Annual Report 2020

Communications Regulation Commission

……. June 2021

COMMUNICATIONS REGULATION COMMISSION

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

2020

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INTRODUCTION

The Communications Regulation Commission (CRC, the Commission) is a specialised independent government body implementing the policies on electronic communications and postal services, as well as the RFS planning and allocation policy in the Republic of Bulgaria.

In compliance with the Bulgarian and European legislation, in the conditions of transparency and equality, the Commission's mission in 2020 is to promote the competition in the country's communications markets by improving the regulatory framework, increasing the investments in the communications sector, developing new technologies, ensuring the effective performance of its control functions and providing a variety of quality services and conditions to protect the interests of end-users.

In line with the approved CRC strategy for 2019-2021, the Commission's main objectives are:

- *achieving an effective and forward-looking regulatory environment;*
- *promoting a sustainable competitive market and consumer protection;*
- *sustainable institutional development and international partnership.*

In order to achieve these objectives, the Bulgarian national regulatory authority (NRA) in the field of communications and postal services has undertaken a number of activities aimed mainly at:

- harmonising the laws and regulations with the European legislation;
- effective allocation and assignment of scarce resource - radio frequency spectrum (RFS) and enabling the introduction of 5G networks;
- improving the conditions for investment in networks and services, and better conditions for end-users of services;
- market analyses and assessments;
- international activity and increasing the administrative capacity of both the general and specialised administration.

The spread of the COVID-19 pandemic at the beginning of the reporting year has brought about new challenges to our country and the world. In these circumstances, the need for better connectivity requires the provision of secure, fast and quality telecommunications. This, in turn, has created greater network requirements and has made CRC to look for a different approach in the implementation of some of its activities related to the regulatory framework, spectrum management, market regulation, network monitoring and control, international activity, etc.

In view of the epidemic, the Commission has set up a coordination centre for operational interaction with mobile operators to support the connectivity and quality of telecommunications services. The main objective of the centre is to synchronise the actions of the regulator and the business in terms of quality of services provided and to provide timely information on measures and actions taken by mobile services providers. CRC monitors the status of the radio spectrum allocated to mobile operators by performing specialised measurements of the quality of services provided to end-users.

In pursuing its strategic objectives, the Commission continued to carry out intensive international activity. CRC participated in a number of virtual meetings and sessions of the Body of European Regulators for Electronic Communications (BEREC), the European Regulators Group for Postal Services (ERGP), the Electronic Communications Committee (ECC), the

European Telecommunications Standards Institute (ETSI), the International Telecommunication Union (ITU) and other international organisations with which the Commission is working closely to implement best regulatory practices, exchange of experience, and develop and improve the functioning of the internal market for electronic communications networks and services.

In the reporting year, CRC worked actively in a national environment to optimise the legislation in the field of information and communication technology, with a particular focus on the activities of drafting the Act amending and supplementing the Law on Electronic Communications (LEC) and bringing the Bulgarian legislation in compliance with the requirements of Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing a European Electronic Communications Code (EECC/the Code). Measures were adopted to facilitate the digitisation of processes related to the conclusion of contracts, to reduce the administrative burden and ensure a high level of consumer data protection.

The European Union's (EU) new regulatory policy in the field of electronic communications has been defined with EECC. The Code established a harmonised framework for the regulation of electronic communications networks and services and associated facilities, defining the tasks of the NRA and the other competent authorities in the procedures to ensure a harmonised implementation of the regulatory framework in the EU as well as a public warning system for severe emergencies and disasters. The Code also includes measures to promote competition and stimulate investment in very high capacity networks and in 5G networks.

Creating better conditions for harmonised and coherent use of radio spectrum across the EU is a prerequisite for ensuring regulatory predictability in terms of investment and overcoming the fragmentation of national markets.

CRC has carried out the activities set out in the National Roadmap for implementation of the obligations of the Republic of Bulgaria under Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency bands in the Union related to the release of the frequency resource from terrestrial digital television for the introduction of 5G networks.

In relation to the provision of harmonised radio spectrum for wireless broadband networks and services, in 2020, the Commission carried out public consultations on the prospects and conditions for using the free resource in the 700 MHz radio spectrum band and launched such consultations with regard to the prospects and conditions for using the free resources in the 26 GHz radio spectrum band, and it also announced plans to limit the number of authorisations to use radio spectrum in bands 2.6 GHz and 3.6 GHz.

An important part of CRC’s activity during the year was the completed fourth round of the procedure for determination, analysis and assessment of the market for wholesale call termination on individual public telephone networks provided at a fixed location and for voice call termination on individual mobile networks.

The Commission also continued to ensure compliance with the legal requirements for the provision of roaming services and international calls and SMS messages within the European Economic Area, by monitoring and controlling the regulated tariffs offered by Bulgarian undertakings.

To improve the analysis process and the operation, CRC prepared and implemented in practice an on-line questionnaires information system whose main purpose is to automate the processes of filling in, sending, receiving and processing information from the operators necessary to perform the functions of CRC. The system has accelerated the process of providing information to the regulator and reduced the administrative burden for operators, and for the first

time in the past year, undertakings providing broadband Internet access submitted information on their activities as of 01.07.2020.

The increased need for connectivity in 2020 and the increased number of users of services provided using the RFS has led to a significant strengthening of the role of the RFS monitoring and control in relation to its effective management with the aim of timely locating and eliminating sources of interference and identifying illegal radio broadcasting systems.

This annual report of CRC was prepared pursuant to Article 38 of the LEC. It presents an overview of the work performed by CRC in 2020 and outlines the main lines in its forthcoming activity.

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

Methodological notes on Section I.

The information presented is based on data received by 29.04.2020 from 88.9% of the undertakings registered at CRC as of 31.12.2020.

The totals are rounded from each exact value and rounding-related differences may occur due to the use of standard calculation functions of the electronic tables and charts. The totals will not therefore necessarily represent the sum of the rounded figures.

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

The total number of undertakings providing services in a given market segment, as presented in the tables, is not the sum of the foregoing items. Where 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 shall be considered to be identical to "end-user party to a contract under Article 227" in accordance with the Law on Electronic Communications (version prom. SG, no. 20 of 9 March 2021).

1. Volume and structure of the Bulgarian electronic communications market

1.1. Market volume

According to the data from the CRC register, as of 31.12.2020, a total of 1,126 undertakings were registered at CRC with the intention to provide public electronic communications. In implementation of Article 5 of the General Requirements[1] and Decision No 426 of 17.12.2020 of CRC, a total of 1,001 of the undertakings registered as of 31.12.2020 have submitted to the Commission an annual activity report for 2020 (the share of undertakings having submitted reports makes up 88.9% of those registered as of the said date).

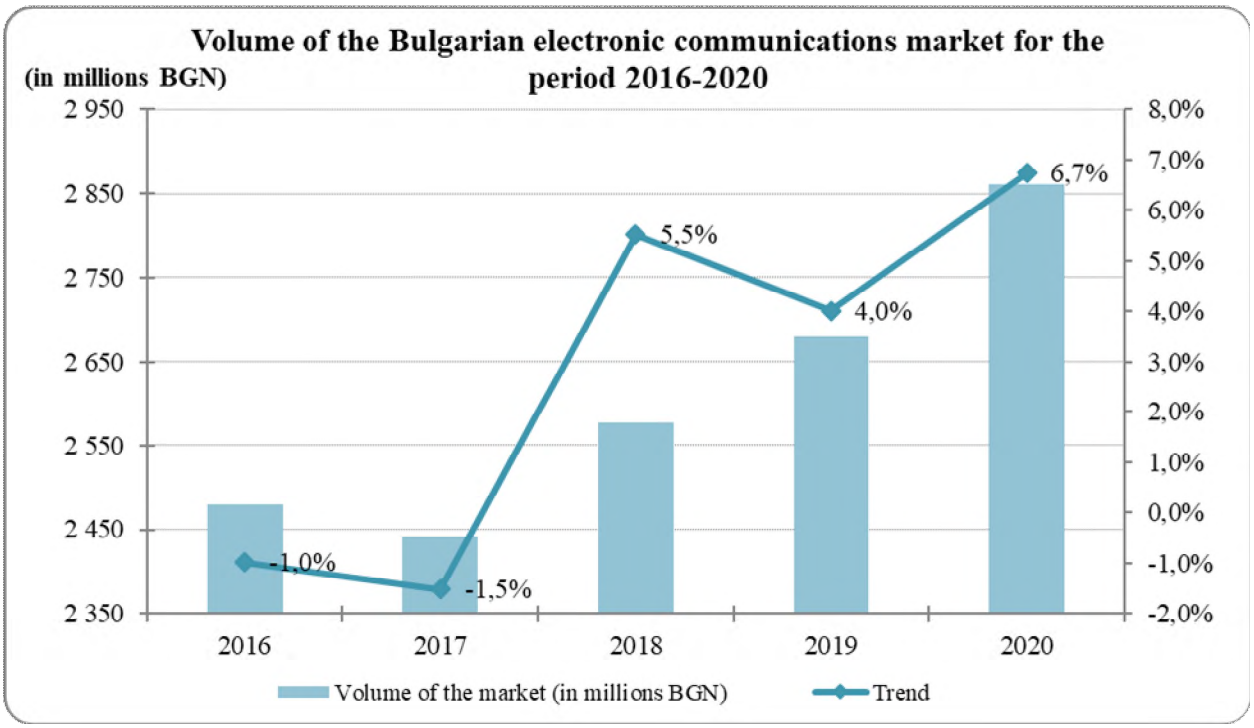
In 2020, 861 undertakings performed their activity, including 14 undertakings which suspended their activity on providing public electronic communications during the year and submitted a report pursuant to Article 5a of the General Requirements (as of 31.12.2020, those undertakings were removed from the CRC register). In comparison to the previous reporting period (2019), an increase was observed in 2020 both in the number of undertakings registered at CRC for the provision of public electronic communications (by 0.4%) and in the number of undertakings actually carrying out activity during the year (up by 1.3%).

[1] 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).

In July 2020, the restructuring of Telenor Bulgaria EAD[2] (Telenor) was announced according to which the company splits its activities in Bulgaria into two - mobile assets and infrastructure - and transfers its assets to telecommunication infrastructure in the newly established company Cetin Bulgaria EAD (Cetin). According to information from the Cetin's website[3], the company will focus on improving and deploying telecommunication and IT infrastructure, their operation and maintenance. The services to be provided by the company (dark fibre, leased lines, IP transit, data transfer, etc.) fall into the 'data transfer and/or Internet access' and 'leased lines' segments.

In 2020, the total volume of the Bulgarian electronic communications market amounted to BGN 2.861 billion, continuing its upward trend for the third consecutive year - the growth reported is 6.7% as compared to the 2019 data.

Figure 1 presents the dynamics in the volume of electronic communications market in the country for the period 2016-2020.



Note: *The data for 2019 have been updated.*

Source: Data submitted to CRC

Figure 1

[2] https://www.telenor.bg/bg/news/ppf-group-%D1%80%D0%B0%D0%B7%D0%B4%D0%B5%D0%BB%D1%8F-%D1%82%D1%8A%D1%80%D0%B3%D0%BE%D0%B2%D1%81%D0%BA%D0%B8%D1%82%D0%B5-%D0%BE%D1%82-%D0%B8%D0%BD%D1%84%D1%80%D0%B0%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%82%D1%83%D1%80%D0%BD%D0%B8%D1%82%D0%B5-%D0%B4%D0%B5%D0%B9%D0%BD%D0%BE%D1%81%D1%82%D0%B8-%D0%B2-%D0%BE%D0%BF%D0%B5%D1%80%D0%B0%D1%82%D0%BE%D1%80%D0%B8%D1%82%D0%B5-%D1%81-%D0%BC%D0%B0%D1%80%D0%BA%D0%B0%D1%82%D0%B0-%D1%82%D0%B5%D0%BB%D0%B5%D0%BD%D0%BE%D1%80-%D0%B8

[3] https://www.cetinbg.bg/services/

The share of the total volume of the public electronic communications market in the GDP volume[4] of Bulgaria for 2020 was 2.4%, registering, for the first year after a long decline, a growth in its GDP share of 0.15 percentage points since 2019, when it amounted to 2.3%.

1.2. Market structure

Information on revenue from the provision of public electronic communications in Bulgaria determined according to the type of services, is provided in Table 1, including the distributed[5] revenue from the provision of bundled services (information on the definition of "bundled services" can be found in point 1.2.1. Bundled Services below).

Table 1

Structure of the electronic communications market in Bulgaria according to the type of services provided for the period 2018 – 2020

Public electronic communications services	Revenue		
	2018	2019 [1]	2020
	(in millions BGN)		
1. Voice telephony services	1,204.421	1,172.133	1,149.745
1.1. Fixed telephony service through numbers from the NNP and public payphones	117.875	114.644	93.016
1.2. Mobile telephony service through numbers from the NNP	1,069.931	1,042.060	1,037.526
1.3. Other voice services[2]	16.615	15.430	19.203
2. Leased lines services	20.147	21.342	19.156
3. Data transfer and/or Internet access services	887.282	998.574	1,196.047
4. Transmission and/or distribution of radio and/or TV programmes services	403.914	424.559	427.294
5. Other services [3]	61.456	64.068	68.793
TOTAL	**2,577.220**	**2,680.677**	**2,861.035**

[1] The data for 2019 have been updated

[2] Includes revenue from the provision of VoIP (voice IP service where no NNP (geographic or non-geographic) numbers are used, the service quality is not guaranteed, and the user must use/have Internet access through the respective device – computer/telephone)

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

Source: Data submitted to CRC

[4]Calculated at current prices. Source: NSI https://www.nsi.bg/bg/content/2206/%D0%B1%D0%B2%D0%BF-%D0%BF%D1%80%D0%BE%D0%B8%D0%B7%D0%B2%D0%BE%D0%B4%D1%81%D1%82%D0%B2%D0%B5%D0%BD-%D0%BC%D0%B5%D1%82%D0%BE%D0%B4-%D0%BD%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%B0%D0%BB%D0%BD%D0%BE-%D0%BD%D0%B8%D0%B2%D0%BE

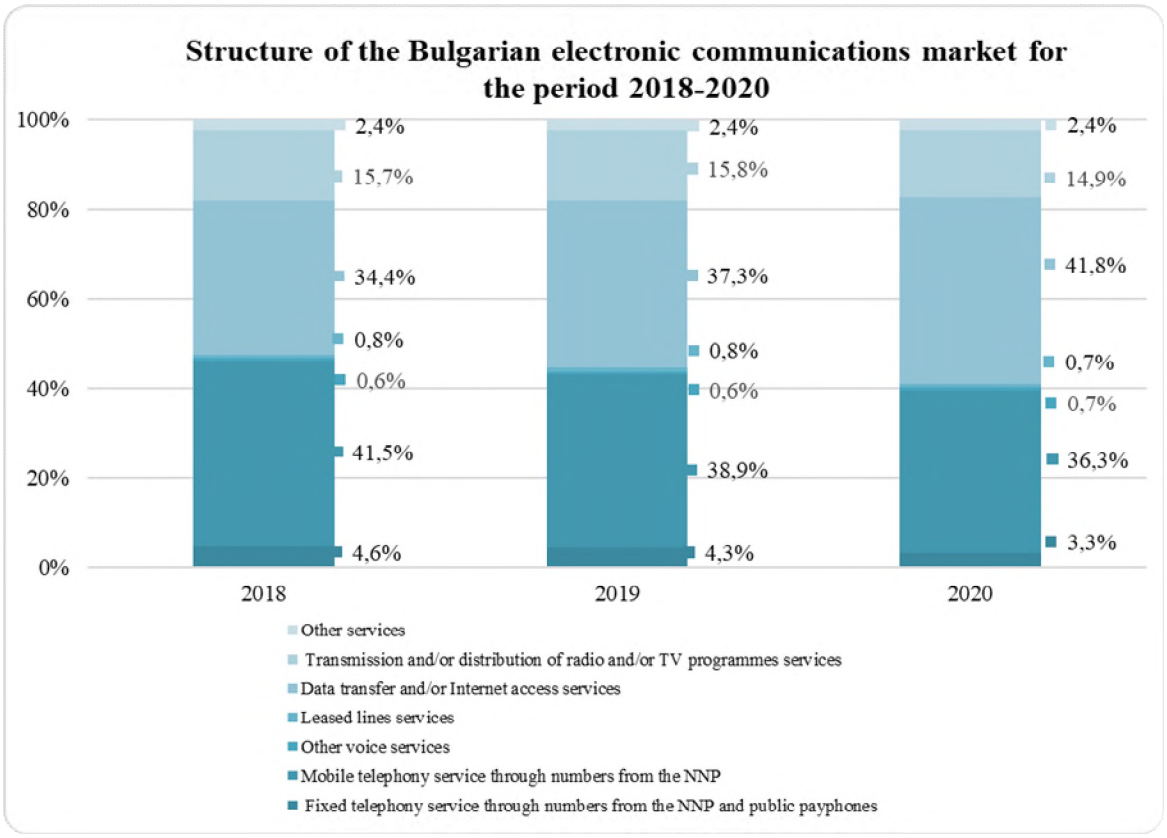
[5] The breakdown of revenue from bundled services (installation fees and monthly subscription for fixed and mobile telephony services, Internet access and television) by types of services included in the bundle is made and presented in the Annual Report by the undertakings which have submitted the information. 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.

In 2020, the total volume of the electronic communications market continued to be determined mainly by revenue from voice services and data transfer and/or Internet access services.

For the first year, the revenue from the data transfer and/or Internet access services exceeded the revenue from voice services, taking up leading position by a share of 41.8% in the total market volume. The relative share of revenue from this market segment within the market structure increased by 4.6 percentage points compared to previous year.

Revenue from voice telephony services (fixed, mobile and other voice services) continued to drop both in absolute (by 1.9% for a one-year period) and in relative terms (by 3.5 percentage points). In 2020, their share in the total volume of the public electronic communications was 40.2%.

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 2018 – 2020.



Source: Data submitted to CRC

Figure 2

As compared to the year before, revenue in three market segments registered a growth in 2020, namely:

- ”Data transfer and/or Internet access“ – 19.8%; over a one-year period, the relative share of the segment grew by nearly 5 percentage points. This year, the growth is mainly due to the ”Data transfer and/or Internet access via fixed networks“ group, as its revenue was up by 31.2%;
- “Other services” registered a growth of 7.4%. The major increase here was observed in the “Access to satellite systems service”, the revenue from which grew by 46.2% compared to 2019, and in the ”Co-location and other forms of shared use, including the

provision of access to towers, masts, etc." (by 11.7% compared to 2019). Revenue from the "Provision of access to duct" service, included in this segment, also registered, although minimal, growth of 0.7%.

- "Transmission and/or distribution of radio and TV programmes services" rose by 0.6%, although revenue from cable and satellite TV registered a decline. The growth recorded in this segment was mainly due to the increase in revenue from IPTV (by 13.4% compared to 2019).

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

ü "Voice telephony services" – by 1.9% in absolute value, the most significant decrease being observed in the fixed telephony service – 18.9%. In this segment, however, a considerable growth of revenue from VoIP was observed (by 24.5% versus 2019).

ü "Leased lines services" reported a decrease by 10.2% in 2020 as compared to 2019.

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

1.2.1. Bundled services

Revenue from bundled services[6] plays a significant role on the electronic communications market in Bulgaria. In 2020, for another consecutive year, consumption of bundled services in Bulgaria increased - as of 31.12.2020, 51% of fixed telephony service subscribers, 74% of mobile telephony service subscribers, 33% of fixed Internet access subscribers, 83% of mobile Internet access subscribers, and 34% 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) from provision of bundled services reached BGN 1,288.823 million,[7] which represents a growth of 11.1% compared to the revenue in the previous year.

According to the data submitted to CRC, in 2020, five undertakings launched activity for the provision of a bundled service - double-play package including fixed Internet access and television. In this way, in 2020, the total number of undertakings providing bundled services amounted to 90, which is by 4 more in comparison with the previous year (86 in 2019).

Subscribers of bundled services

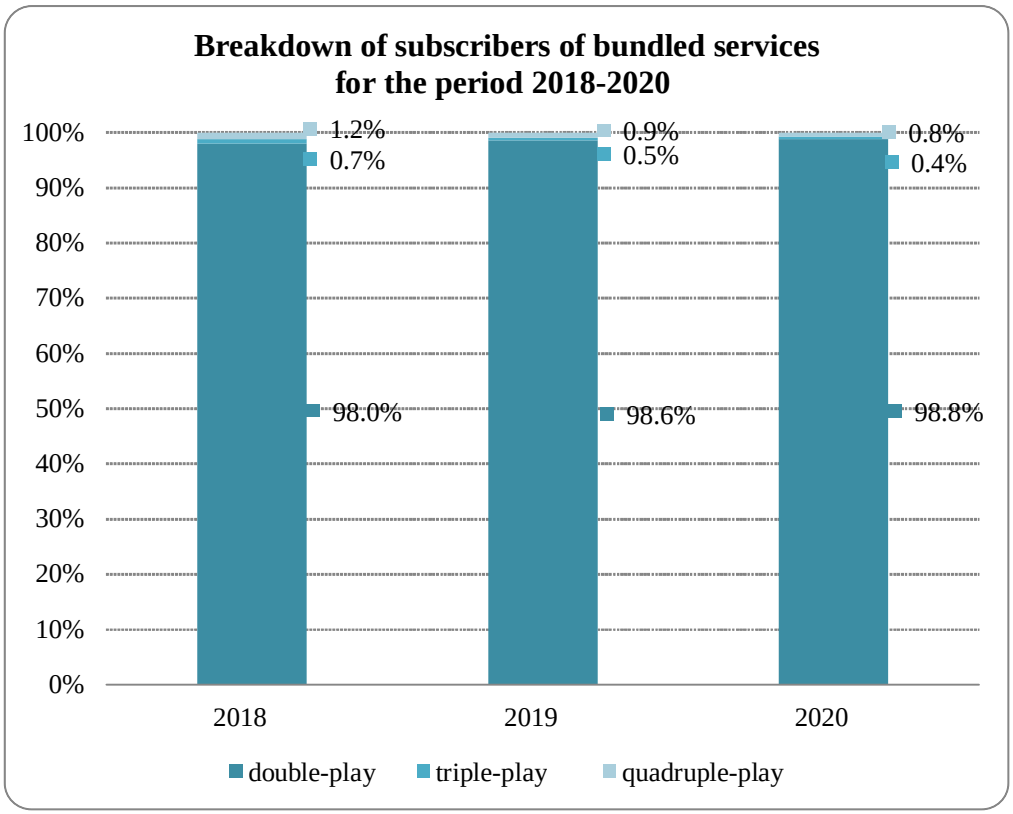
The number of subscribers of bundled services at the end of 2020, according to the data submitted by the undertakings providing public electronic communications in Bulgaria, increased compared to the previous year by 0.2% to reach 6.526 million. As a result, in the period 2019-2020, the value of the "penetration by population"[8] indicator also grew by 0.6 percentage points, thus reaching 94.4%.

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.

[6] "Bundled services" shall mean commercial offers extended 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). "Bundled services" shall include the so called "pure","joint" and "mixed" bundling.

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

[8] This indicator was calculated as the ratio between the total number of subscribers of bundled services and the number of population as of 31.12.2020, according to NSI data (population by districts, municipalities, place of residence and sex: www.nsi.bg)

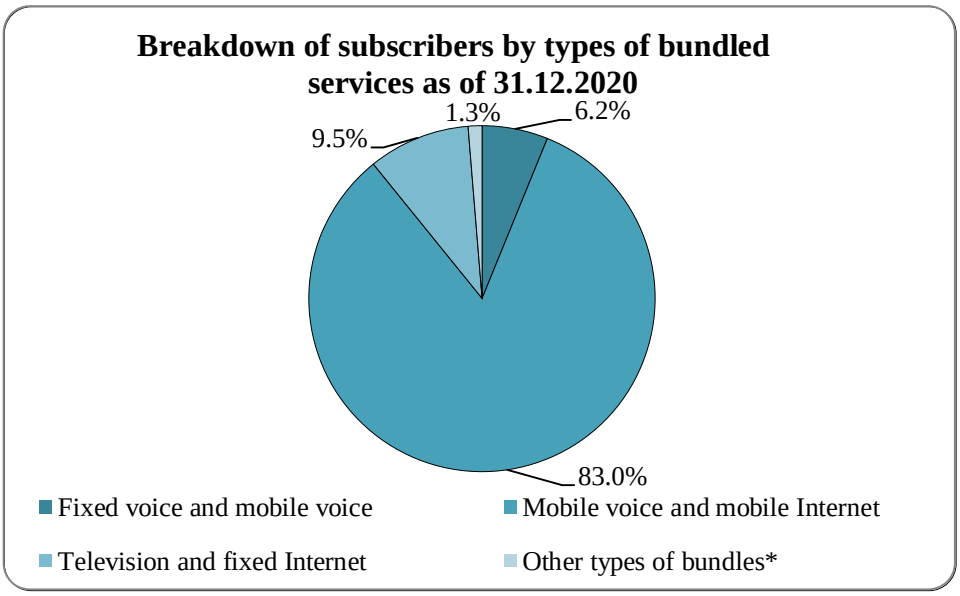


Source: Data submitted to CRC

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 2020, double-play packages covered 98.8% of the total number of subscribers of bundled services, as the number of subscribers to this kind of packages increased by 0.2% compared to the 2019 data. In 2020, as it was the case the year before, the number of subscribers of triple-play packages dropped significantly (by 18.2%), mainly as a result of the reduction (by 55.6%) in the number of subscribers of the "fixed voice, TV and fixed Internet access" and of the "mobile voice, TV and mobile Internet" packages (by 33%). This also affects the share of triple-play packages in the total number of subscribers in which a decline of 0.1 percentage points against 2019 was registered, at the expense of an increase in the share of double-play packages. The interest in quadruple-play packages also registered a drop of 16.5% compared to 2019. The share of the quadruple-play bundles was 0.8%, down by 0.2 percentage points.

Figure 4 presents the breakdown of subscribers by the most preferred bundled services in 2020.



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

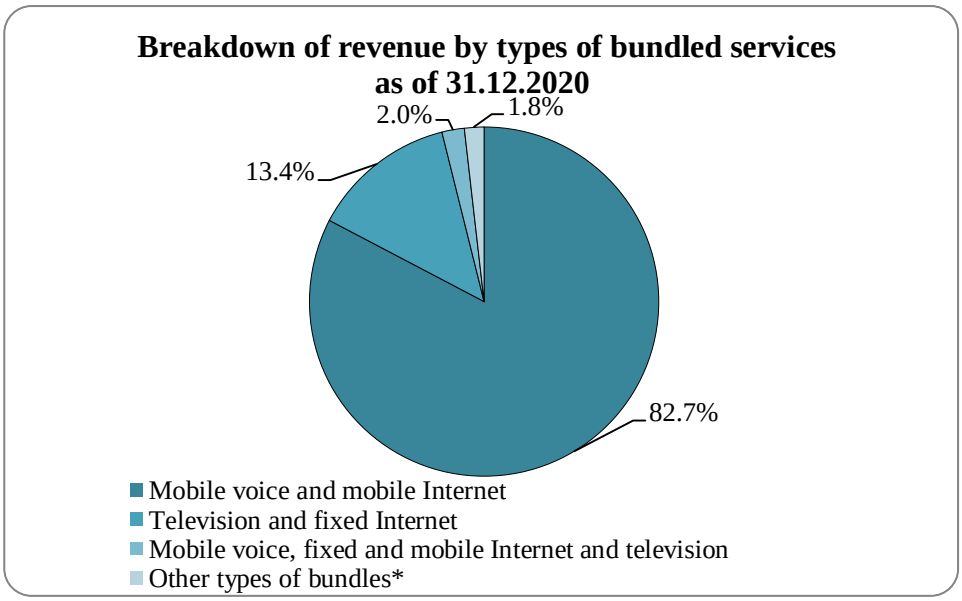
Figure 4

The number of subscribers of the most preferred bundled service – "Mobile voice and mobile Internet access" - grew by 0.2% as compared to 2019, reaching 5.419 million at the end of 2020, which, however did not have a significant impact on their share (it remained 83%). The number of subscribers of the second most used bundle ("Television and fixed Internet access") rose by 7.7% to arrive at 619 thousand in 2020, registering an increase of 0.7 percentage points in relative terms. "Fixed voice service and mobile voice service" bundle, with a relative share of 6.2% of the total number of bundled services subscribers, was used by 403 thousand subscribers (down by 5.9% in absolute value).

Revenue from bundled services

Revenue from bundled services amounted to BGN 1,288.823 million in 2020, registering a growth of 11.1% year-on-year. The highest share (97%) in the total volume of revenue from these services continued to be held by double-play services which, as compared to 2019, reported a growth of 12.1% in absolute value and by 0.9 percentage points in relative value. The share of revenue from triple-play bundles continued its downward trend in 2020 (by 0.3 percentage points), which is a consequence of the reported 18.5% drop in absolute value. Revenue from quadruple-play bundles dropped by 11.9% versus 2019, occupying 2.2% of the total volume of revenue in the segment (by 0.6 percentage points less compared to 2019).

Figure 5 presents the breakdown of revenue by types of bundled services in 2020.



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 2020, the share of revenue from double-play service including mobile voice service and mobile Internet access grew by 1.6 percentage points from 2019 to reach 82.7% of the total volume of the revenue from bundles, and the registered growth in absolute value was 13.3%. The revenue from double-play bundled service "television and fixed Internet" reported an increase of 7.4% versus 2019; however, there is a decline of 0.5 percentage points in their share in total revenue as compared to 2019. The share of quadruple bundled service "mobile voice, fixed and mobile Internet and television", also registered a decline of 0.5 percentage points in 2020. In absolute value, the revenue from this bundle dropped by 11.3%. The highest growth in revenue in 2020, compared to 2019, was reported in triple-play bundle "mobile voice, fixed and mobile Internet" – 46.8%, which, however, makes up a negligible share of the total revenue (it remained at 0.3%).

Summary

In 2020, the following trends were observed in the "Bundled services" segment:

- the consumption of double-play bundles continued to grow at the expense of triple-play and quadruple-play bundles;
- once again, the most preferred bundled services were those that included mobile service – 90.2% of the total number of subscribers used bundles with mobile voice included, while 84% 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 service included (mobile voice and/or mobile Internet).

1.2.2. Investments

In 2020, 397 undertakings (by 25 less than in 2019) invested in the building and maintenance of public electronic communications networks BGN 429.963 million out of the planned BGN 443.047 million in 2019, which shows that the investments made were by 3% less than those planned by undertakings for 2020.

During the year, BGN 104.576 million were invested in fixed networks for the provision of electronic communication services, of which BGN 52.531 million (by BGN 8.281 million less than the previous year) were invested in next-generation access (NGA) networks. In 2020, the number of undertakings that have invested in next-generation access networks increased by 1 compared to 2019 (197 undertakings).

In 2020, the investments in mobile networks were 34% of the total investments of the undertakings, registering an increase of nearly 1% in absolute terms for a one-year period. The investments made amounted to BGN 146.052 million - by 9.7% less than the investments in mobile networks planned by the undertakings for 2020.

2. Voice telephony services

The "voice telephony services" segment includes the following public electronic services: fixed telephony service through geographic numbers from the National Numbering Plan (NNP), "Carrier Selection" service, telephony services via public payphones, mobile telephony service through numbers from the NNP (including SMS[9] and MMS[10]) and other voice services (VoIP[11] services, provision of voice service through commercial representation, etc.).

Table 2 presents summarised information on the reviewed segment in 2020, namely: the number of undertakings which provided services in this market segment, the number of their subscribers/lines that used voice telephony services, and the revenue from services provided.[12]

Table 2

Number of undertakings, subscribers/lines and revenue by type of voice telephony services provided in 2020

Service	Number of undertakings providing the service in 2020	Number of subscribers/lines as of 31.12.2020		Revenue (in millions BGN, excl. VAT)	
		Total [1]	including bundled service subscribers	Total [2]	including from bundled services
1. Fixed telephony service through numbers from the NNP and public paythones	30	837,249*	424,043	93.016	6.236
2. Mobile telephony service through numbers from the NNP	4	7,945,739	5,889,467	1,037.526	612.605
3. Other voice services	21	///	///	19.203	///
Total	**50**	///	///	**1,149.745**	**618.841**

[1] Including subscribers of bundled services

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

* Number of lines of fixed telephony 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

A total of 50 undertakings declared activity on providing voice services in 2020. The number of undertakings providing services from the "Mobile telephony service through numbers from the NNP" group did not change during the year - the number of active undertakings was four. The total number of undertakings which declared activity on providing fixed telephony services through numbers from the NNP and via public payphones/telephone booths during the

[9] Short message service.
[10] Multimedia messaging service.
[11] Voice IP service where no NNP numbers are used, the service has no guaranteed quality and the user must use/have Internet access through the respective device - computer/telephone.
[12] Detailed information on the provision of fixed and mobile telephony services is presented in points 2.1 and 2.2.

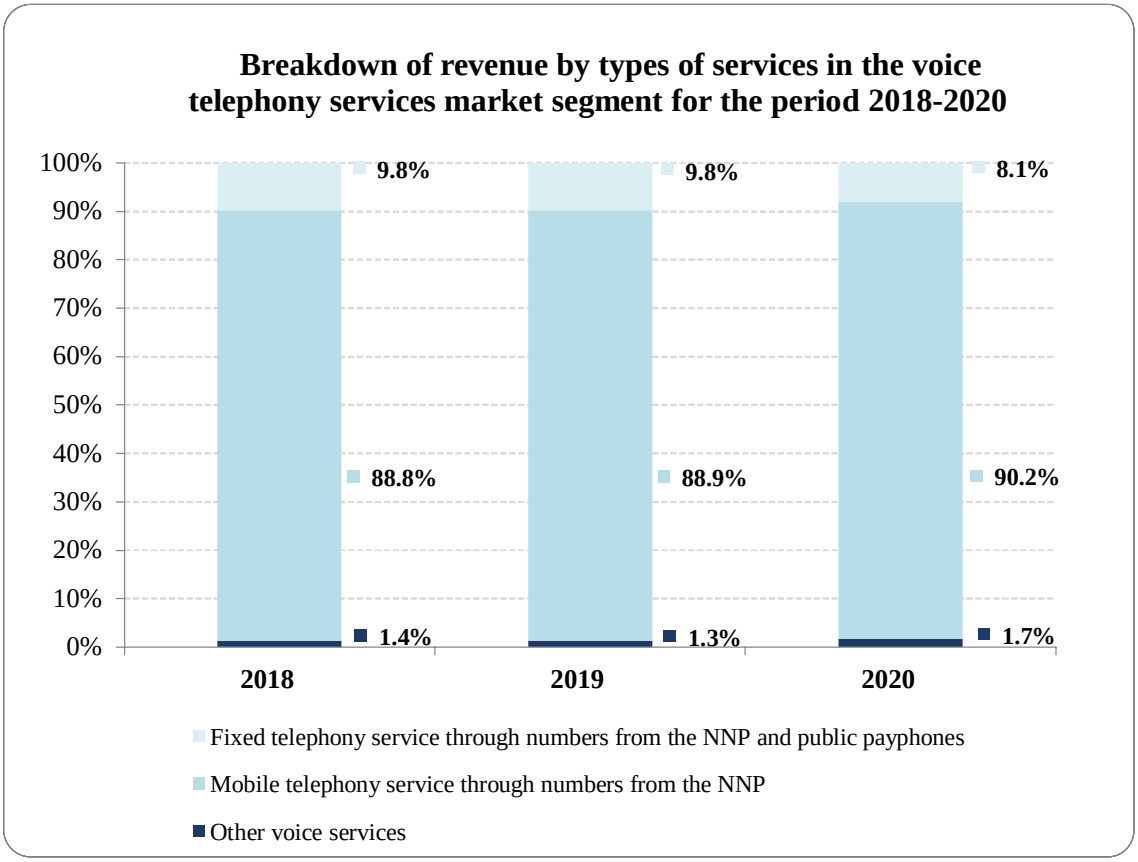
year reached 30. Twenty-eight of the undertakings provided access to fixed telephony service and/or wholesale services for interconnection of public telephone networks, including the Bulgarian Telecommunications Company EAD (BTC), which also provided the service through public payphones/telephone booths. Two undertakings declared that they provided fixed telephony service only through public payphones/telephone booths.[13] In 2020, the number of undertakings providing other voice services was 21, by one undertaking more than the previous year.

The total volume of revenue generated from voice telephony services with revenue from bundled services included, amounted to BGN 1,149.745 million, registering a decline (by 1.9%) in 2020 as compared to the preceding year, when the volume of the segment, measured in revenue, amounted to BGN 1,172.133 million.

In 2020, the decline in revenue in the "Voice telephony services" segment was mainly due to the reduction in revenue from fixed telephony services, including those provided by public payphones - by 18.9%, compared to 2.7% in the previous period. Revenue from the mobile telephony service fell by only 0.4% compared to 2019, with a decline of 2.6% in the previous period (2018-2019). The "Other voice services" group reported a growth of 24.5%, mainly due to an increase in revenue from VoIP services, which in 2020, as in the previous year, accounted for 98.0% of the volume of revenue generated in this group.

Figure 6 shows the distribution of revenue from different services in the segment volume for the period 2018-2020.

[13] In 2019, the number of undertakings which declared activity on providing fixed telephony service through numbers from the NNP and via public payphones/telephone booths reached 28. Of these, 27 undertakings declared activity on providing access to a public telephone service through geographic numbers from the NNP and/or wholesale services for interconnection of public telephone networks. Apart from BTC, only one other undertaking provided a service through public payphones/telephone booths.



Source: Data submitted to CRC

Figure 6

In 2020, as it was expected, the largest share of the total segment volume was formed by revenue from mobile telephony service (90.2%, with 88.9% in the previous year). The share of revenue from fixed telephony service dropped by 1.7 percentage points, while the one of other voice services rose by 0.4 percentage points.

2.1. Fixed telephony service

Market players

As of 31.12.2020, the total number of undertakings authorised by CRC[14] to provide access to fixed telephony service through primary assigned resource - geographic numbers - and access to public telephony service through the "carrier selection" service was 25. A total of 16 undertakings were registered for their intention to provide public electronic communication services through resale of fixed telephony service through secondary assigned numbers. The undertakings listed in the CRC register with the intention of providing telephone services via public payphones at the end of 2020 were 12.

In 2020, the total number of undertakings which declared activity on providing fixed telephony service through numbers from the NNP and/or wholesale services for interconnection of public telephone networks reached 28. Of them, 25 undertakings undertakings declared activity on providing access to fixed telephony service to end-users through geographic numbers. Nineteen of them provided the service through a primary assigned resource, with one

[14] Undertakings authorised to use an individually assigned scarce resource - numbers from the National Numbering Plan (NNP) - for the provision of fixed telephony service.

undertaking ceased activity in the year[15], and 6 declared activity on resale of fixed telephony service through secondary assigned numbers. Three undertakings declared that they provided only wholesale services ("transit" and "physical interconnection") related to the provision of fixed telephony service. In 2020, three undertakings declared activity on providing telephony service through public payphones/telephone booths, one of which was the Bulgarian Telecommunications Company EAD (BTC).

The main providers of fixed telephony service through numbers from the NNP to end-users (retail service) were BTC, A1 Bulgaria EAD (A1) and Telenor Bulgaria EAD (Telenor).

Table 3

Market shares of undertakings providing retail fixed telephony service through NNP numbers

Undertaking	2019		2020	
	Share based on number of fixed telephone lines	Share based on revenue from subscribers	Share based on number of fixed telephone lines	Share based on revenue from subscribers
BTC	60,2%	84,2%	59,5%	83,4%
A1 BULGARIA EAD	24,5%	7,2%	25,1%	7,3%
TELENOR BULGARIA EAD	13,4%	4,7%	13,3%	5,2%
The rest of operators	1,9%	3,9%	2,1%	4,1%

Source: Data submitted to CRC

In 2020, BTC, A1 and Telenor were the main competitors on the retail fixed telephony service market, which accounted for nearly 98% of the market volume, measured on the basis of the number of telephone lines of fixed telephony service subscribers and nearly 96% of the revenue generated from retail service subscribers. In 2020, BTC continued to hold the largest market share based on fixed telephone lines, registering a decline of 0.7 percentage points compared to 2019. The market share of A1 increased by 0.6 percentage points over the one-year period. The share of Telenor remained almost unchanged, as it registered a minimum reduction of 0.1 percentage points. The fixed telephone lines of all other undertakings accounted for only 2.1% of the market, measured on the basis of the number of telephone lines of fixed telephony service subscribers.

As is evident from the data presented in the table, in 2020, compared to 2019, no significant change was observed in the market shares of undertakings calculated based on revenue from the provision of fixed telephony service to end subscribers. The share of BTC decreased by 0.8 percentage points in 2020 compared to 2019, while the one of Telenor grew by 0.5 percentage points. The change in the market share of A1 is negligible, only by 0.1 percentage points, and the cumulative market share of the other market players rose by 0.2 percentage points from 3.9% in 2019 to 4.1% in 2020.

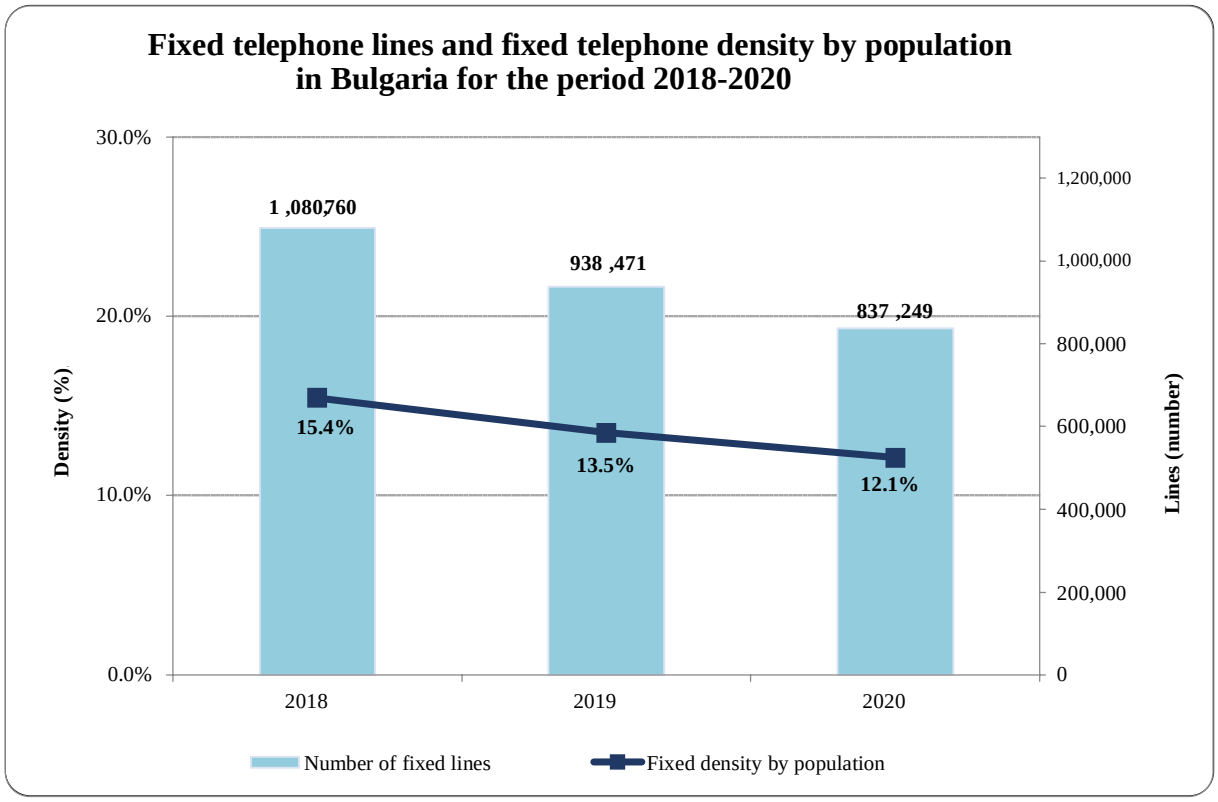
Telephone lines of fixed telephony service subscribers

In 2020, as a result of the decreasing interest of end-users to fixed telephony service, there was a decrease in the number of fixed telephone lines for yet another year. The decline in the total number of fixed telephone lines was by 10.8% compared to 2019, which is by 2.4 percentage points less than the decrease registered in 2019 versus 2018 (13.2%). The number of BTC's lines decreased by 11.7% in 2020, with a drop of 13.9% in the previous period (2019-

[15] The validity of the authorisation of Telecable AD for the use of an individually assigned scarce resource - numbers was terminated by Decision No 330/24.09.2020 at the request of the undertaking as of 24.09.2020.

2018), and as for the other undertakings, the reduction in the total number of fixed telephone lines of fixed telephony service subscribers was by 9.4% in 2020 compared to 2019, with 12.0% for the previous reporting period.

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



Source: Data submitted to CRC

Figure 7

As a result of the decline in the total number of fixed telephone lines by 22.5% for the three-year period under review (2018-2020), the value of the fixed telephone density by population indicator also decreased in 2020, reaching 12.1%.[16]

In 2020, for yet another year, the number of public payphones/telephone booths fell by 2.6% compared to 2019.

Consumption (traffic) of fixed telephony service

In 2020, the volume of the outgoing traffic (in minutes), originated by the users[17] for national (local and long-distance calls, calls to mobile terrestrial networks and non-geographic numbers) and international calls declined, but at a lower rate as compared to the year before. The decrease in consumption in minutes during the reporting year was 4.8% compared to 2019, with a decrease of 13.6% for the period 2018-2019, and the total volume of traffic generated in 2020 amounted to 523.240 million minutes. Only 0.1% of it is the share of traffic generated by public

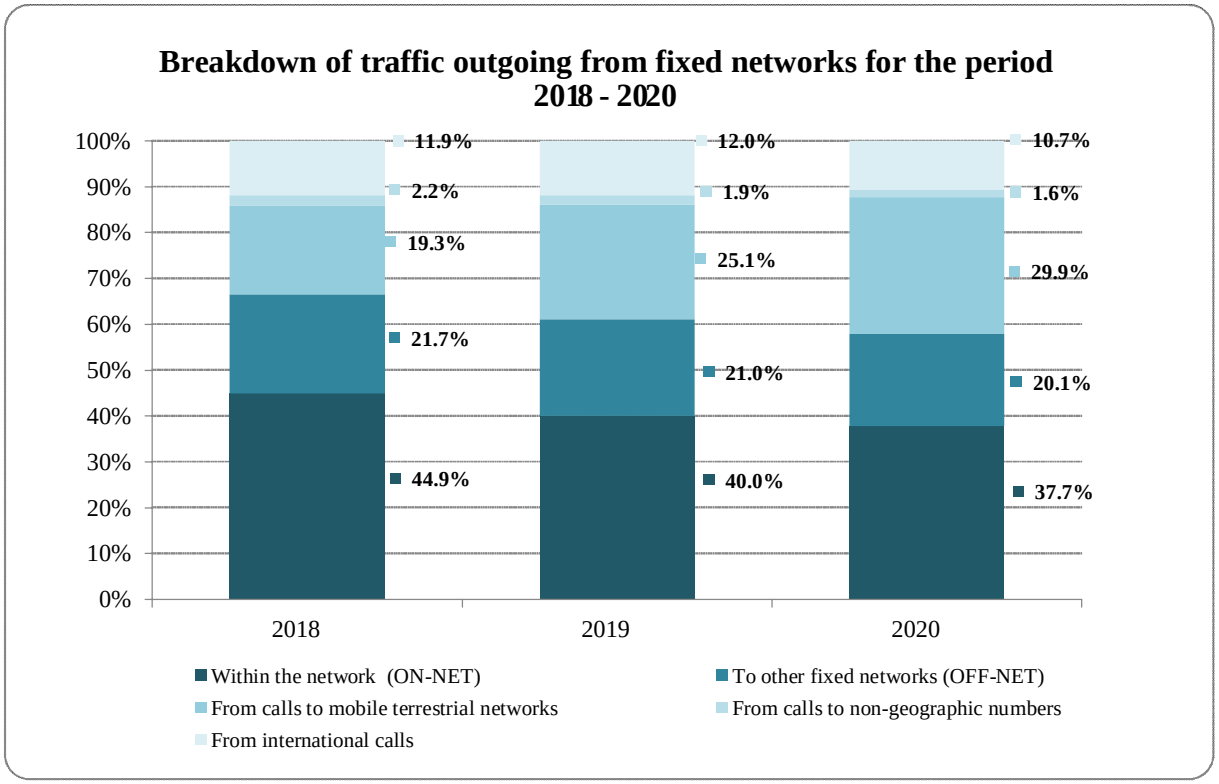
[16] The "fixed density by population" indicator was calculated as the ratio between the total number of active telephone lines as of 31.12.2020 and the number of population as of 31.12.2020, according to NSI data (population by districts, municipalities, place of residence and sex: http://www.nsi.bg/bg/node/2972)

[17] Includes traffic originated by subscribers of fixed telephony services (including the "carrier selection" service), as well as traffic originated from public payphones/telephone booths.

payphones/telephone booths, with a 25.7% reduction in absolute terms in 2020 compared to 2019.

The service provision model, which involves the inclusion of an increasing volume of telephone traffic in the subscribers' monthly fixed telephony service subscriptions, was also applied in 2020, with the share of traffic generated from calls within subscriptions increasing by 1.8 percentage points to reach 89.1%. In this way, the traffic from calls which was paid by subscribers beyond their monthly subscription made up only 10.9% of the total generated traffic. In 2020, the consumption of the "carrier selection" service was once again symbolic, with only one undertaking[18] having declared the provision of this service.

Figure 8 displays the breakdown of the total volume of traffic generated from fixed networks in the period 2018-2020, depending on the call destinations.



Source: Data submitted to CRC

Figure 8

In 2020, as in the previous year, an increase in the volume of traffic from calls was recorded only for calls to mobile networks - by 13.5% over a one-year period, with 89.5% of the total volume of this traffic coming from the consumption included in subscriptions. As a result, the relative share of this traffic in the total volume of minutes generated from calls increased by 4.8 percentage points to reach 29.9%.

For the remaining types of calls, a decrease, both in absolute terms and as a share in the total volume, was observed in 2020 compared to 2019, as follows:

- the volume of traffic within the networks (on-net) dropped by 10.3%, yet it generated, for another consecutive year, the major part of the total traffic volume - 37.7%;
- traffic from calls to other fixed networks (off-net) fell by 9.1% and its share dropped by

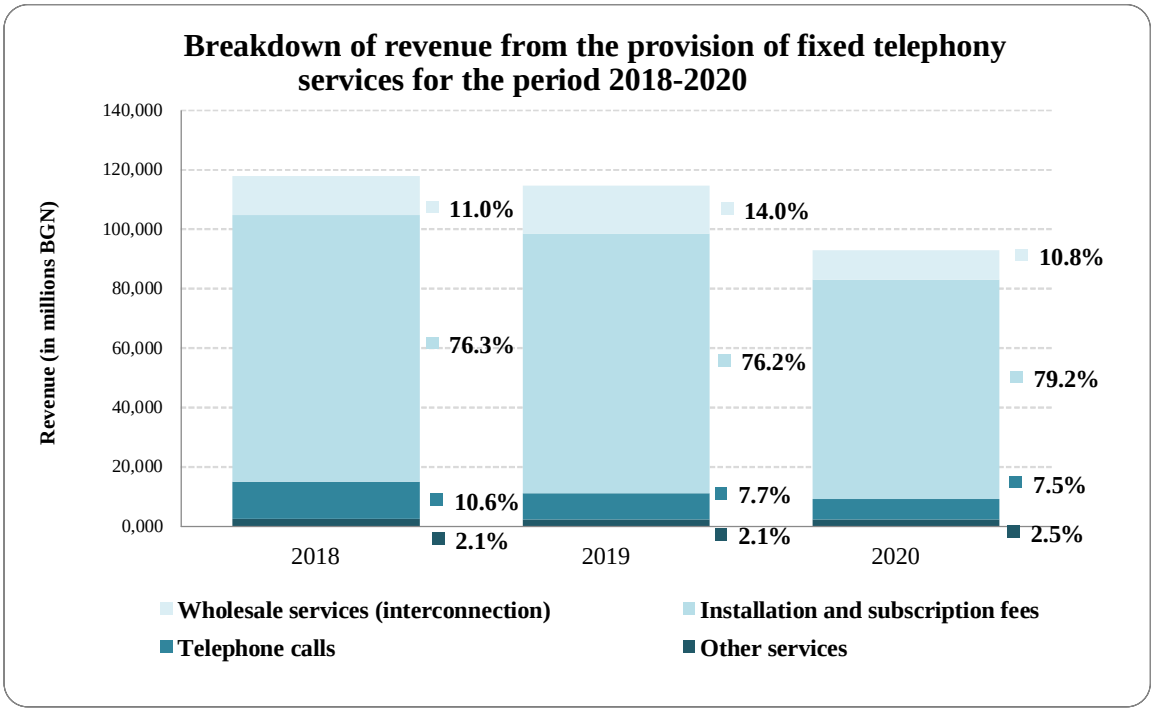
[18] Eastern Telecommunications Company EAD

0.9 percentage points compared to the year before;

- calls to networks abroad accounted for 10.7% of the total retail traffic and decreased both as a relative share of the total consumption by 1.3 percentage points and in absolute terms by 15.2%.

Revenue from fixed telephony service

In 2020, the total volume of revenue generated from the provision of fixed telephony service[19] amounted to BGN 93.016 million, registering a decline of 18.9% compared to 2019. In 2020, as in 2019, revenue from public payphones/telephone booths made up only 0.1% the total revenue from fixed telephony service.



Source: Data submitted to CRC

Figure 9

In 2020, the revenue from installation and subscription fees from the provision of fixed voice services to end-users, including the part of a bundled service, formed the main part of the total revenue generated from the service – 79.2%, compared to 76.2% in 2019.

The main changes reported in terms of revenue generated from fixed telephony service in 2020 are as follows:

- drop in the volume of revenue generated from the provision of access to the fixed telephony service (installation and subscription fees) of 15.7% compared to 2019;
- the revenue generated from calls beyond the subscriptions decreased by 20.7% in 2020 compared to 2019, due to the high proportion of "free minutes" used, included in the price of monthly subscriptions. A decline was also registered in the the revenue generated from calls from public payphones/telephone booths - by 40.4%;
- in 2020, a decrease was also registered in the revenue from wholesale services (including interconnection services - origination, termination, transit and physical interconnection)

[19] Including revenue from calls through the "carrier selection" service and public payphones/telephone booths.

by 37.5%.

Summary

In 2020, the fixed telephony service segment was characterised by the following changes:

- the number of fixed telephone lines of subscribers to a fixed telephony service continues to drop year-on-year - for 2020, the decline was by 10.8% compared to the year before;
- the total consumption of the service, expressed in minutes of retail call traffic, shrinks, with growth being recorded only for calls to mobile networks for yet another year;
- the volume of traffic generated from calls included in subscriptions continues to increase, as subscribers paying only 10.9% of the traffic beyond their subscriptions in 2020.

The data reporting the changes in the main indicators characterising the fixed telephony service do not give grounds to conclude that the COVID-19 pandemic has had a significant impact on the segment. For another year, a decrease was recorded in the values of the main indicators characterising the fixed telephony service. The rate of drop in the number of fixed telephone lines in 2020, compared to 2019, did not differ significantly from the annual reductions recorded for the period 2017-2019. The volume of traffic generated was also reduced but at a lower rate than in the previous years.

The regulation of international call prices which was introduced on 15 May 2019 within the European Union (EU) also did not reverse the downward trend in the consumption of the fixed telephony service, although the 2020 data showed a smaller decrease in the volume of traffic generated from international calls by residential subscribers to EU/EEA countries. In 2020, this type of traffic fell by nearly 4%, with an average decrease of around 22% in previous years (2017-2019). It should also be noted that the main part (around 94%) of total traffic generated to EU/EEA countries by residential subscribers in 2020, as well as in 2019, is consumption included in the subscription plans. The lower rates of decline in consumption, as well as in the total consumption of residential subscribers in 2020, are likely also due to the social isolation resulting from the COVID-19 crisis.

2.2. Mobile telephony service

Market players

In 2020, a total of five undertakings were authorised by CRC[20] for the provision of mobile telephony service in the country, and there was no change in their number and composition compared to the previous year 2019. These are A1, BTC, Bulsatcom EAD (Bulsatcom), Telenor and Ti.Com AD. The data they submitted to CRC in their activity reports for 2020 showed that A1, BTC, Bulsatcom and Telenor continued to offer and provide mobile telephony service on the market in 2020, while Ti.Com AD has not started to offer the service yet.

With a market share of 38.1%, A1 kept its leading position by the number of mobile telephony service subscribers for another year (according to data as of 31.12.2020) (Table 4), while Telenor was again the leader on a retail revenue basis[21] with a market share of 41.6%. The

[20] Undertakings authorised to use an individually assigned scarce resource - numbers from the NNP - for the provision of mobile telephony service.

[21] Market shares were calculated based on revenue from the provision of retail mobile telephony 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 telephony service and revenue from retail service provided standalone, excluding the part of revenue provided bundled with other electronic communication services.

market share of Bulsatcom, calculated both by number of subscribers and by revenue, continued to be symbolic in 2020 as well.

Table 4

Market shares of undertakings providing retail mobile telephony service

Undertaking	2019		2020	
	Share based on number of subscr.	Share based on revenue	Share based on number of subscr.	Share based on revenue
A1 BULGARIA EAD	38.5%	33.7%	38.1%	33.0%
TELENOR BULGARIA EAD	33.4%	41.2%	33.4%	41.6%
BTC	28.1%	25.2%	28.5%	25.4%
BULSATCOM EAD	0.01%	0.002%	0.02%	0.002%
Ti.Com AD*	0.0%	0.0%	0.0%	0.0%

*The undertaking did not provide mobile telephony service in 2019 and in 2020.

Source: Data submitted to CRC

Table 4 shows that in 2020 the changes in the market shares based on both the number of subscribers and on retail revenue from mobile telephony service were insignificant. BTC reported a minimal increase in market share, both on the basis of number of subscribers and on the basis of retail revenue, while A1 once again reported a decline, although symbolic, in both indicators compared to the year before. Telenor also registered a small increase in market share on the basis of revenue, while on the basis of number of subscribers, the company's market share remained unchanged compared to 2019. The particular values of changes in the market shares of A1, Telenor and BTC in 2020 compared to 2019 are as follows:

- the relative share of A1, calculated on the basis of number of subscribers, dropped by 0.4 percentage points, while the one calculated on the basis of revenue fell by 0.7 percentage points;
- the relative share of Telenor, calculated on the basis of number of subscribers, remained unchanged, while the one calculated on the basis of revenue was up by 0.4 percentage points.
- the relative share of BTC, calculated on the basis of number of subscribers, increased by 0.4 percentage points, whilst the one calculated on the basis of revenue was up by 0.2 percentage points.

The data presented on the dynamics in the market shares of mobile undertakings in 2020 show that no dramatic changes were observed in this first year of global economic and social crisis as a result of the COVID-19 pandemic, which could rearrange the positions of Bulgarian mobile undertakings in the mobile telephony service segment in the country as compared to the previous year 2019.

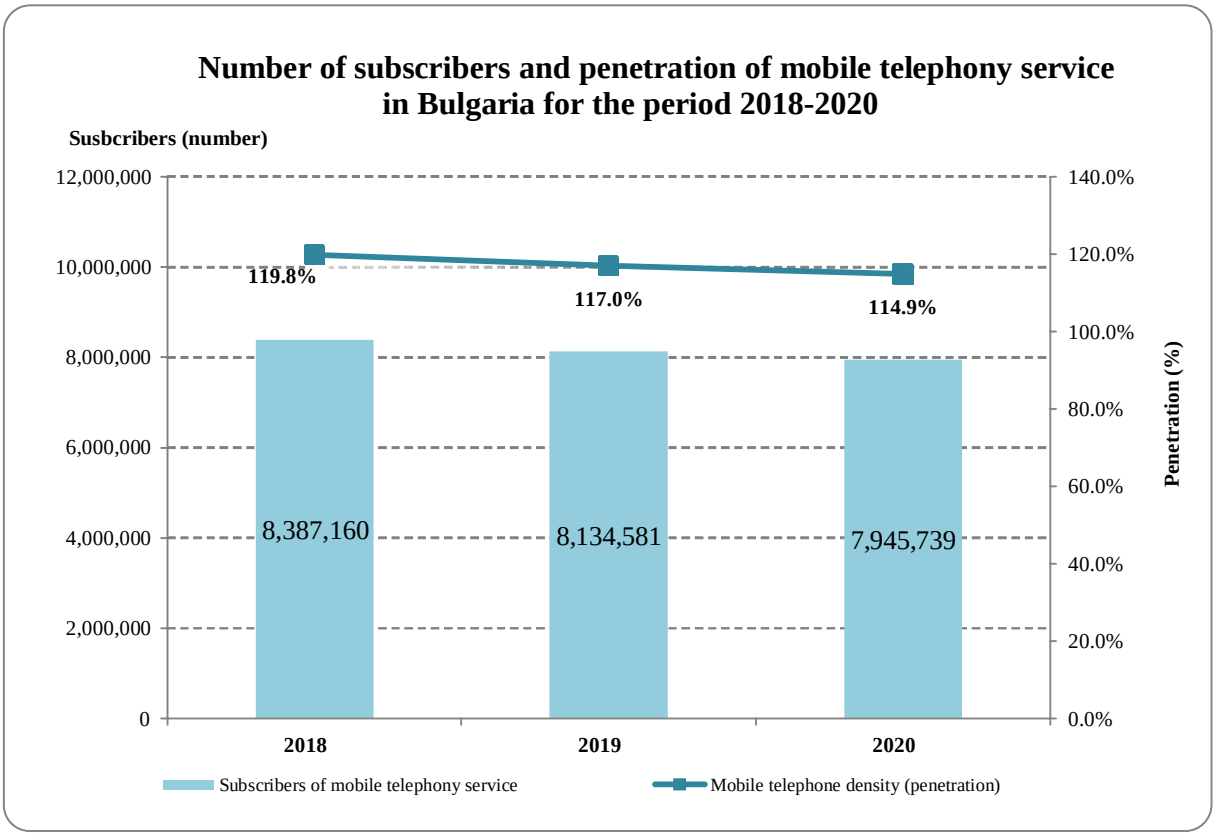
Subscribers of mobile telephony service

As of 31.12.2020, the number of subscribers of mobile telephony service (number of unique SIM cards) amounted to 7,945,739, registering a drop for yet another year compared to the year before (by 2.3% less than in 2019; as of 31.12.2019, the number of subscribers was 8,134,581). It should be noted that the fall in the number of subscribers in 2020 was by 0.7 percentage points lower than the one observed in 2019 (3.0%).

Data provided to CRC by undertakings show that as of 31.12.2020, postpaid subscribers were almost by 114 thousand less than the previous year (down by 1.7%), while the number of users of prepaid cards decreased by 75 thousand compared to the end of 2019 (down by 5.7%).

The reasons for the reduction in the number of mobile telephony service subscribers in the country reported in 2020 are complex; on the one hand, it was driven by the negative impact of the coronavirus pandemic on businesses and ordinary consumers (a consolidation is observed in the use of SIM cards by users and deactivation in order to reduce the cost of telecommunication services of unused SIM cards by business users) and, on the other hand, the negative demographic processes in the country (population reduction and external migration) also have an adverse impact on the number of mobile telephony service users in the country.

The following figure gives information about the number of mobile telephony service subscribers and the service penetration ("mobile telephone density") among the population over the period 2018-2020.[22] As is evident from the data presented, the decline in the total number of mobile telephony service subscribers recorded in 2020 had a negative effect on the size of the service penetration among the population as well.

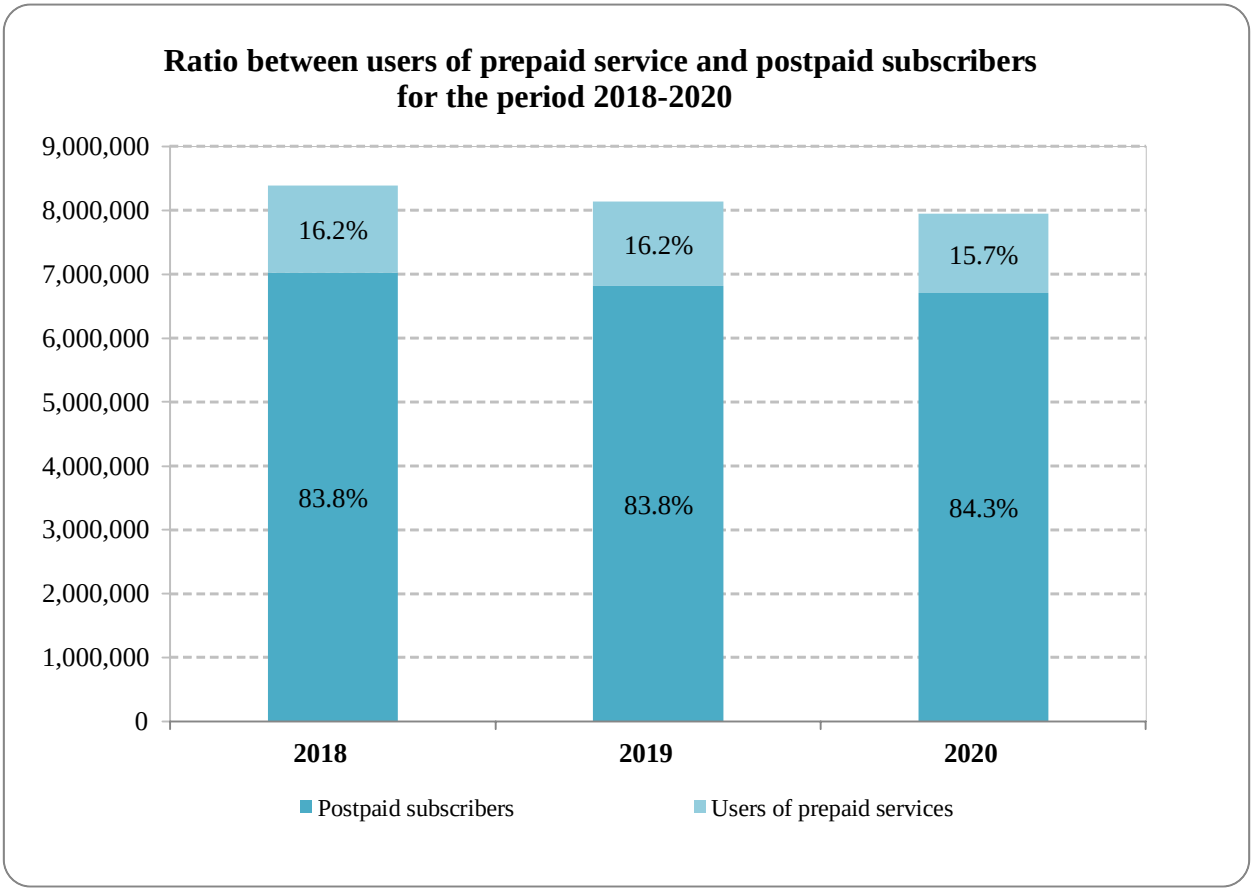


Source: Data submitted to CRC

Figure 10

At the end of 2020, the penetration of mobile telephony service in Bulgaria was 114.9%, down by 2.1 percentage points as compared to the penetration in 2019 (117.0%). This decline shows that in 2020 there was a slight slowdown in the decline rate of the "mobile telephone density" indicator compared to 2019, when a drop of 2.8 percentage points was registered compared to 2018.

[22] The "mobile telephone density" indicator was calculated as the ratio between the number of subscribers of mobile telephony services as of 31.12.2020 and the number of population as of 31.12.2020, according to NSI data (population by districts, municipalities, place of residence and sex: http://www.nsi.bg/bg/node/2972).



Source: Data submitted to CRC

Figure 11

As of 31.12.2020, a slight change (by 0.5 percentage points) was reported in the ratio between users of prepaid mobile telephony service and postpaid subscribers - the share of users using a prepaid service dropped to 15.7%, while 84.3% had a monthly subscription contract with the service provider (Figure 11).

Consumption (traffic) of mobile telephony service

The total volume of mobile outgoing traffic in the country[23] in 2020 amounted to 21,958.47 million minutes, with a significant increase of 12% compared to the total volume of outgoing traffic in 2019. To compare with, the growth reported in 2019 for this indicator was by 1.1%, for 2018 - 2.8%, and for 2017 - 4.5%. This data shows that the 2020 peak registered in the number of minutes used in the Bulgarian mobile networks was provoked by the social distance measures introduced in March 2020 to combat the COVID-19 pandemic in the country. As a result of these measures, throughout most of the year, the use of Internet and telephone calls became almost the only means of personal and business communication in the country and the record growth reported in the consumption of mobile calls for 2020 in Bulgaria is a natural result of the imposed distance form of communication. In this respect, it should be noted that in 2020 there was an increase in all types of outgoing traffic generated by mobile networks in the country: the number of minutes used from mobile to fixed networks in the country grew by 6.9%, the number of minutes used to networks abroad - by 4.6%, the consumption of mobile

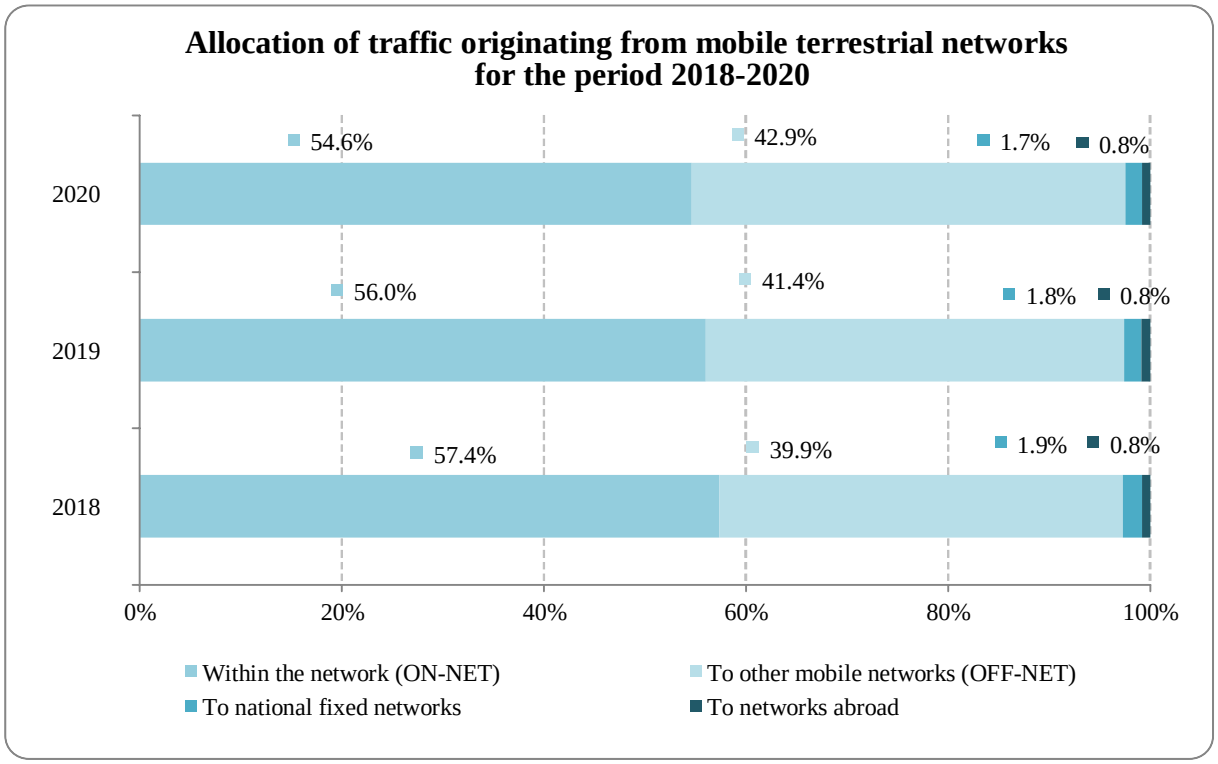
[23] Including outgoing traffic generated by mobile telephony service subscribers within a mobile network (on-net traffic), to other mobile networks in the country (off-net traffic), to fixed networks in the country and to networks abroad.

calls within the own mobile network rose by 9.4%, and the increase in the number of minutes used to other mobile networks in the country was by 16.1%.

It should be noted that the price caps on international calls and SMS messages within the EU introduced on 15 May 2019 had a positive impact on the consumption of international mobile telephone calls to networks within the EU/EEA countries – the 2020 growth recorded in the number of minutes used to networks within the EU/EEA countries was by 15.6% compared to 2019.

The share of consumption (number of call minutes) by subscribers with prepaid SIM cards in the total consumption of mobile telephony service in 2020 continued to drop and was reduced to 3.6% (3.9% in 2019), while the share of consumption by postpaid subscribers increased to 96.4%. Both categories of subscribers experienced an increase in the total volume of their call minutes – an increase of 12.4% was observed in postpaid subscribers and a rise of 5.2% was reported for prepaid subscribers.

Despite the fact that the downward trend in the consumption of mobile calls within a given mobile network (on-net) in recent years has been replaced by a growth of 9.4% in 2020, this has not led to an increase in the share that this traffic holds in the total volume of traffic generated on mobile networks in the country. As shown in the figure below, the share of on-net traffic is decreasing for another year - from 56.0% in 2019 to 54.6% in 2020. The steady upward trend in the share of off-net traffic continued in 2020 and, from 41.4% in 2019, its share reached 42.9% in 2020.



Source: Data submitted to CRC

Figure 12

The figure above shows that the share of traffic to fixed networks in the country (1.7% in 2020) registered a slight decline, while the share of traffic to networks abroad (0.8% in 2020) remained unchanged over the three-year period under review.

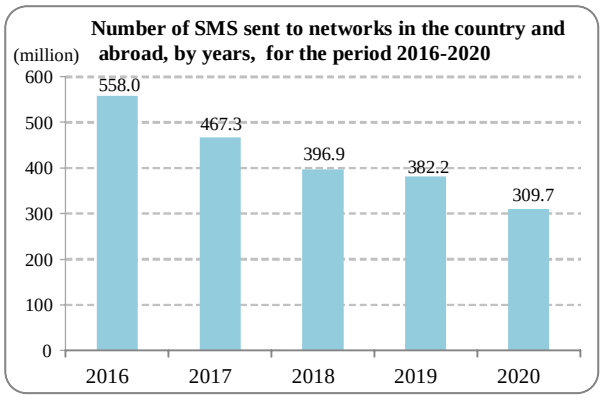
The continuing downward trend in the share of on-net traffic and the increase in the share

of traffic generated to other mobile networks in the country (off-net) shows that there were no adverse effects on competition in the mobile telephony service market in Bulgaria in 2020, linked to "closing the traffic" within the own network of mobile undertakings and end-users had favourable conditions for both on-net and off-net calls.

Naturally, as a result of the restrictive measures introduced in 2020 for travelling abroad in connection with the coronavirus infection, the reduction recorded in 2019 in roaming calls (by 9.1% in the outgoing and 5.3% in the incoming roaming calls) grew in 2020 and the consumption of mobile telephony service in roaming by subscribers of Bulgarian undertakings abroad dropped by the record 25.6% in 2020, and the total volume of incoming calls to subscribers of the Bulgarian undertakings abroad fell by 16.2%.

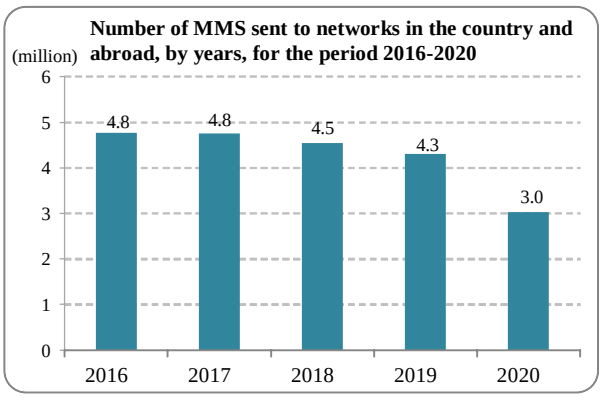
Short multimedia and text messages

In 2020, the total number of short text messages (SMS) sent by Bulgarian subscribers to networks in the country and abroad amounted to 309.7 million (Figure 13) and the total number of short multimedia messages sent (MMS) - to 3.0 million (Figure 14).



Source: Data submitted to CRC

Figure 13



Source: Data submitted to CRC

Figure 14

As shown in the figures above, the beneficial effect of social distance resulting from COVID-19 on the growth rate of mobile phone calls in 2020 is not manifested in the use of short text and multimedia messages. For yet another year, they reported a fall (by 19.0% for SMS and 29.6% for MMS), with a reduction of 44.5% in the number of SMS used in the country and a decline of 36.4% for MMS for the period 2016-2020.

The number of SMS and MMS sent in roaming was also reduced in 2020 - by 40.5% for SMS and 34.8% for MMS messages.

The main reason for the downward trend in the consumption of short text messages in Bulgaria is the fact that, unlike the large volumes of minutes for "free-of-charge" phone calls, which mobile operators include in their subscription and pre-paid mobile telephony tariff plans, the offering of “free-of-charge” SMS included in the plans is not as widespread or is even absent in some of them. This restriction affects the customer habits of mobile subscribers and they prefer either to make a phone call or to use the so-called „Over The Top (OTT)“[24] applications, such as WhatsApp, Facebook Messenger, iMessage, Viber or Skype, rather than paying for traditional SMS or MMS.

[24] In its report BoR (16) 35 (Report on OTT services), BEREC defines the term „over-the-top“ (OTT) as: ‘Content, a service or an application that is provided to the end-user over the open Internet’.

Revenue from mobile telephony service

In 2020, the total volume of revenue from the provision of mobile telephony service amounted to BGN 1,037.526 million, registering a drop, although minimal, for yet another year (by 0.4%), as compared to the previous year 2019. To compare with, the decline in revenue reported in 2019 was by 2.6%.

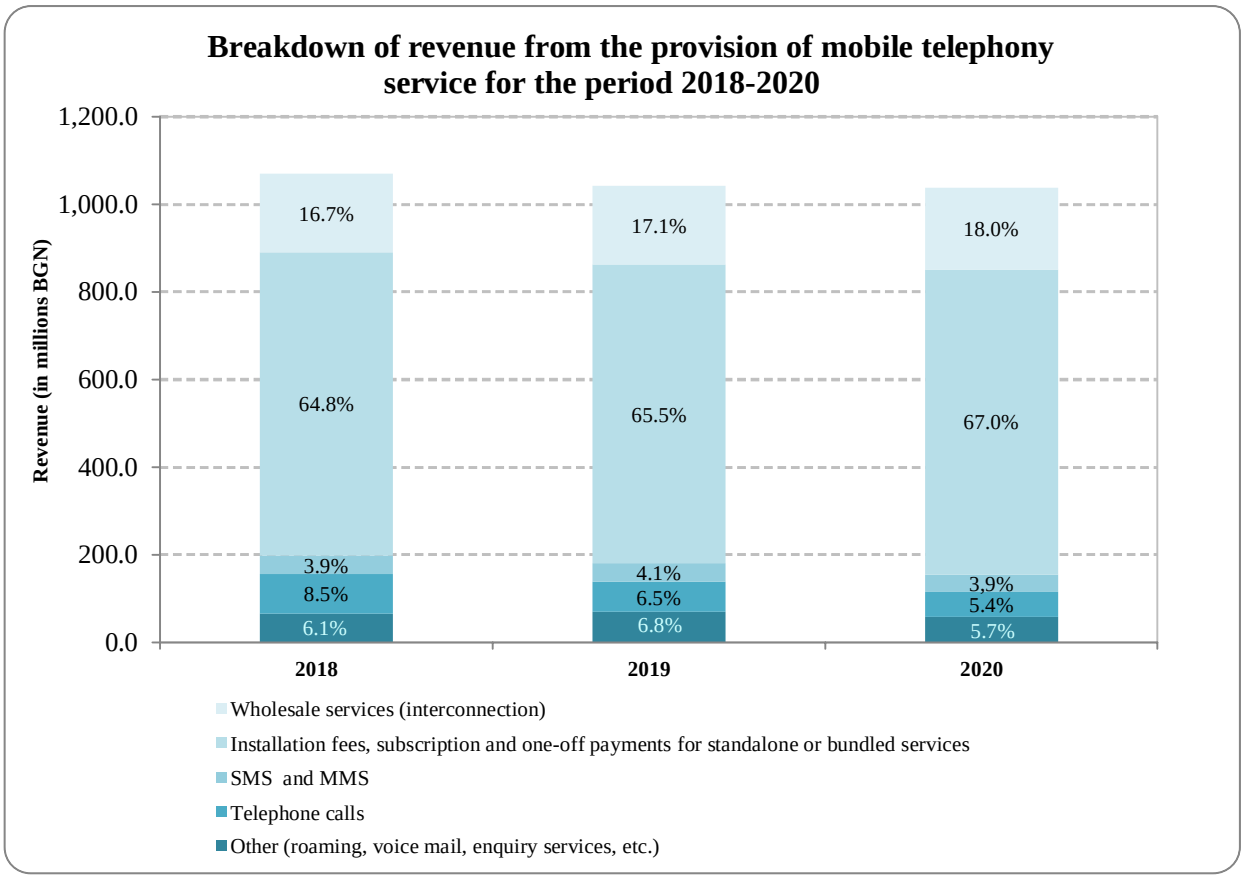
The volume of revenue from the provision of retail mobile telephony service was BGN 850.230 million, while that of revenue from wholesale services amounted to BGN 187.296 million. The data available at CRC show that the decline in revenue from the provision of mobile telephony service was for another year provoked by a drop in retail revenue – by 1.5%. For the third consecutive year, revenue from wholesale services (interconnection) registered a growth - by 4.7%. The data analysis shows that the decline in revenue from the provision of retail mobile telephony service in 2020 was the result from a drop in the traffic revenue from the provision of retail mobile telephony service[25] (by 14.1%). The main reasons for this are the following:

- a fall of 18.1% in outgoing traffic revenue from voice telephony services in mobile networks, resulting, on the one hand, from the high proportion of "free-of-charge minutes" used, which mobile operators include in the monthly subscription price, and, on the other hand, a significant contribution in 2020 had the price caps on international calls and SMS within the EU[26], which resulted in a 45.1% drop in revenue from international calls to networks from EU/EEA countries.
- a 42.1% drop in international roaming revenue as a result of the COVID-19 crisis and the sharp drop in travels abroad since the first quarter of 2020.

The breakdown (structure) of revenue from mobile telephony service for the period 2018-2020, by years, is presented in Figure 15 below. It shows that, in 2020, revenue from monthly subscription fees and installation charges of standalone and bundled provision of the mobile telephony service, which held the largest share in the segment (67.0%), continued to play a key role. The growth of the total volume of wholesale revenue, reported in 2020, led to an increase in their share in the segment which reached 18.0%. The share of revenue from telephone calls (5.4%) registered a decline for yet another year - by 1.1 percentage points.

[25] Includes revenue from voice telephony services, video calls, voice mail, inquiry and information telephony services, calls to numbers from the "118" range, SMS and MMS sent, messages to short network numbers, from international roaming and from other services related to the provision of mobile voice telephony services.

[26] The regulation is provided for in Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and retail charges for regulated intra-EU communications and amending Directive 2002/22/EC and Regulation (EU) No 531/2012.



Source: Data submitted to CRC

Figure 15

The share of revenue from SMS and MMS registered an insignificant decrease in 2020 (by 0.2 percentage points). The share of revenue from other services decreased by 1.1 percentage points, mainly as a result of the significant fall in 2020 in the revenue from international roaming included in this group of revenues.

Summary

The development of the mobile telephony service in 2020 was strongly influenced by the COVID-19 outbreak at the beginning of the year. The anti-epidemic measures related to social distance led to an unusually high level of the increase in the consumption of mobile phone calls in the country observed in recent years, but, at the same time, had a significant negative effect on the consumption of and revenue from roaming mobile calls.

The number of mobile telephony service users decreased for another consecutive year, as part of the reasons for this are also linked to the COVID-19 crisis, as business users, in order to optimise the cost of telecommunication services, deactivated unused SIM cards. The total volume of revenue from non-traffic and traffic mobile services provided at retail level by mobile operators to business subscribers also dropped in 2020.

The price caps on international calls and SMS within the EU introduced on 15 May 2019 had a strongly negative impact on the revenue of mobile operators from international mobile telephone calls to networks within the EU/EEA countries; however, it had a positive effect on the consumption of international mobile telephone calls in 2020.

3. Leased lines services

The 2020 data submitted by the undertakings providing the leased lines service, including international leased lines, confirmed the downward trend observed over the last more than ten

years in this market segment. A growth was only registered in 2019. The total revenue from the provision of the service in 2020 amounted to BGN 19.156 million, registering a drop of 10.2% compared to revenue generated the year before.[27]

Summarised information on the number of undertakings that provided leased lines services, including international leased lines, 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 2020

Service	Number of undertakings providing the service in 2020	Number of leased lines as of 31.12.2020	Revenue in 2020 (in millions BGN, excl. VAT)
1. Wholesale leased lines	**20**	**2,425**	**14.576**
1.1. National leased lines	17	2,196	10.436
1.2. International leased lines	8	229	4.140
2. Retail leased lines	**13**	**1,763**	**4.579**
Total	**24**	///	**19.156**

Source: Data submitted to CRC

Market players

According to the information submitted to the Commission, 24 undertakings (out of 113 that have notified CRC of their intention to provide the leased lines service, listed in the public register as of 31.12.2020) were active in the market segment. Nine undertakings provided the service both in the retail and in the wholesale market, while eight 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 2020.[28]

Table 6

Market shares of undertakings providing retail leased lines

Undertaking	2019		2020	
	Share based on number of retail lines	Share based on retail revenue	Share based on number of retail lines	Share based on retail revenue
BTC	76.8%	64.9%	77.6%	62.4%
A1 BULGARIA EAD	12.6%	16.9%	11.1%	19.4%
SOFIA COMMUNICATIONS EAD	4.7%	7.7%	4.1%	6.6%
All other	5.9%	10.4%	7.2%	11.7%

Source: Data submitted to CRC

[27] With a view to data comparability, for the purposes of the annual report, for the year 2020, revenue from the provision of leased lines also included revenue from the links of the international leased lines that are located outside the territory of the country. The data for 2019 have been recalculated.
[28] The data on the market shares based on revenue for 2019 have been recalculated.

In 2020, as opposed to 2019, the total market share (92.8%) based on number of retail lines of the three major undertakings dropped by 1.3 percentage points, with the most significant decrease registered in the share of A1 BULGARIA EAD – by 1.5 percentage points. Based on retail revenue, the decline reported in the share of the three undertakings was smaller - by 1.2 percentage points. As a result, the remaining players increased their share proportionally, both by revenue and by number of lines.

Table 7

Market shares of undertakings providing wholesale leased lines

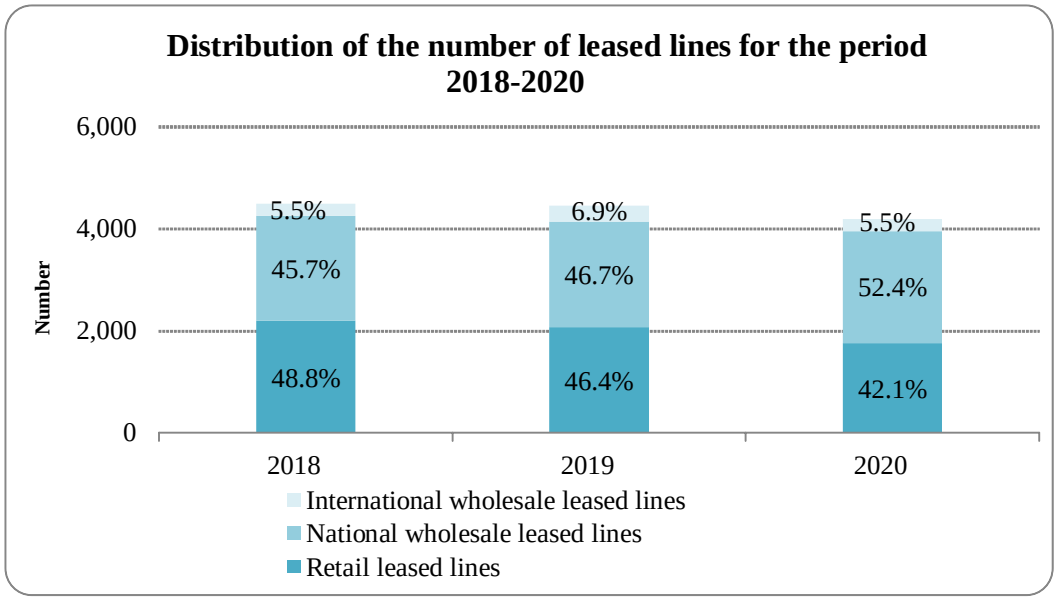
Undertaking	2019		2020	
	Share based on number of wholesale lines	Share based on wholesale revenue	Share based on number of wholesale lines	Share based on wholesale revenue
NOVATEL EOOD	26.9%	49.5%	30.1%	43.0%
SOFIA COMMUNICATIONS EAD	23.7%	5.9%	22.4%	6.2%
BTC	13.8%	21.2%	12.5%	21.3%
All other	35.6%	23.3%	35.0%	29.4%

Source: Data submitted to CRC

In 2020, as opposed to 2019, the total market share (65%) based on number of wholesale lines of the three major undertakings rose by 0.6 percentage points, with the most significant increase registered in the share of NOVATEL EOOD – by 3.2 percentage points. Based on wholesale revenue, the decrease reported in the share of the three undertakings was by 6.1 percentage points.

Number of wholesale and retail leased lines

The total number of wholesale and retail leased lines provided continued to decrease, and the decline registered in 2020 year-on-year was by 6.1%, which is due to the reduced number of retail and wholesale international leased lines.

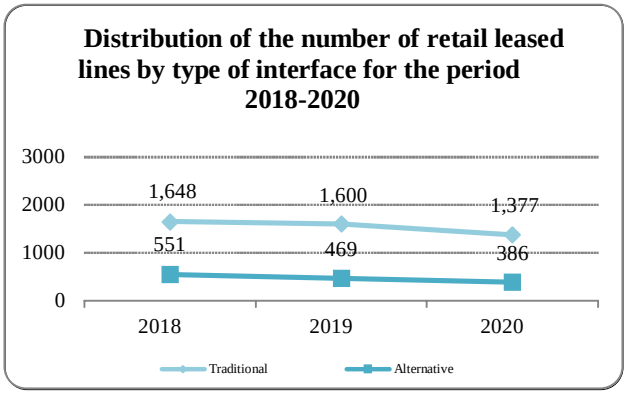


Source: Data submitted to CRC

Figure 16

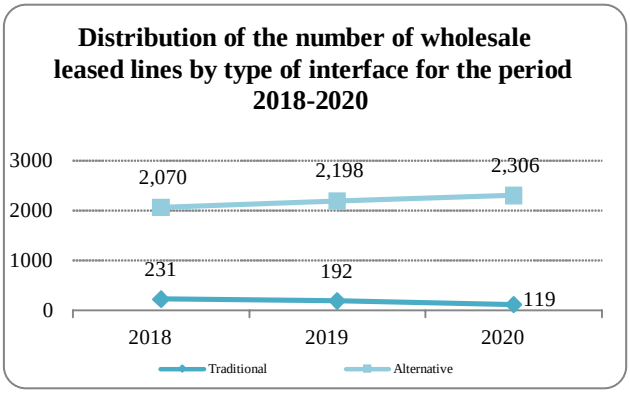
The breakdown of leased lines is displayed in Figure 16. The decrease in the number of retail lines compared to the previous year was by 4.3 percentage points and the decrease in international wholesale leased lines was by 1.4 percentage points. In 2020, there was an increase of 5.7 percentage points in the share of national wholesale leased lines.

Figures 17 and 18 present the distribution of the number of retail and wholesale leased lines provided for the period 2018 – 2020 by type of interface.



Source: Data submitted to CRC

Figure 17



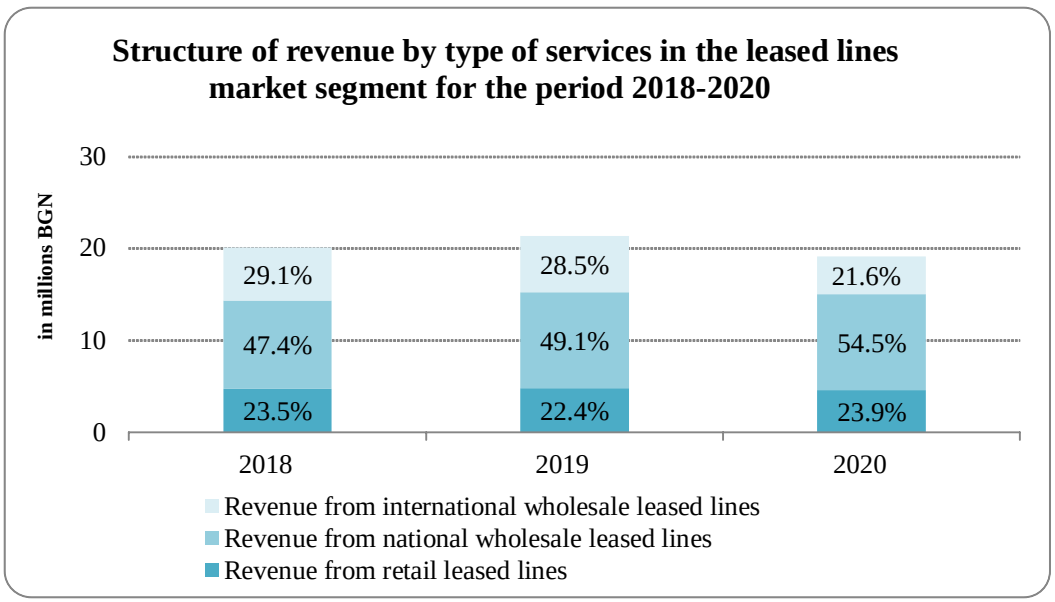
Source: Data submitted to CRC

Figure 18

The total decline in retail leased lines made up 14.8% in 2020, with traditional lines decreasing by 13.9% and alternative lines - by 17.7%, respectively. The reported growth (1.5%) in the number of wholesale leased lines was the result of the 4.9% increase in the number of alternative wholesale lines. The number of traditional wholesale leased lines continued to decrease (by 38%) at a growing drop rate compared to the previous period (the decrease in 2019 versus 2018 was by 16.9%).

Revenue from leased lines

Figure 19 presents the structure of revenue generated from the provision of leased lines services (wholesale and retail) for the period 2018-2020.



Source: Data submitted to CRC

Figure 19

In 2020, the significant decrease in revenue from international wholesale leased lines (by 32% compared to the 2019 figures) as well as the relatively stable amount of revenue from national wholesale leased lines (which are down by only 0.4%) had an impact on the ratio between revenues by types of services in the total segment volume. As a result, the share of national wholesale lines increased by 5.4 percentage points, at the expense of the decrease in the share of international lines which registered a fall of 6.9 percentage points. Compared to 2019, in 2020, the share of retail leased lines rose by 1.5 percentage points.

Summary

The following trends were observed in the leased lines services segment in 2020:

- entry of two new undertakings providing the leased lines service;
- decrease in revenue generated both at wholesale and retail level;
- decline in the number of retail leased lines and increase in the wholesale leased lines;
- increase in the number of wholesale alternative leased lines at the expense of traditional ones.

4. Data transfer and Internet access

Data transfer and Internet access services in the country preserved their upward development in 2020 as well. The total volume of revenue generated from services included in the data transfer and Internet access segment amounted to BGN 1,196.047 million, registering an increase of 19.8% compared to the previous year 2019.[29]

Table 8 presents summarised information about the number of undertakings which provided services in this market segment in 2020 as well as about the number of their subscribers/users and the revenue generated from them.

[29]The data for 2019 have been updated. Revenue from the segment in 2019 amounted to BGN 998.574 million

Table 8

Number of undertakings, subscribers/users and revenue by type of Internet access and data transfer services provided in 2020

Service	Number of undertakings providing the service in 2020	Number of subscribers/users as of 31.12.2020		Revenue (in millions BGN, excl. VAT)	
		Total [1]	inlcl. bundled services subscribers	Total [2]	incl. revenue from bundled services
1. Retail Internet access and data transfer services	**658**	///	///	**1,061.964**	**537.500**
1.1. Internet access[3], incl.	650	8,630,186	6,123,172	998.928	537.500
1.1.1. fixed	649	2,113,103	704,179	310.290	65.808
1.1.2. mobile [4]	5	6,580,566	5,482,476	688.638	471.691
1.2. Data transfer services	59	1,137,321	///	62.665	///
1.3. Other services (hosting, email , etc.)	15	1,410	///	0.371	///
2. Wholesale services	**130**	///	///	**134.083**	///
2.1. Provision of capacity for Internet connectivity (Peering and Transit)	91	770	///	28.124	///
2.2. Data transfer services	30	321	///	8.214	///
2.3. Wholesale provision of Internet access via next generation access networks (NGA)	51	380	///	9.234	///
2.4. Other wholesale services	10	22	///	88.511	///
Total	**693**	///	///	**1,196.047**	///

[1] Including subscribers of bundled services.

[2] Including revenue from bundled services

[3] The data on the total number of subscribers and revenue from Internet access services have been obtained on the basis of data received in CRC from 89.6% of the registered undertakings.

[4] Including mobile access via data cards or modems and bundled services with mobile access to the Internet (including subscribers to data transfer bundles bought in addition to voice plans via 3G and 4G UMTS/HSPA+/LTE mobile networks).

Source: Data submitted to CRC

Market players

The number of undertakings actually providing Internet access and data transfer services in 2020 was 693,[30] by 3 undertakings less compared to 2019.[31] The number of undertakings providing retail services was 658, down by 7 undertakings since the year before, while the number of undertakings providing wholesale services increased by 14 undertakings over the one-year period.

In 2020, as in the previous year, the major providers of fixed Internet access to end-users (retail service) were BTC, A1 and Bulsatcom.

[30] Including undertakings that notified CRC for suspension of their activity in 2020 and declared revenue during the year.

[31] The data for 2019 have been updated.

Table 9

Market shares of undertakings providing retail fixed Internet access

Undertaking	2019		2020	
	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]
BTC	27.0%	21.1%	27.2%	21.6%
A1 BULGARIA EAD	25.9%	17.6%	26.0%	15.8%
BULSATCOM EAD	8.4%	10.3%	8.2%	9.1%
All other	38.7%	51.1%	38.6%	53.5%

[1] Including subscribers of bundled services.

[2] Including revenue from bundled services

Source: Data submitted to CRC

As shown in Table 9, in 2020, BTC and A1 reported an insignificant increase in their market share based on number of subscribers by 0.2 and 0.1 percentage points, respectively. As for Bulsatcom, the downward trend in the market share based on number of subscribers from the previous year was preserved, registering a fall of 0.2 percentage points. With regard to the market share of undertakings based on revenue from retail fixed Internet access, including the share of revenue from the provision of fixed Internet access bundled with other electronic communications services, of the three main undertakings, only BTC increased its market share by 0.5 percentage points. The other two undertakings - A1 and Bulsatcom - once again registered a decline in the share of revenue from fixed access by 1.8 and 1.2 percentage points, respectively, compared to 2019. As for the other undertakings, an insignificant decline was reported on the basis of fixed access subscribers (by 0.1 percentage points), and an increase of 2.4 percentage points was registered on the basis of revenue.

In 2020, mobile Internet access was provided by all five mobile undertakings - A1, BTC, Bulsatcom, Telenor and Ti.Com. Table 10 presents their shares in the provision of mobile Internet in 2019 and 2020.

Table 10

Market shares of undertakings providing retail mobile Internet access

Undertaking	2019		2020	
	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]
BTC	34.1%	33.9%	34.2%	34.7%
A1 BULGARIA	34.1%	36.3%	33.8%	35.6%
TELENOR	31.8%	29.7%	31.8%	29.6%
BULSATCOM	0.02%	0.02%	0.02%	0.02%
Ti.COM	0.03%	0.05%	0.09%	0.06%

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

[2] Including revenue from a standalone service via data card or modem, traffic revenue and the proportion 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 presented on the table, there was no shift in the positions of undertakings providing retail mobile Internet access in 2020 compared to 2019. A slight increase in the market share on a subscriber basis was reported by three of the undertakings - BTC, Telenor and Ti.Com, within 0.06 to 0.1 percentage points, respectively, while Bulsatcom retained its share of the previous year. This slight increase comes at the expense of the A1 share, which registered a decrease of 0.3 percentage points. The third place by share on a subscriber basis was occupied by Telenor which reported an insignificant growth of 0.08 percentage points compared to 2019. No significant changes were registered in the market shares calculated on the basis of revenue - the market shares of BTC and Ti.Com recorded a minimum increase of 0.8 and 0.01 percentage points, respectively, while Bulsatcom preserved its share of 2019. The market shares of A1 (by 0.7 percentage points) and Telenor (by 0.1 percentage points) have fallen since the previous year.

Subscribers of Internet access services

The upward trend in the number of subscribers to Internet access services in the country continued in 2020, albeit to a comparatively lesser extent compared to 2019. As of 31.12.2020, the total number of subscribers to retail Internet services (fixed and mobile Internet access) was 8.630 million, up by 1.7% since the end of the previous year (a growth of 5.4% in 2019 compared to 2018). The number of bundled services subscribers (with fixed and/or mobile Internet access included) also increased, but unlike previous periods, a certain slowdown was observed, as they increased their number by only 0.6% in absolute terms in the past year to reach 6.123 million. The delayed growth rate of the bundled services subscribers reflected on their share based on the total number of subscribers,[32] and they made up 71% in 2020, registering a fall of 0.8 percentage point year-on-year.

The total number of subscribers of fixed Internet access (including services provided in a bundle)[33] preserved its steady growth rate. Over the past year, the number of subscribers grew by 4.9%, reaching 2.113 million, as this increase was due both to the rise in the number of

[32] To avoid duplication, subscribers of bundled services with both fixed and mobile Internet access are excluded from the total number of Internet access subscribers.

[33] Including subscribers of ADSL, LAN, RLAN, CATV, FTTx, satellite access, fixed access through mobile network, as well as number of lines for retail Internet access via leased lines and dedicated access.

subscribers to fixed access provided standalone (by 5.3%) and to the growth in the number of subscribers to fixed access provided in a bundle (by 4%). The share of fixed access subscribers in the total number of subscribers of Internet access registered a growth of 0.7 percentage points year-on-year, and already made up 24.5%.

In 2020, the number of subscribers using mobile Internet access services[34] rose by only 0.5% compared to the year before (to compare with, their growth in 2019 versus 2018 was by 5.1%), reaching 6.581 million. The delayed growth rate was mainly due to the insignificant increase of only 0.1% compared to the 2019 data (a growth of 7.3% in 2019 versus 2018) of the number of subscribers of bundled mobile Internet access which amounted to 5.482 million at the end of 2020. For the first time in many years, an increase was reported in the number of subscribers using the service as a standalone service (via data cards and/or modems) by 3.5% since 2019 (down by 5.2% in 2019 versus 2018), and these subscribers already reached 1.098 million at the end of 2020.

The number of subscribers of mobile Internet access via LTE, which is provided by all five mobile operators in Bulgaria, reported another growth of 8% year-on-year, to reach 4.363 million as of 31.12.2020. The share of LTE subscribers in the total number of mobile access subscribers was already 66.3%, reporting a growth of 4.5 percentage points.

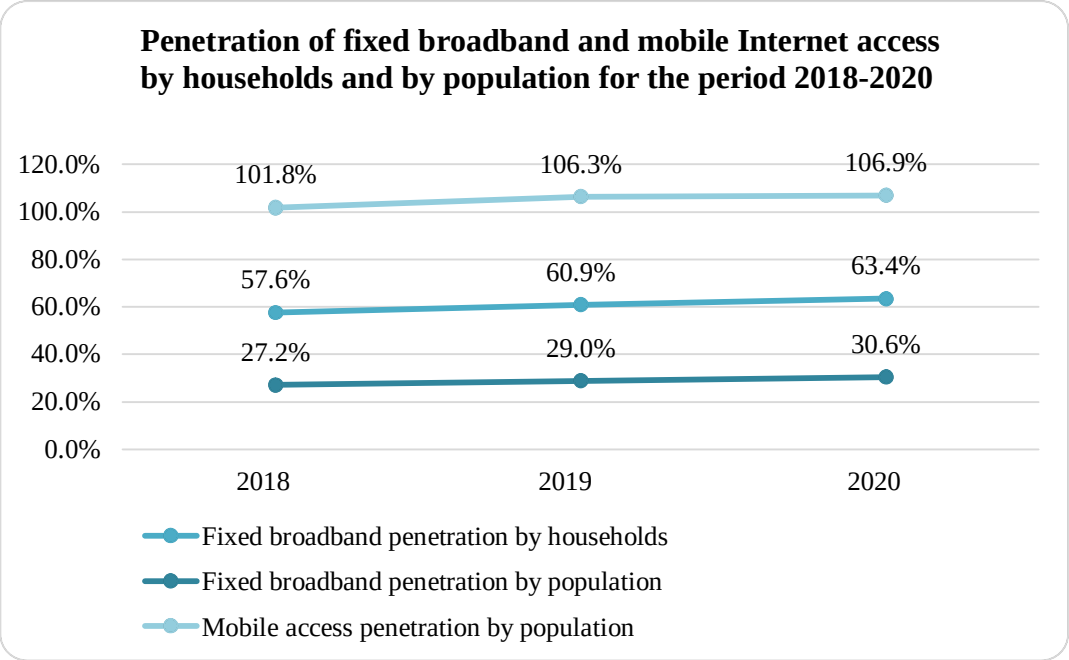
Figure 20 presents penetration[35] of fixed broadband Internet access by population and by households[36] as well as of mobile access[37] by population for the period 2018-2020.

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

[35] This indicator was calculated as the ratio between the number of subscribers of fixed access as of 31.12.2020 and the number of population as of 31.12.2020, according to NSI data (population by districts, municipalities, place of residence and sex: http://www.nsi.bg/bg/node/2972).

[36] This indicator was calculated as the ratio between the number of residential subscribers of fixed access as of 31.12.2020 and the number of households according to the last official census carried out by NSI in 2011 (3,005,589 - ordinary households).

[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 mobile access as of 31.12.2019 and the number of population as of 31.12.2019, according to NSI data (population by districts, municipalities, place of residence and sex: http://www.nsi.bg/bg/node/2972).



Source: Data submitted to CRC

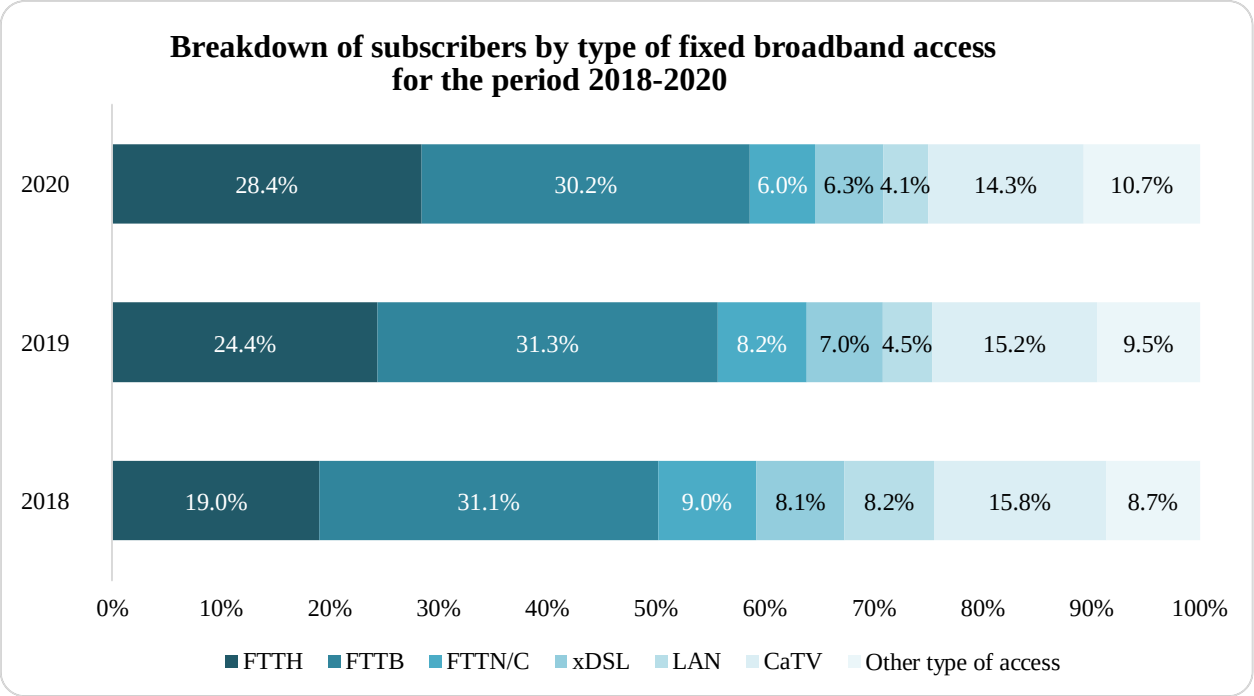
Figure 20

As a result of the delayed growth rate in the number of mobile Internet access subscribers, the "penetration of mobile Internet access by population" indicator also slowed down its rate and reported a growth of only 0.6 percentage points compared to 2019 (this growth was by 4.5 percentage points for the previous period). The registered drop was by 5.1 percentage points for the period 2018-2020.

At the end of 2020, penetration of fixed broadband Internet access among households in the country was 63.4% compared to 60.9%[38] at the end of the preceding year. The value of the "penetration of fixed broadband Internet access by population" indicator also increased to arrive at 30.6%, which represents a growth of 1.6 percentage points.

The breakdown of subscribers by type of fixed Internet access for the period 2018-2020 is shown in Figure 21.

[38] The data for 2018 and 2019 have been updated.



Source: Data submitted to CRC

Figure 21

At the end of 2020, the majority of subscribers of fixed Internet access[39] in Bulgaria continued to use access via fibre-optical networks (FTTH, FTTB and FTTN/C) – 64.6%. The growth recorded versus 2019 was by 0.8 percentage points, as the number of subscribers using fibre-optical networks rose by 6.1% in absolute terms.

The next place, with a 14.3% share, is held by CATV access subscribers (based on the networks for transmission and/or distribution of radio and TV programmes and DOCSIS standard). By the end of 2020, almost all subscribers of CATV access (97.9%) used a DOCSIS 3.0 protocol, whereby the maximum speed to the subscriber can reach up to 200 Mbps. To compare with, at the end of 2018, the subscribers using DOCSIS 3.0 were 94.1% of the CATV access subscribers, with an increase of 3.8 percentage points for the period.

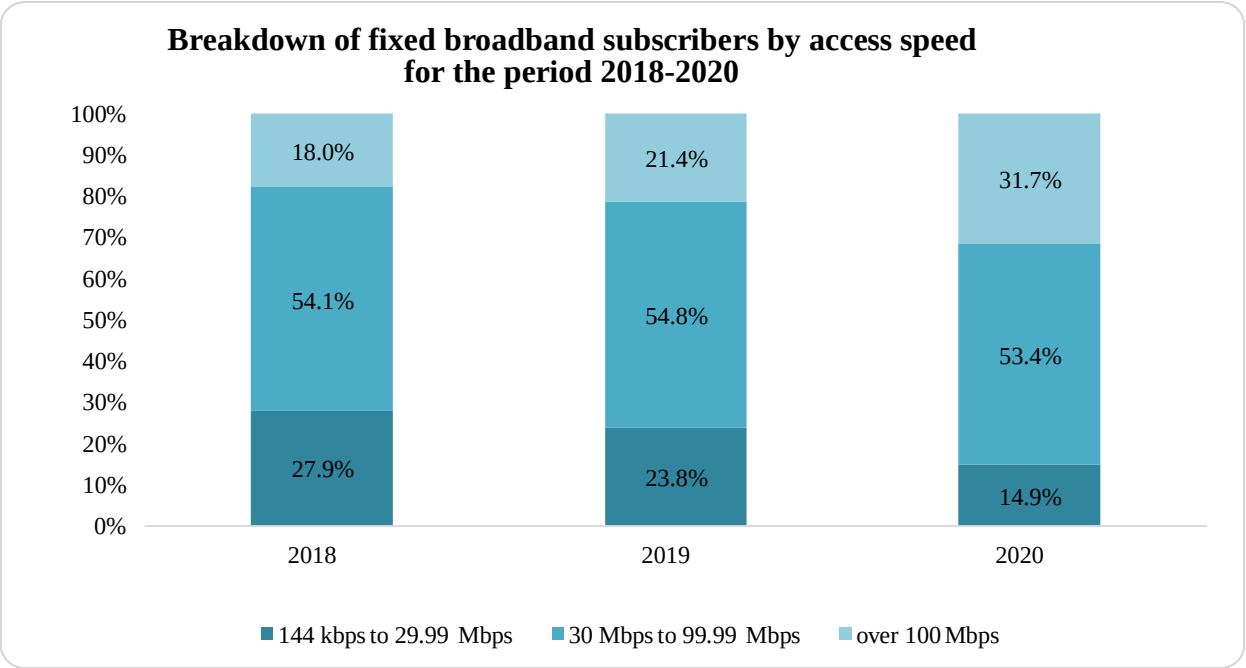
The downward trend in the subscribers of xDSL access, provided only by BTC, continued in 2020 as well. Compared to the end of the previous year, the number of subscribers of that type of access dropped by 5.4%, thus registering a 13.5% decline for the period 2018-2020. Migration of subscribers of BTC using optical ADSL access was preserved as well, registering an increase of 7.4% in the number of BTC subscribers using fibre-optical networks over a one-year period. For the period 2018-2020, the growth was 18% in absolute value. At the end of 2020, the share of BTC subscribers using VDSL in the total number of subscribers of the undertaking was 10.0% or by 1.7 percentage points higher than in 2019.

In 2020, the share of LAN access subscribers continued to decline, reaching 4.1% of the total number of fixed broadband subscribers, with a registered decline of 0.4 percentage points. The share of subscribers to other types of access[40] in 2020 reached 10.7%, as for the three-year period, as presented in Figure 19, the subscribers to this access recorded the most significant increase - by 37.1%. This growth is mainly due to the increase in the number of subscribers

[39] The data for 2018 and 2019 have been updated.
[40] Including RLAN access, fixed access via mobile networks, access via satellite networks and access via leased lines and dedicated access.

using fixed access via a mobile network, which accounted for 82.1% of the total number of subscribers to other types of access and rose by 45% in the period 2018 - 2020.

At the end of 2020, the subscribers of fixed broadband access using high-speed access via NGA networks[41] reached 90.9% of the total number of subscribers of fixed broadband Internet access, while their share was up by 2.4 percentage points compared to the end of 2019. As a result of this upward development, the speed of offered Internet services also increased. The figure below presents the breakdown of the number of subscribers of fixed broadband Internet access according to the international download speed[42] for the three-year period 2018-2020.



Source: Data submitted to CRC

Figure 22

The number of subscribers using Internet access with a minimum speed of 30 Mbps continued to increase in 2020, which is the result of the growing number of subscribers using fibre connectivity and DOCSIS 3.0 cable access protocol. At the end of 2020, 85.1% of subscribers used a minimum speed of 30 Mbps, registering an increase of 8.9 percentage points compared to 2019. More than half (53.4%) of the subscribers of fixed broadband access used high-speed broadband access with international download speed from 30 Mbps to 99.99 Mbps, although their relative share decreased by 0.7 percentage points in the period 2018-2020. The highest growth was observed in the share of users of ultra-high-speed access (minimum 100 Mbps), which rose by 13.7 percentage points over the period under review, also registering a growth by 10.3 percentage points compared to 2019.

The number of broadband access subscribers using speed of minimum 100 Mbps also grew in absolute value. Compared to 2019, 55.3% more subscribers used ultra-high-speed access (minimum 100 Mbps). Over the one-year period, an increase of 2.2% was observed in the

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

[42] The data for 2018 and 2019 have been updated.

number of subscribers using speed from 30 to 99.99 Mbps, while subscribers using speed up to 29.99 Mbps decreased by as much as 34.3%.

Consumption (traffic)

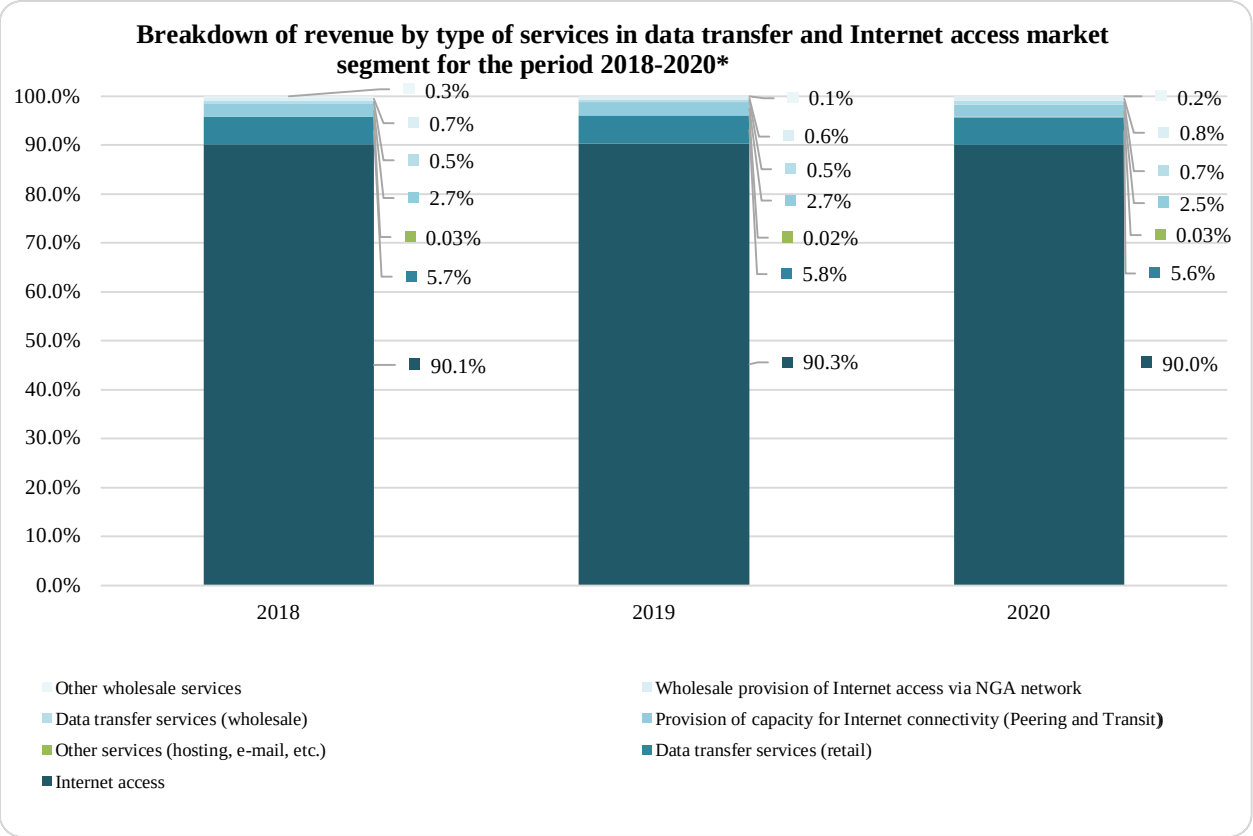
Changes in people's everyday lives during the COVID-19 crisis, driven by factors such as restrictions on free movement, distance learning, teleworking and on-line entertainment, have led to a significant increase in Internet traffic. Mobile Internet traffic grew by 36% in 2020 (a 25% growth in 2019 compared to 2018), as compared to the 2019 figures, reaching 325 million GB. This growth is even more tangible in fixed Internet traffic, with a growth rate of 50% over a one-year period (this growth was 29% in the period 2018 - 2019). Over the two-year period 2018-2020, there has been almost a double growth (94%) in fixed Internet traffic, and according to data submitted by the undertakings, this traffic reached 10.5 million TB in 2020.

Revenue from data transfer and Internet access

In 2020, compared to 2019, revenue[43] from the data transfer and Internet access segment reached BGN 1,196.047 million. The registered increase of 19.8% compared to the 2019 data was mainly due to the increased revenue from wholesale services which reported a growth by nearly 3.4 times. The total amount of revenue from retail services was BGN 1,061.964 million, 94.1% of which was revenue from Internet access services (BGN 998.928 million).

Figure 23 presents the breakdown of revenue generated for the period 2018-2020.

[43] 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.



** For the purposes of the graphic presentation of the breakdown of revenue by types of services in the market segment, the 2020 revenue are exclusive of revenue from other types of wholesale access services ("Access and related services") of Cetin - the new undertaking started its operations in the middle of 2020, therefore, the division of revenue by specific services and their presentation will take place for the next full one-year period.*

Source: Data submitted to CRC

Figure 23

In 2020, there was no substantial change in the overall structure of revenue in the segment. The highest relative share (90%) continued to be held by revenue from retail Internet access services which registered a growth of 10.8% in absolute value compared to 2019. Traditionally, the total revenue from the provision of mobile Internet access continued to register an increase, though at a decreasing rate compared to the year before, with a registered rise of 12.7% over the one-year period. A growth of 7.0% was observed in fixed Internet retail revenues, with the rate of change rising from the 2019 figures. This is mainly due to the increase in revenue as a standalone service[44] by 8.4% as well as in revenue from the provision of bundled services with fixed Internet access included, which grew by 1.9% compared to 2019. In bundled services with mobile Internet access included, there was a 23.1% increase compared to 2019, and for the period 2018 - 2020, these revenues increased by almost 60%.

Summary

The trends observed in the data transfer and Internet access segment in recent years were to a great extent preserved in the past year 2020. The following was reported compared to 2019:

- increase in the total number of retail Internet services subscribers, which is mainly due to the rise in the number of subscribers of fixed Internet access provided standalone;

[44] Including revenue from standalone Internet access, revenue from the sale of vouchers and cards, revenue from access via leased lines and dedicated access.

- continued increase in the share of LTE subscribers in the total number of mobile Internet subscribers due to the wide coverage of LTE networks at a national level, both by territory and by population;
- growth in the total volume of revenue in the segment due to the increased revenue from retail Internet access services and the significant increase of revenue from wholesale services.

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

In 2020, the volume of the "transmission and/or distribution of radio and TV programmes services" market segment reached BGN 427.294 million, registering a growth of 0.6% since 2019.[45]

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 24 below:

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 2020

Service	Number of undertakings providing the service in 2020	Number of subscribers/users as of 31.12.2020		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 [4]	**242**	**2,027,890**	**681,282**	**391.719**	**132.482**
1.1. Cable TV	209	523,170	327,598	104.825	65.761
1.2. Satellite TV	4	913,947	104,033	167.179	17.947
1.3. IPTV	45	590,773	249,651	119.715	48.774
2. Terretrial broadcasting of radio and TV programmes	**60**	///	///	///	///
3. Provision of transmission/distribution of radio and TV programmes	**12**	///	///	**35.575**	///
3.1. 1. Transmission of radio and TV programmes services	4	///	///	3.283	///
3.2. Distribution of radio and TV programmes services including wholesale TV service (via IPTV and/or DVB-C)	9	///	///	32.292	///
Total	///	///	///	**427.294**	///

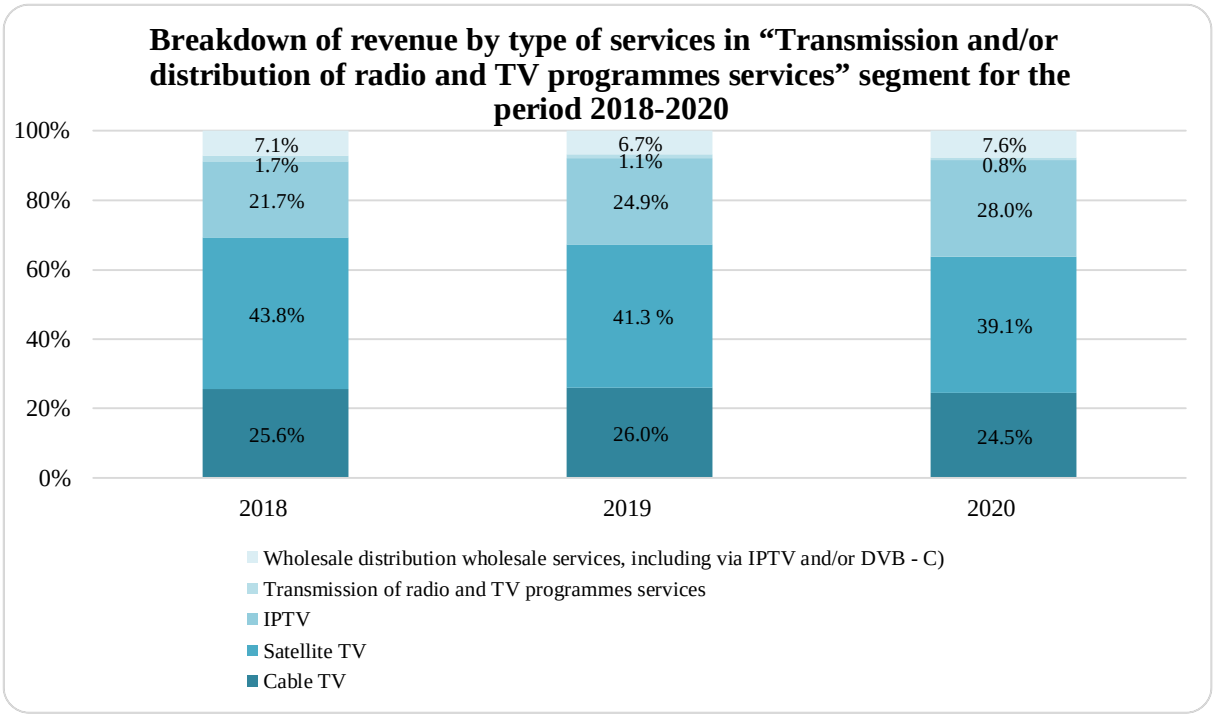
[1] Including subscribers of bundled services.
[2] Including revenue from bundled services.
[3] Revenue from bundled services by TV platforms was measured on the basis of the distribution of bundled services subscribers by platforms.
[4] Data on the total number of subscribers and the revenue from the retail distribution of radio and TV programmes are valid as of 29.04.2021 on the basis of information received from 89.9% of registered undertakings.

Source: Data submitted to CRC

According to the data submitted by undertakings, there was a growth in revenue from two services registered in 2020 – IPTV (by 13.4%) and wholesale transmission of radio and TV

[45] The data for 2019 have been updated.

programmes services (by 13.5%) over the one-year period under review. Revenue for all other services in the segment fell compared to 2019. A drop was observed in the amount of revenue from cable television - by 5% and satellite television - by 4.7% compared to 2019. For another consecutive year, the most significant drop from the previous year was recorded in revenue from wholesale transmission of radio and TV programmes services - by 30.4%. This is due to the registered decline of over 35% in revenue from wholesale satellite transmission, which occupies a significant share in the total revenue from wholesale transmission of radio and TV programmes services.



Source: Data submitted to CRC

Figure 24

In 2020, the largest share of the total volume of the segment (91.7%) continued to be occupied by revenue from the provision of retail radio and TV programmes services (Figure 24): cable television, satellite television and IPTV. For yet another year, revenue from satellite television held the highest share in the total segment volume, as this share dropped by 2.2 percentage points in relative value for a one-year period to arrive at 39.1%, followed by the share of revenue from IPTV which in 2020 replaced in the second position the share of revenue from cable TV. The share of revenue from the provision of IP television once again registered the most significant growth in relative value compared to the year before - 3.1 percentage points, reaching 28% of the total segment volume and getting ahead of the share of revenue from cable TV by 3.5 percentage points. The latter decreased by 1.5 percentage points compared to 2019 and covered 24.5% of the total volume of the segment in 2020. The smallest shares were held by revenue from wholesale services - 7.6% from distribution of radio and TV programmes services, including wholesale service via IPTV and/or DVB-C, and 0.8% from wholesale transmission of radio and TV programmes services, respectively.

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 2.5% to arrive at 242[46] in 2020 (Table 11), as the observed downward trend reported in the last several years continued.

As of 31.12.2020, the total number of undertakings actually providing cable television was 209 (down by 7 compared to 2019). For several years now, there has been a trend towards expansion of the activity of cable operators, which started offering IPTV to their subscribers, with the number of undertakings offering both cable TV and IPTV at the end of 2020 amounting to 13, 1/3 of which are among the largest 10 undertakings.

The undertakings providing satellite TV in Bulgaria as of 31.12.2020 increased by 1 compared to the previous years, with the traditional providers of satellite TV - Bulsatcom, BTC and A1 - being joined by Neosat EAD.

As of 31.12.2020, 45 undertakings actually provided the IPTV service, with their number up by two compared to the previous year. Another 7 declared their intention to start offering the service in 2021.

The table below presents the relative shares of the first three undertakings, calculated based on the number of subscribers and revenue from the provision of retail television services, including the part of revenue from bundled services with television included, for the period 2019-2020.

Table 12

Market shares of undertakings providing retail pay TV for the period 2019-2020

Undertaking	2019		2020	
	Share based on subscribers	Share based on revenue	Share based on subscribers	Share based on revenue
BULSATCOM EAD	36.3%	36.7%	33.9%	35.8%
A1 BULGARIA EAD	25.0%	28.5%	25.7%	28.8%
BTC	24.1%	20.7%	25.5%	21.0%
All other	14.6%	14.1%	15.0%	14.3%

Source: Data submitted to CRC

As is evident from the data presented in Table 12, the positions of the largest undertakings in terms of their shares in the total number of subscribers of retail television and in the total volume of revenue from its provision were preserved in 2020 as well. The share of Bulsatcom continued to drop in 2020. Notwithstanding the reported drop of 2.4 percentage points in the share based on number of subscribers and 0.9 percentage points based on revenue, the undertaking continued to hold the highest market share in this market segment. The second position was held by A1. The share of the undertaking based on number of subscribers increased by 0.7 percentage points and based on revenue - by 0.3 percentage points from the previous year, covering 25.7% of subscribers and 28.8% of revenue generated from the provision of pay TV in 2020, respectively. For the second consecutive year, a positive change was observed in the share of the third largest undertaking in this market segment - BTC - based on number of pay TV subscribers. In 2020, this share rose by 1.3 percentage points, covering 25.5% of pay TV

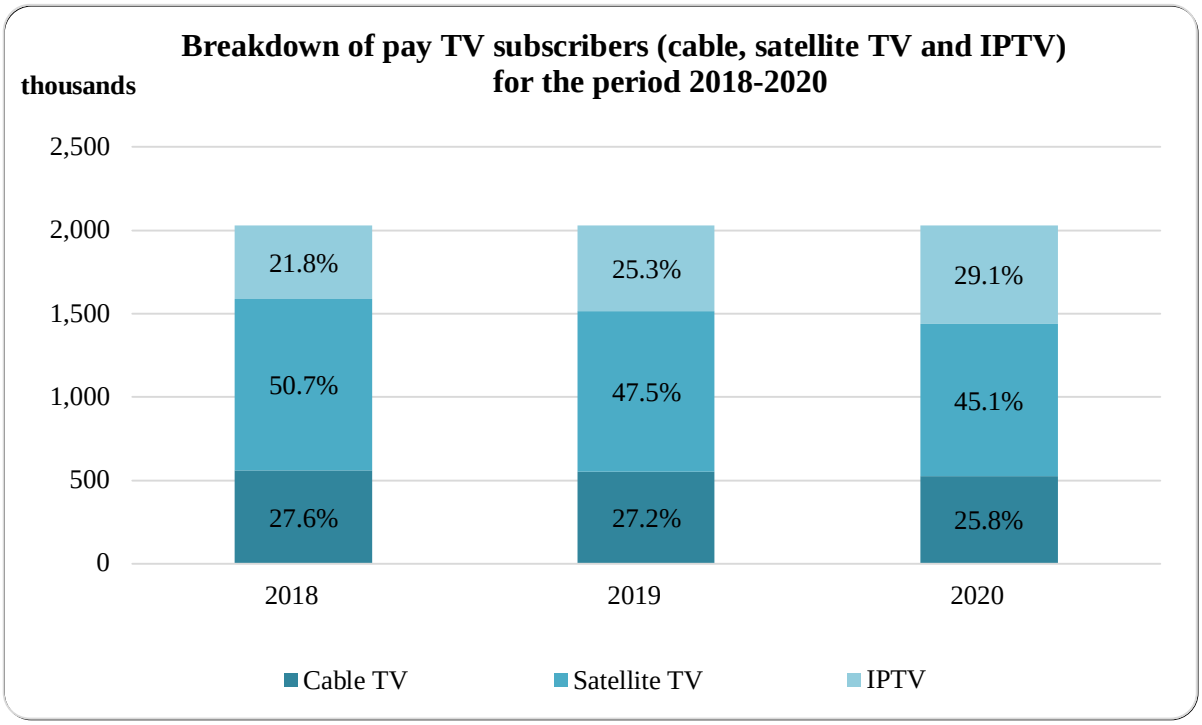
[46] Including undertakings that notified CRC for suspension of their activity in 2020 and declared revenue during the year.

subscribers, bringing the value of this indicator closer to that of A1. The share based on revenue also grew compared to the previous year - by 0.3 percentage points - and arrived at 21%. The observed decline in the share of Bulsatcom based on number of subscribers and on revenue affects negatively the aggregate market share of the first three undertakings, with a decline of 0.3 percentage points based on subscribers and based on revenue at the expense of the share of all other players in the market segment.

Subscribers of retail distribution of radio and TV programmes services

As of 31.12.2020, the number of retail pay TV subscribers remained almost unchanged compared to the year before, reaching 2.03 million subscribers,[47] as this indicator registered an insignificant decline of 0.1% compared to the end of 2019.

The figure below presents the shares of subscribers by platforms in the total number of pay TV subscribers for the period 2018-2020.



Source: Data submitted to CRC

Figure 25

In 2020, a growth in the number of subscribers and in their relative share in the total number of pay TV subscribers was again recorded only for IPTV. The number of IPTV subscribers continued to grow at a decreasing rate as compared to the previous reporting periods – by 14.9%, but its share rose significantly once again – by 3.8 percentage points, reaching 29.1% as of 31.12.2020. For the first year, both the number and share of IPTV subscribers exceeded the number and share of cable TV subscribers. The presence of 4 new undertakings which had declared subscribers by the end of 2020, as well as the registered increase in the number of subscribers to over 55% by all other IPTV providers, are the reasons for the growth of this indicator over the one-year period.

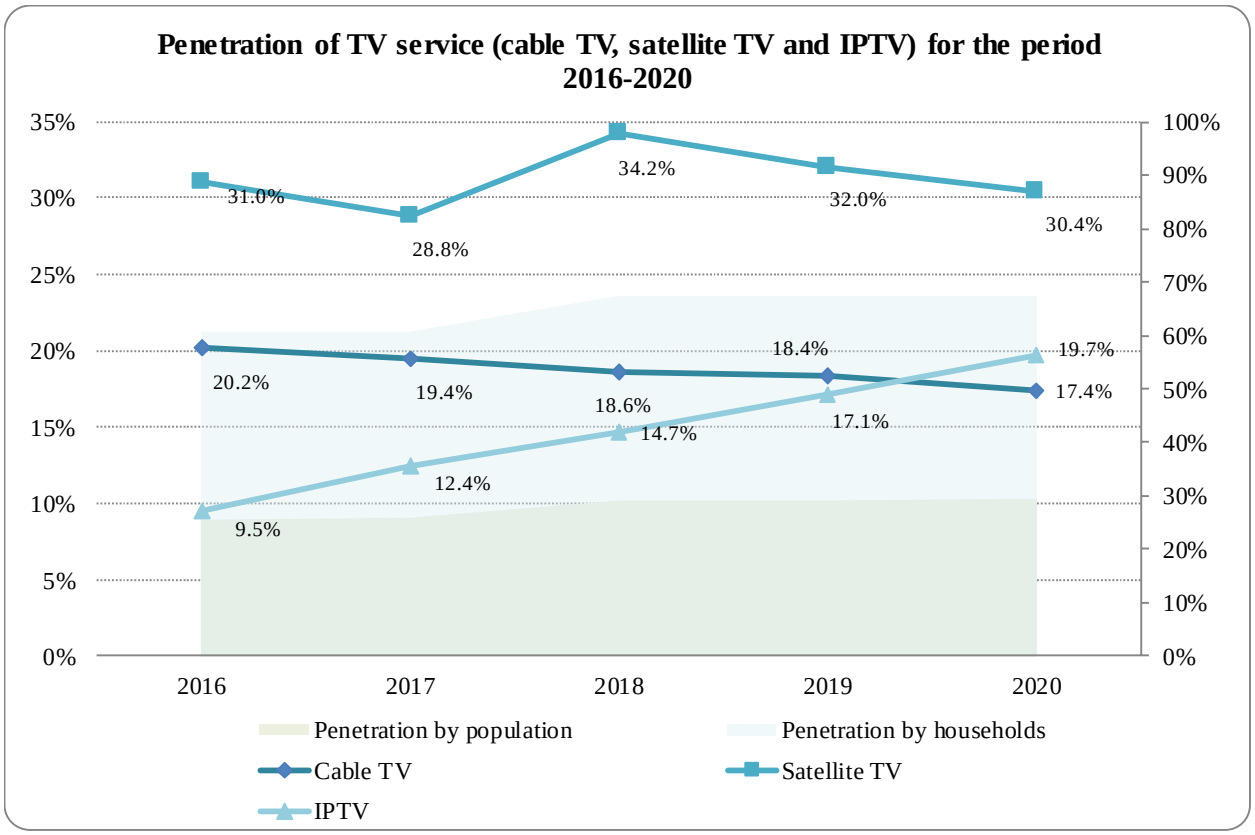
The increase in the share of IPTV subscribers in 2020 was mainly at the expense of a fall in the share of satellite TV subscribers, down by 2.4 percentage points over the one-year period,

[47] Including subscribers of bundled services who amounted to 681,282 as of 31.12.2020.

with the indicator's value returning to its 2012 levels. Nevertheless, as of 31.12.2020, satellite TV subscribers continued to occupy the largest share, covering 45.1% of the total number of pay TV subscribers in the country (Figure 25). In absolute terms, the number of subscribers of satellite television fell by 5.1% compared to 31.12.2019.

The downward trend in the number of cable TV subscribers was preserved, with a drop of 5.3% in the current reporting period, while their share in the total number of pay TV subscribers decreased by 1.4 percentage points to 25.8%.

For the period considered, the penetration[48] of pay TV among households in Bulgaria remained at the same level as in the previous two reporting periods. As of 31.12.2020, there was a decline of less than 0.1 percentage points, with the value of this indicator remaining at 67.5%. By platforms, the penetration of cable and satellite TV showed a decline of 1 and 1.6 percentage points, respectively, versus 2019. IPTV penetration continued to grow, reaching 19.7% at the end of 2020 - an increase of 2.5 percentage points compared to the previous year (Figure 26). There was also a slight increase in the penetration of pay TV among the Bulgarian population,[49] reaching 29.3% in 2020 - up by 0.1 percentage points compared to 2019.



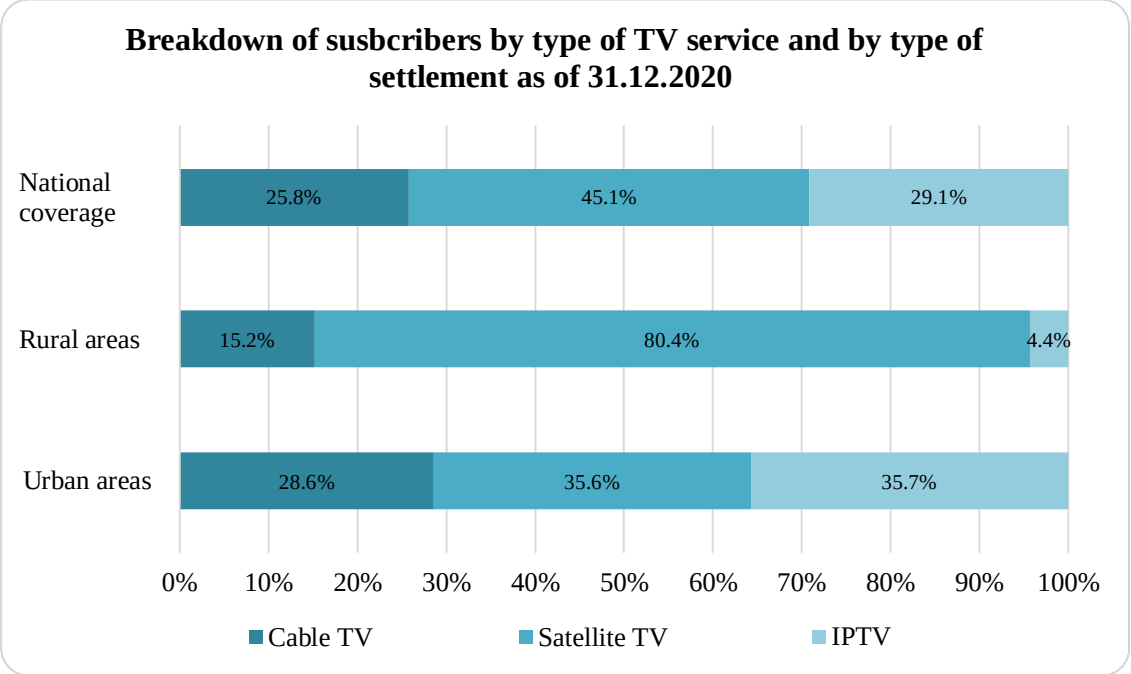
Source: Data submitted to CRC

Figure 26

Figure 27 displays the breakdown of subscribers of pay TV according to the settlement where they used this service as of 31.12.2020.

[48] This indicator was calculated as the ratio between the number of subscribers of pay TV as of 31.12.2020 and the number of households according to the last official census carried out by NSI in 2011 (3,005,589 - ordinary households).

[49] This indicator was calculated as the ratio between the total number of subscribers of pay TV as of 31.12.2020 and the number of population as of 31.12.2020, according to NSI data (population by districts, municipalities, place of residence and sex: https://www.nsi.bg/bg/node/2972)



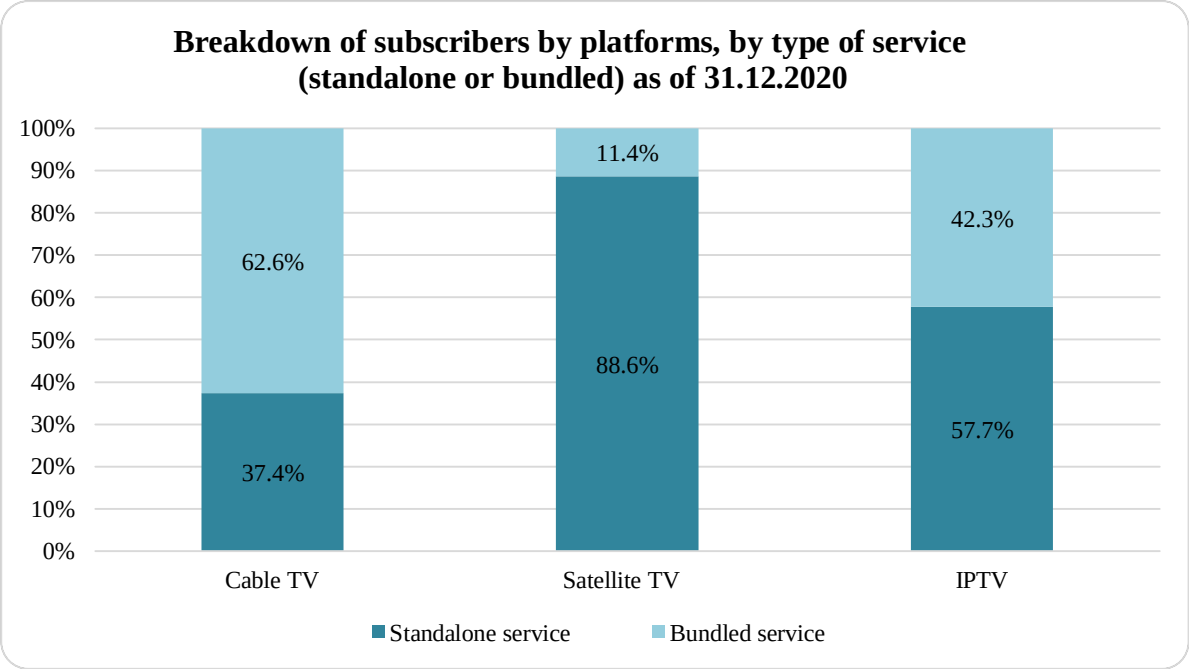
Source: Data submitted to CRC

Figure 27

For yet another year, the share of satellite TV subscribers in rural areas was several times as much as the shares of the remaining two platforms. For the second year, however, its share is decreasing, with a drop of 1.1 percentage points reported over the one-year period, at the expense of IPTV subscribers' share. As a result of the launch of IPTV in 1,883 new rural areas and the reported increase in the subscribers of this platform in another 162 rural areas compared to 2019, the number of IPTV subscribers in rural areas increased almost 3 times by the end of 2020, and this was also reflected in its share which tripled to reach 4.4% over the period considered.

The subscribers of all three platforms in urban areas have relatively similar shares, with the share of IPTV subscribers continuing its upward development and, apart from that of cable TV subscribers, already getting ahead of the share of satellite TV subscribers as well, accounting for 35.7% of the total number of pay TV subscribers in urban areas. The share of cable TV subscribers was down by 1.3 percentage points to 28.6%, while that of satellite TV subscribers dropped by 2.9 percentage points to 35.6%, in line with the general decline observed at national level (Figure 27).

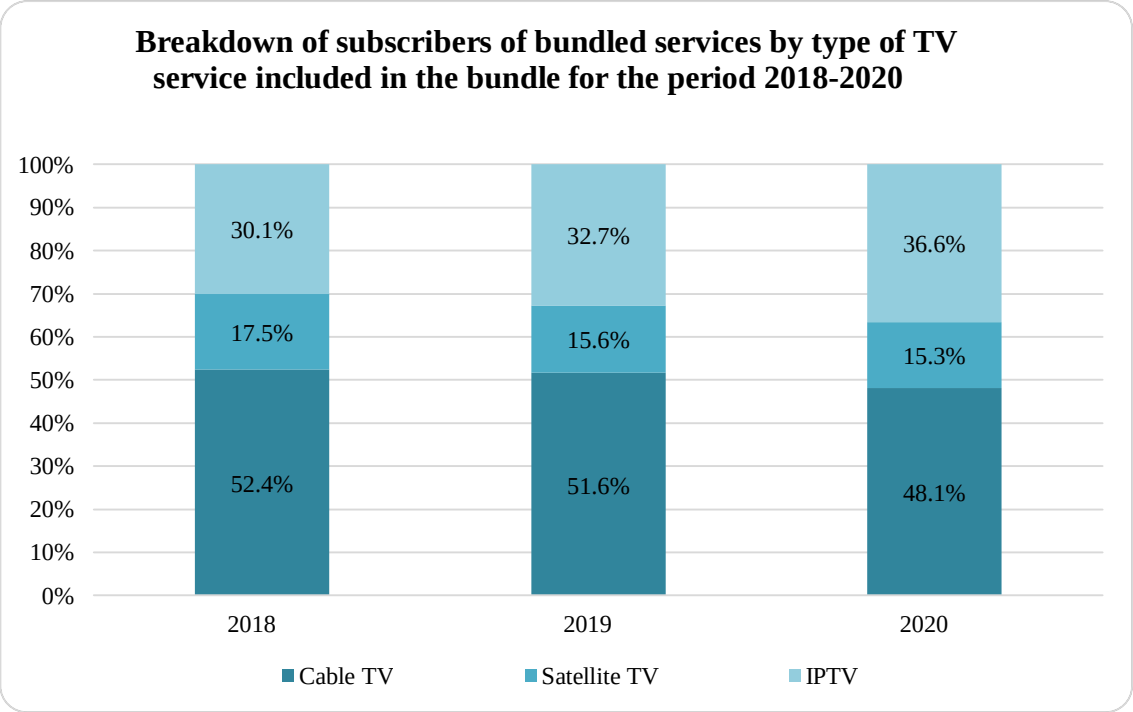
The number of subscribers of bundled services with television included continued to increase in 2020 compared to the year before - by 3.2%, to arrive at 34% of the total number of subscribers of pay TV. The figure below shows the share of subscribers of bundled services with television included in the total number of subscribers distributed by platforms, as of 31.12.2020.



Source: Data submitted to CRC

Figure 28

No significant changes in the structure of subscribers by type of service were observed over the period under review. As compared to the end of 2019, all shares of subscribers of bundled services, distributed by platforms, have grown. Although, in absolute terms, only the number of subscribers to bundled services, with cable TV included, decreased by almost 4%, as of 31.12.2020, their share of the total number of cable TV subscribers registered the highest increase compared to the dynamics in the shares of the remaining platforms - from 0.9 percentage points, reaching 62.6%. For the same period, the relative shares of bundled services subscribers, with satellite and IPTV included, grew by 0.7 and 0.2 percentage points to reach 11.4% and 42.3%, respectively, of the total number of subscribers of the respective platform (Figure 28).



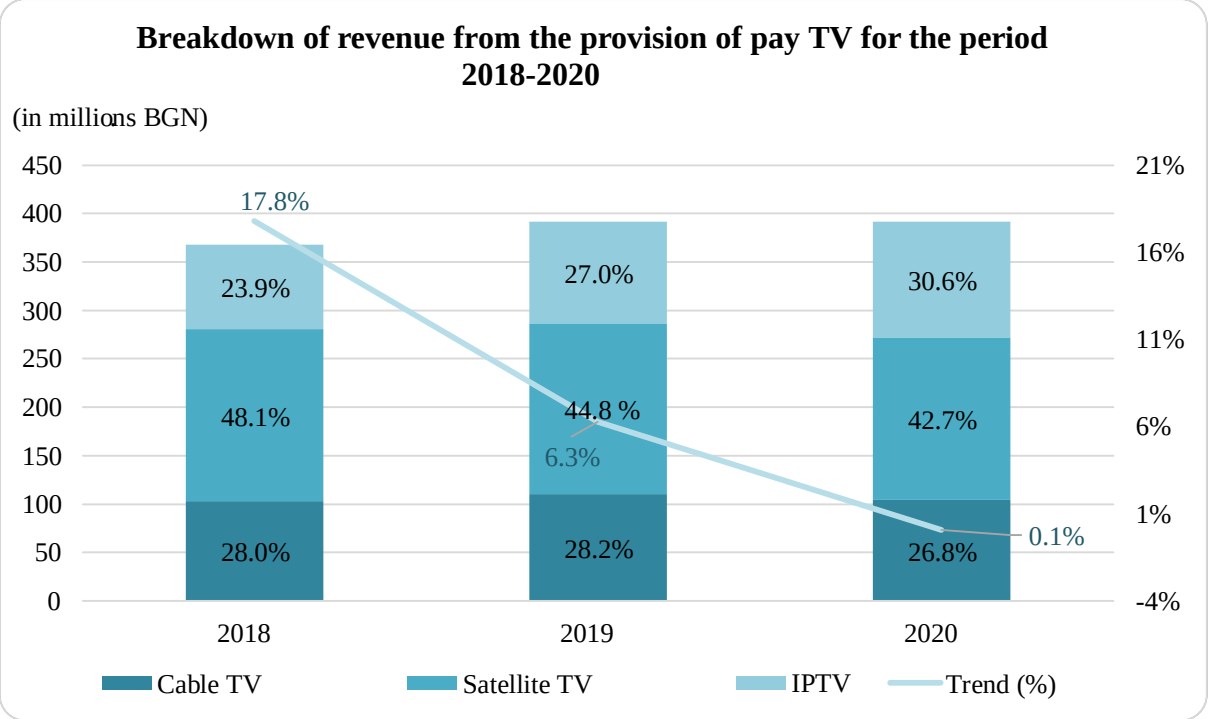
Source: Data submitted to CRC

Figure 29

At the end of 2020, the share of subscribers of bundled services with cable TV included already covered less than half of the total number of subscribers of bundled services with television included. Over the one-year period, it fell by 3.5 percentage points down to 48.1% as of 31.12.2020 (Figure 29). The number of subscribers to satellite TV packages remained almost unchanged, with an increase of less than 1% compared to 2019. Despite the reported growth, its share of the total number of subscribers to bundled services with television included decreased by 0.3 percentage points to 15.3%. At the end of 2020, compared to the end of 2019, a growth was also registered in the number of bundled services subscribers with IPTV included – by 15.5%, and its share in the total number year-on-year grew up by 3.9 percentage points to 36.6%.

Revenue from retail distribution of radio and TV programmes services

The volume of total revenue, including revenue from bundled services with pay TV included, amounted to BGN 391.719 million in 2020, as it rose insignificantly by only 0.1% compared to 2019 (Figure 30). 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 based on the breakdown of bundled services subscribers with television included, by platforms for each undertaking.*

Source: Data submitted to CRC

Figure 30

Only revenue from IPTV reported a growth in 2020 versus the year before, as for the one-year period under review it was up by 13.4%, and its share in the total volume of the retail market segment grew by 3.6 percentage points to arrive at 30.6%. A decline was observed both in absolute and relative terms in respect of revenue from the other two platforms. Over the one-year period, 5% less revenue from cable TV and 4.7% less revenue from satellite television was generated, and its share in the total volume of the market segment fell by 1.4 percentage points to 26.8%, respectively, in terms of cable TV revenue and by 2.1 percentage points to 42.7% in respect of satellite television.

The share of revenue from the provision of bundled services with television included rose by 1 percentage point as compared to the year before, covering 34% of the total volume of the retail segment. In terms of revenue generated from a standalone service, a growth was only observed in revenue from IPTV, following the trend in the growth of subscribers of this platform. For the past year, the increase was 11.7%, with revenue rising from of BGN 63.5 million in 2019 to almost BGN 71 million in 2020. A significant drop was reported in revenue from standalone cable TV - from over 11% compared to the previous year to BGN 40 million, and the recorded fall in revenue from satellite television for the one-year period was 3.9% to BGN 150 million.

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

In 2020, 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, remained unchanged compared to the year before - 12.

Detailed information on the number of undertakings which in 2020 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, as well as on the structure of the above services' market, is displayed in Table 13 and in Figure 31 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 2020

Types of wholesale transmission and distribution of radio and TV programmes service	Number of undertakings providing the service in 2020	Number of subscribers/ users of the service as of 31.12.2020	Revenue from the service in 2020 (in millions BGN, excl. VAT)
1.1. Transmission of radio and TV programmes services, including:	**4**	///	**3.283**
1.1.1. Terrestrial radio-relay transmission	1	///	
1.1.2. Satellite transmission	2	///	
1.1.3. Other type of transmission	2	///	
1.2. Distribution of radio and TV programmes services, including wholesale IPTV service provided to other undertakings, including:	**6**	///	**29.978**
1.2.1. Terrestrial broadcasting	6	45	22.661
1.2.2. Satellite broadcasting	2	///	
1.3. Wholesale TV service (via IPTV and/or DVB-C) provided to other undertakings for resale purposes	3	47	**2.315**
Total	**12**	///	**35,575**

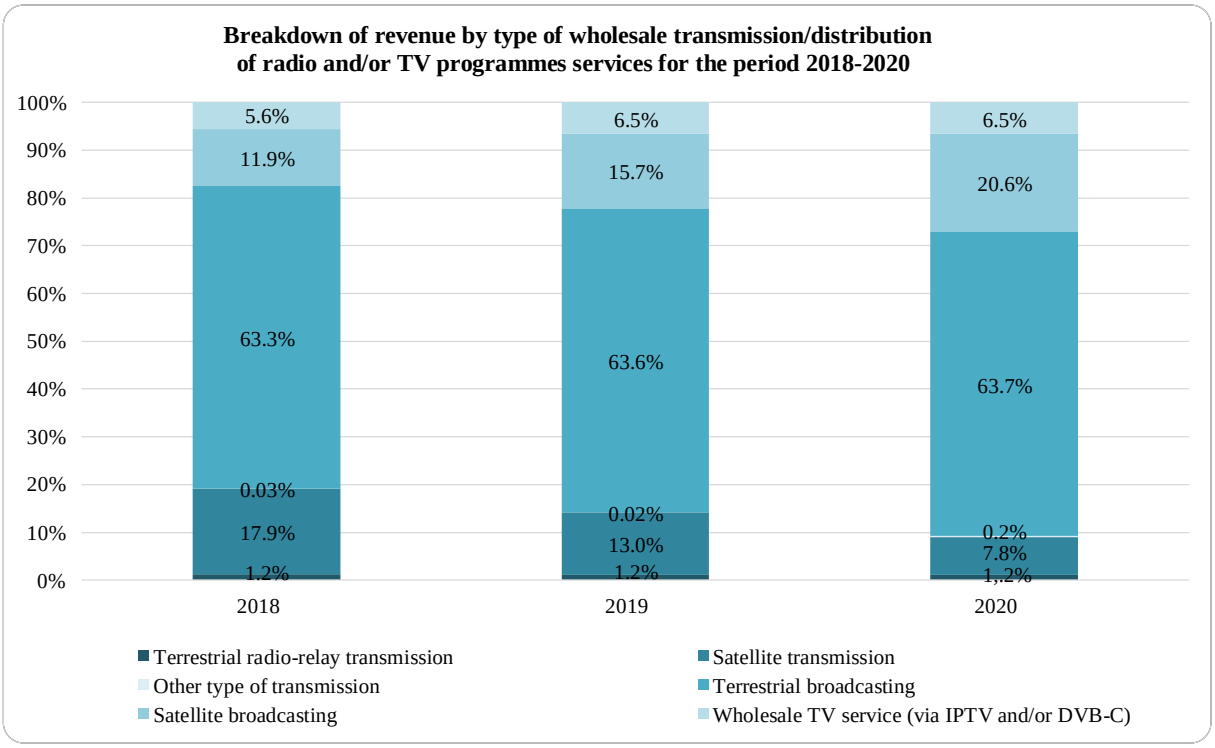
Source: Data submitted to CRC

In 2020, the number of undertakings providing transmission of radio and TV programmes services was 4, decreasing again by one compared to those that were active in 2019. Undertakings providing distribution of radio and TV programmes services also fell by one to 6, and wholesale TV services via IPTV and/or DVB-C in 2020 were already provided by three undertakings.[50]

Revenue from the provision of the wholesale transmission and distribution of radio and TV programmes services amounted to BGN 35.575 million, registering an increase of 7.2% compared to the previous year. This growth is the result of a positive change reported in the revenue from distribution of radio and/or TV programmes services – by 14%, and the revenue from wholesale TV services provided via IPTV and/or DVB-C – by 6.5% compared to the previous year. A decline was recorded only for the first main category of wholesale TV services - transmission of radio and TV programmes services. During the year, 30.4% less revenue was generated, resulting from a significant decline in satellite transmission revenue - by 35.5%, which could not be compensated by the growth in the revenue from terrestrial radio relay transmission – 8.1% and from other type of transmission – more than 14 times, due to the low relative shares of these services (12.9% and 2.2%, respectively) in the volume of revenue from the provision of wholesale transmission of radio and TV programmes services.

The figure below presents the structure of revenue generated by types of services for transmission/distribution of wholesale radio and TV programmes services for the period 2018-2020.

[50] Mitko.Com EOOD, United Telecommunications Company AD and Viora Interaktiv OOD



Source: Data submitted to CRC

Figure 31

The data in Figure 31 show that in 2020 the largest share in the revenue from the provision of wholesale transmission and distribution of radio and TV programmes services was again held by terrestrial broadcasting – 63.7%, while the smallest share (0.2%) was occupied by wholesale services for the provision of other types of transmission (optical) of radio and TV programmes.

5.3. Terrestrial broadcasting of radio programmes – VHF broadcasting

At the end of 2020, 60 undertakings were registered at CRC to provide services for terrestrial broadcasting of radio programmes, as 57 of these undertakings actually provided the services. As of 31.12.2020, two undertakings remained with national coverage – Bulgarian National Radio and Darik Radio AD.

Summary

In 2020, the following changes were observed in the “transmission and/or distribution of radio and TV programmes services" segment versus 2019:

- Increase in the total volume of revenue from the segment, as a result of the reported increase in revenue from retail provision of IPTV and wholesale distribution of radio and TV programmes;
- Insignificant drop in the number of retail subscribers, as a result of which the penetration of the TV service among the households remained at its levels from the previous reporting period;
- Growth in the consumption of bundled services with retail television included;
- Growth in 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 showed resilience against the background of the COVID-19 crisis, continuing its upward development in the past year 2020 as well. Undertakings and electronic communications service providers played a key role during the pandemic, ensuring the functioning of a number of vital areas of social and economic life. Despite the force majeure circumstances, undertakings continued to invest in the deployment of next generation access networks (NGA networks), providing high and ultra-high Internet access and data transmission speeds, connection quality and security, information security and device mobility. At the same time, they continued to expand their services by offering comprehensive and innovative solutions to their consumers and business customers, beyond traditional communication services, such as smart home, digital wallet, cloud services and ICT solutions. The deployment of 5G networks is also expected to boost the development of digital services offered by undertakings, such as consumer and industrial IoT (Internet of things) services, AI (artificial intelligence) and ML (machine learning) solutions. The development of the electronic communications market next year will be largely influenced by the extent to which the recent coronavirus infection is contained in Bulgaria and worldwide, as well as by the measures that national governments will take to overcome it. The trends observed in 2020 which are expected to be maintained in the following year as well are as follows:

- Increase in the mobile telephony service consumption and, at the same time, drop in revenue from its provision.
- Taking into account the fact that, following the adoption of the Delegated Regulation (EU) 2021/654 of 18 December 2020 setting a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination (Delegated Regulation (EU) 2021/654), from 1 July to 31 December 2021, Bulgarian operators (fixed and mobile) should apply relatively uniform rates to the currently applied wholesale voice call termination rates, but in 2021, the rate of drop in the volume of fixed and mobile telephony service revenue is not expected to be significantly affected.
- Increase in the number of mobile Internet subscribers using LTE technology, both because of the strong competition among undertakings and their desire to provide new services. In the coming years, the focus of mobile operators is expected to be on the construction and deployment of 5G networks, with the 5G competition about to deepen alongside the wider deployment of 5G networks and the evolution of the portfolio of services offered by operators.
- Increase in the number of subscribers using fixed high-speed and ultra-high-speed access due to the ongoing migration to NGA networks.
- IPTV will continue its upward trend both in terms of subscribers and in terms of revenue from provision of the service. With the development of technology and the ongoing deployment of next generation access networks, it is expected that the provision of TV will shift from traditional TV broadcasting platforms to the provision of TV content based on Internet access, which may affect the development of the segment and the dynamics of competition.
- Increase in the bundled services subscribers and revenue, and preservation of the preference for bundled services made up of two electronic communication services (double-play bundles) and especially for bundles with mobile service (mobile voice and/or mobile Internet included) at the expense of triple-play and quadruple-play bundles.
- The market positions of the Bulgarian Telecommunications Company EAD in the electronic communications market are expected to strengthen and the structure of the

market segments is expected to change as a result of planned[51] and implemented[52] acquisitions of leading regional undertakings of national importance.

7. Provision of the universal service

7.1. Degree of satisfaction from the universal service provision

As of 31.12.2020, there was no change in the coverage provided by the undertaking obligated to provide the universal service[53] - the Bulgarian Telecommunications Company EAD (BTC), measured by number of territorial units compared to the previous year. The above coverage includes settlements and settlement formations (resorts, etc.), which are included in the Unified Classification of Administrative-Territorial and Territorial Units.[54]

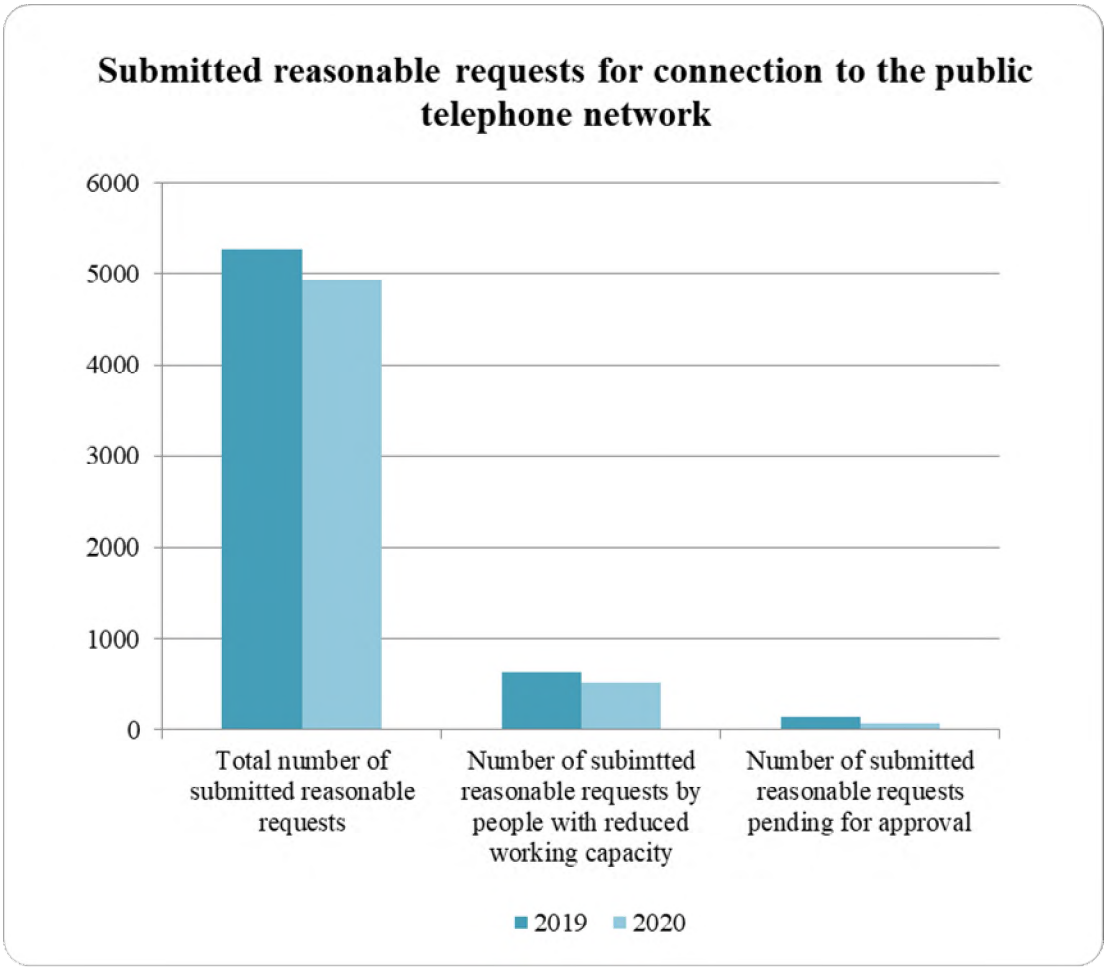
In 2020, the telephone density by households[55] registered a decline of another 2 percentage points since the year before, as a result of the steady downward trend in the total number of residential subscribers of BTC. As of 31.12.2020, BTC ensured access and provided public telephony services to 2% less residential subscribers compared to 2019.

7.2. Analysis of the universal service provision

7.2.1. Access to and provision of the universal service

As is evident from Figure 32 below, at the end of 2020, the total number of submitted reasonable requests for connection decreased by 6% compared to the previous year. A decrease in the number of submitted requests for connection filed by people with disabilities continued to be registered, as the submitted requests were by 16% less than in 2019. This confirms the steady downward trend in the interest in services within the scope of the universal service.

[51] https://www.vivacom.bg/bg/residential/za-nas/novini/vsichki (news from 10.05.2021)
[52] http://reg.cpc.bg/Decision.aspx?DecID=300059888; http://reg.cpc.bg/Decision.aspx?DecID=300059889
[53] Pursuant to § 7 of the Law on Electronic Communications.
[54] https://www.ekatte.com/;
[55] 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).



Source: Data submitted to CRC

Figure 32

In 2020, the number of requests for connection pending for approval was by 51% less than the year before, which is mainly due to the decrease of the total number of submitted requests. The share of rejected requests for connection in the total number of submitted requests was 28%, as the main part of this share (75%) was the result of a ceased interest by the customers.

BTC performs its obligation to ensure free-of-charge calls to emergency numbers, as the traffic generated to them in 2020 dropped by 5%, and the number of calls decreased by over 22%.

7.2.2. Access to public payphones

The steady trend of reduction in the number of public payphones owned by BTC continued in 2020 as well, although at decreasing rates as compared to previous years (to compare with, in 2019 versus 2018, their number dropped by 4.3%, while the decrease in the current one-year period was 2.6%). As in 2019, in 2020, the criteria for a sufficient number of public payphones installed in municipalities with over 1,500 residents exceeded considerably the minimum number required by Ordinance No 6.[56] In the remaining categories, the criteria for a sufficient number of public payphones were not met.

[56] Ordinance No 6 of 13 March 2008 on the universal service under the Law on Electronic Communications (title amended, SG, no. 77 of 9 October 2012).

According to the criteria set out in Ordinance No 6, BTC has the obligation to ensure a sufficient[57] number of public payphones. According to these criteria, Table 14 presents the number of public payphones which, if reached, would mean that the obligation to ensure a sufficient number in 2020 has been fulfilled.

Table 14

Population	Number of municipalities	Sufficient number of public payphones
below 500 residents	1,977	1,977
from 500 to 1,500 residents	992	1,262
over 1,500 residents	451	3,567
Total:	3,420	6,806

Source: Estimates based on data submitted to CRC

The number of public payphones, property of BTC, whose qualitative characteristics include facilities for users with impaired hearing and for users with no or impaired eyesight, also registered a decrease of 4.1% on a one-year basis. As of 31.12.2020, these public payphones made up 58.5% of the total number of public payphones in the country. Part of them provide for a textual or other type of connection for people with impaired hearing or speech and are accessible for users in wheelchairs by being installed in suitable locations. In 2020, no change in the quality parameter of the public payphones provided was observed, 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.

7.2.3. Ensuring telephone directory and provision of enquiry services

In compliance with the LEC and with relation to the provisions of Article 6 of Ordinance No 5,[58] the undertaking obligated to provide the universal service must issue at least one telephone directory in printed and/or electronic form. In 2019, CRC approved BTC's proposal for the release of a public telephone directory for 2020 in an electronic form. The telephone directory is available at the undertaking's official website.[59] There were no sales of telephony directory in printed form.

In compliance with its obligation to provide information on the numbers included in the general telephone directory, BTC provided end-users with a 24-hour telephone enquiry service in the past year through number 11 800.

[57] A sufficient number of public payphones is considered to be present when there is at least 1 public payphone and/or 1 public access point for voice telephony services available in municipalities with up to 500 residents; at least 1 public payphone and/or 1 public access point to voice telephony services per 500 residents in municipalities with more than 500 residents and at least 1 public payphone and/or 1 public access point for voice telephony services per 1,500 residents in municipalities with more than 1,500 residents. To determine the number of municipalities in each category by the number of residents, with a view to calculating the sufficient number of public payphones, data from the National register of settlements of NSI have been used. http://www.nsi.bg/nrnm/index.php?f=8&ezik=bul.

[58] Ordinance No 5 of 13.12.2007 on the terms and procedure for release of telephone directories, including working with database, their transfer and use, and for provision of telephone enquiry services.

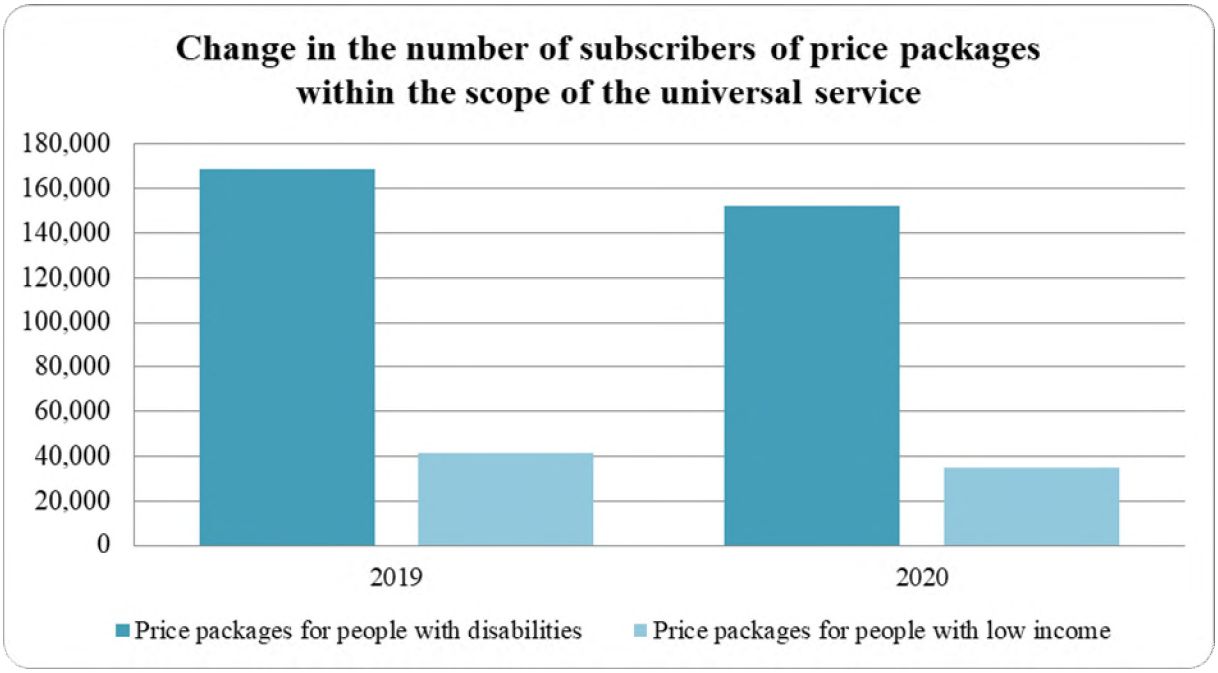
[59] http://www.vivacom.bg/online/cgi-bin/wpd.cgi?temp=home.html&ls=0.

In 2020, a considerable drop of 33.4% was observed in the traffic from end-users to telephone enquiry services as well as a 30.1% decline in the number of calls to numbers providing telephone enquiry service.

7.2.4. Affordability of tariffs of the universal service

In 2020, in fulfilment of its obligation to provide price packages within the scope of the universal service at affordable[60] prices, BTC continued to offer, without any change either in prices or in conditions, price packages intended for users: with low income (”Limited” plan, as named by BTC); with over 90% impaired work capacity or capacity for social adaptation (“Handicap 160” plan, as named by BTC); with over 50% impaired work capacity or capacity for social adaptation (“Handicap 300” plan, as named by BTC); people with special social needs admitted to social or health institutions (“Social and health institutions” plan, as named by BTC).

As of 31.12.2020, the subscribers of price packages within the scope of the universal service decreased by 11% compared to those in 2019. The chart below displays the trend in the number of subscribers of price packages within the scope of the universal service for 2019 and 2020.



Source: Estimates based on data submitted to CRC

Figure 33

The number of subscribers of price packages for people with low income and price packages for people with disabilities decreased in 2020 compared to the previous year by 15.5% 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 Figure 33 do not include the number of subscribers using price packages for people with special social needs, because it amounted to only 0.003% of the total number of subscribers of price packages within the scope of the universal service.

[60] 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.

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.[61]

According to the data submitted by BTC,[62] in 2020, the undertaking reported fulfilment of all target values.

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

In 2020, BTC did not submit to CRC a request for compensation of the unfair burden from the universal service provision within the statutory deadline - 30.06.2020. 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.

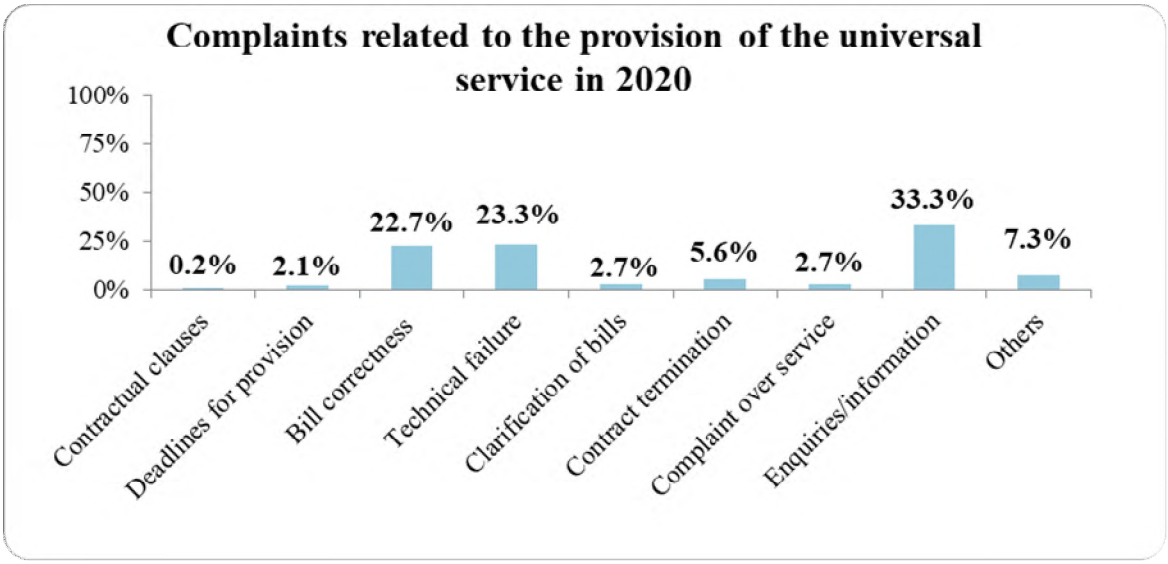
In relation to the provisions of Article 203 (2) of the LEC, an annual meeting of the Universal Service Compensation Fund was held, during which the report of the Fund's Management Board for 2019 was considered. In the absence of a request from the incumbent undertaking, no examination procedure was initiated. In this respect, the Fund's Management Board did not come up with a decision on the amount of compensation due, did not set the percentage of gross revenue and the amount of the contribution of the undertakings to the Fund and, therefore, no funds were received in the Fund.

7.5. Complaints and complaint resolution

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

In 2020, the number of complaints filed with BTC regarding the provision of the universal service was by 29.1% less than in 2019. Most often, the complaints disputed technical failures, bill correctness, contract termination and enquiries/information concerning clarification of monthly bills. The causes for filing complaints are illustrated in Figure 34.

[61] http://www.crc.bg/section.php?id=904&lang=bg.
[62] Through the CRC's electronic system of on-line questionnaires
[63] The content of the itemised bill is defined in Art. 260, Para 3 of the LEC.



Source: Data submitted to CRC

Figure 34

The number of complaints by all types of categories is decreasing, with the highest decline being reported in the number of complaints submitted due to clarification of contractual clauses, termination of contract, etc. There is no substantial change in the percentage breakdown of complaints submitted in relation to the provision of universal service for the previous year.

In 2020, the percentage of unsatisfied complaints amounted to 69% of the total number of complaints filed, registering an increase of 8 percentage points compared to 2019.

7.6. Prospects for development of the universal service

The data show the downward trend of decline in the interest in the services within the scope of the universal service continues, as a result of the decreasing demand for traditional telephony services at a fixed location and their replacement with mobile telephony services. Only price packages within the scope of universal service intended for people with special social needs and people with low income continued to be used, albeit with a decreasing trend, and they are important, given the preferential conditions, for vulnerable social groups.[64] These packages provide access to basic and essential electronic communications services to citizens in the farthest regions or to the most vulnerable groups of households, thereby limiting the possibility for their social exclusion.

The interest in the services within the scope of the universal service in Bulgaria is expected to continue to decrease in 2021 as well.

II. LEGAL AND REGULATORY FRAMEWORK

1. EU regulatory framework for electronic communications

With Directive (EU) 2018/1972 of the European Parliament and the Council of 11 December 2018 establishing the European Electronic Communications Code, a revision of the applicable EU regulatory framework was performed. Pursuant to Article 124 (1) of Directive (EU) 2018/1972, the EU Member States had to adopt and publish, by 21 December 2020, the laws, regulations and administrative provisions necessary to comply with this Directive, and they shall apply those measures from 21 December 2020.

[64] Price packages for people with impaired work capacity or capacity for social adaptation; people admitted to social and health care facilities; or people with low income

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 bodies 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

With a view to introducing Directive (EU) 2018/1972 a draft law was drawn up in 2019 to introduce the necessary amendments to the LEC. It has been drafted to fulfil the commitments of the Republic of Bulgaria as an EU Member State to bring the Bulgarian legislation into compliance with the requirements of Directive (EU) 2018/1972.

The amendments and supplements to the LEC follow the provisions of Directive (EU) 2018/1972 and relate to the following more substantial changes:

- The conditions that may contain the general requirements and authorisations for the use of radio frequency spectrum, numbering resources and position on the geostationary orbit have been refined;
- The criteria to be taken into account in determining the regime of use of radio frequency spectrum and in limiting the number of authorisations to be issued have been further developed, with the possibility to define the conditions for shared use of radio frequency spectrum;
- In order to ensure faster access to the radio frequency spectrum and to reduce administrative burden, a possibility of using the radio frequency spectrum on the basis of registration has been foreseen;
- New rules relating to the authorisation of the use of radio frequency spectrum have been introduced, such as a period of time no less than 15 years, with the possibility of extending at least up to 20 years for the use of harmonised radio frequency spectrum for wireless broadband services;
- Conditions have been envisaged for the authorisation of alternative use of harmonised radio frequency spectrum;
- Procedures have been introduced for cooperation with competent authorities of other EU Member States in the case of cross-border coordination of radio frequency spectrum;
- The scope of universal service has been expanded while allowing some of the ancillary services that are part of the universal service to be abolished;
- The provisions on consumer rights have been amended by introducing new requirements on pre-contractual and contractual information, transparency, quality of service, duration and renewal of the contract, security and access to emergency numbers, facilitating processes for the provision of number portability and switching of providers of Internet access services, better protection when using bundled services, etc.;

- The rules on the protection and processing of personal data of end-users when concluding an electronic communications service contract have been refined.

These amendments and supplements are expected to achieve a more effective, efficient and coordinated use of radio frequency spectrum; development of the electronic communications market, maintaining conditions for effective competition; enabling the construction and development of very high capacity networks, including 5G networks; enhancing the protection of citizens' interests and the rights of end-users, including people with disabilities, ensuring adequate broadband Internet access for all users.

In 2021, the 44th National Assembly adopted the Law on Amendment and Supplement to the LEC (SG, no. 20 of 9 March 2021), which applies from 13 March 2021. Pursuant to § 353 of the transitional and final provisions, the regulatory acts implementing the Law shall be brought into compliance within 6 months of its entry into force. Within twelve months of the Law's entry into force, CRC shall adopt the following new regulations: rules on the use of radio frequency spectrum - free, after registration or after authorisation; rules for interaction with the undertakings concerned when submitting applications, international coordination and registration in international electronic communications organisations of the position on the geostationary orbit with the relevant radio frequency spectrum and of the radio frequency spectrum used by non-geostationary satellite system, and for the procedure of payment of fees set by an international act; rules on the provider switching process, taking into account the technical feasibility and the need to maintain continuity of service for end-users; rules on minimum security requirements for public electronic communications networks and services and risk management methods for their security. Pursuant to § 356 of the transitional and final provisions, CRC shall, within 6 months of the Law's entry into force, review the existing obligations for the provision of publicly available telephones and/or other public access points to voice telephony services of certain quality, provision of a directory and telephone inquiry services imposed as an obligation for the provision of the universal service as part of the services within the scope of the universal service. CRC shall, by 21 December 2021, review any universal service obligations imposed until the entry into force of this Law.

3. Important regulatory decisions of CRC in 2020

The total number of CRC decisions adopted in 2020 was 434, the majority of which are in implementation of CRC's powers according to the LEC. Among those decisions, the acts that play a more significant role in ensuring a foreseeable and competitive environment in the sector are as follows:

- Decision No 433 of 21.12.2020 announced the intention to limit the number of authorisations for the use of radio frequency spectrum in the 3.6 GHz band for terrestrial systems capable of providing electronic communications services (TDD mode of operation) with national coverage, by issuing four authorisations for the use of the 3430-3500 MHz, 3500-3600 MHz, 3600-3700 MHz and 3700-3800 MHz frequency bands. With this Decision, an invitation was extended to stakeholders to submit their intention to use the individually assigned scarce resource - radio frequency spectrum in the 3.6 GHz band.
- By Decision No 428 of 17.12.2020, CRC opened a public consultation procedure on the prospects and conditions for use of the free resource in the 26 GHz band;
- By Decision No 427 of 17.12.2020, CRC adopted the results of the public consultations held on the prospects and conditions for use of the free resource in the 700 MHz band. Undertakings have expressed a general interest in using a resource in the 700 MHz band without any specific intention to acquire spectrum within this

calendar year. A new public consultation to identify the business interest in acquiring the 700 MHz band is planned for the first half of 2021;

- By Decision No 424/17.12.2020, CRC adopted a decision to amend and supplement the General requirements for the provision of public electronic communications. The amendments made it possible to submit the annual activity reports of undertakings through an electronic on-line questionnaires system.
- By Decision No 409 of 03.12.2020, CRC announced its intention to limit the number of authorisations for use of frequency spectrum within the 2.6 GHz band. With this Decision, an invitation was extended to stakeholders to submit their intention to use the individually assigned scarce resource - radio frequency spectrum in the 2.6 GHz band.
- By Decision No 157 of 09.04.2020, CRC ended the public consultation procedure for a draft decision amending and supplementing the Technical requirements for the operation of electronic communications networks from the broadcasting radio service and related equipment;
- By Decision No 122 of 26.03.2020, CRC adopted a decision to amend and supplement the General requirements for the provision of public electronic communications. The amendments facilitate the processes of concluding contracts in the telecommunications sector by digitising these processes, reducing the administrative burden and ensuring a higher level of personal data protection;
- By Decision No 89 of 27 February 2020, CRC amended the General requirements for the implementation of public electronic communications by obliging all telephony service providers to offer at least one plan for telephone services with included time for calls to geographic and/or mobile numbers, which also includes calls with numbers after code 700.

4. Provision of electronic communications

4.1. Authorisations for the use of individually assigned scarce resource

The authorisations for the use of individually assigned scarce resource issued during the year are presented in Table 15.

Table 15

Authorisations for 2020 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 analogue broadcasting of radio signals with national and local coverage	61	13	10	1
Electronic communications networks for terrestrial digital broadcasting of television signals with national and local coverage	6	-	1	-
Electronic communications networks from mobile radio service - PMR	46*	14*	23	7
Electronic communications networks from the aeronautical mobile radio service	5	1	-	1
Electronic communications networks from the fixed satellite radio service	3	4	1	-
Electronic communications networks from the fixed radio service of the "point-to-point" type	37**	1	4	4
Authorisation for the use of individually assigned scarce resource – numbers for provision of public electronic communications	20	-	1	-
Electronic communications networks for fixed wireless access (FWA)	-	-	-	1
Authorisation for the use of individually assigned scarce resource - radio frequency spectrum for industrial needs	1	-	-	-
Temporary authorisations	-	23*	-	-
TOTAL:	**179**	**56**	**40**	**14**

** The total number of provided radio frequencies for these authorisations was 89;*

*** Amendments and supplements to the technical data of a total of 3,429 radio links, including provided radio frequency spectrum for new 524 links.*

4.2. Notifications on the provision of public electronic communications

The activities related to the notifications submitted in 2020 for the provision of public electronic communications are presented in Table 16.

Table 16

Type of activity	2020 (number)
Processed notifications for provision of public electronic communications	80
Processed notifications for termination of the provision of public electronic communications	48
Issued certificates for entry in the Register	18
Undertakings entered in the Register	47
Undertakings deleted from the Register	42

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

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

Table 17

Authorisations, certificates and licenses	
Type of document	**2020 (number)**
Authorisations for radio amateur capacity	183
HAREC certificates	19
CEPT licenses	28
Allocated call signs	237*

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

In 2020, 7 amateur radio licence exams were held with 157 examined persons in the cities of Sofia, Plovdiv, Varna and Gotse Delchev.

4.4. Interconnection and access

By Decisions No 265 of 23 July 2020 and No 266 of 23 July 2020, CRC determined the markets for wholesale call termination on individual public telephone networks provided at a fixed location and for voice call termination on individual mobile networks. All new undertakings subject to transparency obligations, within the time limit set by the Commission, published the conditions under which they provide interconnection and the access needed for its implementation.

By Decision No 265 of 23 July 2020, CRC imposed an obligation on BTC EAD to apply a price threshold for services for access to network facilities and elements necessary to access the network. In fulfilment of the equal treatment obligation, the undertaking has sent an amendment to the contracts to the undertaking with which it had concluded a contract for interconnection, and signed contracts have been submitted to CRC.

BTC EAD and A1 Bulgaria EAD have amended and supplemented their mobile termination conditions with new clauses on manipulation of the A-numbers and the artificially generated traffic. In accordance with Decision No 266 of 23 July 2020, the two undertakings have notified the Commission and the undertakings with which they had concluded interconnection contracts within the prescribed period and published the amendments on their websites.

In 2020, the Commission considered one request for the issue of binding instructions under Articles 54 and 56 of the LEC. Subject matter of the request is the launch of negotiations for the conclusion of an interconnection contract for the purpose of termination of traffic. CRC held several meetings with the parties to the dispute, through which an agreement was reached. During the dispute procedure, bilateral interconnection agreements were submitted to CRC. In view of this, there is no need to give binding instruction.

III. ACTIVITIES UNDER THE LAW ON ELECTRONIC COMMUNICATIONS, THE LAW ON ELECTRONIC DOCUMENT AND 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

In recent years, wireless communications have become an indispensable product for society. The increased need for wireless Internet access, the emergence of new technologies and applications that require high-speed support has created greater requirements for the networks on which they are being provided. An increasing amount of frequency resource is needed to meet all these needs. This has also resulted in the significantly increased social importance of radio frequency spectrum.

Radio frequency spectrum management has become a real challenge – on the one hand, it is a resource that is scarce by its nature, on the other hand, it is a fundamental resource for wireless communications, which are becoming increasingly essential in our daily lives.

The new EU regulatory policy on electronic communications was set out in the EECC published in 2018. A harmonised framework for the regulation of electronic communications networks and services was established, the tasks of the NRA were defined, and the procedures to ensure a harmonised application of the regulatory framework in the EU were determined. A coordinated approach was established for the deployment of 5G networks in the EU through provisions setting out the obligations of Member States to simultaneously provide spectrum, for a minimum duration of authorisations for the use of harmonised spectrum for wireless broadband services, peer review of such provision, providing conditions for a more relieved spectrum use.

CRC manages the radio spectrum for civil needs in the Republic of Bulgaria in accordance with the development trends of electronic communications on a global and European scale, in line with the European radio frequency spectrum policy and taking into account national interests and specifics.

In 2020, in performing the activities related to the radio frequency spectrum management, CRC took into account the Updated Electronic Communications Policy, the Updated State Policy for Radio Spectrum Planning and Allocation in the Republic of Bulgaria. In the Regulatory policy for radio frequency spectrum management for civil needs, CRC defined its main objectives, mechanisms and approaches for radio frequency spectrum management for civil needs. Among them are to ensure the effective use of radio frequency spectrum, to create conditions for the development of a competitive communications sector and to increase the social and economic benefits arising from the use of the frequency resource.

In the Opinion[65] of the Radio Spectrum Policy Group (RSPG[66]), the 700 MHz, 3.6 GHz and 26 GHz bands have been identified as the primary bands to introduce 5G in Europe. The Technical requirements for the operation of terrestrial networks capable of providing electronic communications services, as adopted by CRC, ensured the conditions for harmonised use of the radio spectrum in the 700 MHz, 3.6 GHz and 26 GHz bands. This allowed the use of frequency resources for different technologies with sufficient flexibility to deliver current and future wireless broadband services, including those based on 5G networks.

In the context of ensuring conditions for the introduction of 5G networks and in order to promote investment in infrastructure and stimulate innovation, the Commission took actions to reduce fees for the assignment and use of spectrum in the technologically neutral bands. Optimising the spectrum fees is an important condition for more investments in the mobile communications sector, as this will allow undertakings to use wider frequency bands and build networks of higher capacity to deliver high-speed broadband services of better quality to meet consumers' needs.

Pursuant to Article 1 of Decision (EU) 2017/899, by 30 June 2020 at the latest, Member States had to authorise the use of the 694-790 MHz frequency band (700 MHz band) for terrestrial systems capable of providing wireless broadband electronic communications services. In order to meet the objectives set and to respond to the growing demand for new quality services, as well as to comply with the principles of transparency, publicity and consultancy set out in the LEC provisions, CRC conducted public consultations on the prospects and conditions for using the available recourse in the 700 MHz radio frequency band. Undertakings have expressed a general interest in using resources within this band. No particular intentions to acquire spectrum within the calendar year were stated. The consultation is in line with the undertakings' opinions, their need for a sufficient free financial resource for investment in new networks and technologies, and the uncertainty caused by the COVID-19 crisis.

With the purpose of releasing frequency resource for mobile networks and ensuring a harmonised use of the 700 Mhz band, as of 01.06.2020, the authorisation issued to NURTS DIGITAL EAD for the use of individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications via an electronic communications network for terrestrial digital broadcasting with national coverage was discontinued.

A major component in the evolution of mobile technologies and the development of 5G is the use of a large amount of spectrum, respectively wider bands to support higher speeds, higher traffic volumes and the provision of better quality services.

In order to make available the free resource in the 2.6 GHz and 3.6 GHz frequency bands, at the end of 2020, CRC launched public consultations on the announced intentions to limit the number of authorisations to use radio frequency spectrum in these bands.

[65] Strategic roadmap towards 5G for Europe - Opinion on spectrum related aspects for next-generation wireless systems (5G)
[66] Radio Spectrum Policy Group

In the 2.6 GHz band, the number of authorisations for the use of spectrum for terrestrial network allowing the provision of electronic communications services with national coverage was as follows: three authorisations with 2x20 MHz, one authorisation with 2x10 MHz and two authorisations with 25 MHz.

In the 3.6 GHz band, which, given the characteristics of the wave propagation and the amount of spectrum available, is one of the first bands suitable for development of the 5G networks, CRC announced its intention to limit the number of authorisations to use spectrum in this band to four, which will be used to provide three 100 MHz frequency blocks and one 70 MHz block, respectively.

In fulfilment of Article 54 EECC on the coordinated provision of certain 5G spectrum bands in time, Member States, by 31 December 2020, had to provide opportunity for the use of at least 1 GHz in the 24.25 - 27.5 GHz band.

The most recent ITU World Radiocommunication Conference (WRC-19) decided to define the 24.25-27.5 GHz band on a global basis for the future development of international mobile communications, including 5G networks, subject to conditions for the protection of existing networks.

One of the measures identified by the European Commission (EC) in Recommendation (EU) 2020/1307, as a possible incentive for the introduction of 5G, is the use of an individual authorisation regime for the 24.25-27.5 GHz band, in particular the implementation of fast-track administrative procedures for spectrum assignment, where it applies to geographically restricted rights of use with a view to promoting its timely use.

Taking into account the characteristics of wave propagation in the 24.25-27.5 GHz band, the spectrum in it is suitable for providing capacity in highly urbanised areas of large cities. The introduction of 5G technologies and new active antenna systems also allows the building of an in-house coverage in buildings with large people flow (shopping centres, business buildings, residential buildings, etc.).

Taking into account the basic parameters set out in Decision 2020/590/EU for defining the amount of the spectrum block to be allocated to an undertaking, the continuous frequency blocks that may be made available for use by terrestrial networks capable of providing wireless broadband electronic communications services, at the end of 2020, CRC launched a public consultation procedure on the prospects and conditions for using the free resource in the 26 GHz band.

The results of the public consultation on the announced intention to limit the number of authorisations for use of spectrum in the 2.6 GHz and 3.6 GHz bands for terrestrial networks capable of providing electronic communications services with national coverage and the prospects and conditions for using the 26 GHz radio spectrum resources, are to be considered and adopted in early 2021.

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

Following one of its main priorities – effective management and efficient use of the scarce resource – radio frequency spectrum, CRC has studied and analysed the need for amendment of and supplement to the secondary legislation relating to the management of the radio frequency resource. As a result of this analysis, the following secondary legislative acts were amended and supplemented:

- Technical requirements for the operation of terrestrial networks capable of providing electronic communications services;

- Technical requirements for the operation of electronic communications networks from broadcasting radioservice and related equipment;
- Technical requirements for the operation of electronic communications networks from fixed-satellite radio service, mobilesatellite radio service and related equipment;

With the amendment and supplement to the above regulations, the provisions of new decisions of the EC and of the ECC on the harmonised use of radio frequency spectrum were transposed into the Bulgarian legislation, and conditions for the use of the radio frequency spectrum by 5G networks were determined.

With the amendment of and supplement to the Technical requirements for operation of terrestrial networks capable of providing electronic communications services, the following decisions were transposed into the Bulgarian legislation:

- Commission Implementing Decision (EU) 2020/636 of 8 May 2020 amending Decision 2008/477/EC as regards an update of the technical conditions applicable to the 2500-2690 MHz frequency band;
- Commission Implementing Decision (EU) 2020/590 of 24 April 2020 amending Decision (EC) 2019/784 as regards an update of the technical conditions applicable to the 24.25- 27.5 GHz frequency band.

By transposing the provisions of those Decisions of the EC into the applicable Technical requirements for the operation of terrestrial networks capable of providing electronic communications services, the technical conditions for harmonised use of frequency spectrum in the 2.6 GHz and 26 GHz bands for the deployment and development of 5G networks were updated.

The amendment of and supplement to the Technical requirements for the operation of electronic communications networks from broadcasting radioservice and related equipment fulfilled the time schedule set out in the National Roadmap for fulfilling the obligations of the Republic of Bulgaria under Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of radio frequency bands 470-790 MHz in the Union (Roadmap). The discontinuation of the use of radio frequency band 694-790 MHz from radio broadcasting service for digital terrestrial television networks after 1 June 2020 was reflected in Annexes 6 and 9 to the Technical requirements. In addition, Annex 5 to the Technical requirements fine-tunes the procedure governing stops of transmissions from transmission stations in connection with prevention or failure.

In line with the development of nano- and micro-satellite communications (small satellites) and in order to promote the introduction of new technologies, the Technical requirements for the operation of electronic communications networks from radioservices, fixed-satellite, mobile-satellite and related equipment, were amended and supplemented. By defining appropriate frequency bands for satellite systems of non-geostationary orbit and their usage, conditions for the exploitation of Bulgarian satellite systems of non-geostationary orbit were created. The aim of the amendment and supplement is to encourage investment in the satellite communications sector, stimulate innovation and the development of new technologies.

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 relation to the activities relating to implementation of the Decisions adopted at the World Radiocommunication Conference, which took place in 2019 (WRC-19), CRC was actively involved in the interdepartmental working group. Proposals were prepared to amend the

National Radio Spectrum Allocation Plan in relation to the implementation of WRC-19 decisions and to harmonise spectrum allocation with the European spectrum allocation table.

Mobile radio service

In 2020, CRC issued three temporary authorisations for the use of radio frequency spectrum in the 2 GHz band - respectively to:

- A1 Bulgaria EAD was assigned frequency resource 2x5 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications in the LTE network of the undertaking;

- Telenor Bulgaria EAD was assigned frequency resource 2x5 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications in the LTE network of the undertaking;

- BTC EAD was assigned frequency resource 2x5 MHz for the testing of new technical facilities and/or new electronic communications networks before their putting into service for the carrying out of electronic communications in the LTE network of the undertaking.

In the 2.6 GHz band, three temporary authorisations for the use of radio frequency spectrum were issued respectively to:

- A1 Bulgaria EAD was assigned frequency resource 2x20 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications in the LTE network of the undertaking;

- Telenor Bulgaria EAD was assigned frequency resource 2x20 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications in the LTE network of the undertaking;

- BTC EAD was assigned frequency resource 2x20 MHz for the testing of new technical facilities and/or new electronic communications networks before their commissioning for the carrying out of electronic communications in the LTE network of the undertaking.

With regard to ensuring conditions for the introduction of 5G networks in Bulgaria, in 2020, CRC issued temporary authorisations for the use of radio frequency spectrum in the 3.6 GHz band - respectively to:

- A1 Bulgaria EAD was assigned frequency resource 100 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications;

- Telenor Bulgaria EAD was assigned frequency resource 100 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications;

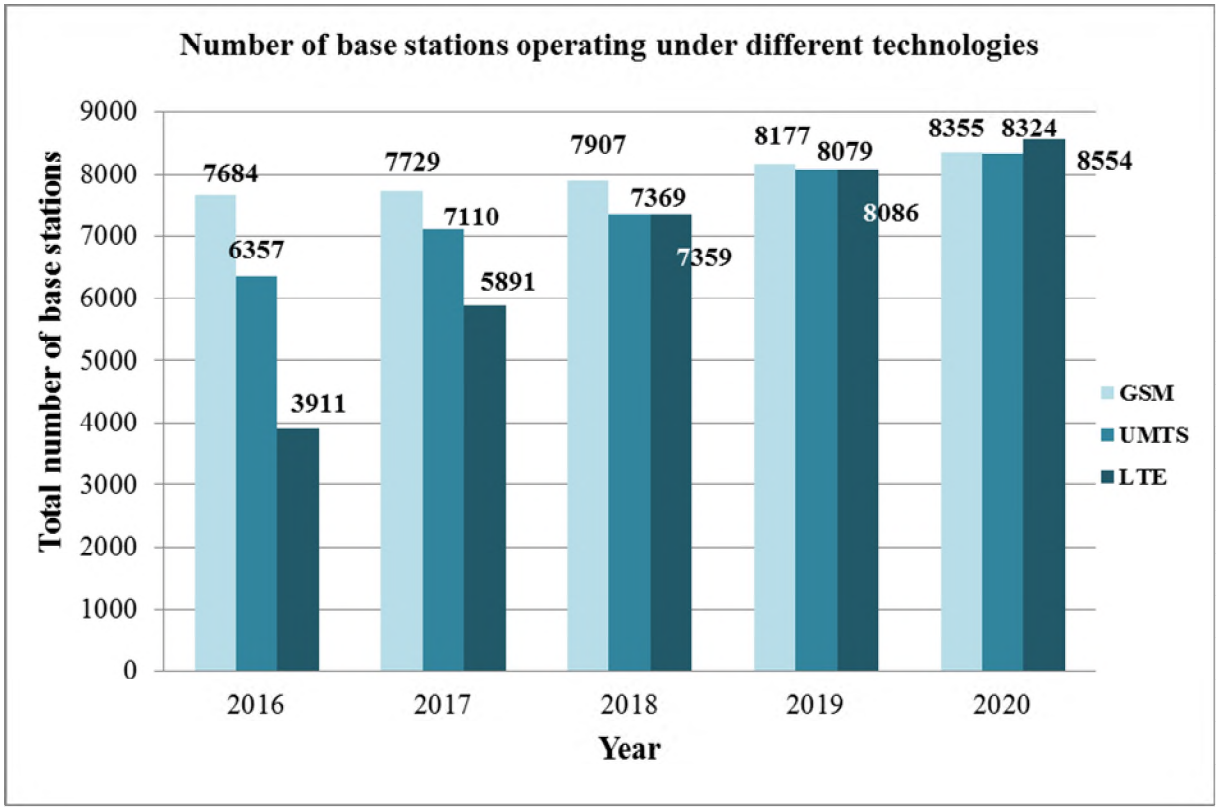
- BTC EAD was assigned frequency resource 100 MHz for the testing of new technical facilities and/or new electronic communications networks before their putting into service for the carrying out of electronic communications.

The authorisations were issued for the testing of various applications of the 5G technology. The declaration of a state of emergency in the country in relation to COVID-19 has created a number of restrictions that have prevented undertakings from successfully and fully performing the planned tests.

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, 89 radio frequency channels (55 simplex and 17 duplex) were provided to undertakings, of which 27 radio frequencies were for the construction of 27 new radio networks for the provision of electronic communications for private needs through an

electronic communications network from the mobile radio service. The total number of deployed networks amounted to 1,822.

The digitisation of the economy and the dynamic development of the digital society create new prospects for a number of sectors in the industry, allowing for increased competitiveness by improving productivity. Therefore, high-speed electronic communications networks are of key importance for more and more sectors and are an important factor for the growth of the economy as a whole. At the same time, providing the necessary conditions for mobile broadband access to the Internet guarantees the citizens' right to access quality electronic communications services. All this is the reason for the massive penetration of LTE technology and consequently the increase in the number of LTE base stations, as is evident from the chart presented in Figure 35. The development of 4G networks will continue in the future to ensure high network capacity and higher data transfer speeds. At the end of 2020, the global coverage[67] by 4G population will be over 80% and is expected to reach around 95% in 2026.



Source: CRC

Figure 35

Fixed radio service

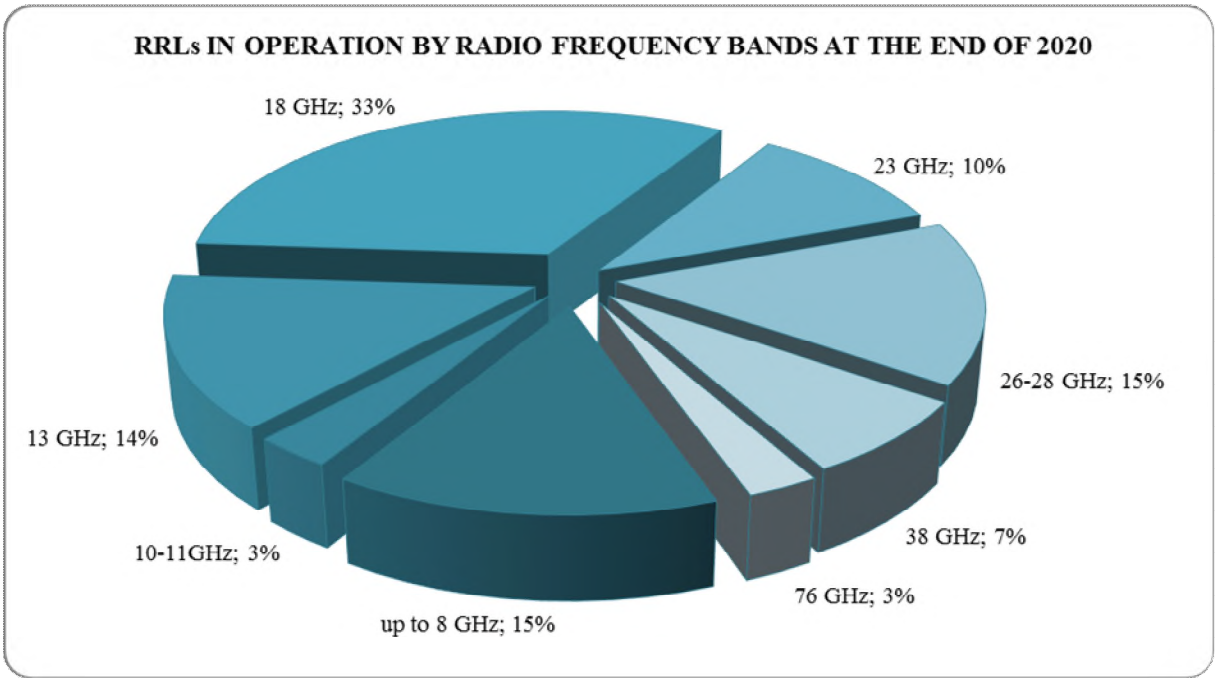
In 2020, one authorisation was issued and 37 amendments and supplements were made to authorisations for the use of individually assigned scarce resource – frequency spectrum - for the provision of electronic communications via electronic communications network of the point-to-point type concerning the technical data of a total of 3,429 one-way radio relay links (RRLs). With them, radio frequency spectrum was allocated to new 1,048 links, their total number reaching 17,841 versus 17,750 for 2019. The trend for deployment of high-tech digital systems using XPIC/CCDP technologies continued, as the number of RRLs using these systems reached

[67] Ericsson Mobility Report, November 2020

10,514 at the end of 2020 (an increase of 4.6% compared to 2019 – 10,048 items). The amendments of the authorisations reflect the increased need of undertakings to use higher transmission capacity, which in turn increases 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 band 18 GHz, their number reached 5,862), preserving the 32% share in the total number of RRLs at the end of 2020. The development of high-density communications networks using the super-high-frequency bands continued. At the end of the year, RRLs in bands 28 GHz, 38 GHz and 76 GHz, for which there are authorisations issued for the use of the frequency spectrum, totalled 4,486. In 2020, the use of coupled radio frequency bands 71-76 GHz and 81-86 GHz for high-capacity RRLs continued, as their number reached 488 at the end of the year.

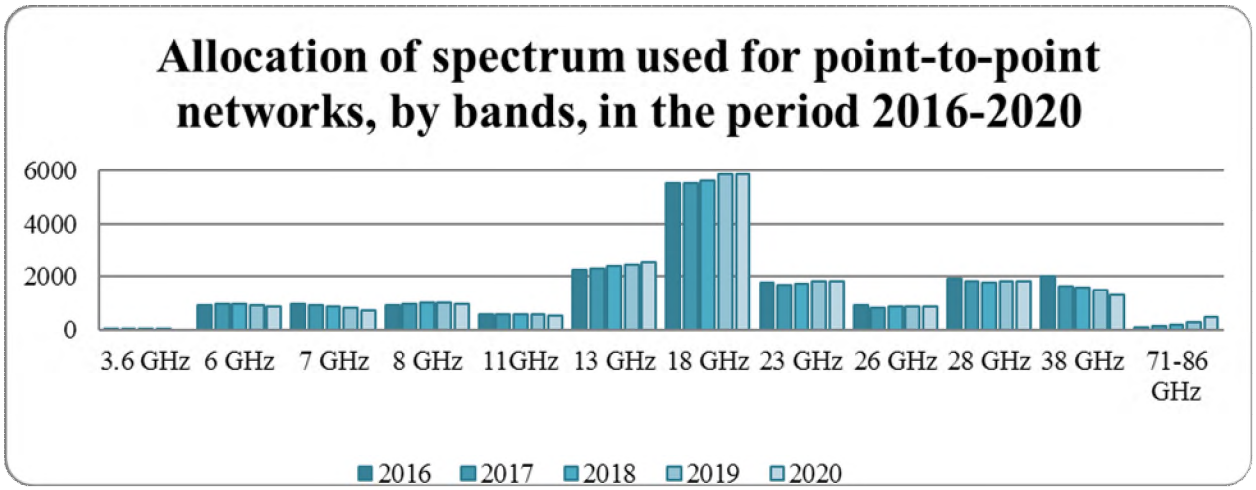
Figure 36 presents information on the percentage breakdown of active RRLs by radio frequency bands assigned with authorisations for the use of individually assigned scarce resource – frequency spectrum - for the provision of electronic communications via electronic communications network of the point-to-point type, at the end of 2020.



Source: CRC

Figure 36

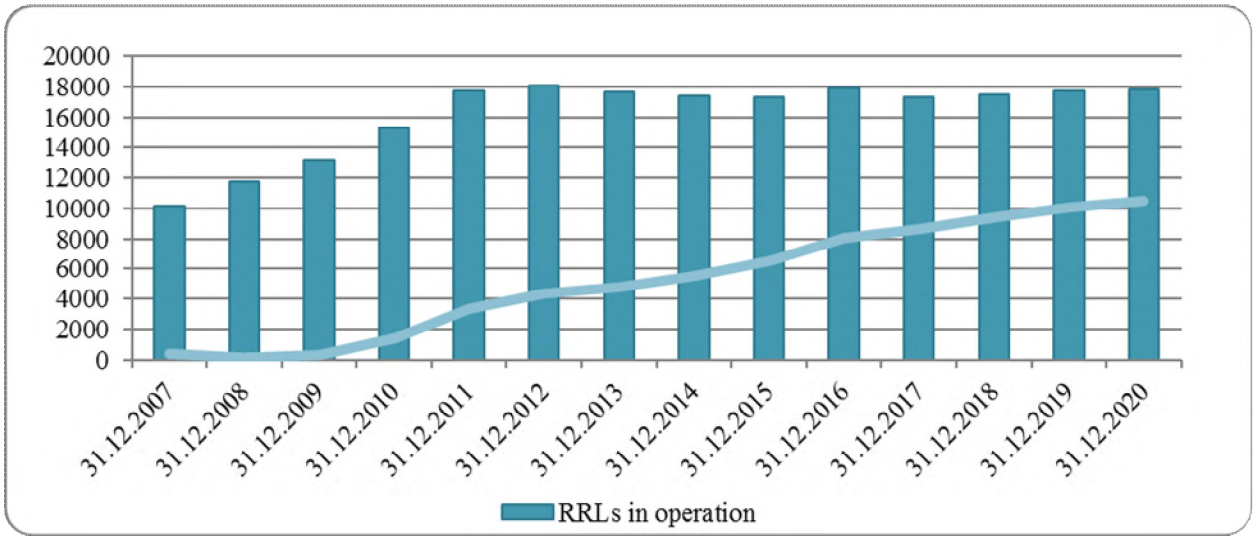
Figure 37 presents the allocation of spectrum used for point-to-point networks, by bands, in the period 2016-2020.



Source: CRC

Figure 37

Figure 38 displays the active RRLs by years, compared with the part of them which uses XPIC/CCDP technologies.



Source: CRC

Figure 38

The rapid development of 4G and higher generation electronic communications networks has led to the need to provide higher transmission capacities to meet the demand of undertakings providing electronic communications services to provide ultra-broadband transmission as a wireless alternative to communications networks with optical-based solutions. This also determines a change in the frequency bands used for "point-to-point" networks.

According to the Technical requirements for the operation of terrestrial networks capable of providing electronic communications services, the frequency band 3600–3800 MHz (part of the 3400–3800 MHz band) can be used subject to the parameters set out in EC Decision

2014/276/EU.[68] RSPG adopted the Strategic roadmap toward 5G for Europe - Opinion on spectrum related aspects for next-generation wireless systems (5G)[69], which is regularly updated. The opinion identified the 3400 – 3800 MHz (3.6 GHz band) band as one of the initial 5G deployment bands in Europe.

Pursuant to Article 54 EECC, by 31 December 2020, Member States, including Bulgaria, should have taken all appropriate measures to reorganise and allow the use of sufficiently large 3.6 GHz blocks for the deployment of 5G networks.

In this respect, CRC launched activities in the period 2017-2019 on the release of the 3.6 GHz frequency band, including the replanning and national coordination of the existing RRLs in the 3600–3800 MHz frequency band to other appropriate frequency bands.

The release of the 3400–3800 MHz band which completed in 2020 and was identified as a priority for the future development of 5G communications, has led to an increase in the amount of spectrum in the 3.6 GHz band needed for the deployment of 5G networks.

In 2020, the trend of increasing the number of 4G base stations, as well as the need for high-capacity connections, continued. Therefore, over the past four years, there has been a clear trend toward using RRLs with a wider frequency band. RRLs with a bandwidth of 3.5 MHz and 7 MHz migrate to the 14 MHz, 28 MHz and wider bands. The number of RRLs with a bandwidth of 3.5 MHz and 7 MHz in 2017 was 3,962, in 2018 it was 2,798, and in 2019 - 2,030, reaching 1,742 MHz at the end of 2020 (down by 53% compared to 2017).

Satellite radio services

In 2020, the activity related to regulation of satellite radio services continued to be focused on the coordination of the positions using geostationary orbit from fixed – satellite (FSS) and broadcasting – satellite (BSS) radio service. The high intensity of the coordination process was preserved. The goal of this process is to avoid potential interference to the Bulgarian planned systems on position 1.2°W (BSS) and 56.02°E (FSS).

In the past year, an international coordination procedure was launched in ITU for two Bulgarian satellites on non-geostationary orbit: SPARTAN and QMR-KWT, working in the band allocated for amateur satellite radio service. Requests for preliminary international coordination (API) were published by the ITU Radiocommunication Bureau in July 2020.

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 2020, the relevant objections were sent in view of performing the regulatory functions of CRC in terms of the efficient use and effective management of the frequency spectrum.

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

Broadcasting

In 2020, a total of 28 technical characteristics of electronic communications networks for terrestrial analogue broadcasting of radio signals in the VHF band (frequency band 87.5-108.0

[68] According to Implementing Decision (EC) 2014/276/EU of the European Commission of 2 May 2014 amending Decision 2008/411/EC on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communication services in the Community

[69] Strategic roadmap towards 5G for Europe - Opinion on spectrum related aspects for next-generation wireless systems (5G)

MHz) were examined and analysed, of which 2 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 26 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.

In order to test new technical methods and technologies for the implementation of electronic communications, 1 temporary authorisation for the use of an individually assigned scarce resource – radio frequency spectrum in the VHF band was issued in 2020, and for short-term events, 4 temporary authorisations for the use of an individually assigned scarce resource – radio frequency spectrum in the VHF band were issued.

In relation to the authorisation issued for the use of individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications via electronic communications network for digital terrestrial television broadcasting with national coverage to BTC EAD, a total of 428 technical characteristics were examined and analysed.

In 2020, CRC received 2 applications for the issue of a temporary authorisation to use individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications through electronic communications network for digital terrestrial broadcasting on the territory of the city of Sofia, and 2 applications for the issue of a permanent authorisation to use individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications through electronic communications network for digital terrestrial broadcasting on the territory of the city of Sofia. In this respect, five technical characteristics of the electronic communications network for digital terrestrial broadcasting of radio signals were examined and analysed.

National and international coordination

In 2020, in the Advisory Council for National Coordination and Agreement to CRC, 1,660 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.

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

During the past year, all publications in the biweekly circulars BRIFIC for terrestrial radio services were processed and analysed. As a result, coordination was carried out for:

- 131 radio frequency assignments of foreign administrations with their relevant technical parameters, in accordance with the Regional Agreement, Geneva 1984;
- 4 radio frequency allotments and assignments for amendment of the GE06D digital plan with the relevant technical parameters, in accordance with the Regional Agreement relating to the introduction of the digital terrestrial radio and television broadcasting service in the frequency bands 174-230 MHz and 470-862 MHz (Geneva 2006);

The Radio Communication Bureau received applications for the addition of:

- 9 radio frequency assignments of Bulgarian VHF radio stations to Plan Geneva 1984, which were entered in Part A of Plan Geneva 1984.
- 28 radio frequency assignments of Bulgarian VHF radio stations to Plan Geneva 1984, which were entered in Part B of Plan Geneva 1984.
- 6 T-DAB assignments which were entered in Plan GE06D in accordance with the Regional Agreement relating to the introduction of the digital terrestrial radio and television broadcasting service in the frequency bands 174-230 MHz and 470-862 MHz (Geneva 2006).

In accordance with the procedures under Article 12 of the ITU Radio Regulations, 171 (80 in season A and 91 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 circulars BRIFIC for fixed-satellite and broadcasting-satellite radio services were processed and analysed. 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 positions on geostationary orbit and the assignments for fixed 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 non-planned satellite systems and existing Bulgarian terrestrial networks, pursuant to Article 21 of the Radio Regulations – 10 objections for 15 satellite systems;

· 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 – 8 objections for 11 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 – 9 objections for 15 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 30 of the Radio Regulations – 4 objections were made for 4 satellite systems;

· 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 – 3 objections were made for 3 satellite systems;

· coordination of non-planned satellite station, potentially affecting another non-planned satellite station, pursuant to Art. 9.7 and Art. 9.41 of the Radio Regulations – objections were made for 73 satellite systems, as written notices were sent to the relevant administrations;

· coordination of satellite station from broadcasting-satellite radio service and fixed radio service when both are on primary basis, pursuant to Art. 9.11 of the Radio Regulations – objections were made for 5 satellite systems;

· 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 27 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 21 satellite systems;

· coordination of emitting satellite station to stations from terrestrial radio services located on the territory of the Republic of Bulgaria pursuant to Article 9.21/C of the Radio Regulations – objections were made for 10 satellite systems.

The protection of the orbital resources of the Republic of Bulgaria for fixed-satellite and broadcasting-satellite radio services from other satellite systems is an important factor for the smooth implementation and operation of the national systems and the modification made from broadcasting-satellite radio service. Moreover, coordination allows the smooth operation of radio services in bands on co-primary basis.

Electromagnetic compatibility

During the year, electromagnetic compatibility analyses of 79 Bulgarian and 219 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, 13 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 resource

At the end of 2020, the total number of undertakings authorised to use the individually assigned scarce resource – numbers for provision of public electronic communications, was 27.

In the past year, one authorisation for the use of individually assigned scarce resource - numbers was terminated, at the request of Telecable AD. The validity of the authorisations for numbers issued to two undertakings was extended.

In 2020, 1,100 geographic numbers were allocated for use to one undertaking. The total number of geographic numbers allocated at the end of the year was **8,856,800**.

Due to optimisation of networks and services of the undertakings or termination of their activity in 2020, the following were released:

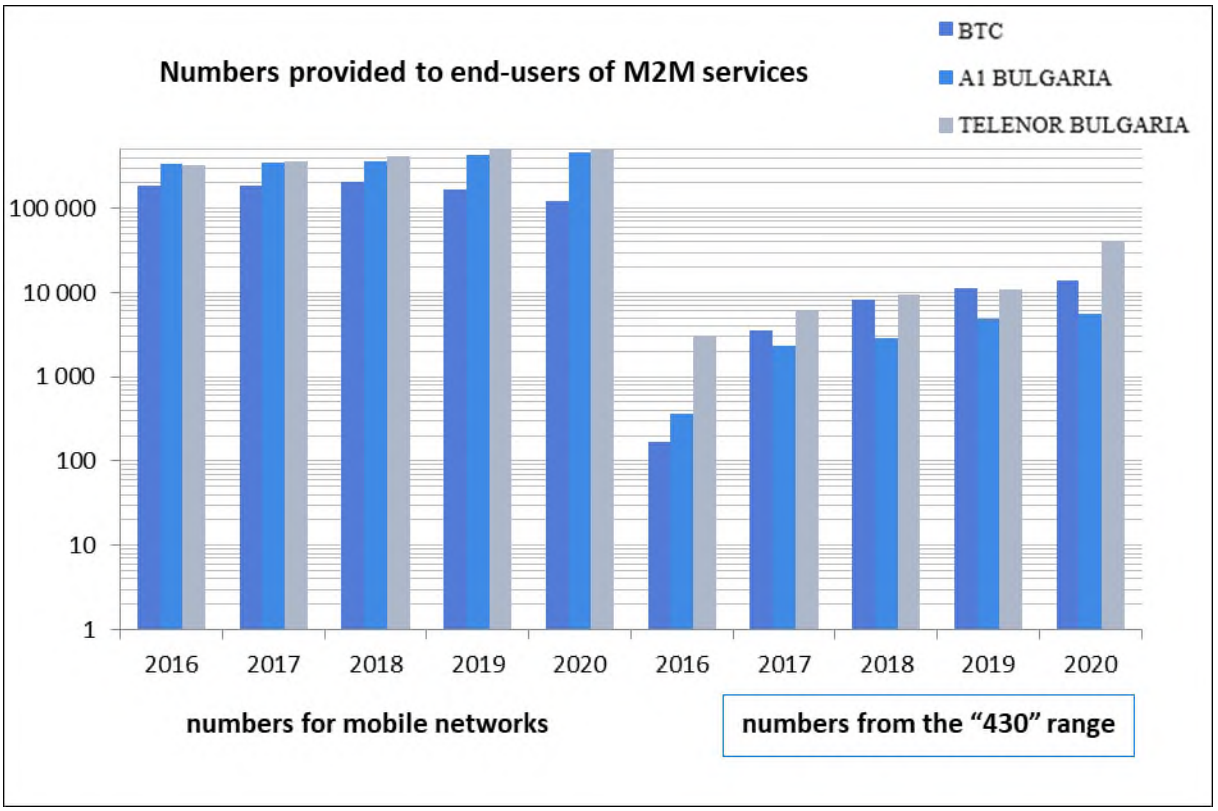
- 517,600 geographic numbers;
- **42** national signaling point codes;
- **2** international signaling point codes;
- **3,000** numbers from the ‘90’ range;
- **100** numbers from the ‘700’ range;
- **100** numbers from the ‘800’ range;
- **1** number for access to the dial-up Internet access service;
- **1** number for access to information services.

Technological developments in the field of electronic communications reduce the interest of consumers in fixed telephony services. This also affects the need of undertakings for geographic numbers and explains the small amount of numbers assigned and the large amount of geographic number released in 2020.

In order to ensure the process of servicing ported numbers and to protect the right of end-

users to continue the use of their ported numbers, 6,600 geographic numbers were ported 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, Bulgarian Telecommunications Company EAD (BTC), and Telenor Bulgaria EAD.



Source: CRC

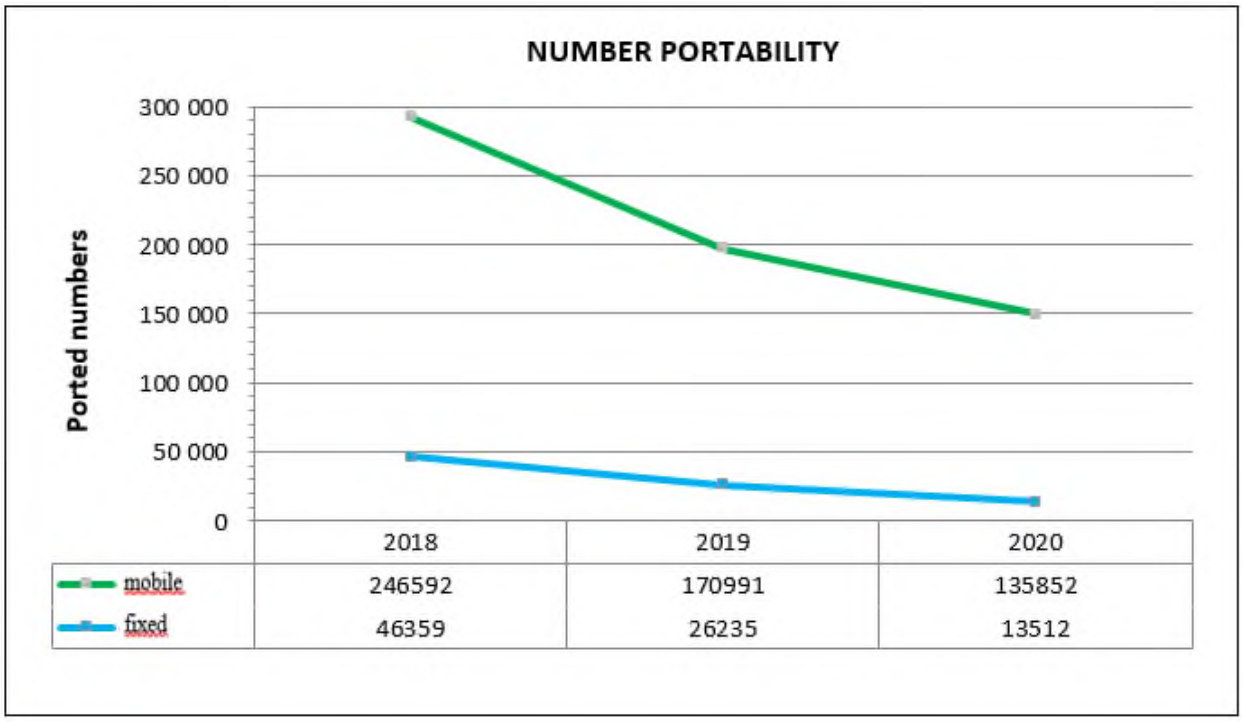
Figure 39

In 2020, an increase in the numbers from the “430” range, assigned to end-users, was reported. The trend towards the use of more numbers for M2M services from the ranges for access to mobile networks continued. BTC and Telenor saw an increase in the numbers from the "430" range provided to end-users and a decrease in the numbers from the mobile network access range.

Number portability

In 2020, there was a decline, compared to 2019, in the number of end-users who took advantage of their right to retain their number in the event of a change of the undertaking providing the relevant service. The trend for the porting of more numbers in mobile networks than numbers in fixed networks was also preserved.

Data on the numbers ported over the last three years are shown in the following figure:



Source: CRC

Figure 40

1.2. Regulation and monitoring of the electronic communications markets

The analysis of the competitive environment on the markets for electronic communications networks and/or services and the regulatory measures adopted in order to ensure such competitive environment, are among the main working priorities of CRC. The Commission's activities related to the implementation of these objectives in 2020 were:

Regulation of the electronic communications markets

In fulfilment of the CRC's goals for 2020, the fourth round of analysis and assessment of the market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1 of Commission Recommendation 2014/710/EU) and of the market for wholesale voice call termination on individual mobile networks (market 2 of Commission Recommendation 2014/710/EU) was launched. Through its established toolbox, CRC reported that there was no possibility in both wholesale markets to stimulate an effective competition, therefore it defined the markets subject to ex ante regulation and imposed specific obligations on undertakings with significant impact. Pursuant to CRC Decision No 265/23.07.2020 and CRC Decision No 266/23.07.2020, until the entry into force of the obligation to apply a single maximum rate for voice call termination in fixed/mobile networks as defined in the EC delegated act, adopted on the basis of Article 75(1) of Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (EECC), incumbent undertakings apply cost-oriented prices in accordance with the 2020 levels set out in CRC Decision No 550/20.10.2016, determined on the basis of an efficient operator costs calculated in accordance with the adapted pure BULRIC model.

On 18 December 2020, in fulfilment of the requirements of Directive 2018/1972, the EC adopted a Delegated Regulation setting a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination rate.

With regard to the development of the document, the EC set up an informal expert group composed of representatives of NRAs in the field of electronic communications in the Member States. The purpose of the working group was to advise and provide expertise to the EC and its bodies on certain proposals and initiatives, including on the preparation of delegated regulations, to ensure that the views and needs of the Member States are adequately reflected in the development of the document. The working group held two working meetings on 10 February 2020 and on 11 September 2020, in which representatives of CRC also took part. Discussions were held on a number of key aspects of the draft Delegated Regulation.

The adopted Delegated Regulation provides definitions of mobile and fixed voice termination service whereby the central element of the termination service is the number called. The Regulation only concerns price obligations and will be applicable to any provider of mobile and fixed termination services in the Union. The prices set therein apply to calls originating from a Union number and terminating to a Union number, i.e. a number included in the national numbering plans of the EU Member States concerned.

Monitoring of the electronic communications market

In accordance with Article 40 of the LEC, as well as Article 15 of the Methodology for the terms and procedures of relevant markets definition, analysis and assessment[70] (the Methodology), CRC regularly collects information from the undertakings providing electronic communications based on a set of parameters for which data is collected by means of special-purpose questionnaires. In 2020, the real exploitation of the CRC's electronic on-line questionnaire system was launched. On the basis of the amendments to the General Requirements (amended and suppl. SG, no. 111 of 31 December 2020), undertakings were given the opportunity to complete and send their 2020 Activity Reports, by 15 March 2021 (subsequently extended until 31 March 2021), either via the electronic system or by 1 March 2021 via the CRC documentary portal. As a result, 95% of the respondent undertakings (951 out of 1,001) provided the information via the electronic system.

Ensuring compliance with the legal requirements for the provision of roaming services and international calls and SMS messages within the European Economic Area.

In 2020, CRC continued to continuously monitor and control the implementation of the requirements of Regulation (EU) No 531/2012,[71] Implementing Regulation (EU) 2016/2286[72] and Regulation (EU) 2015/2120.[73] In particular, the Commission carried out monitoring and control of:

- the policies applied to the fair use of regulated roaming services;

[70] https://crc.bg/files/smp-metodika-2018_10.01.2019g.pdf (issued by the CRC Chairman, prom. SG, no. 89 of 13.11.2012, in force as of 13.11.2012, amended and supplemented, no. 101 of 07.12.2018).

[71] Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union, amended by Regulation 2015/2120 of 25 November 2015 and Regulation (EU) 2017/920 of 17 May 2017.

[72] Commission Implementing Regulation (EU) 2016/2286 of 15 December 2016 laying down detailed rules on the application of fair use policy and on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment;

[73] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and retail charges for regulated intra-EU communications and amending Directive 2002/22/EC and Regulation (EU) No 531/2012.

- compliance with price caps for roaming services within the European Economic Area (EEA);
- compliance of retail prices for regulated intra-EEA communications (calls and SMS) applied by Bulgarian providers with the European legislation;
- compliance with the requirements for transparency and for bill shock prevention;
- compliance with the requirements for offering and applying alternative rates for roaming and regulated communications within the EEA.

CRC is also actively involved in BEREC's work on assisting the EC to review the current roaming regulation and to draft legislative proposals for changes.

The Commission carries out regular checks in relation to complaints received regarding the use of mobile roaming services.

On the basis of the abovementioned, it was established that undertakings providing public electronic communications services via mobile networks:

- apply the “roam like at home” (RLAH) and the “fair use policy” (FUP) for postpaid and prepaid plans with roaming included, as required by Implementing Regulation (EU) 2016/2286;
- fulfil the provisions for transparency and accidental roaming and bill shock prevention in compliance with the requirements laid down in Regulation (EU) No 531/2012;
- apply prices in accordance with the regulated wholesale roaming services caps laid down in Regulation (EU) No 531/2012;
- successfully apply the maximum retail rates for international calls and SMS within the EEA in accordance with Regulation (EU) 2015/2120.

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

In 2020, the functionalities of the National Radio Frequency Spectrum Monitoring System for Civil Needs (NMS) were expanded by means of hardware update of the last mobile radio monitoring station (MS) of the monitoring system as well. The update was carried out by integrating a modern high-end broadband monitoring receiver into the measurement systems of the MS.

The functionalities for radio interference detection and localisation in the 32 GHz band were upgraded by supplying 4 (four) high-end spectrum analysers and 2 (two) portable monitoring systems in the 8 GHz band.

A technological assessment of the NMS was carried out to analyse and assess the state of the existing radio monitoring system and to draw up a programme for its optimisation over the next 5 years.

The study on the possibilities of expanding and modernising the NMS in line with the development of modern RFS technologies continued.

Regarding the technical and technological support of the activities relating to the control and monitoring of electronic communications networks using RFS, activities relating to the maintenance of the specialised technological equipment were carried out in 2020: fixed, mobile and transportable radio monitoring stations, portable measurement equipment, including calibration, where applicable.

At the end of 2020, for the implementation of its control functions, CRC had at its disposal the following main measurement systems:

- 15 (fifteen) fixed stations for RFS monitoring (1 manned and 14 unmanned RMS) in the bands from 20 to 3000 MHz;
- 7 (seven) mobile stations for RFS monitoring in the bands from 10kHz/20 MHz to 3000 MHz;
- 2 (two) portable systems for measurement of the coverage and quality of services provided within the GSM/UMTS networks;
- 2 (two) portable systems for measurement of the coverage and quality of services provided within the GSM/UMTS/LTE networks;
- 7 (seven) portable measurement systems for measurement of the coverage and quality of the DVB-T networks;
- 7 (seven) transportable measurement systems in the bands from 1 GHz to 26.5 GHz;
- 7 (seven) portable measurement systems in the bands from 9 kHz to 20 GHz;
- 7 (seven) portable measurement systems for measurement in the bands from 9 kHz to 3 GHz;
- 3 (three) portable measurement systems in the bands from 20 MHz to 31 GHz;
- 4 (four) portable monitoring systems in the bands from 8 kHz to 8 GHz;
- 4 (four) portable measurement systems - spectrum analysers - in the bands from 680 MHz to 32 GHz.

The further expansion of the functionalities and technological capabilities of the NMS has been planned in the following aspects:

1. Ensuring that lawful users can use radio spectrum efficiently and without interference, preventing the illegal use of spectrum and controlling the quality of services provided to end-users.

2. Development of the NMS by setting up new fixed compact radio monitoring stations to ensure greater territorial coverage, including higher frequency bands.

3. Ensuring systems for measuring the coverage and quality of mobile networks in connection with the use of new bands and the introduction of new technologies throughout the country.

4. Ensuring quality control of the services provided through terrestrial digital broadcasting, and preventing the illegal distribution of digital radio and television programmes.

The building of a modern and efficient RFS monitoring system requires the investment of considerable funds in its development and maintenance.

The funding provided in 2020 allowed the update of mobile stations from the NMS, which was launched in 2019, to be completed and the delivery of portable measurement and monitoring systems made it possible to extend the controlled frequency band of RFS for civil needs.

In the period 2021-2025, subject to having the necessary funding and implementing the programme developed, further development and modernisation of the NMS and more efficient control and monitoring of the radio spectrum for civil needs by the Commission will be ensured.

1.4. International activity of CRC in 2020

In 2020, CRC continued to maintain an effective and fruitful international cooperation and to actively participate in the work of specialised organisations in the field of electronic communications and postal services at a global, European and regional level. This contributed to the application of good regulatory practices, exchange of experience, as well as to the development and better functioning of the internal market for electronic communications networks and services.

Due to the global COVID-19 crisis, some of the major international events scheduled for the year, such as the Mobile World Congress (GSMA), the regular Universal Postal Union (UPU[74]) Congress, the ITU Digital World exhibition and the World Telecommunication Standardization Assembly (WTSA[75]) were either cancelled or postponed until 2021 or 2022, respectively.

All other major events in which CRC took part were held virtually via various platforms: Cisco Webex, Zoom, Microsoft Teams, etc.

Participation in the work of European structures

In 2020, CRC continued to cooperate directly with the European structures and the Permanent Representation of the Republic of Bulgaria in Brussels, with a view to protecting Bulgaria's interests through a consistent and coordinated national position on the EU legislation.

In 2020, the Commission participated actively both at the management and expert level in the work of the Independent Regulators Group (IRG[76]) and BEREC, contributing to the development of common regulatory practices. During the four IRG General Assemblies and BEREC Plenary meetings, as well as the Contact Network meetings which were held during the year, a number of documents were discussed and adopted in implementation of the BEREC Work Programme for 2020, which were directly reflected in the work of CRC, the most important of which are:

- BEREC Guidelines to assist NRAs in the consistent application of geographical surveys of network deployments pursuant to Article 22 EECC;
- BEREC Guidelines on common approaches to the identification of the network termination point in different network topologies pursuant to Article 61(7) EECC;
- BEREC Guidelines on very high capacity networks under Article 82 EECC;
- BEREC Guidelines to foster the consistent application by NRAs of the conditions and criteria for assessing co-investments in new very high capacity network elements pursuant to Article 76(4) EECC;
- BEREC Guidelines on the criteria for a consistent application of Article 61(3) EECC concerning the imposition of access obligations after the first concentration or distribution point in the access network;
- BEREC Guidelines on common criteria for the assessment of the ability to manage numbering resources by undertakings other than providers of electronic communications networks or services pursuant to Article 93(2) EECC;
- BEREC Guidelines detailing the quality of service parameters of internet access services and publicly available interpersonal communications services and the publication of information pursuant to Article 104(2) EECC;

[74] Universal Postal Union
[75] World Telecommunication Standardization Assemby
[76] Independent Regulators Group

- BEREC Guidelines on how to assess the effectiveness of public warning systems transmitted by different means pursuant to Article 110(2) EECC;
- Updated BEREC Guidelines on the implementation of the Open Internet Regulation (Regulation (EU) 2015/2120);
- Updated BEREC Guidelines on intra-EU communications;
- BEREC Guide to the 5G Radar and 5G Radar;
- Report of BEREC recent activities concerning the EU 5G Cybersecurity Toolbox Strategic Measures 5 and 6 (Diversification of suppliers and strengthening national resilience);
- BEREC's contribution to the public consultation on the proposal for the recommendation on internal market procedures in line with the EECC;
- BEREC's contribution to the review of the EC access recommendations;
- BEREC's response on the targeted EC public consultation on the evaluation of the state aid rules for the deployment of broadband networks.

In addition to the above meetings, an extraordinary virtual plenary meeting of the BEREC Board of Regulators was held, during which a draft BEREC contribution was discussed in the context of the launch of the EC public consultations on the Digital Services Act.

A BEREC Stakeholder Forum was also held in 2020, where CRC was represented at the level of CRC members. The event provided an opportunity for all stakeholders to exchange ideas on BEREC's work and plans, as well as to discuss issues relevant to the telecommunications market. The main focus of the Forum was on the regulation of digital platforms. In the context of the stakeholder discussion, questions on the scope of regulation, binding criteria for the definition of digital platforms subject to regulation, the establishment of an EU-level mechanism to ensure coherence and harmonised conditions in the internal digital market, the structure and new regulatory powers of competent authorities, as well as the role of BEREC and NRAs in this process were discussed.

During the reporting period, the Commission also actively participated in the work of ERGP.

The participation of CRC in the two plenary meetings and the meetings of the Group's Contact Network have enabled the establishment of CRC positions on the need to form a new regulatory framework in the postal sector. CRC, together with the other members of the Group, was actively involved in setting priorities for the operation of ERGP in 2021 and in analysing the impact of the COVID-19 pandemic on the postal sector. In the past year, the following important documents were adopted by ERGP:

- ERGP Work Programme 2021;
- ERGP Report exploring the possible definitions in the postal sector;
- ERGP Response to the public consultation on the evaluation of the Postal Services Directive;
- ERGP Response to the launched public consultation procedure of the EC Digital Services Act (DSA);
- ERGP Report on the consequences of COVID-19 on the postal sector;
- Report on the quality of service, consumer protection and complaint handling for 2019;

- ERGP Report on core indicators for monitoring the European postal market;
- ERPG Report on key consumer issues;
- ERPG Report on the implementation of the Regulation of the European Parliament and of the Council on cross-border parcel delivery services (EU);
- ERGP Report on the suitability of regulatory tools to promote competition;
- ERGP Report on interconnection models and access to international postal networks.

With its active participation in the work of BEREC and ERGP, CRC contributed to the preparation and adoption of a number of documents implementing the EECC, as well as of the opinions of the two groups on the draft bills adopted by the EC of the Digital Services Act (DSA) and the Digital Markets Act (DMA).

Communication with the EC

In November 2020, the regular annual mission of representatives of the EC Directorate-General for Communications Networks, Content & Technology was held to assess the development of the electronic communications market in the Republic of Bulgaria with regard to the preparation of the EC regular report in this respect.

Participation in the activity of specialised international organisations

In 2020, CRC also took part in forums organised by the International Telecommunication Union (ITU), European Conference of Postal and Telecommunications Administrations (CEPT), European Telecommunications Standards Institute (ETSI), Network of Regulators of the Member States of the International Organisation of the Francophonie (FRATEL[77]), etc.

CRC was represented at the management level in the Global Symposium of Regulators (GSR) on topic “The Regulatory Wheel of Change: Regulation for Digital Transformation”. GSR-20 marked its 20th edition and the global ICT regulatory community celebrated 20 years of regulatory frameworks development. The jubilee event focused on providing concrete guidance to achieve meaningful connectivity in the digital transformation. In addition to the high-level panels on topical, current policy and regulation issues, GSR-20 included interactive sessions and training involving regulators and policy-makers from around the world, thus becoming a global platform for discussion. The event enabled ITU members to share experience and knowledge, to cooperate and to identify evolving regulatory tools and approaches to ensure affordable, safe, secure and reliable connectivity, as well as on-line access and use for people all over the world. The event also adopted Best Practice Guidelines on topic “The Gold Standard for Digital Regulation”, where CRC also provided its contribution to Vectors of regulatory action: Inclusiveness, agility and resilience.

Representatives of the Commission also participated in the closing week of the virtual World Summit on the Information Society Forum (WSIS Forum 2020), which marked 15 years since its establishment. The theme of the event was "Fostering Digital Transformation and Global Partnerships: WSIS Action Lines for Achieving the Sustainable Development Goals (SDGs)". The programme included policy statements, interactive high-level dialogues, a WSIS Prize ceremony, a ministerial round table and a series of WSIS Action Line facilitation meetings. The event was attended by high-level officials, scientists, ICT experts, youth, business and civil society leaders. The event discussed the role of ICT as a means of achieving the United Nations SDGs, with due regard to the global monitoring and implementation mechanism of the 2030 Agenda for Sustainable Development. Over the last 15 years, the WSIS Forum has proved to be an effective, multi-stakeholder global platform which is open and inclusive to all to

[77] Réseau francophone de la régulation des télécommunications

exchange knowledge and information, improve the network for cooperation and sharing best practices in the ICT sector.

CRC also participated in the round table organised by BEREC and the World Mobile Industry Association (GSMA). The meeting was attended by the members of BEREC and representatives at the management level of European telecommunications operators. Topics related to the role of telecoms in the recovery from the COVID-19 crisis, approaches to the development of a new Digital Services Act, and new competitive tools for digital platforms to deal with load-related problems were discussed. In addition, different approaches were considered on the challenges related to the cost of 5G deployment and the improvement of existing procedures.

Within the ITU Virtual Digital World 2020, jointly organised by the ITU and the Vietnamese Ministry of Information and Communications, a virtual Ministerial Round Table on the “Role of Digital Technologies During and After the COVID-19 Pandemic” took place. The event was joined by ministers and deputy ministers, heads of regulatory bodies and leaders of private sector telecommunications and IT companies, as well as representatives of CRC. Three panels examined the importance of connectivity in the light of the global COVID-19 pandemic and the future role of digital technologies in national digital strategies.

CRC also took part in ETSI’s 75th and 76th General Assemblies (GA), which addressed key issues relating to the Institute's activities, strategy and financing. Due to the COVID-19 pandemic, the 75th GA was not physically held. Some of the decisions, where possible, were passed by correspondence. The rules of procedure were subsequently amended and texts allowing the GA to be held electronically were included and approved in the Institute's basic document (ETSI Directives) A new Board was selected at the 76th GA. An Annual Report of the Director-General for 2020, including a report on the Institute's development, membership and meetings held, a review of the achievements and work of the technical committees, the development of projects and relations with the EC and partner organisations, new cooperation memorandums, etc. were reviewed and approved. An Administrative Action Plan and a report on the Institute's financial position were adopted.

CRC also participated in two meetings of ETSI national standardisation organisations where information was provided and topics of mutual interest were addressed. Among the topics under consideration was the introduction of a fast-track procedure for the approval of draft European standards (ENs) within 60 days instead of 90 days for a standard procedure.

The Commission was also represented at the 18th Annual Meeting of the eCommunications NRAs Network (FRATEL) of Member States of the International Organisation of the Francophonie in December. The meeting focused on "Investment, Technological Innovation, Competition: What Are the New Challenges Facing Tariff Regulation?". In this respect, the event focused on tariff provisions to promote network modernisation and wholesale tariff regulation in favour of easing retail regulation. The outcome of the study on the feasibility of the mobile coverage presentation tool and the quality of service intended for FRATEL members was also presented at the meeting.

Members of CRC also participated in the second virtual round table at management level in December 2020, jointly organised by the World Bank (WB), ITU, GSMA and the World Economic Forum (WEF). The meeting focused on "The Role of Digital Technologies in the COVID-19 Crisis: From Emergency Response to Resilient Recovery". The event was attended by ministers of finance and information and communication technology (ICT), heads of regulatory authorities and chief executives of the ICT industry. The round table discussed best practices and measures taken in response to the COVID-19 pandemic, as well as future-oriented priorities to accelerate sustainable recovery.

CRC experts participated in the 52nd, 53rd and 54th Plenary sessions of the ECC of CEPT related to RFS management, numbers and networks. At the meetings, decisions and reports were adopted with relation to introduction of 5G technology, mobile/fixed communication networks (MFCN) in the 26 GHz band, harmonised technical conditions for the future railway mobile communications system (FRMCS), railway mobile systems (RMR), wireless access systems such as radio local area networks (WAS/RLAN) in 6 GHz, networks for programme making and special events (PMSE) and the European table of frequency allocations. Decisions were adopted on the harmonised use of earth stations operating geostationary and non-geostationary satellite networks operating in frequency bands below 1 GHz (S-PCS<1GHz) and intelligent transport systems (ITS). The new ECC Strategic Plan for 2020-2025 was adopted. The decisions adopted are to be implemented in accordance with our national interests and specificities in 2021.

Experts also took part in the 20th and followed based on documents the 21st meeting of the ECC Working Group "Numbering and Networks" (CEPT/ECC/WG NaN). The work of the WG NaN and the project teams is related to the management of numbering resources and interconnection and access. The working group brings together experts in these areas and allows for the exchange of specific experiences, clarification of issues raised and resolution of specific problems. The highlights of the work in 2020 were related to the following topics: numbering resources - secondary assignment, number portability, use of national numbering resources in the territory of other countries, etc.; emergency communications – caller location and eCall; methods for measuring and evaluating the results of measuring the quality of the mobile internet service; participation of working group members in the work of other organisations - ITU-T, ETSI, BEREC expert working groups, etc.

CRC representatives also took part in the meetings of the Working Group "Frequency Management" (WGFM), which took place in February, June and October. The meetings examined and approved decisions and reports on harmonised spectrum use and discussed regulatory issues concerning different types of technologies. The main topics were related to defining the conditions for spectrum harmonised use by intelligent transport systems, radio local area networks, earth stations on mobile platforms, satellite and railway communications, short-range devices.

The participation in the work of the ECC and its groups assists CRC in the implementation of activities related to the management of orbital resources, radio frequency spectrum, eCall numbering resources, secondary assignment of numbers and emergency calls. This in turn ensures that national policies for electronic communications are implemented in line with European and global trends.

In 2020, the preparation for the ITU World Radiocommunication Conference (WRC-23) was started with the participation of CRC experts. During the virtual meetings of the WRC Preparatory Group (CPG[78]), its organisational structure was approved, four project teams were set up to review the agenda items of the conference, the information provided on the activities concerning WRC-23 in regional organisations as well as the preliminary positions of other international organisations were considered. The work of CPG will be completed immediately before WRC-23. With its participation in this group, CRC started its preparation for WRC-23, which will contribute to the effective participation of its representatives in the conference, as well as to the implementation of the guidelines for radio communications development and spectrum management worldwide.

In 2020, CRC actively participated in various international events at management and expert level with a view to achieving its strategic objectives at national and international level. The implementation of good regulatory practices, the exchange of experience for the

[78] Conference Preparatory Group

development and better functioning of the internal market for electronic communications networks and services will continue to be a strategic area for the development of international cooperation based on multilateral dialogue and an in-depth bilateral partnership with other NRAs.

1.5. Information technology for 2020

The provision of suitable information service by CRC and the support of the electronic administrative services provided is of significant importance for the efficient performance of its regulatory and monitoring functions. The Commission sets the following priorities for the development of information services:

- Support of existing business and citizen-oriented electronic services and development and support of domestic electronic services;
- Extending the technological options for implementation of interoperable open standards and innovations in the development of the used and deployment of new information systems;
- Establishment of an organisational, communication and information environment for the efficient and at the same time transparent operation of the CRC administration.

In 2020, CRC carried out projects related to improving the information and communication environment:

- The CRC information system for on-line completion and acceptance of questionnaires for the reporting of the activities of undertakings providing public electronic communications networks and/or services and of postal service operators was put into operation;
- The provision of 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 LEC, the Law on Electronic Document and Electronic Trust Services (LEDETS) and the Postal Services Act (PSA);
- Supply, installation and warranty support of a cluster server system and provision of the necessary licenses for it;
- Renewal of anti-spam and web-filter licenses;
- Updating an Oracle licensed software;
- Supply of communications and computer equipment.

Project No BG05SFOP001-1.010-0001

In 2020, in implementation of measure 74 "Building and development of the information systems and registers of CRC for improving the effectiveness of regulatory activity and the quality of administrative service" of the updated Roadmap for implementing the Updated strategy for the development of eGovernment in the Republic of Bulgaria 2019-2023, CRC prepared a project proposal for applying for grants under the Operational Programme “Good Governance” (OPGG) under procedure BG05SFOP001-1.010. As a result of the approved evaluation report under the procedure, an Administrative contract No BG05SFOP001-1.010-0001-C01 was concluded by the Head of the Managing Authority of the OPGG on 08.06.2020 for the implementation of project No BG05SFOP001-1.010-0001 “Building and development of the information systems and registers of CRC for improving regulatory and control activities and raising the quality of the administrative service". The implementation period of the project is from 01.10.2019 to 31.12.2021.

The main project actions are:

- Action 1: Setting up a mechanism to measure and monitor the quality parameters of the Internet access service (Action 1).
- Action 2: Development of an information system "Licensing and Registers" of CRC in line with the principles of e-government (Action 2).
- Action 3: Building an instrument to compare electronic communication services rates (Action 3).
- Action 4: Development of a mechanism to limit the cases of accidental roaming recorded in the territory of the Republic of Bulgaria by developing a mobile application to alert users and collect information from CRC about areas where accidental roaming has been registered (Action 4).

Under Administrative contract No BG05SFOP001-1.010-0001-C01, four public procurements were carried out and contracts were concluded with the contractors for each of the four actions. The opening information event was held on-line on 20.10.2020.

As of 31.12.2020, the following implementation stages of each of the actions were completed:

- *For Action 1 — Stage 1 'Data and requirements analysis';*
- *For Action 2 — Stage 1 'Data and requirements analysis';*
- *For Action 3 — Stage 1 'Data and requirements analysis';*
- *For Action 4 — Stage 1 'Data and requirements analysis' and Stage 2 'Preparation of a system project and a prototype'.*

Information about the project was published on the CRC's website: https://crc.bg/bg/rubriki/611/opdu.

CRC plans to implement projects related to e-government:

- 'Development, deployment and maintenance of an information system ensuring the granting of individual rights to use radio frequency spectrum on the basis of registration';
- Development, deployment and maintenance of an information system providing for the registration activities of transceiver stations on terrestrial networks enabling the provision of electronic communications services, activities under Article 151, Para 1, point 16 of the Spatial Planning Act and short-range Wi-Fi access points.

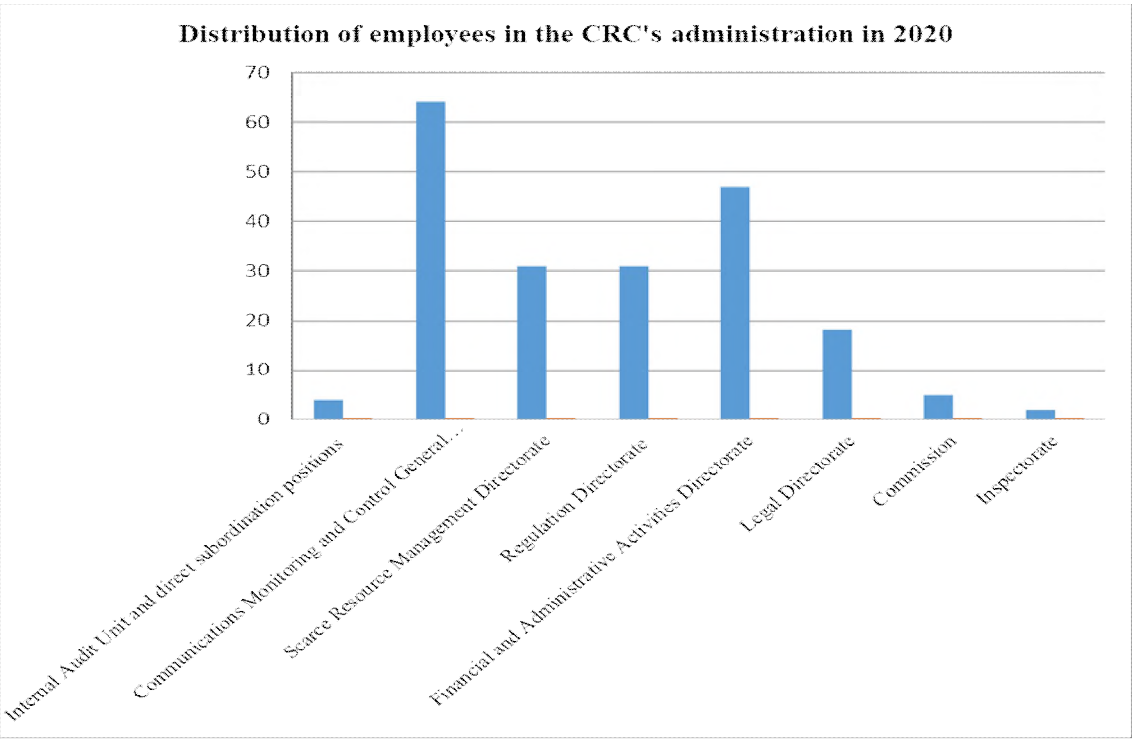
1.6. CRC's administrative capacity

One of the key objectives of CRC is to establish a sustainable system for human resources development that will ensure that tangible and lasting results are achieved in its activities.

By amending the Rules of Procedure of the Communications Regulation Commission and its administration, the organisational structure of CRC has been optimised as of 28.01.2020 and the Commission carried out its activities in 2020 with the following breakdown of employees:

- Commission 5
- Internal Audit Unit and direct subordination positions 4
- Inspectorate 2

- Financial and Administrative Activities Directorate 47
- Communications Monitoring and Control General Directorate 64
- Legal Directorate 18
- Scarce Resource Management Directorate 31
- Regulation Directorate 31

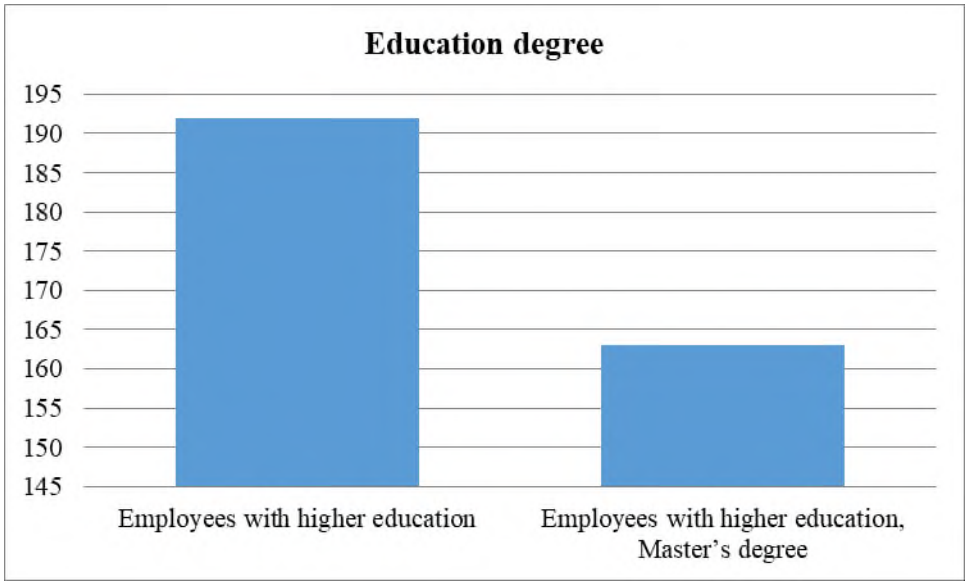


Source: CRC

Figure 41

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

Of the total number of CRC employees, 192 employees had higher education, as 163 of them had a Master's degree (Fig. 42).



Source: CRC

Figure 42

The employees working in the CRC's administration hold diplomas in the following areas – technical sciences; legal sciences; economic sciences; humanitarian sciences, etc. The largest share is held by technical, followed by economic sciences which is in line with the Commission's work specifics.

In the Commission's administration, employees are appointed and released in accordance with the provisions of the Law on Civil Servants (LCS), the Ordinance on Recruitment and Selection Procedures in Case of Mobility of Civil Servants, and the established Internal Rules.

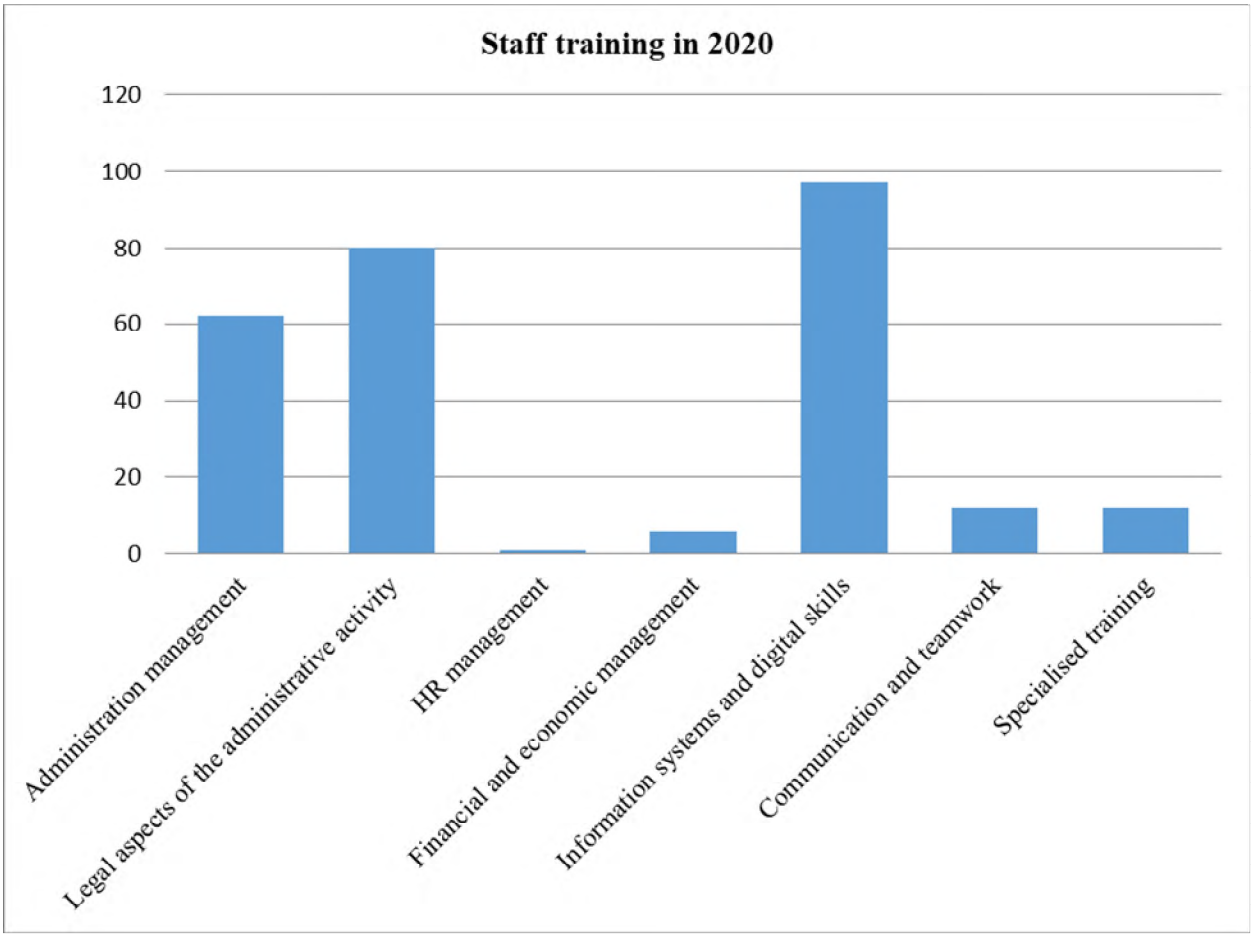
In 2020, a total of 10 (ten) competitions and selection procedures were organised and held in CRC, as a result of which 13 (thirteen) new employees were appointed by the end of the year. Employees admitted from other administrations under the provisions of Article 81a LCS were 2 (two). Terminated employment relationships based on various legal grounds for the same period - 16.

Remunerations of employees are determined in accordance with the provisions of the LCS, the Labour Code and the Ordinance on the Salaries of Civil Servants in the State Administration.

In 2020, in order to improve the administrative capacity of the CRC administration staff and maintain up-to-date and new knowledge, participation was organised in specialised trainings and seminars, by area and number as follows:

- Administration management 62
- Legal aspects of the administrative activity 80
- Human resource management 1
- Financial and economic management 6
- Information systems and digital skills 97
- Communication and teamwork 12
- Specialised training 12

The new knowledge acquired during the training is exchanged both in a working environment as well as by means of a shared folder of materials to be applied by all experts.



Source: CRC

Figure 43

According to the Ordinance on the conditions and procedure for assessing the performance of civil servants, one of the main objectives of the assessment is: "identifying the development needs of each employee and improving their competences".

In this context, to obtain feedback from the participants on the extent of satisfaction and practical usefulness of the training, at the end of 2020, a questionnaire was prepared and sent to all employees. The respondents reflected their impressions of the training passed since the beginning of the year and what other training they thought would help them to raise their qualification and improve their performance.

To facilitate the completion and optimise the data processing, the questionnaire was prepared in an electronic form.

The results obtained were systematised and, based on them, an analysis was prepared of the needs and the planned participation in new training, in accordance with the specifics and opportunities.

Ensuring health and safety at work is part of the process for improving the working conditions at CRC. Therefore, throughout the year, the Commission's management was making the necessary efforts aimed at improving the organisation and management of operations to ensure health and safety at work. In this respect, measurement of the illumination levels in the control points and the level of overall illumination in the work areas of CRC was carried out.

Training in health and safety at work of CRC’s management staff was conducted under the occupational medicine service contract.

According to a workplace risk assessment, personal protective equipment was provided for employees from the Communications Monitoring and Control Directorate General.

Various measures were taken in the organisation of work with the aim of reducing the risk of coronavirus infection, ensuring safety and health at work and a smooth functioning of the CRC administration. An extraordinary briefing was also carried out on CRC's staff to limit the spread of COVID-19 and to provide up-to-date information on the risks of infection.

2. Other important activities

2.1. Standardisation

In compliance with Article 30 LEC, in 2020, CRC performed the functions of the National Standardisation Organization (NSO) for ETSI, as it carried out activities related to:

- providing access, through the CRC website, to all stakeholders in the Republic of Bulgaria to give their opinions and comments on the draft European standards of ETSI;
- participating in open procedures for public enquiry and approval of ETSI's draft European standards;
- implementing the approved and published European standards as national, and providing information on their transposition to ETSI.

CRC is working in cooperation with the Bulgarian Institute for Standardisation (BDS) for the implementation of ETSI standards as Bulgarian. In the past year, 66 standards were introduced by endorsement and notified to ETSI.

CRC also participated with its representatives in the work of the Technical Committees (TC) for Standardisation of BDS (TC 47, TC 57, TC 75, TC 80), having relation to electronic communications.

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

In 2020, CRC received three notifications of incidents which meet the criteria for an incident with significant market power, as defined in the General Requirements for Provision of Public Electronic Communications. One incident is related to a technical problem in a fixed Internet access network, while the others are related to an outage of power supply to base stations due to deteriorated meteorological situation in the country. None of the incidents occurred during the country's state of emergency. In fulfilment of its obligation under Article 243b (5), CRC sent the above information to the EC and to the European Union Agency for Cybersecurity (ENISA[79]).

By Decision No 425 of 17.12.2020, CRC established advisory councils on the issues of security of public mobile terrestrial electronic communications networks and mobile services and on the security of public fixed electronic communications networks and fixed services. The work of the advisory councils is expected to achieve common positions of the undertakings concerned on minimum requirements for security measures for public communications networks and services. The activities of the advisory councils will be carried out in 2021.

2.3. Electronic trust services

In fulfilment of its powers under the Electronic Document and Electronic Trust Services Act, in 2020, CRC confirmed the qualified status of the trust services providers Information Services Plc. and System for Electronic Payments Bulgaria/SEP Bulgaria JSC, and of the trust services provided by them.

[79] European Union Agency for Cybersecurity

CRC maintains an up-to-date national trusted list that contains information about the qualified trust services providers and about the services provided by them. Two new trust services of the provider Eurotrust Technologies AD were entered.

In 2020, the total number of the issued certificates for qualified electronic signature was over 566,000, and for qualified electronic seals - over 160. The issued qualified electronic time stamps were above 28,134,000, and the qualified certificates for website authentication - over 250. The electronic proofs of qualified validation of qualified electronic signature issued were more than 482,000.

2.4. Communications control

CRC exercises effective control over compliance with the LEC requirements and regulations in the field of electronic communications throughout the country. To this end, it has built a territorial structure - a central unit in the city of Sofia and five territorial units in the cities of Plovdiv, Burgas, Varna, Veliko Tarnovo and Vratsa. For yet another consecutive year, CRC has traditionally focused on protecting the interests of end-users, while respecting the principles of legality, equality and transparency.

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

CRC is performing its main monitoring and control functions with regard to the RFS for civil needs through the established NMS. A periodic preventive control of the condition of RFS for civil needs is carried out on the entire territory of the country with the aid of fixed and mobile stations for radio monitoring. The objective is to ensure appropriate and interference-free conditions for the provision of electronic communications to the lawful spectrum users and to ensure a certain quality of services provided through them to end-users.

The need for sufficient free spectrum is increasing as new technologies enter and e-communications are continuously improving, 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 continues to grow, there is also an increase in the substantial role of RFS monitoring and control in respect of its effective management.

To ensure the normal operation in the light of the ever 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.

In 2020, 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 RFS 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.

As a result of the regular scheduled monitoring carried out, in 2020, the undertakings were provided electronically with 13,686 measurement results concerning the basic technical parameters of the countrywide radio broadcasting stations. In 2020, the steady 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

A scheduled daily monitoring was carried out in the 20-3000 MHz frequency band through fixed (manned and unmanned) stations for radio monitoring by NMS on the territory of serviced areas, and through mobile stations for radio monitoring – periodic control and monitoring throughout the country.

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

- fulfilment of CRC decisions - measurements of basic technical parameters of 35 broadcasting stations were carried out to assess their compliance with the approved technical parameters; in about 1/3 (11) of the inspections, it was found that the broadcasting stations are not in compliance with the technical parameters approved by CRC decisions, and prescriptions to be brought into compliance were given for 9 of the discrepancies established;
- compliance with the provisions of the authorisations issued - 22 inspections were carried out, and about 1/3 (7) of the inspections found that the conditions of the authorisations granted have not been complied with and that the necessary remedial actions have been taken;
- fulfilment of the prescriptions given - 9 inspections were carried out, as 8 of them found that the prescriptions have been fulfilled and administrative penalties have been imposed for failure to comply with one of the prescriptions.

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 2020, special attention was paid to the monitoring in VHF frequency ranges for radio and television broadcasting for evaluation of the electromagnetic environment and cross-border interferences from Bulgaria's neighbouring countries. All data obtained from the measurements are 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). In 2020, measurements carried out in the territory of 28 settlements to assess the electromagnetic environment and register 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 were summarised and analysed. The results were included in the drafted 353 measurement reports. 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 ambient temperature, the sea water temperature, and the state of the sea, electromagnetic environment and cross-border penetration are carefully monitored.

In addition to border areas, in 2020, measurements were also carried out in 51 inland settlements and were recorded in 512 measurement reports, to assess the electromagnetic environment in support of spectrum management.

- *monitoring of frequency ranges intended for mobile PMR networks* - evaluation of the actual RFS occupancy and registration of illegal broadcasting - frequency ranges intended for mobile PMR networks were monitored in 41 settlements, and the results were summarised in 318 measurement reports.

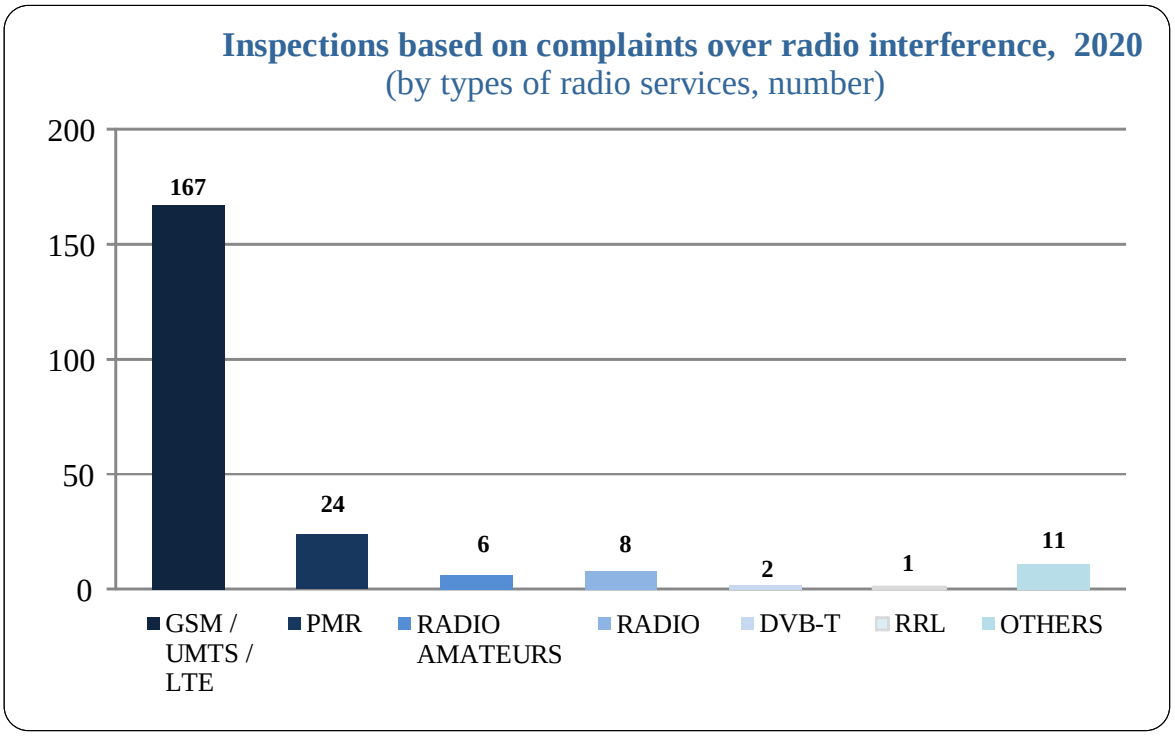
- *evaluation of the electromagnetic compatibility of VHF/FM radio broadcasting stations in the 87.5÷108.0 MHz band and the radio navigation and*

communication equipment of the aeronautical services operating in the 109.0÷137.0 MHz frequency band - to guarantee the electromagnetic compatibility and trouble-free operation of the radio navigation and communication equipment of the aeronautical services, measurements were carried out on 8 radio transmission sites under the *Methodology for measuring A1 type intermodulation products generated by the operation of closely situated 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 consumer interest

- monitoring with regard to complaints for radio interference received from lawful spectrum users, citizens, organisations and institutions.

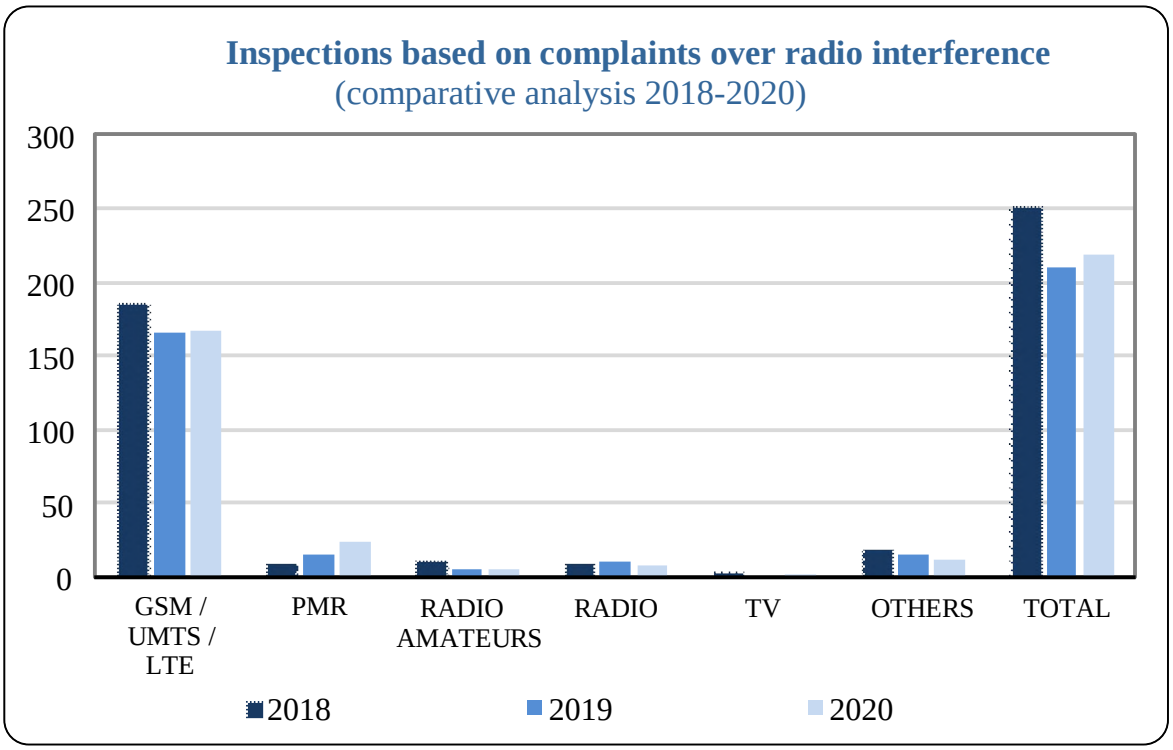
In 2020, 160 cases of radio interference were examined, and the results were included in 219 measurement reports (Figure 44). The necessary measures for quick localisation and elimination of interfering sources were timely undertaken. Interferences from GSM/UMTS/LTE amplifiers (repeaters) transmitting in frequency ranges intended for public electronic communications through mobile terrestrial networks had a relatively high share in 2020 as well. The next place was occupied by cases of registered interferences from defective (household and network) radio equipment. It is estimated that the share of recorded interferences from radio jammers decreased significantly in 2020 compared to the previous year. 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 44

A comparative analysis of the solved cases of interference in connection with inspections carried out under the received complaints, by types of services for the period 2018-2020, is presented in Figure 45.



Source: CRC

Figure 45

- monitoring and inspections concerning received complaints related to the ensured coverage of mobile terrestrial networks, terrestrial digital television of DVB-T standard, and terrestrial analogue broadcasting of radio signals.

In 2020, 31 complaints were examined on issues with ensured coverage of mobile terrestrial networks, terrestrial digital television of DVB-T standard, and terrestrial analogue broadcasting of radio signals, with 194 measurement reports being compiled for the results:

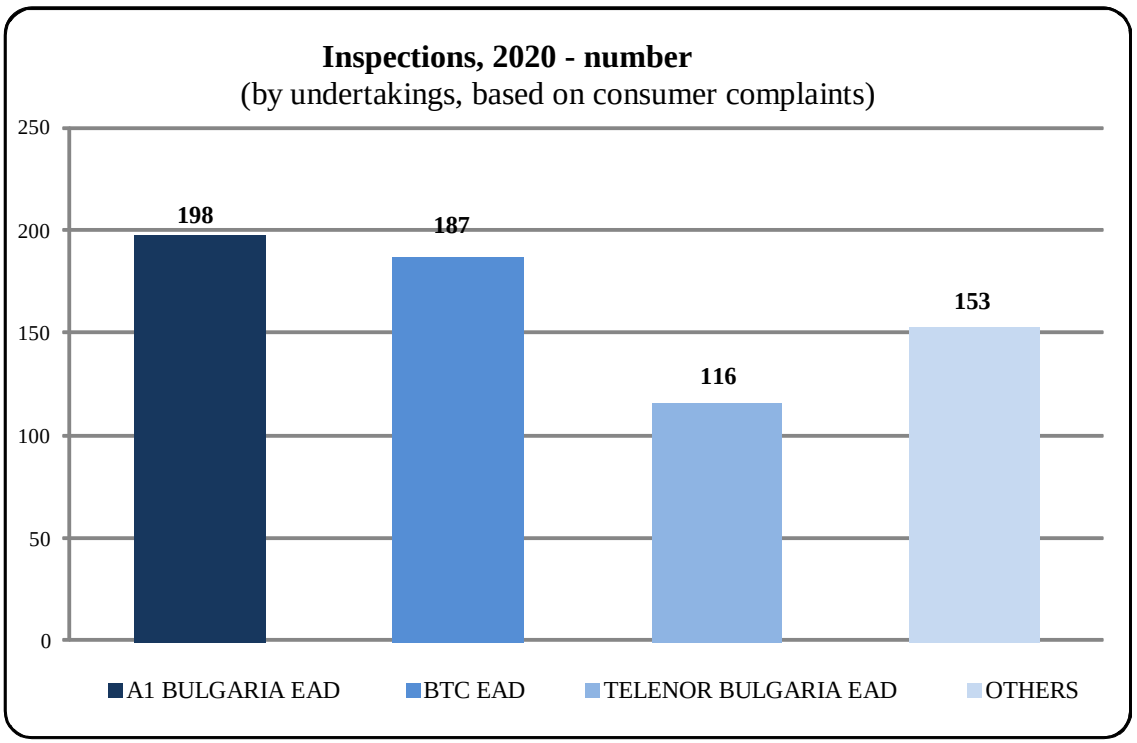
- coverage of mobile terrestrial networks - in connection with the 12 complaints received for lack of coverage of mobile terrestrial networks (GSM/UMTS/LTE) in 2020, the declared coverage was analysed and the necessary measurements were carried out and included in 140 measurement reports; scheduled measurements of GSM/UMTS/LTE mobile networks in 65 settlements and 8 routes from the Republican Road Network were carried out and the results were included in 1,689 measurement reports;
- coverage of terrestrial digital television of DVB-T standard and terrestrial analogue radio broadcasting networks - in connection with the 19 complaints received regarding issues with the ensured coverage of electronic communications networks of DVB-T standard and analogue terrestrial radio broadcasting of radio signals, inspections and measurements were carried out on the territory of the country and were recorded in 54 measurement reports.

The results from the RFS monitoring and control carried out in 2020 were summarised in a total of 12,019 measurement reports, and 11,606 measurement reports were drawn up for the conducted scheduled monitoring, 1/3 of which were in relation to the overview monitoring carried out by the stationary and mobile radio monitoring stations from the NMS on the entire territory of the country.

2.4.2. Inspection activity

In 2020, in connection with the CRC control functions related to the control over electronic communications provision pursuant to the LEC, 4,279 inspections were carried out with regard to: implementation of CRC decisions; compliance with the provisions of the authorisations issued; inspections concerning ensured coverage from mobile terrestrial networks and digital television networks, etc.; inspections regarding detection and removal of interference; inspections based on risk analysis; provision of services without notification/authorisation; non-provision of information to CRC; inspections with relation to submitted complaints related to: problems with the use of mobile services in roaming; compliance with the requirements of Chapters 14 and 15 of the LEC; compliance with the general requirements for the provision of public electronic communications; sending of unsolicited messages for the purposes of direct marketing and advertising by the undertakings without the prior consent of the consumers; non-provision of itemised bills to end-users; dispute of monthly bills and charged penalties; portability of geographic and mobile numbers; problems with the coverage and quality of the service provided to end-users, etc.;

In 2020, the main share (around 77%) of inspections in connection with complaints received were performed to the three largest undertakings providing electronic communications services (Figure 46). Some 501 inspections were carried out in relation to end-user complaints submitted to CRC concerning the services they offer: A1 BULGARIA EAD - 198 inspections, BTC EAD – 187 inspections, and TELENOR BULGARIA EAD – 116 inspections.



Source: CRC

Figure 46

In 2018, significant attention was once again paid to the observance of the LEC requirements in respect of the **protection of the interests of end-users**, the more important groups of inspections being as follows:

- Inspections related to the **protection of the interests of end-users:**

- **problems with the use of roaming mobile services** - in 2020, the greatest number of inspections were carried out in respect of complaints received concerning problems with used roaming mobile services - 156 inspections (by about 64% less than in 2019), of which to A1 BULGARIA EAD - 59 inspections (38%), to TELENOR BULGARIA EAD - 53 inspections (34%), and to BTC EAD - 44 inspections (28%); 1 administrative offence act (AOA) was drawn up for established violations.

- compliance with the requirements of **Chapter 15 of the LEC** in respect of **user data protection** - reduction in the number of complaints received regarding compliance with the requirements of Chapter 15 of the LEC was reported, as 78 inspections were carried out concerning:

§ 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 - about amounts charged when registering in games, quiz games, purchase of information and entertainment contents and other Information Society Services - 53 inspections were carried out;

§ free-of-charge **provision of itemised bills** for services used – 25 inspections were carried out;

For ascertained violations of Chapter 15 of the LEC, in 2020, 5 administrative offence acts (AOAs) were drawn up.

- Compliance with the requirements of **Chapter 14 of the LEC** concerning the contracts signed with undertakings providing electronic communication services: requisites of the offered individual contracts, terms and conditions of the provided services, prices of the provided services, price packages or tariffs and conditions for their use, general terms and conditions of the individual contracts, etc. - a decrease was registered in the number of complaints received in 2020, as 57 inspections were carried out (by nearly 61% less than in 2019).

For ascertained violations of Chapter 14 of the LEC, in 2020, 2 administrative offence acts (AOAs) were drawn up.

As a result of the inspections carried out and the actions taken, there were significantly fewer infringements (by about 76% less than in 2019) of Chapter 14 and Chapter 15 of the LEC in 2020.

- **dispute of bills and charged penalties** - in 2020, there was a significant decline in the number of complaints received in connection with dispute of bills and charged penalties; a total of 17 inspections were carried out (by about 70% less than in 2019).

· Inspections concerning the compliance with the **General Requirements** for the provision of public electronic communications - 51 inspections were carried out (by about 50% less than in 2019).

For ascertained violations of the General Requirements for the provision of public electronic communications, in 2020, a total of 14 AOAs were drawn up (by about 62% less than in 2019).

· Inspections related to solving problems in the **number portability** implementation in case of changing the telephony service provider - in 2020, 37 inspections were carried out under complaints related to obstructing the users' right to portability of mobile and fixed numbers by about 37% less than in 2019), and 2 AOAs were drawn up for established violations.

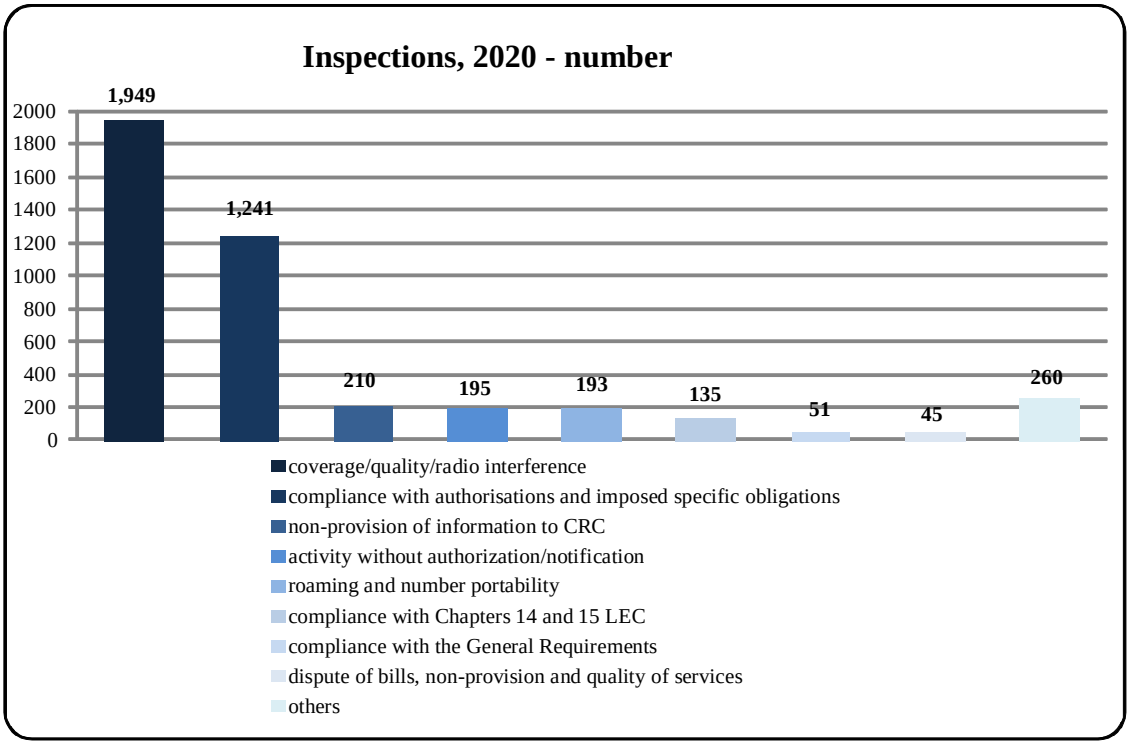
· Inspections on **compliance with the authorisations' conditions and CRC decisions** - in 2020, 1,241 inspections were carried out on compliance with the authorisations' conditions, implementation of CRC decisions, compliance with specific obligations and inspections of electronic communications networks for analogue terrestrial broadcasting for compliance of the transmission stations with the technical characteristics approved by CRC. For ascertained violations, 4 AOAs were drawn up.

· Inspections under complaints on **coverage and quality of the services provided from mobile terrestrial networks** under the GSM/UMTS/LTE standard and DVB-T networks, as well as inspections regarding **complaints on radio interferences** – a total of 336 inspections were carried out.

· Inspections of undertakings for **non-provision of information to CRC** - in 2020, 210 inspections were carried out of undertakings that have failed to provide information or have provided incomplete or inaccurate information, and 15 AOAs were drawn up.

In 2020, 1,808 of the inspections performed (or about 42%) were **on the basis of risk analysis** – 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. For ascertained violations in the inspections carried out on the basis of risk analysis, 4 AOAs were drawn up.

Summarised data for the performed control activity and the engaged administrative and punitive liability in offences of the LEC and secondary legislative acts in 2020 are displayed in Figures 47 and 48.



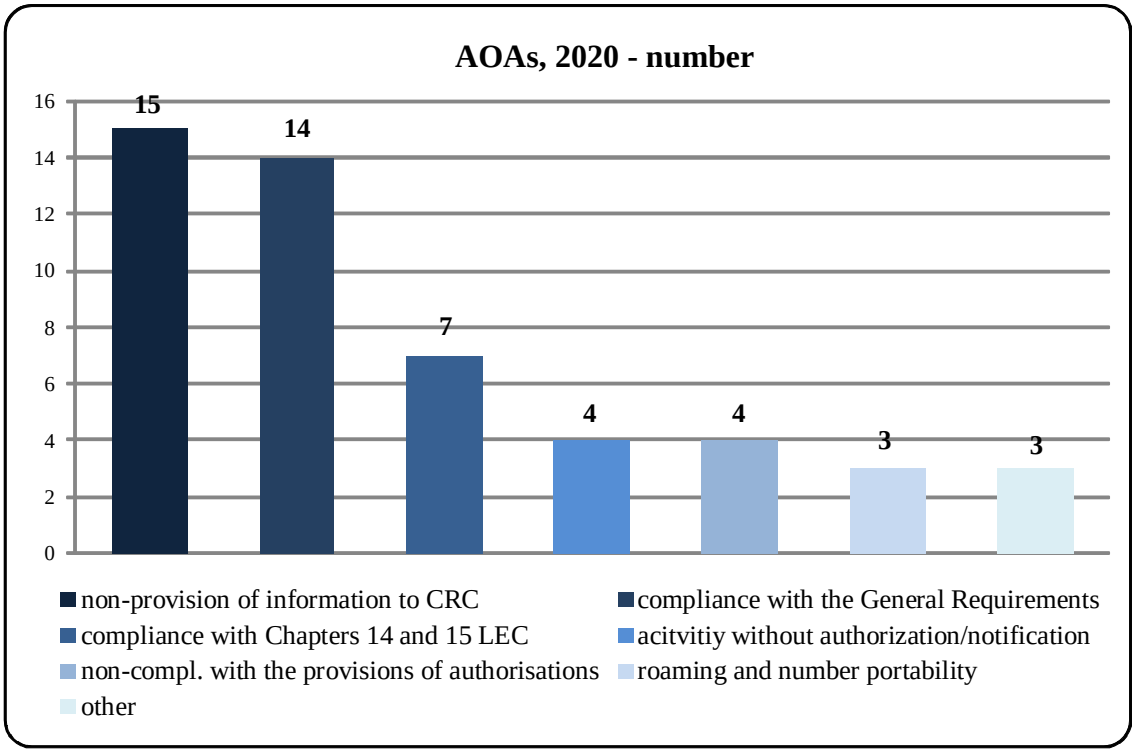
Source: *CRC*

Figure 47

As a result of the inspections, for the administrative violations of the LEC found, **50 administrative offence acts** were drawn up in 2020, with the main share (58%) being held by

acts regarding non-compliance with the General Requirements for the Provision of Electronic Communications and non-provision of information to CRC.

The preventive control carried out in previous years has resulted in a significant reduction in the number of violations of the LEC in 2020, which is why the AOAs drawn up in 2020 were by 63% less than in 2019.



Source: *CRC*

Figure 48

2.5. Quality of the Internet access service and net neutrality

In 2020, CRC put in place an electronic system for on-line questionnaires, through which providers of electronic communications services have the opportunity to complete the annual activity report questionnaire on-line. According to the data collected by the electronic system, 1,126 undertakings have declared to the Commission their intention to provide electronic communications services. Of these, 939 have announced activity related to the provision of the (wholesale and retail) Internet access service.

The analysis of information on the implementation of Articles 3 and 4 of Regulation (EU) 2015/2120 on net neutrality and open Internet access shows that, compared to 2019, the number of undertakings implementing the Regulation is increasing, also respecting the guidelines set out in CRC's "Position on compliance with the requirements of Articles 3 and 4 of Regulation (EU) 2015/2120[80] by providers providing Internet access to end-users" (Decision No 170/18.04.2019). Undertakings with a website, in their general terms or in a separate document on their website, have described the conditions for providing the Internet access service in terms of both the quality parameters and the traffic management measures they apply. Those of the

[80] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning 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

undertakings without a website have provided documents in electronic or paper form containing the conditions they apply for the provision of the service, the quality parameters and the traffic management measures. In addition, quality parameters of the service offered are also included in the individual contracts signed with end-users. The review of the information provided has not revealed any breaches of the requirements of Articles 3 and 4 of Regulation (EU) 2015/2120.

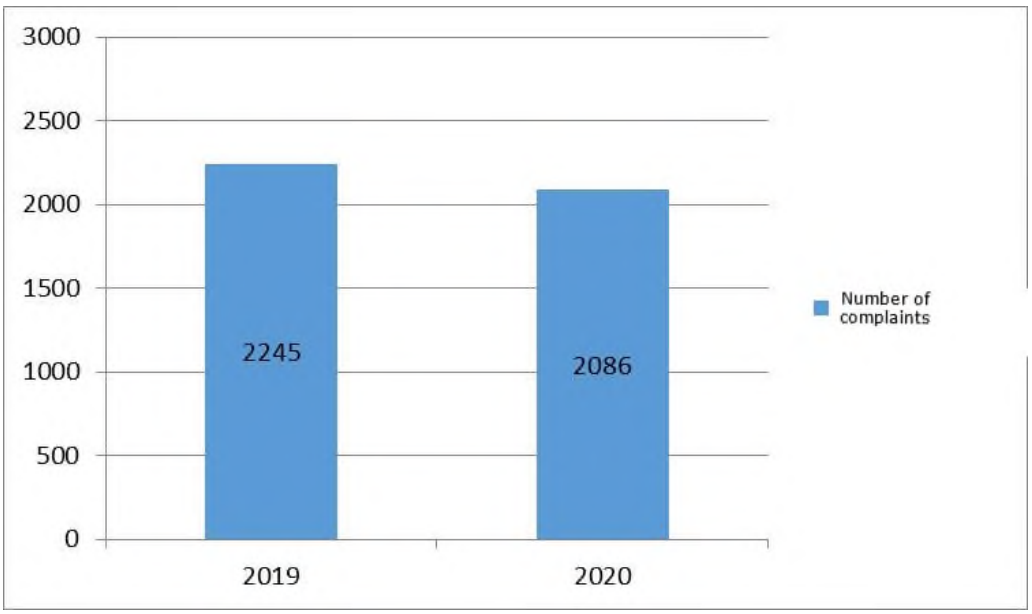
Pursuant to Article 5 of Regulation (EU) 2015/2120, CRC prepares an annual report for the EC and BEREC on Internet access and net neutrality. In this report, the Commission takes into account the activities ensuring non-discriminatory treatment of traffic when providing the Internet access service and protecting the rights of end-users. There is also an analysis of the implementation of Articles 3 and 4 of Regulation (EU) 2015/2120, on the basis of data collected[81] from undertakings regarding Internet access and net neutrality.

In addition, CRC launched a project on "Setting up a mechanism to measure and monitor the quality parameters of the Internet access service". The mechanism will be used by end-users and CRC to measure and monitor the quality of the Internet access service provided to end-users via fixed and mobile networks. End-users will thus be able to measure and compare the quality of Internet access with the values set in their individual contracts.

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

In 2020, a total of 2,086 complaints were filed with CRC by users against different undertakings providing electronic communication services. For the second year in a row, there has been a decline in the complaints received by CRC (by nearly 10%).

Complaints received by CRC, 2019 and 2020



Source: CRC

Figure 49

Among the most frequent complaints are those related to charging of services, formation of monthly bills, termination of contracts, customer service, and charging of roaming services in border areas.

[81] Through the electronic system of on-line questionnaires

Approximately half of the of complaints received during the year concern matters that fall outside the control and regulatory powers of CRC. In such cases, the regulator also acts as mediator and forwards the case to the provider concerned for the purpose of out-of-court settlement of the dispute.

A number of complaints were forwarded by competence to other state bodies (Commission for Consumer Protection, National Construction Supervision Directorate, Commission for Personal Data Protection, Ministry of Health, etc.).

The ongoing trend towards reduction in the number of complaints received by CRC is also due to the initiative launched in 2019 by the regulator to hold periodic meetings with the three mobile operators - A1 BULGARIA EAD, BTC EAD and TELENOR BULGARIA EAD.

In 2020, CRC held three meetings where a number of issues were resolved concerning consumer contracts, pre-contractual information, as well as the acceleration of the mediation process which CRC carries out under consumer complaints of a contractual nature.

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 and digital content, fall within the competence of CCP. In this respect and in implementation of the law, CRC has referred many consumer issues to CCP.

In 2020, CRC and CCP continued to cooperate 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 (4) of the Law on Consumer Protection.

Legal representation in CRC cases

In 2020, CRC's legal representatives took part in 233 court sessions on administrative and criminal matters before the country's regional and administrative courts. During the year, 75 confirmatory judgements were delivered on disputed CRC's punitive decrees, and the number of annulment judgements was 24. Eight complaints were filed before the administrative courts under the individual administrative acts issued by CRC. Four CRC decisions were confirmed during the year.

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

In the exercise of its powers in 2020, CRC ruled in 15 proceedings on requests for the resolution of disputes between electronic communications network operators (ECN) and electricity distribution companies.

By Decision No 254 of 09.07.2020, a procedure was closed which was based on a request by CEZ RAZPREDELENIE BULGARIA AD to give binding instructions to 102 electronic communications network operators. By Decision No 65 of 13.02.2020, CRC refused to give binding instructions to CEZ RAZPREDELENIE BULGARIA AD at the request of NET 1 EOOD and COMNET SOFIA EAD.

By Decision No 253 of 09.07.2020, CRC refused to give binding instructions to NURTS BULGARIA EAD at the request of IT MANIA EOOD.

By Decision No 364 of 08.10.2020, CRC ruled on the absence of grounds to remove the electronic communication network of NETCOM.

By Decision No 393 of 12.11.2020, CRC refused to give binding instructions to ELEKTRORAZPREDELENIE YUG EAD under the “Price and Pricing Mechanism” section at the request of VIRGINIA-R N EOOD, BO CABLE EOOD, IPTV EOOD, K & G UNISAT-TV OOD, NIKO NET COM EOOD, DIANA CABLE TV OOD and DIGITAL CABLE TELEVISION OOD.

Disputes for assistance were considered at the request of IN TRADE 87 EOOD, TERZIEV- 2004 OOD, LANSTAR OOD, WHYNET 1 EOOD and KENTAVAR M EOOD against ELEKTRORAZPREDELENIE YUG EAD.

The relatively lower number of cases compared to 2019 is a clear trend toward a decreasing number of the cases of addressing CRC with requests for resolution of disputes concerning access to physical infrastructure.

IV. BUDGET

CRC budget implementation for 2020

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

Pursuant to Article 35 (1) of the Law on State Budget of the Republic of Bulgaria (LSBRB) for 2020, CRC was allocated with:

- *revenue in the amount of BGN 70,488 thousand;*
- *expenses in the amount of BGN 14,727 thousand.;*
- *transfers in the amount of BGN 55,761 thousand.*

The Commission administers revenue pursuant to Article 51(1) of the LEC, Article 64 of the PSA, and Article 81(8) of the Law on Electronic Communications Networks and Physical Infrastructure.

In 2020, the revenue earned from fees, fines, financial penalties and interest amounted to BGN 55,666 thousand – 79% of the annual plan.

The reason for the failure to fulfil the annual plan in the revenue from fees part for 2020 is the adoption of the draft decree amending and supplementing the Tariff of fees to be collected by CRC under the LEC, adopted by CRC Decision No 402 of 31.10.2019 and belatedly on 25.03.2020 by the Council of Ministers. In this respect, the undertakings' initial intentions to utilise, at the beginning of 2020, the radio frequency resources in the 2 GHz, 2.6 GHz and 3.6 GHz bands were postponed to 2021.

In 2020, an adjustment of the Commission's budgetary expenses was made on the basis of Article 109(5) of the Public Finance Act, in connection with Article 102 of the 2020 LSBRB, Article 7 and § 2 of the Final Provisions of Decree No 402/ 22.12.2020 of the Council of Ministers approving additional expenses under the budget of the Ministry of Health for 2020, at the expense of cost savings and/or transfers to the budgets of other first-degree budget authorising officers under the state budget for 2020, and Article 6 (4) of Ministerial Decree No 381 of 30 December 2019 on the implementation of the state budget of the Republic of Bulgaria for 2020.

With this adjustment, the expenditure part of the CRC budget for 2020 has been reduced by BGN 1,500 thousand, at the expense of personnel costs (BGN 450 thousand), maintenance (BGN 700 thousand) and the capital expenditure (BGN 350 thousand).

A further reduction in expenditure of BGN 210 thousand was made, providing funds for the initial financing of activities under the "Building and development of the information systems and registers of CRC for improving the regulatory and control activities and raising the quality of the administrative service” project, under contract No BG05SFOP001-1.010-0001-

C01/08.06.2020 for the provision of a grant under the Operational Programme "Good Governance", co-financed by the EU through the European Social Fund.

In view of the adjustments made, the Commission's revised expenditure plan is BGN 13,017 thousand and the total costs recorded amount to BGN 12,769 thousand, or a fulfilment of 98%.

Transfers to the Ministry of Transport, Information Technology and Communications pursuant to Article 19 (1) of the LEC

In 2020, transfers were made to the Ministry of Transport, Information Technology and Communications amounting to BGN 55,761, 100% of the regulated level in Article 35 (1) LSBRB for 2020.

Review of collected fees and administrative costs incurred in 2020:

The structure of the revenue from fees under the CRC budget for 2020 was as follows:

Table 18

Revenue from fees	**Value (BGN '000)**
Revenue generated for 2020, incl.:	**54,701**
- one-off fees under the Law on Electronic Communications (LEC), including one-off fees for administrative services	654 17
- one-off fees under the Postal Services Act (PSA)	24
- one-off fees under the Law on Electronic Communications Networks and Physical Infrastructure	4
- administrative annual charge on control under LEC and PSA	6,203
- annual fees for the use of radio frequency spectrum	40,478
- annual fees for the use of positions on geostationary orbit with the appropriate radio frequency spectrum	222
- fees for the use of numbering resources	7,116

In 2020, the revenue earned from fines, sanctions and interest amounted to BGN 965 thousand.

In connection with the enforcement of acts for the establishment of public state receivables to be collected and enforced punitive decrees issued by the National Revenue Agency, additional revenue at the amount of BGN 34 thousand were collected in 2020.

The Commission's budget funds, as allocated in the LSBRB for 2020, were spent on financing its activities (including projects related to market regulation and liberalisation), for participation in the work of BEREC and to ensure effective and efficient control.

The structure of the Commission's expenses for 2020 was as follows:

Table 19

Type of expenses	Value (BGN '000)	Share (%)
1. Salaries	4,908	38
2. Social security contributions	1,356	11
3. Other remunerations and payments	288	2
4. Operating costs	1,832	14
5. Taxes and charges paid	64	1
6. Membership fee	67	1
7. Capital expenditure	4,254	33
Total costs	**12,769**	**100**

In 2020, 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 legislative acts were implemented of priority.

The CRC investment policy in 2020 was focused on two areas:

- expenditure on ICT projects - supply of cluster server system, computer technology, replacement of batteries of UPS facilities, communication equipment and routers for fixed radio monitoring stations;
- expenditure on NMS equipment - radio monitoring station measurement equipment; mobile station for radio interference detection and location; compact radio monitoring and radio location systems; portable measurement equipment; portable monitoring, control and radio interference detection system.

A long-term investment solution is the payment for the preparation of a conceptual design for the establishment of an electromagnetic compatibility laboratory for testing and control of radio electronic equipment.

Within the second stage of the 2021 Budgetary Procedure, an increase in the expenditure part of CRC's budget for 2021 by BGN 6,759 thousand, as compared to the one approved by the LSBRB for 2020, which also included the changes envisaged in the income policy, was defended before the Ministry of Finance and the National Assembly. The increase was regulated in the LSBRB for 2021.

The additional funds will allow the Commission in 2021 to:

- proceed with the delivery of measurement devices and equipment for development and update of the NMS, in line with the entry of new technologies (including 5G networks), the consistent improvement of electronic communications which will provide high-speed data transmission, high capacity and high quality services. This

will ensure the normal operation of the state-of-the-art radio networks (non-harmful interference operation) to protect the public interest and the interest of end-users;

- financing the construction of the building of an electromagnetic compatibility laboratory for testing and control of radio electronic devices. The laboratory will provide inspection of radio equipment, end electronic communications devices, household appliances, illumination, medical, remote devices, industrial equipment, etc. for their compliance with the essential requirements for electromagnetic compatibility. Different types of devices will be tested in order to take the necessary actions and/or to inform the competent authorities of the legal measures envisaged.

CONCLUSION

The past year was a year of challenges and search for solutions in all areas of the social and economic life, not only at national level but also internationally. The crisis, which was triggered by the COVID-19 pandemic, clearly demonstrated the critical role of information and communication technologies in the continuous successful functioning of societies by making them a mandatory product in the daily lives of individuals. The increased need for Internet access, the emergence of new technologies and applications that require high-speed support has determined the social importance of telecommunications worldwide.

In this environment, as part of the global telecommunications community, CRC continued its mission and goals related to ensuring an adequate regulatory environment and RFS management policies.

In 2020, an important part of the Commission's work was the project launched under the Operational Programme “Good Governance” titled "Building and development of the information systems and registers of CRC for improving the effectiveness of regulatory and control activities and increasing the quality of administrative service", which should be completed at the end of 2021, including the following four main actions:

- Setting up a mechanism to measure and monitor the parameters for quality of the Internet access service;
- Development of an information system "Licensing and Registers" of CRC in line with the principles of e-government;
- Building an instrument to compare electronic communication services rates;
- Development of a mechanism to limit the cases of accidental roaming recorded in the territory of the Republic of Bulgaria by developing a mobile application to alert users and collect information from CRC about areas where accidental roaming has been registered.

With a view to ensuring security conditions for public communications networks and services, at the end of the reporting year, CRC established two advisory councils for the preparation of two common positions of the undertakings on the minimum security requirements and risk management methods. One of the advisory councils addressed the security of public mobile terrestrial electronic communications networks and mobile services, focusing on fifth generation mobile networks, and the other dealt with the security of public fixed electronic communications networks and fixed services.

Considering the dynamic development of technology and the changes in the consumption patterns triggered by the accelerated entry of the global network access, CRC will prepare an analysis of the need to maintain the existing obligations for the provision of publicly available telephones and/or other public access points to voice telephony services of certain quality, provision of a directory and telephone inquiry services imposed as an obligation for the provision of the universal service.

In relation to the adopted amendments of the LEC, promulgated in State Gazette, no. 20 of 9 March 2021, the focus of the CRC's work in 2021 will be mainly on the adoption of the following more important regulations:

- Rules on the use of radio frequency spectrum after registration and the establishment of a register of the rights to use the radio frequency spectrum granted on the basis of registration.
- Rules for interaction with the undertakings concerned when filing applications, international coordination and registration in international electronic communications

organisations of the positions on the geostationary orbit with the relevant radio frequency spectrum and of the radio frequency spectrum used by the non-geostationary satellite system, and the procedure of payment of fees defined by an international act.

- Ordinance on the content, conditions and procedure of the keeping, maintenance and use of the register of transceiver stations of terrestrial networks, the activities under Article 151, Paragraph 1, point 16 of the Spatial Planning Act, and short-range wireless access points, and the establishment of the relevant register.
- Rules on minimum security requirements for public electronic communications networks and services and risk management methods for their security.
- Joint instructions from the Commission and the Commission for Personal Data Protection on the conditions, methodology and time limits for providing information on the existence of unpaid end-user obligations toward undertakings providing public electronic communications services.
- Rules for the switching of an Internet access services provider.
- Draft ordinance amending Ordinance No 6 of 13 March 2008 on the universal service under the LEC concerning amendments to the scope of the universal service.
- Draft Ministerial Decree amending the Methodology for determining the prices and price packages of the universal service in relation to changes in the scope of the universal service.
- Rules for calculating the net costs of the universal service provision - in relation to changes in the scope of the universal service.
- Methodology for the terms and procedure of relevant markets definition, analysis and assessment, and criteria for designating undertakings with significant market power.

The Commission will continue to implement the priorities at European and national level, corresponding to the dynamically evolving market for electronic communications and services. In this context, CRC will also develop in 2021 a strategy for its activities for the period 2022-2024, setting clear objectives and proposing instruments for achieving them in the medium term. The Regulatory policy for the use of numbering resources for the provision of electronic communications and the Regulatory policy for radio frequency spectrum management by which the Commission will define its main objectives, mechanisms and approaches for radio frequency spectrum management for civil needs over the next years, are about to be adopted in 2021.

The objectives of the electronic communications policy are to ensure the provision of modern and quality electronic communications services to the public and the business, by creating the conditions for the development of an electronic communications networks and services market as part of the EU internal market. The deployment and use of very high capacity networks and the provision of 5G services will boost the automation of processes and the development of connected and autonomous devices, an efficient and sustainable competition, operational compatibility of electronic communications services, affordability, selection, security of networks and services, and advantages for end-users, including equal access to services for persons with disabilities.

The main priorities for the following year and for the years to come are to hold public consultations and tenders to provide harmonised radio frequency spectrum in the 700 MHz, 2.6 GHz, 3.6 GHz and 26 GHz bands and other harmonised bands for wireless broadband services.

This report takes into account the work done in 2020 and outlines the upcoming intensive work of the Commission with a view to accomplishing its mission, contributing to the creation of a predictable and well-functioning regulatory environment in the field of electronic communications.