of developing and deepening the bilateral cooperation. During the year, meetings were held with representatives of the Agency for Electronic Communications of the Republic of North Macedonia, during which the possibilities for reducing the tariffs for international roaming between the Republic of Bulgaria and the Republic of North Macedonia were discussed.

The Commission was represented at a management level at the Annual International Regulatory Conference organised by the Agency for Electronic Communications (AEC) of the Republic of North Macedonia. The theme of the conference was "Challenges to the Gigabit Society". Within two days, representatives of regulatory authorities, academic community, operators and business representatives discussed issues related to the latest technological developments in the ICT sector, as well as the roadmap for reducing the prices of roaming services in the Western Balkans in the interest of end-users, the perspective of regulators and operators on the deployment of new technologies, the frequency policy for fast mobile broadband access, the instruments for efficient regulation, etc.

CRC representatives also took part in the 19th International Regulatory Conference organised by the Agency for Electronic Communications and Postal Services of Montenegro (EKIP). During the conference, CRC representatives, together with representatives of European and regional regulatory agencies, ministries, operators and experts of international organisations and institutes held discussions on topics related to the development of broadband access and infrastructure, safety and security of EU networks and services, promoting end-users' protection, international roaming and termination. Experience was also shared in the deployment of 5G networks, digital radio and increasing the availability of networks and services. A special place was also given to issues related to the harmonisation of the European Electronic Communications Code and the role of national regulatory authorities in the digital transformation era.

In order to achieve its strategic objectives on a national and international scale, in 2022, CRC took an active part in various international events at management and expert level. The Commission will continue to develop its international cooperation on the basis of multilateral dialogue and bilateral partnership with other national regulatory authorities (NRAs).

1.5. Information Technology for 2022

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;
- Expanding the technological opportunities for the implementation of interoperable open standards and innovations in the development of the used and the deployment of new information systems;
- Creating an organisational, communication and information environment for efficient and at the same time transparent functioning of the CRC administration.

In 2022, CRC performed the following projects related to e-governance:

- Developed new information system with subject: “Register for the application and assignment of rights for use of radio spectrum on the basis of registration”.
- Developed new information system with subject: "Register of the transceiver stations of terrestrial networks capable of providing electronic communications services, the activities carried out under Article 151, Para 1, p. 16 of the Spatial Planning Act, as well as of small-range wireless access points”.

In 2022, CRC fulfilled the following projects related to improving the information and communication environment:

- Ensuring post-warranty support of the information system “Licensing and Registers” 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).
- Delivered and configured disaster recovery center 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 Oracle licensed software;
- Deliveries of automated tape library and servers;
- Migration of the active directory from Windows Server 2012 to Windows Server 2019;
- Providing licenses for the protection of end-devices by using SentinelOne;
- Deployment of a multi-factor authentication system for employees in CRC and for external contractors when making a VPN access to their supported systems;
- Improvement of the technical and communication procurement and related services:
    - ➢ Support of VPN connectivity between the Commission's offices throughout the country;
    - ➢ Performing a completely new configuration of network equipment in CRC and deployment of DHCP;
    - ➢ Provision of post-warranty service of existing communication equipment;

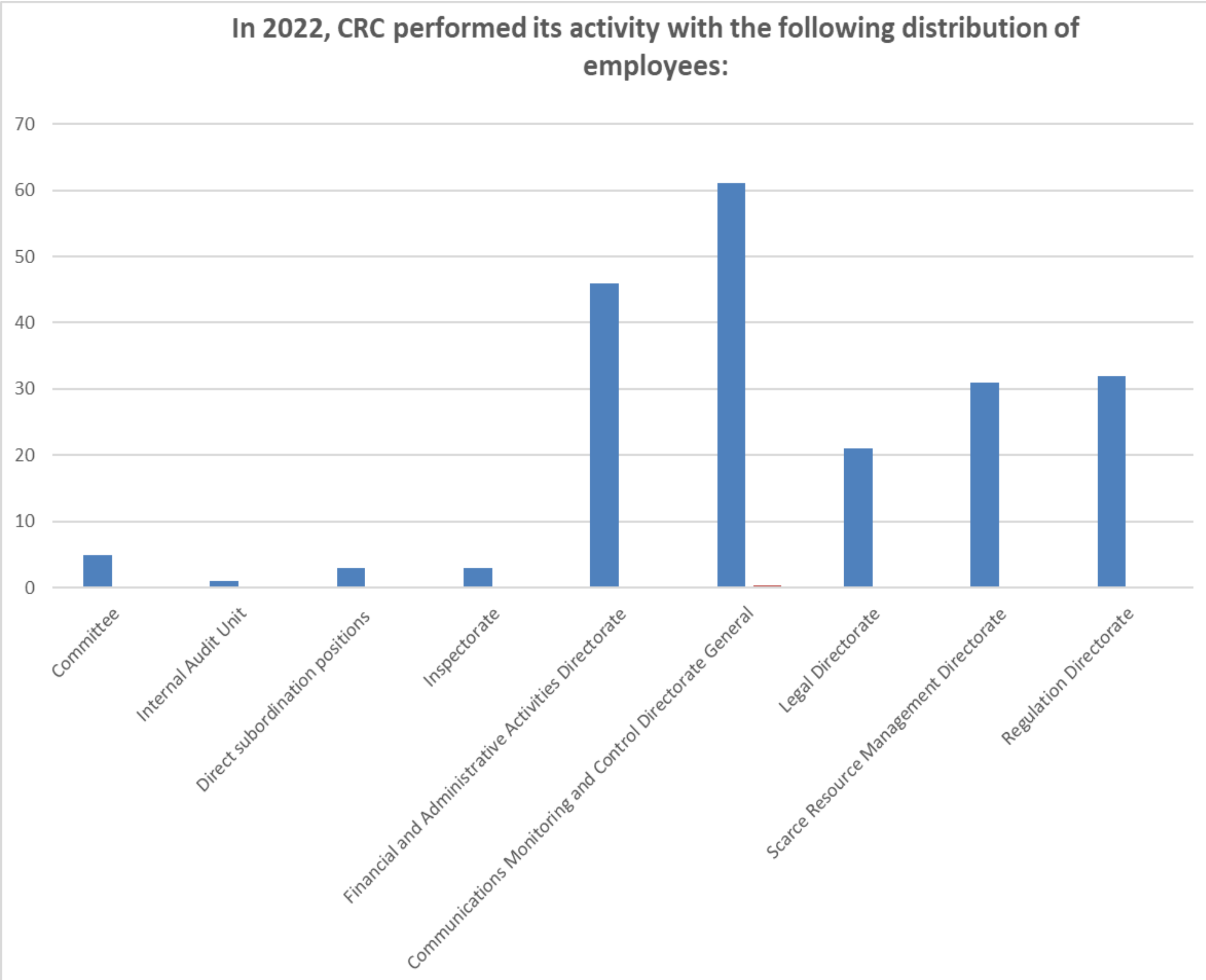
- ➢ Procedures carried out for the purchase of an automated tape library and servers serving the regulator's activity;

1.6. CRC's administrative capacity

One of the main goals of human resource management at the Communications Regulation Commission is to attract, retain and develop employees with high professional qualification and potential, motivated and responsible in their work to achieve the goals and tasks set by CRC.

In 2022, 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	61
• Legal Directorate	21
• Scarce Resource Management Directorate	31
• Regulation Directorate	32

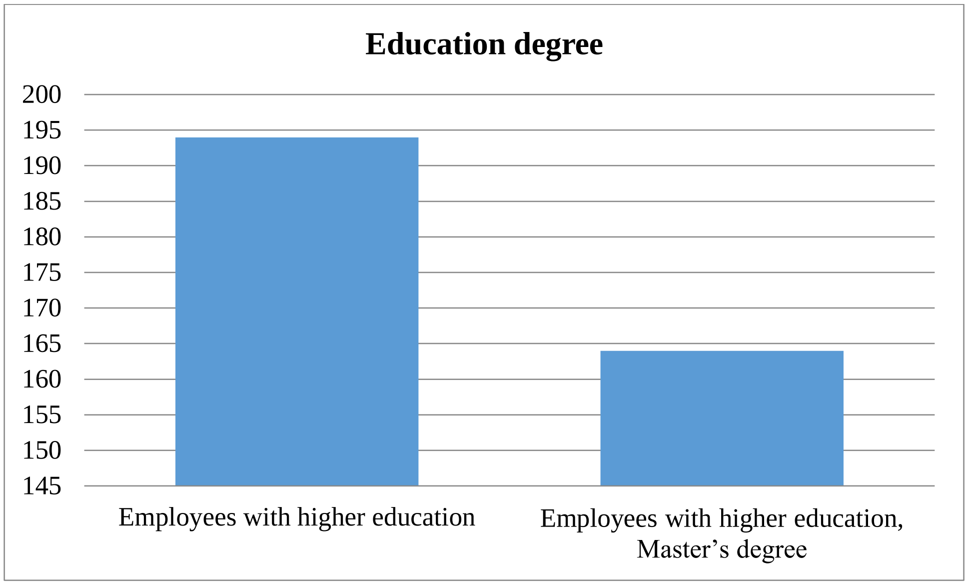


Source: CRC

Figure 47

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

Of the total number of CRC employees, 194 had higher education, as 164 of them had an educational and qualification degree "Master".



Source: CRC

Figure 48

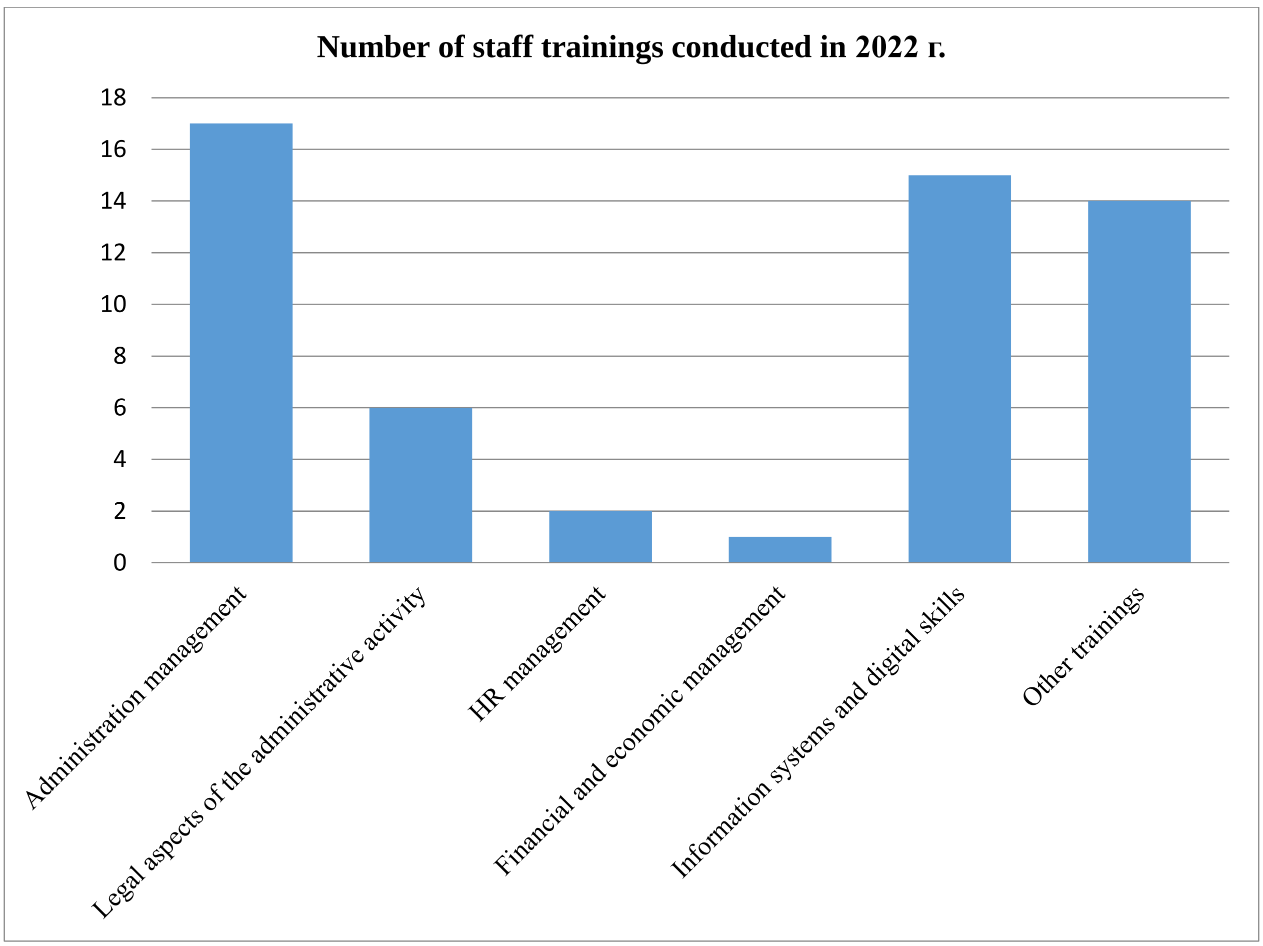
The employees at the CRC administration had education in the following areas – technical sciences; legal sciences; economic sciences; humanitarian sciences and others. The highest share was held by the technical, followed by the economic sciences, which is in line with the specifics of the Commission's 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 2022, a total of 24 (twenty-four) competitions were organised and conducted, resulting in 16 (sixteen) 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 2 (two). Terminated legal relationships on different legal grounds for the same period – 15 (fifteen).

In 2022, in order to improve the administrative capacity of the employees of the CRC administration and to maintain up-to-date and new knowledge, participation in specialised trainings and seminars were organised, by areas and number, as follows:

Area of training	**Number of trainings conducted**	**Number of trained employees**
Administration management	17	69
Legal aspects of the administrative activity	6	14
Human resource management	2	3
Financial and economic management	1	1
Information systems and digital skills	15	251
Specialised training	16	206



Source: CRC

Figure 49

In order to increase the effectiveness and efficiency of trainings, the needs for participation in new trainings are 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 of CRC.

To receive feedback from the employees of the CRC administration who attended trainings in 2022, as well as to study the areas that are important for their development in the next calendar year, three e-surveys were developed and 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. Periodically, including in 2022, a risk assessment of workplaces and medical examinations of employees is carried out for prevention and prophylaxis.

2. Other important activities

2.1. Standardisation

CRC fulfilled its obligations as a National Organisation for Standardisation before ETSI in 2022 as well, providing 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. As feedback, CRC provided information to ETSI on the transposed standards.

The Commission works together with the Bulgarian Institute for Standardisation (BIS) to introduce the European standards published by ETSI as national standards. In 2022, 65 standards were introduced with recognition, only with a translation of the title, published in the BIS Official Bulletin.

CRC actively participated 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.

The Commission participated with its representative in the ETSI General Assembly, held twice a year, as well as in the regular and extraordinary meetings of the National Organisations for Standardisation (NOSs) for ETSI. Pursuant to Regulation (EU) 1025/2012, CRC provided an annual report and participated in meetings and discussions on new activities assigned to the NOSs by Regulation (EU) 2022/2480[72] which entered into force in 2023.

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

In 2022, the activities of the Advisory Councils on the security of public mobile terrestrial electronic communications networks and mobile services and on the security of public fixed

[72] https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32022R2480

electronic communications networks and fixed services were completed. The two councils adopted Positions on the examined security issues, which are published on the CRC's website[73].

Taking into account the requirements of the applicable European Commission acts and taking into account the sectoral positions, the Commission adopted rules on minimum security requirements for public electronic communications networks and services and risk management methods (the Rules)[74]. The Rules also set out the criteria for determining the impact of a security incident as significant, the requested information, the format and manner of notification of security incidents.

Four security incidents meeting the criteria for an incident with a significant impact, as set out in the Rules, occurred in 2022. Two of the incidents occurred on a mobile network, which led to the suspension of the services provided. The reason for their occurrence is failure of the technical equipment. The other two incidents are related to the inability to use interpersonal services without numbers on the territory of Bulgaria, and they have occurred in case of failure in the software product. In fulfilment of its obligation under Art. 243b (5) of the LEC, CRC sent the above information to the European Commission and to the European Union Agency for Cybersecurity (ENISA).

In 2022, each of the undertakings A1 Bulgaria EAD, Bulgarian Telecommunications Company EAD and Yettel Bulgaria EAD provided a developed Multivendor Strategy. The strategies developed were examined at a meeting of the Commission and letters with the conclusions made were sent to the undertakings.

2.3. Electronic trust services

In fulfilment of its powers under the Law on Electronic Document and Electronic Trust Services, CRC maintains up-to-date the national trusted list, which contains information about qualified trust service providers and the services provided by them. In 2022, no new trust services were entered in the national trusted list.

In 2022, the total number of issued qualified certificates for electronic seal was 189, and for electronic signature - over 1,395,000, which is an increase of 39% compared to the previous year. The increased interest is due, on the one hand, to the possibility of remote signing with a qualified electronic signature and the issue of short-term qualified certificates for qualified electronic signature and, on the other hand, to the development of the financial sector and the on-line services it offers. Last but not least, the development of electronic administrative services in the public sector as well as the affordable prices of trust services for consumers play a big role for the increased number of qualified electronic signature certificates issued, as well as for qualified electronic time stamp. Data on the trust services provided in the last three years are presented in Table 17.

[73] https://www.crc.bg/bg/rubriki/229/sigurnost-i-cjalost-na-elektronnite-syobshtitelni-mreji-i-uslugi
[74] https://crc.bg/files/Pravna/Pravila_minimalni_iziskvania.pdf

Table 17

Trust service	2020	2021	2022
	number	number	number
Issued qualified certificates for electronic signature	**566,689**	**1,002,763**	**1,395,881**
Issued qualified certificates for electronic seal	**161**	**167**	**189**
Issued qualified electronic time stamps	**28,134,161**	**219,610,192**	**526,426,850**
Issued qualified certificates for website authentication	**253**	**234**	**318**
Issued electronic evidence for qualified validation of electronic signature / seal	**482,825**	**2,233,080**	**2,399,804**
Qualified preservation service for qualified electronic signature/seal	**45,550**	**7,064**	**189,864**
Issued electronic evidence of a qualified service for an electronic registered delivery service	**-**	**218,802**	**503,163**

CRC representatives participated in an interdepartmental team, which has the task of examining an application submitted by Borika AD for notification of an electronic identification scheme. The work of the interdepartmental group will continue next year.

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. In 2018, the communications control and monitoring regarding compliance with the LEC and the secondary legislation requirements in the area of electronic communications on the territory of the Republic of Bulgaria focused on protecting the interests of end-users in accordance with the principles of legality, non-discrimination and transparency. For the efficient 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.

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.

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.

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.

As the number of users of services provided through the use of RFS and the development of modern technologies increases, the essential role of the monitoring and control of RFS in terms of its efficient management is also growing.

In 2022, the main activities in the area of RFS monitoring and control were:

2.4.1.1. Protection of the interests of end-users - setting up conditions for the normal work of lawful users of frequency spectrum for civil needs; guaranteeing a certain quality of services provided to end-users, as well as preventing the occurrence of illegal broadcasting through the exercise of preventive and follow-up monitoring and control.

In 2022, as a result of regular scheduled monitoring, the undertakings were provided with results for 12,570 measurements from the conducted monitoring of the main technical parameters of radio transmission stations on the territory of the country.

In 2022, as a result of the preventive control, the trend towards maintaining the 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 2022, scheduled daily monitoring was carried out in the 20-3000 MHz frequency band through fixed (manned and unmanned) stations for radio monitoring by NRFSMS on the territory of their serviced areas, and through mobile stations for radio monitoring – periodic control and monitoring throughout the country. On the territory of the city of Sofia, city of Plovdiv and city of Burgas, through the constructed new fixed stations of the "compact radio monitoring systems" type, the observed frequency range was extended up to 6 GHz.

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*** – in connection with inspections in implementation of CRC decisions, measurements of basic technical parameters of 34 transmission stations for analogue terrestrial radio broadcasting of radio signals and digital terrestrial television broadcasting for the assessment of their compliance with the approved technical characteristics were carried out; only one discrepancy was found for which a prescription was given for the bringing of a transmission station in conformity.

- ***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 4 transmission stations for analogue terrestrial radio broadcasting of radio signals were made, and one of the inspections found a deviation of the technical parameters for which a prescription was 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 the border areas of the country, in 2022, special attention was paid to the monitoring in the VHF frequency bands for radio and television broadcasting for evaluation of the electromagnetic situation and cross-border penetration from neighbouring countries of the Republic of Bulgaria.

The measurements carried out on the territory of 31 settlements were summarised and analysed for evaluation of the electromagnetic situation and registration of cross-border penetration from the territories of the Republic of Turkey, Republic of Serbia, Romania, Ukraine, Russia, Republic of North Macedonia and Republic of Greece. The results were included in the drafted 348 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 the International Telecommunication Union (ITU).

In the summer months, when penetration of cross-border broadcasts along the Bulgarian Black Sea coast intensifies as a result of the influence of the environment (temperature, sea water temperature, and state of the sea surface), electromagnetic environment and cross-border penetration are carefully monitored.

To assess the electromagnetic situation in support of spectrum management, in 2022, measurements were also carried out in 25 settlements from the interior of the country, included in 451 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 15 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 222 measurement reports**.**

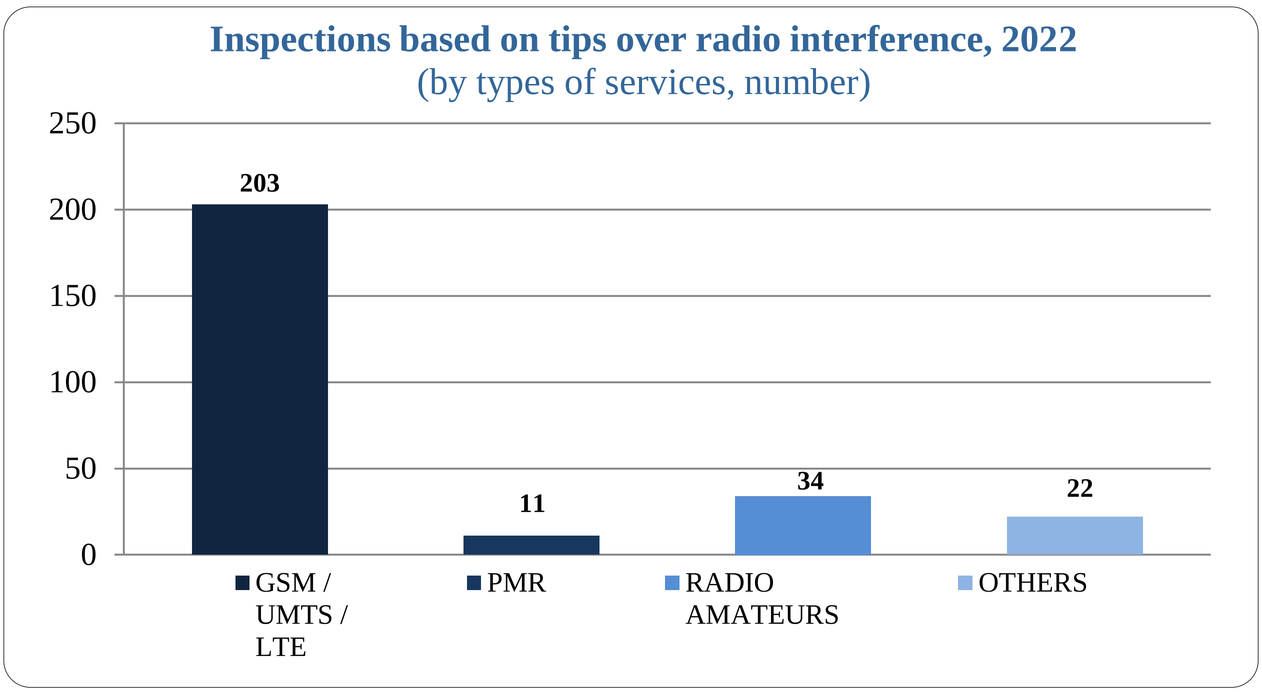
- ***evaluation of the electromagnetic compatibility of VHF/FM radio broadcasting stations in the 87.5÷108.0 MHz band and the radio navigation and communication equipment of the aeronautical services*** operating in the 109.0÷137.0 MHz frequency band.

In order to ensure electromagnetic compatibility and trouble-free operation of the radio navigation and communication equipment of the aeronautical services, measurements were carried out on 7 radio transmission sites according to the *Methodology for measurement of intermodulation products of type "A1", obtained when operating at nearby VHF radio transmission stations*.

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;

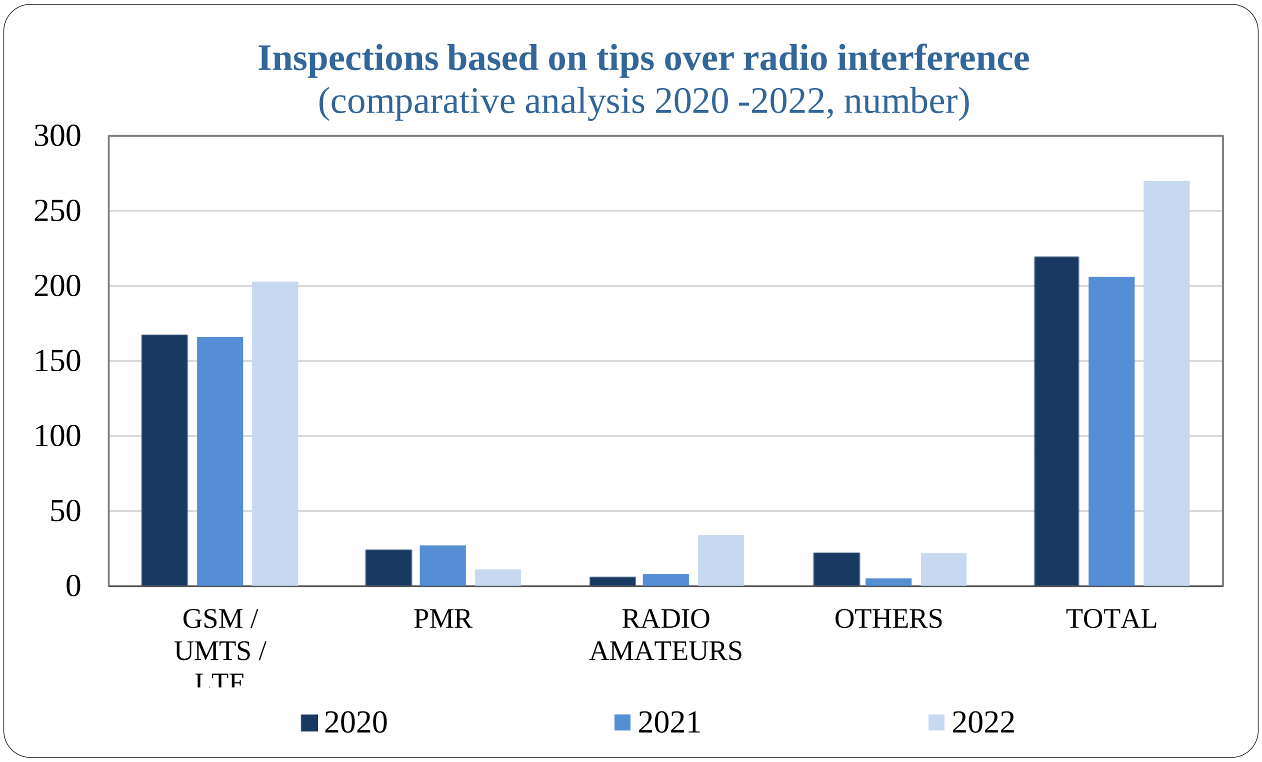
In 2022, 178 cases of radio interference were investigated and 270 measurement reports were drafted for the results (Fig. 50). The necessary measures for quick localisation and elimination of interfering sources were timely undertaken. The interferences from GSM/UMTS/LTE repiters transmitting in frequency ranges intended for public electronic communications through mobile terrestrial networks had a relatively high share in 2022 as well. The second place is held by cases of detected interference transmissions from defective (domestic and network) radio equipment. It is reported that the share of recorded interference transmissions from radio jammers has decreased significantly. Radio interferences resulting from electromagnetic incompatibility and mutual interferences as a result of the shared use of different technology in bands designated for the operation of mobile terrestrial radio networks continued.



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 2020-2022, 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, and terrestrial analogue radio broadcasting of radio signals***;

In 2022, 43 tips concerning problems with the coverage from mobile terrestrial networks, DVB-T terrestrial digital television networks and terrestrial analogue radio broadcasting were investigated, and 159 measurement reports were drawn up for the results:

– coverage of ***mobile terrestrial networks*** - in connection with received 37 tips for lack of coverage of mobile terrestrial networks (GSM/UMTS/LTE) - in 2022, an analysis of the declared coverage was made and the necessary measurements were carried out, as shown in 153 measurement reports; scheduled measurements of the coverage and quality of GSM/UMTS/LTE mobile networks in 54 settlements and 5 routes from the Republican road network were carried out, the results being included in 295 measurement reports;

– coverage of ***terrestrial digital television under the DVB-T standard and networks for terrestrial analogue broadcasting of radio signals*** - in connection with received 6 tips, inspections and measurements were carried out on the territory of the country, included in 6 measurement reports; scheduled inspections of the coverage and quality of the services provided by DVB-T networks were also carried out and the results were included in 74 measurement reports;

The results of the monitoring and control of the RFS carried out in 2022 were summarised in a total of 7,690 measurement reports, as 6,235 measurement reports were drawn up for the conducted scheduled monitoring, and a large part of the measurement reports reflect the results of 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 connection with the implementation of the CRC control functions related to the control in the implementation of electronic communications under the terms of the LEC, in 2022, in the conditions of an emergency epidemic situation, 2,470 inspections were carried out.

The main focus was 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:

- ***problems with the use of mobile roaming services*** – most of the inspections carried out in 2022 in connection with the received tips were about problems with used mobile roaming services - 195 inspections (by about 46% more than in 2021). No violations of the LEC were found during the inspections.

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

  – ***prices of the services offered*** – in 2022, 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. – 113 inspections were carried out (by about 94% more than in 2021);

  – ***dispute of bills and penalties*** – a total of 31 inspections were carried out (by about 20% more than in 2021).

For ascertained violations of Chapter 14 of the LEC, in 2022, three administrative offence acts (AOAs) were drawn up.

In 2022, 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 – 65 inspections were carried out (by about 37% less inspections since 2021):

  – *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 - 42 inspections were carried out;

  – free-of-charge ***provision of itemised bills*** for services used – 23 inspections were carried out.

In connection with the inspections carried out in 2022 for compliance with Chapter 15 of the LEC, 2 AOAs were drawn up for offences found.

- ***quality of the services provided***, non-provision of universal voice service, speed of fixed Internet, failures, etc. – 88 inspections were carried out (by about 114% more than in 2021). Nine AOAs were drawn up for non-provision of "universal voice service".

▪ compliance with ***the general requirements for carrying out public electronic communications*** – 179 inspections were carried out, 164 of them were inspections of undertakings ***that have not provided information*** or have provided incomplete or inaccurate information to CRC about their activities in 2021, and 7 AOAs were drawn up.

▪ problems in carrying out ***number portability*** in case of change of the telephone service provider - in 2022, 36 inspections were carried out (by about 63% more than in 2021) in connection with problems in number portability; one AOA was drawn up for the offence found.

In 2022, the major share (around 81%) of the inspections on consumer tips received by the Commission were carried out on the three largest undertakings providing electronic communications services (Fig. 3). Five hundred and four inspections were carried out in relation to consumer tips from end-users concerning the services they offer, as follows: A1 Bulgaria EAD - 178 inspections, Vivacom Bulgaria EAD – 203 inspections, and Yettel Bulgaria EAD – 123 inspections.

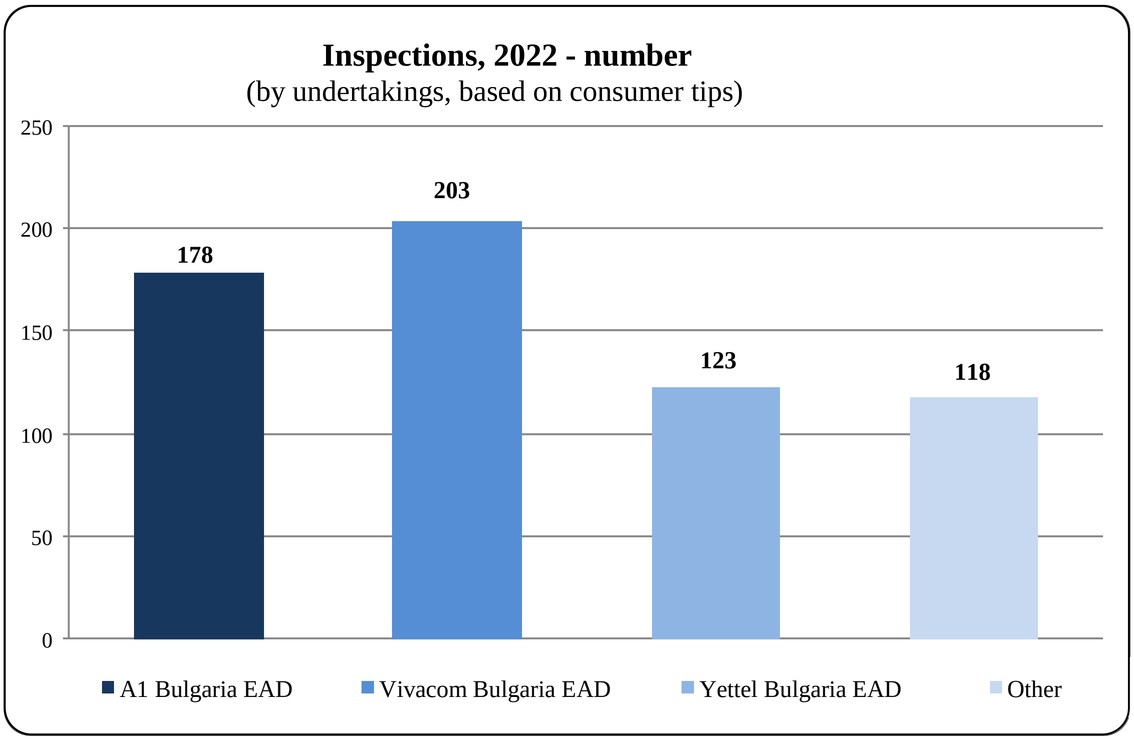


Figure 52

In 2022, 438 inspections (or about 18% of the inspections performed) 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. During the scheduled inspections, no violations of the LEC were found, defined on the basis of a risk analysis.

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, offences were found and 4 AOAs were drawn up.

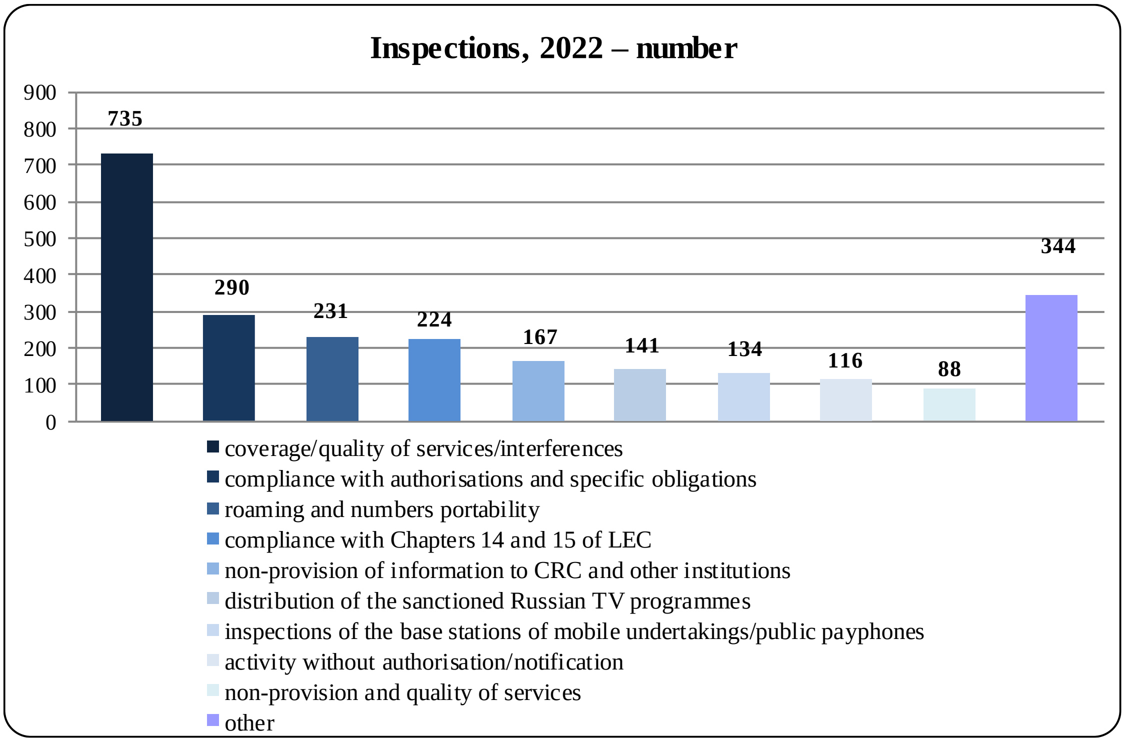
Three hundred twenty-six inspections were carried out ***for compliance with the conditions of the authorisations and decisions of CRC***, compliance with specific obligations and inspections of electronic communications networks for terrestrial analogue broadcasting for compliance of the transmission stations with the technical characteristics approved by CRC, for compliance with prescriptions given. Five AOAs were drawn up for offences found during the inspections performed.

In 2022, the Communications Monitoring and Control Directorate General carried out inspections of the mobile terrestrial networks of A1 Bulgaria EAD, Vivacom Bulgaria EAD and Yettel Bulgaria EAD in order to verify the reliability of the information provided by the undertakings to CRC in connection with the authorisations issued to them. The following municipalities on the territory of the country were randomly selected for inspection: Rakovski Municipality (Plovdiv District), Sevlievo Municipality (Gabrovo District), Kameno Municipality (Burgas District), Borovan Municipality (Vratsa District) and Vetrino Municipality (Varna District). During the inspections in the five municipalities, a total of 117 base stations (BS) were checked, for which a total of 59 records of findings and 300 measurement reports were drawn up. During the inspections, some inconsistencies and a problem with the reliability of the information provided to CRC by the three undertakings and the actually built and put into operation base stations were found, for which the necessary measures were taken.

In connection with Decision No RD-05-15/01.03.2022 of CEM on the suspension of the broadcasting of Russia Today and the derivative programmes, as well as Sputnik and the derivatives, in 2022, 141 inspections were carried out of undertakings providing the service "*distribution of radio and television programmes*", and no broadcasting of the above programmes was found during the inspections.

According to p. 4 of CRC Decision No 350/30.09.2021, with a view to ensuring stability and support of the gradual transition and in order to meet the reasonable needs of consumers, including consumers with disabilities, by 30 September 2023, Vivacom Bulgaria EAD will continue to provide public payphones and/or other points for public access to voice telephone services. In this regard, 17 inspections were carried out for the presence of public payphones in the following cities: Sofia, Plovdiv, Burgas, Varna, Veliko Tarnovo, Gorna Oryahovitsa and Vratsa. The inspections were carried out at airports, ports, railway and bus stations, hospitals and police stations, customer service offices of Vivacom Bulgaria EAD. The results of the inspections showed that there are non-working telephone sets and a large part of them are in extremely poor condition, for which the undertaking has been requested to take the necessary measures to keep the sets in good working order and dismantle the malfunctioning sets.

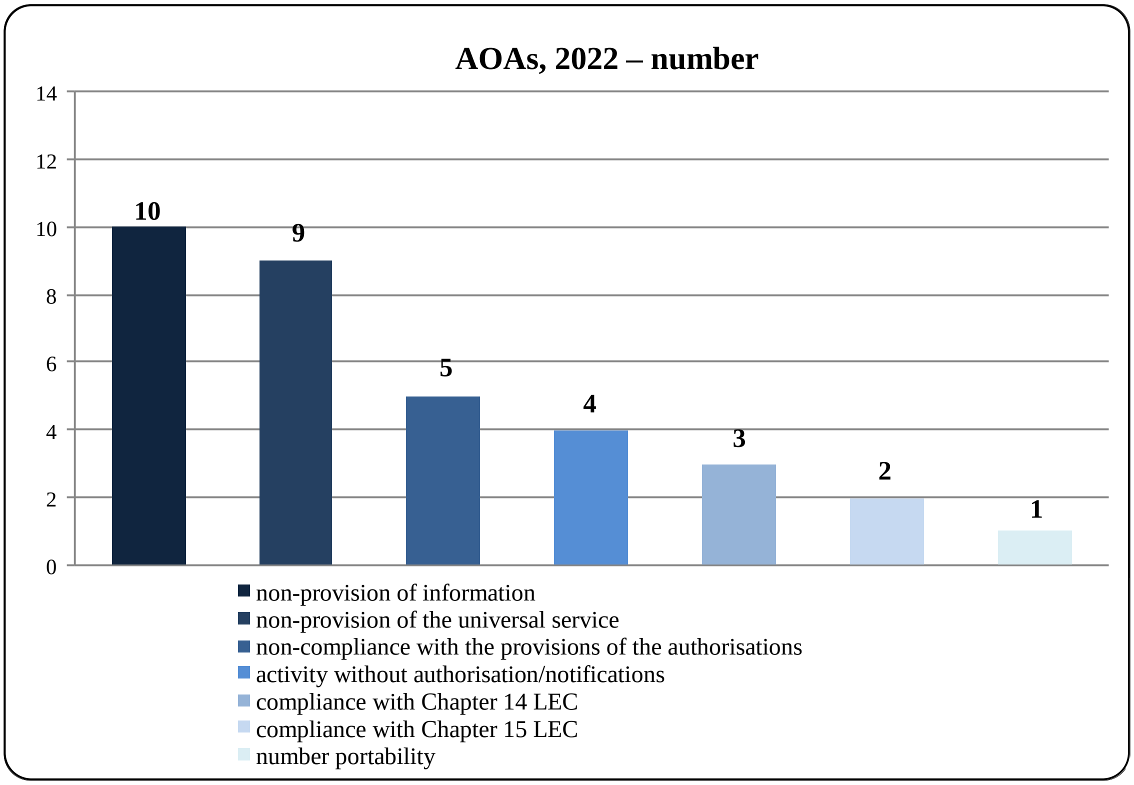
Summarised data for the performed control activity and the engaged administrative and punitive liability in offences of the LEC and secondary regulations in 2022 are displayed in Figure 53 and Figure 54.



Source: *CRC*

Figure 53

As a result of the inspections, for the administrative violations of the LEC found, 34 **administrative offence acts** were drawn up in 2022, as the main share (56%) was held by non-provision of requested information to CRC and other institutions and for non-provision of universal voice service.



Source: *CRC*

Figure 54

2.5. Quality of the Internet access and net neutrality service

Through the CRC's electronic system for on-line questionnaires, the information about the activities of the providers of electronic communications services (ECSs) at retail and wholesale level was collected and processed, including the achieved quality of the services provided in accordance with the General requirements for the implementation of public electronic communications. The providers of the retail Internet access service (IAS), obliged to provide information in compliance with the requirements of Article 3 and Article 4 of Regulation (EU) 2015/2120[75] (the Regulation), submitted data on the measures they apply to ensure net neutrality and the quality of the services they provide.

The results of the analysis of the submitted information for the implementation of Articles 3 and 4 of the Regulation indicate that:

– contracts with end-users do not include restrictions on the services they use;

– providers of Internet access service providers (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, except for exceptions in

[75] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures on open Internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union.

accordance with Article 3 of the Regulation.

Information pursuant to Art. 4, Para 1, ‘d’ of Regulation (EU) 2015/2120, is included by the providers in their General Terms and Conditions, contracts or is prominently displayed on their websites. Providers of fixed IAS provide a clear and understandable explanation of the minimum, normally available, maximum and advertised download and upload speeds, and providers of mobile IAS service provide information about the expected maximum and advertised speed.

On the basis of the data collected by the undertakings regarding Internet access and net neutrality, as well as the activities of the commission in connection with the Regulation, CRC prepared a report containing an analysis of the implementation of Articles 3 and 4 of Regulation (EU) 2015/2120. This report was sent to the European Commission and BEREC at the end of June 2022 in accordance with the requirements of the Regulation.

At the end of 2021, CRC adopted the implementation of the project for the construction of a Mechanism for measuring and monitoring the quality parameters of IAS (Mechanism), and in March 2022, by CRC Decision No 80 of 10.03.2022, it launched a procedure for public consultation on a draft Decision for approval of the Mechanism. In the course of the public consultation, the opinions of stakeholders were received and examined. By Decision No 333 of 13.10.2022, CRC approved the Mechanism, as well as the conditions for conducting measurements that can serve the purposes of legal protection of consumers.

Over the past year, the BEREC Guidelines for the application of the Regulation were updated with a new interpretation of Article 3[76] of the Regulation, following a decision of the Court of Justice of the European Union (EU)[77]on the so-called ‘zero tariff’. According to p. 40b of the Guidelines, any practice of differentiated pricing that is not neutral with regard to applications/content or certain websites is considered inadmissible. In this regard, CRC requested information from operators providing mobile services whether zero or differentiated tariff services are included in their tariff plans for mobile Internet. The information collected showed that there is a commercial practice for the provision of differentiated pricing services. Having regard to the new interpretation of Article 3, by Decision No 395 of 24 November 2022, CRC launched a public consultation procedure for setting deadlines to terminate this commercial practice. The procedure was finalised in early 2023.

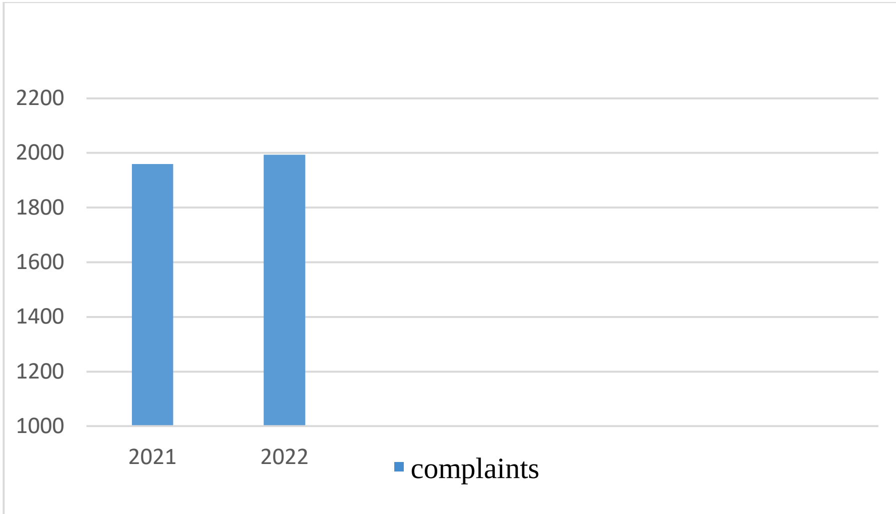
2.6. Protection of the interests of the electronic communication services users

In 2022, CRC received 1,993 complaints from end-users. To compare with, in 2021, the number of complaints was 1,959. Most of the complaints (continuing the trend of previous years) concern the charging of services, access to and payment of digital content, termination of contracts for electronic communications services and the use of “random roaming” (border roaming on the territory of the Republic of Bulgaria).

[76] Article 3 of Regulation (EU) 2015/2120 prohibits the application of commercial practices in which, after exhaustion of the provided data volume, all applications are blocked or subject to a speed limit, except for the application offered at zero or other different tariff.

[77] Cases C-807/18 and C-39/19 Telenor Magyarország, C-854/19 Vodafone, C-5/20 Vodafone and C-34/20 Telekom Deutschland

Complaints received by CRC, 2021 and 2022



Source: *CRC*

Figure 55

Most of the tips received during the year concern issues that are beyond the control and regulatory powers of CRC. In these cases, the regulator acts as a mediator and forwards the case to the respective provider for the purpose of out-of-court settlement of the dispute. In the framework of this procedure, a significant part of the disputes brought 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, etc.

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

In 2022, CRC held four meetings (three meetings with representatives of the three mobile operators and one meeting with representatives of Speedy AD, Econt Express OOD and Bulgarian Posts EAD). At these meetings, issues related to consumer protection and improvement of service in the points of sale were resolved, including:

- the possibility of requesting a detailed statement under the LEC through a qualified electronic signature;
- improving the service to elderly consumers;
- the legal introduction of the new requirements of the roaming regulation;
- the application of Art. 230, Para 1, 2 and 3 of the LEC;
- the possibility for consumers to refuse payment through their accounts of digital content services;
- services to postal users, including: drafting the consignment waybill, communication with customers, customs services and representation, complaints and training of operators’ employees.

Cooperation with the Commission for Consumer Protection

There is a shared competence between CRC and the Commission for Consumer Protection (CCP) regarding some of the issues related to consumer protection in the area of electronic communications services. Complaints related to distance contracts, unfair trade practices, removing unfair contract clauses, charging of unsolicited services, information services, digital content, etc., fall within the competence of CCP. In this respect and in implementation of the law, CRC has referred many consumers' issues to CCP.

In 2022, CRC and CCP continued their joint work in the framework of the work of the sectoral conciliation committees for the consideration of disputes in the field of electronic communications and postal services, established with the provision of Article 182, Para 4 of the Law on Consumer Protection.

Legal representation in cases of CRC

In 2022, procedural representatives of CRC participated in 61 meetings on administrative and criminal cases before the regional and administrative courts of the country. During the year, 33 confirmatory decisions on contested penal decrees of CRC were issued, while the number of revocation decisions was 10. According to the individual administrative acts issued by CRC, 8 complaints were filed before the administrative courts.

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

In 2022, CRC completed a dispute resolution procedure under the LECNPI and by Decision No 70 of 24.02.2022, CRC rejected requests filed under No. 12-03-7/05.10.2021 by LINEINI MREGI OOD, CABLE TV DELTA OOD and MULTIMEDIA-BG EOOD for giving mandatory instructions to Bulgarian Telecommunications Company EAD (current name Vivacom Bulgaria EAD) in connection with the General conditions for access to and/or joint use of passive infrastructure (underground duct network) of the network operator.

Decision No 70 of 24.02.2022 was appealed, since by Decision No 3870/10.06.2022, the court of first instance dismissed the complaint in its entirety. A cassation appeal was lodged with the Supreme Administrative Court (SAC) against the decision of the Administrative Court of Sofia City. SAC issued Decision No 1637/14.02.2023 whereby the Court partially revoked Decision No 3870/10.06.2022 of the Administrative Court of Sofia City and Decision No 70/24.02.2022 of the Communications Regulation Commission in the part under p. 15 and p. 16 of the Commission's decision. In the rest of the cases, these decisions were confirmed by the cassation instance. The cassation instance returned the file to the Commission for a new ruling, in accordance with the instructions given.

IV. BUDGET

CRC budget implementation for 2022

The Commission Chairman is a primary budget administrator pursuant to Article 50 LEC.

Pursuant to Article 37 (1) of the Law on State Budget of the Republic of Bulgaria (LSBRB) for 2022, CRC was allocated with:

- *revenue in the amount of BGN 51,110 thousand;*
- *expenses in the amount of BGN 18,577.9 thousand;*

• *transfers in the amount of BGN 32,532.1 thousand*

The Commission administered revenue pursuant to Article 51 (1) LEC. In 2022, the revenue earned from fees, fines, financial sanctions and interest amounted to BGN 59,990.6 thousand - 117% of the annual plan.

The reason for the over-fulfilment of the annual plan, in the part of the revenue from fees for 2022, is the proceeds from one-off charges for the provision of additional spectrum in the 1800 MHz band and for the provision of spectrum in the 26 GHz band.

The reported expenses for 2022 amounted to BGN 18,043.9 thousand, which is a fulfilment of 97%.

In 2022, transfers were made to the Ministry of Transport and Communications, amounting to BGN 32,532.1 thousand - 100% of the regulated level in Art. 37, Para 1 and Art. 25, Para 1 LSBRB for 2022, in implementation of Art. 19, Para 1 of the LEC.

Review of fees collected and administrative costs incurred in 2022

The structure of revenue from fees under the CRC budget for 2022 was as follows:

Table 18

Revenue from fees	Value (BGN'000)
Revenue generated for 2022, incl.:	59,739.7
- one-off fees under the LEC	14,811.8
- one-off fees under the PSA	8.5
- one-off fees under the LECNPI	0.9
- administrative fees under the LEC including - administrative annual charge on control under the LEC - one-off fees for administrative services under the LEC	3,517.3 3,490.8 26.5
- administrative annual charge on control under the PSA	810.9
- annual fees for use and temporary use of radio spectrum	33,709.9
- annual fees for the use of the positions on geostationary orbit with the appropriate radio frequency spectrum	59.6
- fees for the use of numbering resources	6,820.8

Additionally earned revenue from fees, sanctions and interest in the amount of BGN 250.9 thousand.

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 27.2 thousand were collected in 2022 by NRA.

The funds in the expenditure part of the Communication's budget, determined in the LSBRB for 2022, 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 2022 was as follows:

Table 19

Type of expenses	Value (BGN'000)	Share (%)
1. Salaries	5,919.6	32.8
2. Social security contributions	1,704.0	9.4
3. Other remunerations and payments	208.3	1.1
4. Operative costs	2,519.7	14.0
5. Taxes and fees paid	68.2	0.4
6. Membership fee	91.1	0.5
7. Capital expenditure	7,533.0	41.8
Total expenditure:	18,043.9	100

According to Section B 'Expenditure', Group I 'Current Non-Interest Expenditure', p. 3 of the CRC's Profit and Loss Statement for 2022, the amount of the allowances for depreciation for 2022 was BGN 2,454 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 2022 of CRC, was BGN 10,510 thousand. According to preliminary data, the amount of the administrative expenses of CRC for 2022, 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.

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 2022 included:

- ICT projects - supply of hardware to ensure the redundancy of the cluster system used in CRC, automated tape library, servers, multifunctional devices, scanners, UPS equipment;

- the construction 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 for the National Radio Frequency Spectrum Monitoring System for Civil Needs (NRFSMS) – supply of a combined mobile radio monitoring station, detection and localisation of radio interference and measurement of mobile networks, mobile RFS monitoring station, compact radio monitoring and radar systems for NMS, antenna controllers for mobile radio monitoring stations for the replacement of existing assets, spectral analysers, HF cables of antenna-feeder systems for fixed radio monitoring stations;

- intangible fixed assets - GIS system ensuring the activities of registration of transceiver stations of terrestrial networks, licenses for Windows Server, automated system for inventory of TFA, implementation of functional changes in the electronic system for on-line questionnaires of the Commission.

CONCLUSION

In 2022, the telecommunications sector faced new opportunities and challenges presented by a dynamic regulatory, technological, and competitive environment. The progress in the sector has led to an increase of the network capacity with additional optical and wireless deployments to meet the constant demand for higher-speed networks since 2021. In the context of fast-developing technologies, the need for solutions that are adequate to the dynamics is becoming increasingly urgent for all participants in the economic and social life, both internationally and nationally, and, in this process, the role of the regulator is essential.

The actions performed in 2022 and the results stated in the report give reason to conclude that, for the most part, the objectives set by the Strategic Plan for the reporting year have been achieved. This is also the starting point from which the Communications Regulation Commission, as an independent specialised state authority implementing the policies in the field of electronic communications, planning and distribution of radio spectrum in the Republic of Bulgaria, has set its priorities and objectives for 2023.

In the management of the scarce resource in the following year, these priorities are related to the implementation of measure C7.R2: Effective use of the radio spectrum in the utilisation of the funds under the National Recovery and Resilience Plan (RRP139 code) and completion of the activities under the Agreement between the Air Force of the Republic of Bulgaria and the undertakings providing electronic communications networks and/or services for the conduct of tests in the 700 MHz and 800 MHz bands. In this regard, CRC will conduct a procedure for the assignment of radio spectrum in both bands.

Another important priority is the conduct of public consultations and tenders for the provision of harmonised spectrum within the 2.6 GHz, 3.6 GHz and 26 GHz bands and other bands harmonised for wireless broadband services, as well as the commissioning of the Register of the rights granted for use of the radio spectrum on the basis of registration and the Register of transceiver stations of terrestrial networks capable of providing electronic communications services, the activities under Article 151, Para 1, p. 16 of the SPA and small-range wireless access points.

Following public consultations, the draft Regulatory policy for the use of numbering resources for the implementation of electronic communications is to be adopted in the next one-year period. The document lays down that the granting of rights to use national numbering resources should continue to be based on objective, transparent and non-discriminatory procedures, providing opportunities for the development of competition between undertakings in the electronic communications sector. In connection with the development of technologies, opportunities will be provided to provide the necessary resource for existing and new electronic communications networks and services.

In view of the upcoming World Radiocommunication Conference (WRC-23) of the International Telecommunication Union (ITU) in 2023 in Dubai (UAE), within the framework of its powers, the Commission will participate in both the preparation of the official position of the Republic of Bulgaria on the items of the WRC-23 agenda and in the holding of the meetings during the conference.

To ensure broad accessibility of electronic communications services, including those provided through very high-capacity networks, and to increase consumer satisfaction with the quality of the universal service, the Commission will continue the activities to determine the appropriate broadband access speed within the framework of the obligation to provide the universal service under Article 182 (4) of the LEC.

A forthcoming task is also to conduct a geographic survey on the coverage of electronic communications networks that can provide broadband access and to identify areas where the provision of state aid for the construction of very high-capacity networks is permissible.

Next year, additional information will also be collected with a view to the conduct in 2024 of a fourth round of analysis of the wholesale market for local access provided at a fixed location (market 1 of European Commission Recommendation (EU) 2020/2245 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation).

In the performance of its functions as the National Standards Organisation for the European Telecommunications Standards Institute (ETSI), CRC will conduct a public consultation on Regulation (EU) 2022/2480, which enters into force in 2023, on the tasks assigned by the EC to ETSI for the development of new standards.

In order to increase the efficiency of the control functions performed in relation to electronic communications with the use of radio spectrum and to carry out the monitoring and control activities, CRC will continue to build, develop and modernise the National Radio Frequency Spectrum Monitoring System for civil needs, according to the System Development Plan for the period 2021÷2025 and the updated roadmap for the period 2023÷2025.

The commissioned three new mobile stations for radio monitoring, detection and localisation of interference sources and illegal broadcasting as well as for measurements of the coverage and quality of the terrestrial networks and the six active fixed stations of the compact systems type are expected to be upgraded in the following year by one more mobile radio monitoring station up to 26.5 GHz, two fixed radio monitoring stations of the compact systems type up to 6 GHz and two mobile network measurement systems. In this way, the active system will expand its capabilities for radio monitoring and control of the radio spectrum up to 6 GHz in an urban environment.

In 2023, the construction of an electromagnetic compatibility (EMC) laboratory is also 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 spectrum.

The past year 2022 was a year of challenges and search for solutions in response to the dynamically developing digital environment. In response to these challenges and the decisions taken was the work of the Communications Regulation Commission, which is reflected in this Annual report. The information in the report reflects both the achievements in 2022 and the guidelines for future hard work to achieve an effective and future-oriented regulatory environment, a sustainable competitive market and consumer protection.