Annual Report 2019

Communications Regulation Commission

2 June 2020

COMMUNICATIONS REGULATION COMMISSION

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

2019

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INTRODUCTION

The Communications Regulation Commission (CRC) is a specialised independent regulatory body implementing the policy on electronic communications and postal services in the Republic of Bulgaria.

The Commission's vision in 2019 is linked to its mission and is to promote, in a transparent and equal manner, in compliance with the Bulgarian and European legislation, 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 fulfilling this vision, the main strategic objectives of CRC over the past year were:

- *Achieving an effective and forward-looking regulatory environment*
- *Promoting a sustainable competitive market and consumer protection*
- *Sustainable institutional development and international partnership*

The implementation of part of these objectives and the changes in the regulatory policy of the European Union have encouraged the active participation of representatives of CRC in different formats in the analysis and preparation of proposals for legal changes related to the implementation of the European Electronic Communications Code (the Code), as well as active participation in the work of the Body of European Regulators of Electronic Communications (BEREC), the European Regulators Group for Postal Services (ERGP), the Electronic Communications Committee (ECC) and other international organisations with which the Commission is working closely.

CRC carried out active international activity in the framework of the specialised international and European organisations at international and European level, contributing to the application of good regulatory practices, exchange of experience, development and better functioning of the internal market for electronic communications networks and services.

In fulfilment of the strategic objectives and in support of the single European market, the Commission transposed new European Commission decisions on harmonised use of radio spectrum into the Bulgarian legislation, providing conditions for the introduction of new technologies and services.

An important task on the Commission's agenda was to perform market analysis and designate the undertakings with significant market power. In 2019, the third round of the procedure for determination, analysis and assessment of the market for wholesale local access provided at a fixed location was completed, and the fourth round of analysis and assessment of 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 was started.

Monitoring and control of compliance with the legal requirements in the provision of roaming services was carried out. Continuous monitoring of the regulated roaming tariffs offered by Bulgarian roaming providers and control of compliance with the roaming price caps within the European Economic Area, as well as control of the offering and application of alternative roaming tariffs, was carried out.

The continuous monitoring and control of the radio frequency spectrum (RFS) was a prerequisite for ensuring appropriate and interference-free conditions for electronic

communications and for ensuring the quality of the services they provide, with the ever increasing workload of the spectrum.

This annual report was prepared by the Communications Regulation Commission pursuant to Article 38 of the LEC. It presents an overview of the work performed by CRC in 2019 and outlines the main directions in its forthcoming activity.

Note: In 2020, a quantitative study was conducted on the pay TV, Internet and bundled telecommunication markets in Bulgaria with a reference date 31.12.2019, using the methodology approved by CRC in connection with Article 38(3) of the LEC. The study is accessible at the following address:
https://www.abbro-bg.org/wp-content/uploads/2020/06/TV_Internet_Package-Services-Market-Measurement_2019_Nat_CRC.pdf

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

Methodological notes on Section I.

The information presented is based on data received by 30.04.2020 from 89.7% of the undertakings registered at CRC as of 31.12.2019.

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

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

The total number of undertakings 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.

Under the LEC, 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".

1. Volume and structure of the Bulgarian electronic communications market

1.1. Market volume

According to data from the CRC register, as of 31.12.2019, a total of 1,122 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 34 of 23.01.2019 of CRC, a total of 1,006 of the undertakings registered as of 31.12.2019 have submitted to the Commission an annual activity report for 2019 (the share of undertakings having submitted reports makes up 89.7% of those registered as of the said date).

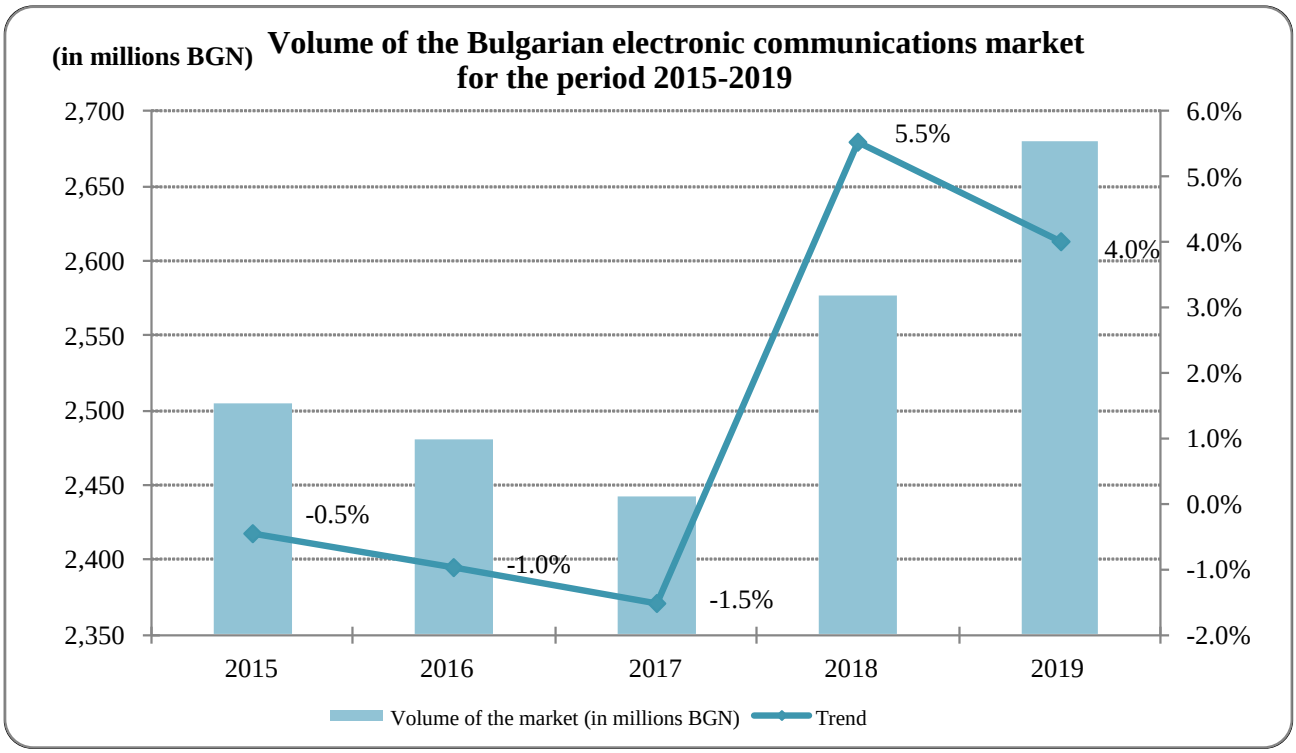
In 2019, 850 undertakings performed their activity, including 21 undertakings which suspended their activity on providing public electronic communications during the year and submitted a report pursuant to Article 5a of the General Requirements (as of 31.12.2019, those undertakings were removed from the CRC register). In comparison to the previous reporting period (2018), an increase was observed in 2019 both in the number of undertakings registered at CRC for the provision of public electronic communications (by 0.2%) and in the number of undertakings actually carrying out activity during the year (up by 0.1%). In 2019, the total volume of the Bulgarian electronic communications market amounted to BGN 2.680 billion,[2] with an increase reported for the second consecutive year following a continuous downward period – by 4% as compared to the 2018 data[3] and by 9.7% for the period 2017-2019.

Figure 1 presents the dynamics in the volume of electronic communications market in the country for the period 2015-2019.

[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);

[2] Including revenue from undertakings that suspended their activity in 2019. As of 30.04.2020, Cable Sat-Zapad OOD, one of the main regional providers of the Internet and TV access services in Bulgaria, submitted incomplete information pursuant to CRC Decision No 34/23.01.2020 (lack of Appendices No 4-01 Data Transfer and Internet Access, and No 5 Distribution of Radio and/or TV Programmes to the Decision). Missing subscriber and revenue data were assessed and included in the summarised data on these indicators in this report. The undertaking is included in the total number of undertakings which actually provided services in 2019.

[3] The data for 2018 have been updated.



Note: *The data for 2018 have been updated.*

Source: Data submitted to CRC

Figure 1

The share of the total volume of the public electronic communications market constituted 2.3% of the total GDP[4] of Bulgaria for 2019. Notwithstanding the growth reported in the total volume of the public electronic communications market, a decrease of 0.1 percentage points was observed in its share of the total GDP versus 2018, when it amounted to 2.4%. The said decrease is due to the greater increase of Bulgaria's GDP (by nearly 10% in 2019) as compared to the growth in the electronic communications market volume.

1.2. Market structure

Information on revenue from the provision of public electronic communications in Bulgaria by segments, 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).

[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.

Table 1

Structure of the public electronic communications market in Bulgaria according to the type of services provided for the period 2017 – 2019

Private electronic communications services	Revenue		
	2017	2018 [1]	2019
	(in millions BGN)		
1. Voice telephony services	1,264.695	1,204.421	1,172.133
1.1. Fixed voice service through numbers from the NNP and public payphones	136.744	117.875	114.644
1.2. Mobile telephony service through numbers from the NNP	1,115.949	1,069.931	1,042.060
1.3. Other voice services [2]	12.002	16.615	15.430
2. Leased lines services	23.212	20.147	21.342
3. Data transfer and/or Internet access services	750.475	887.282	998.067
4. Transmission and/or distribution of radio and/or TV programmes services	347.292	403.914	424.531
5. Other services[3]	56.650	61.456	64.068
TOTAL	**2,442.323**	**2,577.220**	**2,680.141**

[1] The data for 2018 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)

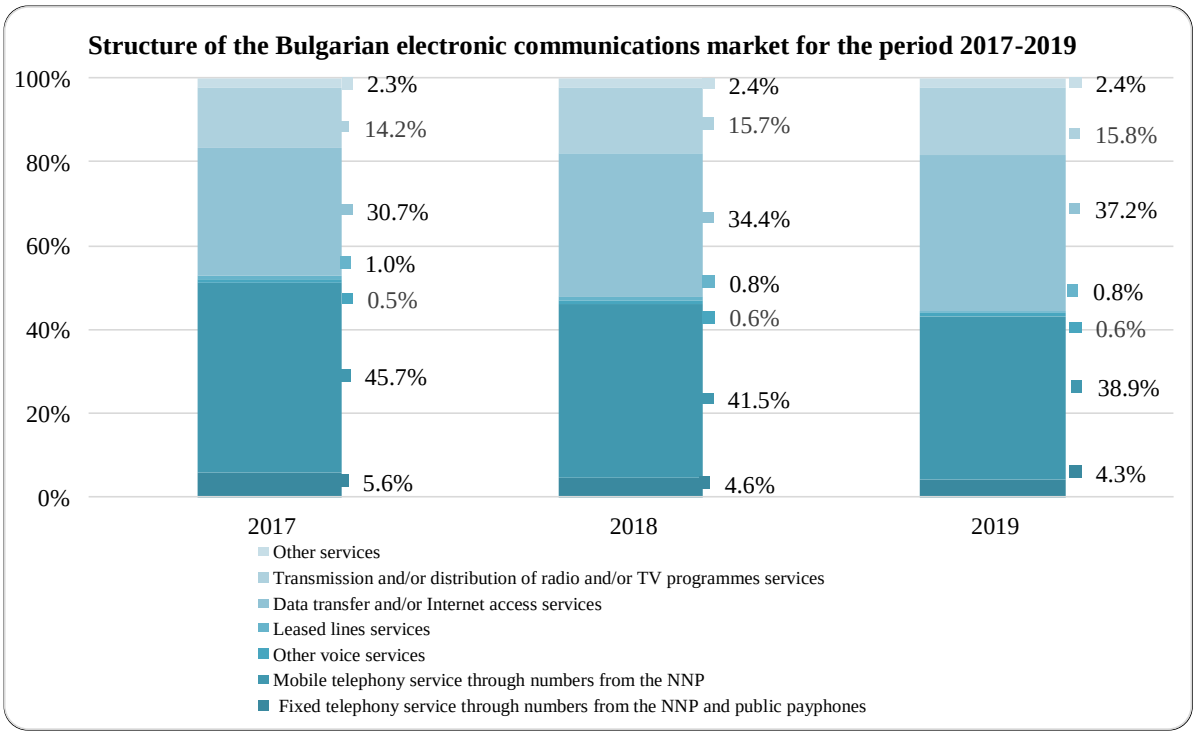
[3] The segment includes revenue from the provision of duct network access, satellite systems access service, shared use, including provision of towers, masts, dark fibre, co-location services other than those provided for interconnection and other services.

Source: Data submitted to CRC

In 2019, the total volume of the electronic communications market continued to be determined mainly by the revenue from voice services and data transfer and/or Internet access services.

Although revenue from voice telephony services (fixed, mobile and other voice services) continued to drop both in absolute (by 2.7% for a one-year period) and in relative value (by 3 percentage points), their share in the total volume of the public electronic communications market in 2019 preserved its leading position with 43.8%. The data transfer and/or Internet access services that took up 37.2% of the total market volume ranked second. The relative share of revenue from this market segment within the market structure increased by 2.8 percentage points compared to 2018.

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 2017 – 2019.



Source: Data submitted to CRC

Figure 2

As compared to the year before, revenue in four market segments registered a growth in 2019, namely:

- ”Data transfer and/or Internet access“ – 12.5%; over a one-year period, the relative share of the segment grew by nearly 3 percentage points. This growth is mainly due to the ”Data transfer and/or Internet access via mobile terrestrial networks“ group, as its revenue was up by 17%;
- For the first time following a continuous downward period, “Leased lines services” registered an increase of 5.9% as compared to 2018.
- “Transmission and/or distribution of radio and TV programmes services” rose by 5.1%, with the greatest increase in revenue in the segment reported by IPTV (by 20.2% versus 2018);
- “Other services” registered a growth of 4.3%. The major increase here was observed in the “Access to satellite systems” service, the revenue from which grew by 16% compared to 2018, and in the ”Co-location and other forms of shared use, including the provision of access to towers, masts, etc.” (by 4.1% since 2018). Revenue from the “Provision of access to duct” service, included in this segment, also registered a growth of 3.9%.

The only segment that recorded a decline over the reporting period for another consecutive year is “Voice telephony services” - by 2.7% compared to 2018.

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 2019, for another consecutive year, consumption of bundled services in

[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

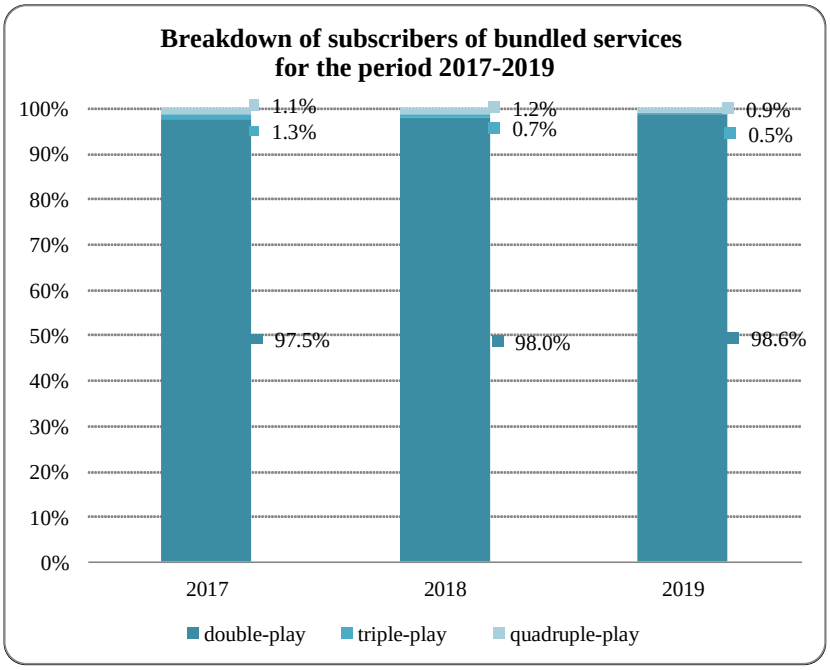
Bulgaria increased - as of 31.12.2019, 50% of fixed telephony service subscribers, 73% of mobile telephony service subscribers, 34% of fixed Internet access subscribers, 84% of mobile Internet access subscribers, and 33% of pay TV subscribers used the service in a bundle with other electronic communications services. As a result, the total volume of revenue (from installation fees and monthly subscriptions) gained from bundled services reached BGN 1,160.267 million,[7] which represents a growth of 11.4% compared to the revenue in the previous year.

According to the data submitted to CRC, in 2019, three undertakings launched activity for the provision of a bundled service - double-play package including fixed Internet access and television. In this way, in 2019, the total number of undertakings providing bundled services amounted to 86, which is by 3 less in comparison with the previous year (89 in 2018).

Subscribers of bundled services

The number of subscribers of bundled services toward the end of 2019, according to the data submitted by the undertakings providing public electronic communications in Bulgaria, increased compared to the previous year by 6.2% to reach 6.516 million. As a result, in the period 2018-2019, the value of the "penetration by population"[8] indicator also grew by 6.1 percentage points, thus reaching 93.7%.

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



Source: Data submitted to CRC

Figure 3

The data presented in Figure 3 confirm the upward trend in the share of packages including two electronic communications services (double-play packages) which has been observed during

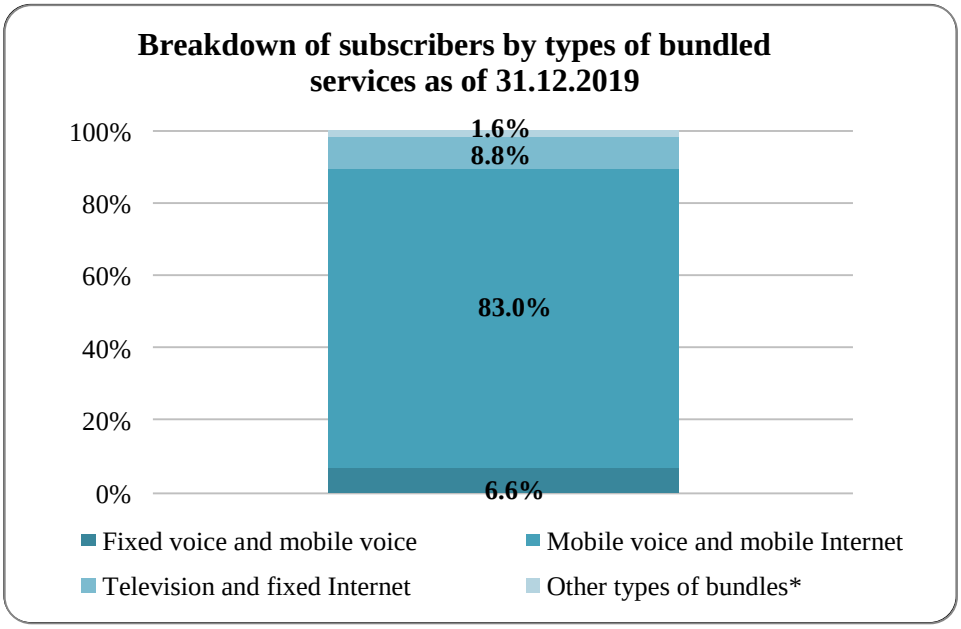
service, (4) Mobile broadband Internet access, and (5) Pay TV (cable, satellite or IPTV). "Bundled services" shall include the so called "pure", "joint" and "mixed" bundling

[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 31.12.2019, according to NSI data (population by districts, municipalities, place of residence and sex: www.nsi.bg)

the recent years. In 2019, double-play packages covered 98.6% of the total number of subscribers of bundled services, as the number of subscribers to this kind of packages increased by 6.8% compared to the 2018 data. In 2019, as it was the case the year before, the number of subscribers of triple-play packages dropped significantly (by 29.9%), mainly as a result of the reduction (by 41%) in the number of subscribers of the “mobile voice, TV and mobile Internet” and of the "fixed voice, TV and fixed Internet access” packages (by 37.7%). This also affects the share of triple-play packages in the total number of subscribers in which a decline of 0.2 percentage points against 2018 was registered, at the expense of an increase in the share of double-play packages. After a prolonged period of growth, the interest in the quadruple-play bundles dropped by 19% compared to 2018. The share of the quadruple-play bundles was 0.9%, down by 0.3 percentage points.

Figure 4 presents the breakdown of subscribers by the most preferred bundled services in 2019.



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

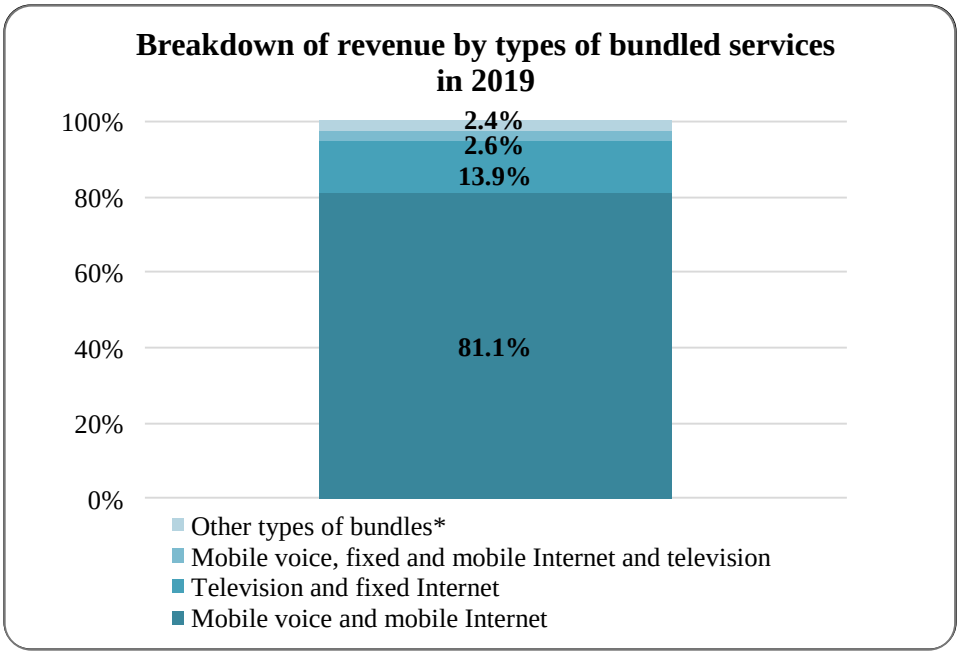
The number of subscribers of the most preferred bundled service – “Mobile voice and mobile Internet access” - grew by 7.7% as compared to 2018, reaching 5.409 million at the end of 2019. As a result, 83% of the subscribers of bundled services used double-play bundled service including mobile voice and mobile Internet access, registering an increase of 1.2 percentage points in relative value. The number of subscribers of the second most used bundle (“Television and fixed Internet access”) rose by 6.8% to arrive at 575 thousand in 2019, which, however, did not affect their share significantly (it remained at 8.8%). “Fixed voice service and mobile voice service” bundle, with a relative share of 6.6% of the total number of bundled services subscribers, was used by 428 thousand subscribers (down by 2.9% in absolute value).

Revenue from bundled services

Revenue from bundled services amounted to BGN 1,160.267 million in 2019, registering a growth of 11.4% year-on-year. The highest share (96.1%) in the total volume of revenue from these services continued to be held by double-play services which, as compared to 2018 data, reported a growth of 12.6% in absolute value and by 1 percentage point in relative value. The share of revenue from triple-play bundles continued its downward trend in 2019 (by 0.6 percentage

points), which is a consequence of the reported 30.2% drop in absolute value. Revenue from quadruple-play bundles dropped by 1.4% versus 2018, occupying 2.8% of the total volume of revenue in the segment (by 0.4 percentage points less compared to 2018).

Figure 5 presents the breakdown of revenue by types of bundled services in 2019.



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 2019, the share of revenue from double-play service including mobile voice service and mobile Internet access grew by 1.6 percentage points from 2018 to reach 81.1% of the total volume of the segment, and the registered growth of revenue in absolute value was 13.6%. The revenue from double-play bundled service "television and fixed Internet" reported an increase of 10% versus 2018; however, there is a decline of 0.2 percentage points in their share in the total revenue as compared to 2018. Following a gradual increase in the period 2015-2018, the share of quadruple-play service "mobile voice, fixed and mobile Internet and television" reported a drop of 0.3 percentage points in 2019. In absolute value, revenue from this bundle decreased by 0.4% in 2019; to compare with, it grew by 74.4% in 2018. The highest share of revenue in 2019 versus 2018 was reported by the triple-play bundle "mobile voice, fixed and mobile Internet" - 82.6%, which, however, occupied an insignificant share in the total revenue (0.3%).

Summary

In 2019, 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 – 90.7% 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 2019, 422 undertakings (by 8 less than in 2018) invested in the building and maintenance of public electronic communications networks BGN 425.199 million out of the planned BGN 393.485 million in 2018, which shows that the investments made were by 8.1% more than those planned for 2019.

During the year, BGN 115.810 million were invested in fixed networks for the provision of electronic communication services, of which BGN 60.812 million (by BGN 25.974 million less than the previous year) were invested in next-generation access (NGA) networks. In 2019, the number of undertakings that have invested in next-generation access networks increased by 3 compared to 2018 (196 undertakings in 2019 versus 193 undertakings in 2018).

In 2019, the investments in mobile networks made up 34.1% of the total investments of the undertakings, registering an increase of 9.6 percentage points for a one-year period. The investments made amounted to BGN 145.051 million - by 18.8% more than the investments in mobile networks planned by the undertakings for 2019.

2. Voice telephony services

The "Voice telephony services" segment includes the following 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 2019, 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 2019

Service	Number of undertakings providing the service as of 31.12.2019	Number of subscribers/lines as of 31.12.2019		Revenue (in millions BGN, excl. VAT)	
		Total [1]	including bundled service subscribers	Total [2]	including from bundled sevices
1. Fixed telephony service through numbers from the NNP and through public payphones	28	938,471*	465,368	114.644	7.312
2. Mobile telephony service through numbers from the NNP	4	8,134,581	5,909,337	1,042.060	576.820
3. Other voice services	20	///	///	15.430	///
Total	**47**	///	///	**1,172.133**	**584.132**

[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.*

In 2019, two undertakings provided a service through public payphones/telephone booths. To keep the confidentiality of their data, the table does not include a standalone position "Telephone service via public payphones" - the data are included under point 1.

Source: Data submitted to CRC

[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.

In 2019, the number of undertakings providing services from the "Mobile telephony service through numbers from the NNP" group did not change and, as of 31.12.2019, the number of active undertakings was four. At the end of the year, the total number of undertakings which declared activity on providing fixed telephony services through numbers from the NNP and via public payphones, reached 28. Twenty-seven of these undertakings provide fixed telephony service, as well as related services for interconnection of public telephone networks, including the Bulgarian Telecommunications Company EAD (BTC), which also provides the service through public payphones/telephone booths. One undertaking declared the provision of fixed telephony service only through public payphones/telephone booths.[13] At the end of 2019, other voice services were provided by 20 undertakings, compared to 25 the year before.

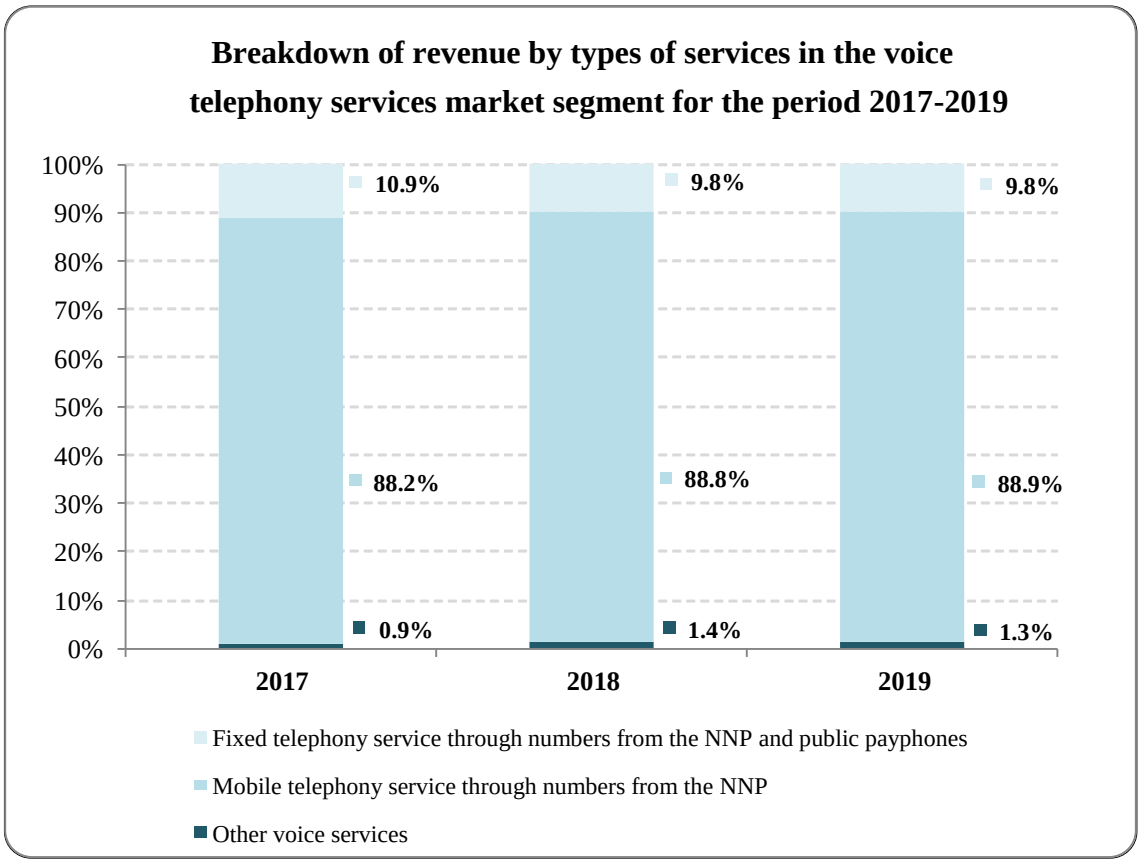
In 2019, the total volume of revenue generated from voice telephony services with revenue from bundled services included, amounted to BGN 1,172.133 million, registering a decline (by 2.7%) compared to the previous year 2018 when the volume of the segment was BGN 1,204.421 million.[14]

The downward trend in revenue generated in the "Voice telephony services" segment continued for another consecutive year, as in 2019 it was provoked by a decline in the revenue from all groups of services included in the segment. The lowest reduction in revenue was registered by the mobile telephony service - 2.6% over a one-year period, with a 4.1% reduction over the previous period (2017-2018). The fixed telephony service showed a drop of 2.7%; to compare with, it was down by 13.8% over the previous period. The other services group reported a 7.1% drop in 2019 compared to 2018. The main share of revenue in this group was generated by the provision of VoIP services, which accounted for nearly 98.0%, with an increase, in absolute value, of 15.9% in revenue over a one-year period.

Figure 6 shows the distribution of revenue from different services in the segment volume for the period 2017-2019.

[13] For 2018, 27 undertakings declared that they provided fixed telephony service through numbers from the NNP as well as telephone service through public payphones/telephone booths, with one company (BTC) providing both services, 25 undertakings, including BTC, declared that they provided fixed telephony service through numbers from the NNP, including services for interconnection of public telephone networks, and 2 companies declared that they provided telephone service only through public payphones/telephone booths.

[14] The data for 2018 have been updated.



Source: Data submitted to CRC

Figure 6

In 2019, no significant change was observed in the structure of the "Voice telephony services" market segment, presented as revenue by types of services. As it was expected, the largest share of the total segment volume was formed by revenue from mobile telephony service (88.9%, with 88.8% in the previous year).

2.1. Fixed telephony service

Market players

At the end of 2019, the total number of undertakings authorised by CRC[15] 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 26. A total of 13 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 2019 were 12.

At the end of 2019, the total 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. Twenty-four of these undertakings provided access to a fixed telephony service to end-users through geographic numbers, with 19 providing the service through primary assigned resource, and 5 declared that they carried out activity on resale of fixed telephony service through secondary assigned numbers. Three undertakings declared that

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

they provided only wholesale services ("transit" and "physical interconnection") related to the provision of fixed telephony service. In 2019, in addition to BTC, only one other undertaking declared that it provided telephone service through public payphones/telephone booths.

In 2019, the major 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	2018		2019	
	Share based on number of subscr. lines	Share based on revenue from subscribers	Share based on number of subscr. lines	Share based on revenue from subscribers
BTC	60.7%	84.0%	60.2%	84.2%
A1 BULGARIA EAD	23.7%	7.7%	24.5%	7.2%
TELENOR BULGARIA EAD	13.5%	5.2%	13.4%	4.7%
All other	2.2%	3.2%	1.9%	3.9%

Source: Data submitted to CRC

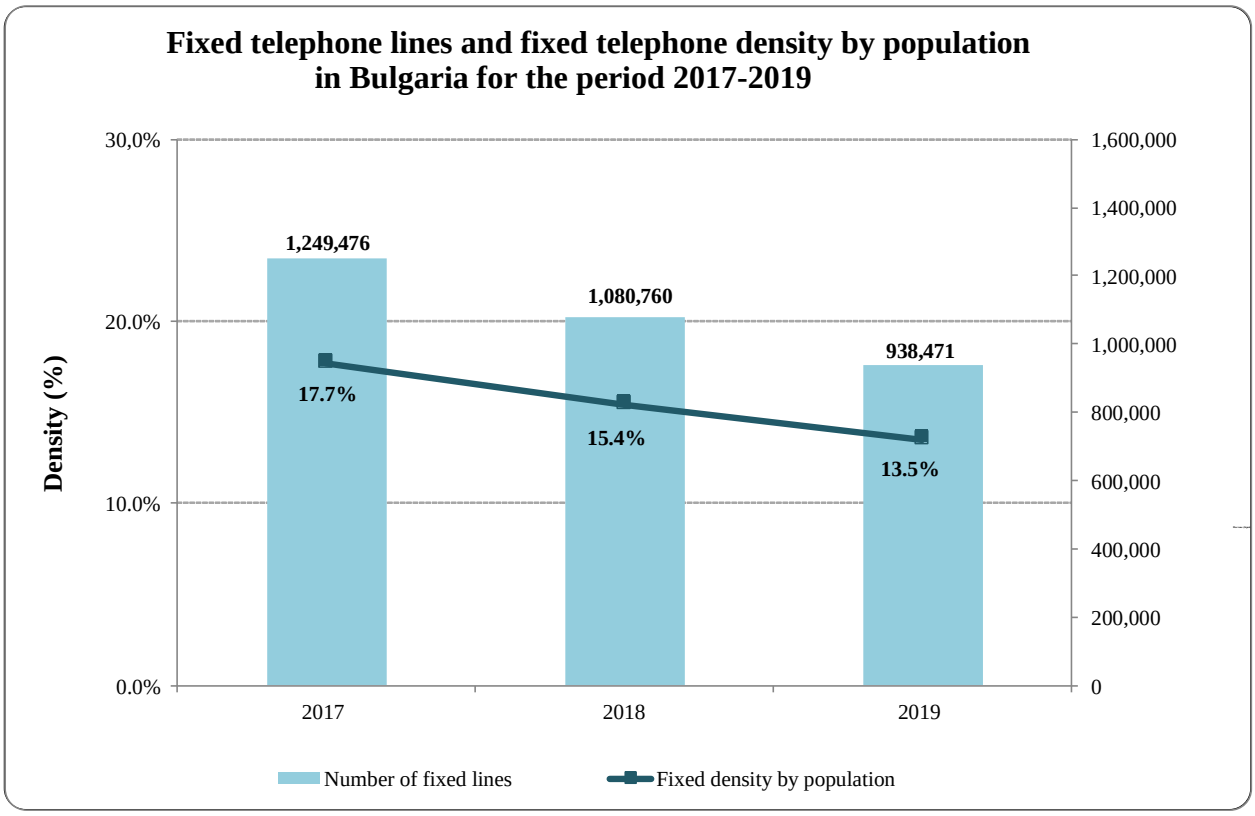
As is evident from the data presented in the table, in 2019, compared to 2018, no significant change was observed in the market shares of undertakings forming 98% of the market, measured by the number of fixed telephone lines of subscribers and 96% of revenue generated from the provision of retail services. In 2019, BTC continued to hold the largest market share based on fixed telephone lines, registering a decline of 0.5 percentage points since 2018, followed by A1 which reported a growth of 0.8 percentage points. As for Telenor, it registered a minimum reduction of 0.1 percentage points over a one-year period.

No significant changes in the market shares were reported based on revenue from the provision of fixed telephony service to end subscribers, including the part of revenue from the provision of the service bundled with other electronic communication services – BTC registered a year-on-year growth of 0.2 percentage points compared to 2018. The market shares of A1 and Telenor, calculated based on retail revenue, dropped by 0.5 percentage points compared to the year before.

Telephone lines of fixed telephony service subscribers

In 2019, for another consecutive year, there was a decline in the number of fixed telephone lines. The number of lines of the incumbent undertaking decreased by 13.9%, and the total number of fixed telephone lines of subscribers of the alternative undertakings was down by 12.0%. As a result, the total decline in 2019, compared to 2018, was 13.2%, which is by 0.3 percentage points less than the decrease registered in 2018 versus 2017 (13.5%).

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



Source: Data submitted to CRC

Figure 7

The decreasing interest of voice services users in the fixed telephony service leads to a year-on-year drop in the number of fixed telephone lines, with a total registered decline in this indicator of 24.9% for the three-year period under review (2017-2019). As a result of the decline in the total number of fixed telephone lines, the value of the fixed telephone density by population indicator also decreased in 2019, reaching 13.5%.[16]

In 2019, for yet another year, the number of public payphones/telephone booths fell by 4.3% compared to 2018.

Consumption (traffic) of fixed telephony service

As a result of the decline in the number of fixed telephony subscribers, a decrease in the service consumption was reported for yet another year. In 2019, 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 was down by 13.6% compared to 2018 (to compare with, there was a decrease of 17.9% for the period 2017-2018), and amounted to 549.88 million minutes. Only 0.1% of it is the share of traffic generated by public payphones/telephone booths, with a 55.2% reduction in absolute terms in 2019 compared to 2018.

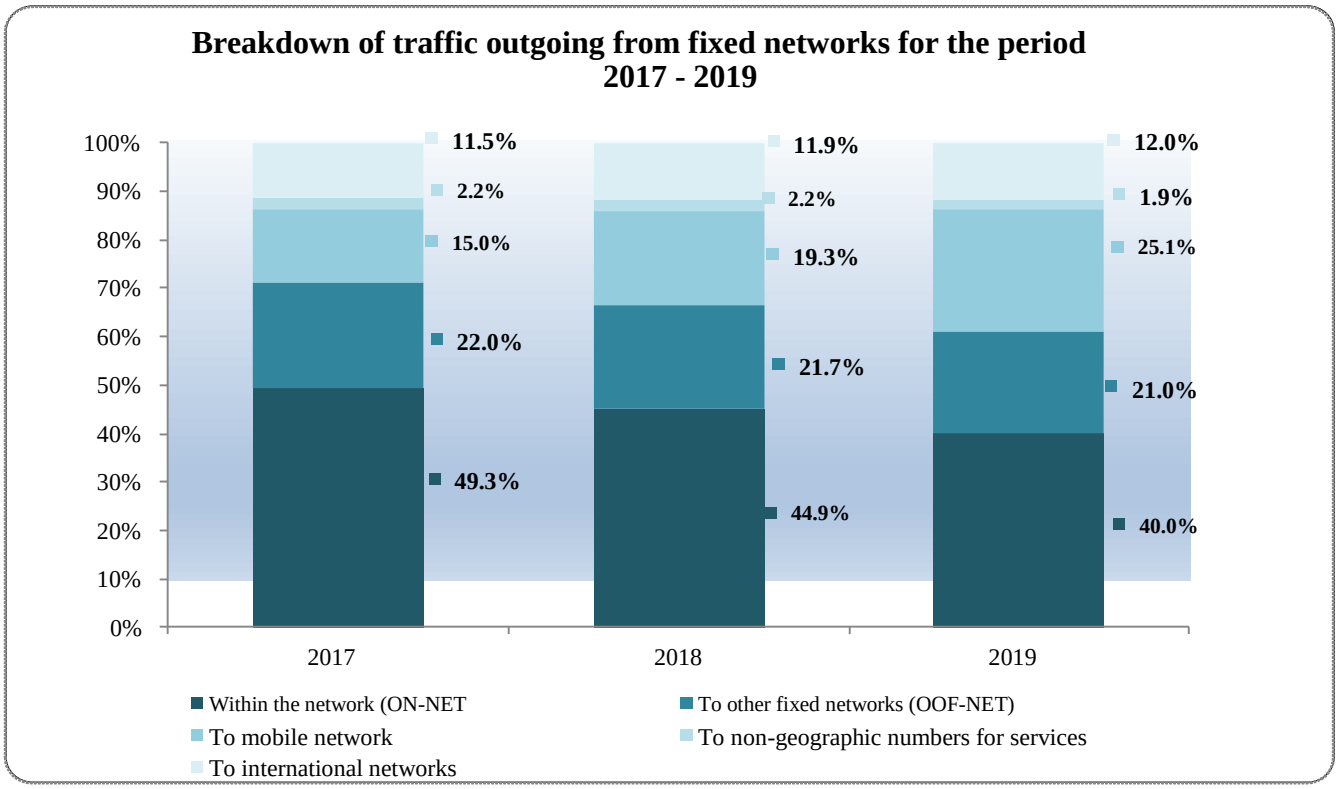
The service provision model, which involves the inclusion of an increasing volume of telephone traffic in the subscribers' monthly fixed telephony service subscriptions, was also applied in 2019, with the share of traffic generated from calls within subscriptions increasing by 2.7 percentage points to reach 87.4%. In this way, the traffic from calls which was paid by subscribers beyond their monthly subscription made up only 12.6% of the total generated traffic.

[16] The "fixed density by population" indicator was calculated as the ratio between the total number of active telephone lines 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)

[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.

In 2019, 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 2017-2019, according to the call destinations.



Source: Data submitted to CRC

Figure 8

In 2019, as in the previous year, an increase in the volume of traffic from calls was recorded only for calls to mobile networks - by 12.3% over a one-year period, with 86.7% 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 5.8 percentage points to reach 25.1%, for the first year exceeding the share of traffic from calls to other fixed networks. Although the share of international calls in the total traffic rose by 0.1 percentage points, a decrease of 13.4% was recorded in absolute value, as compared to the previous year.

For the remaining types of calls, a decrease, both in absolute terms and as a share in the total volume, was observed in 2019 compared to 2018, as follows:

- the volume of traffic within the networks (on-net) dropped by 23.1%, yet it generated, for another consecutive year, the major part of the total traffic volume - 40.0%;
- traffic from calls to other fixed networks (off-net) fell by 16.0% and its share dropped by 0.7 percentage points compared to the year before.

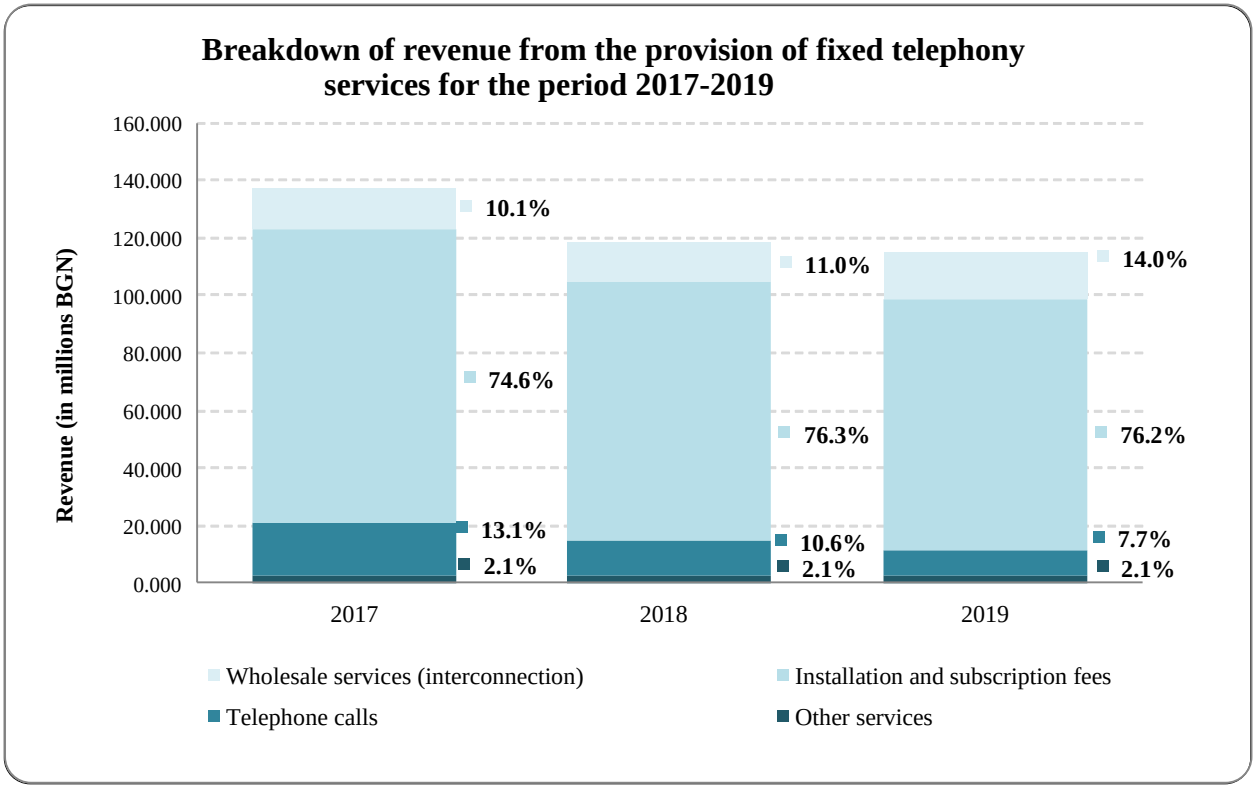
Revenue from fixed telephony service

In 2019, the total volume of revenue generated from the provision of fixed telephony service[19] amounted to BGN 114.644 million, which represents a decrease of 2.7% compared to

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

2018. The lower reduction rate for 2019, compared to 2018, is due to an increase in the volume of revenue from wholesale services (interconnection), and in particular the transit service - by 47.8%. As is evident from the breakdown of revenue from fixed telephony service, this also results in an increase in the share of wholesale services in total revenue - from 11.0% in 2018 to 14.0% in 2019.

Revenue from public payphones/telephone booths in 2019 represented only 0.1% of the total revenue from fixed telephony service (to compare with, their share was 0.3% in 2018).



Source: Data submitted to CRC

Figure 9

In the period 2017-2019, installation and subscription fees from the provision of the service to end-users, both as a standalone service and as part of a bundled service, formed the main part of the total revenue from fixed telephony service (76.2% in 2019).

The main changes reported in terms of revenue generated from fixed telephony service in 2019 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 2.8% compared to 2018;
- due to the increasing share of consumed "free minutes" included in the monthly subscription fees, as well as due to the year-on-year drop in consumption, the revenue generated from traffic beyond subscription fees registered a decline of 29.3% versus 2018, with a 30.2% drop for the previous period (2017-2018). A decline was also registered in the the revenue generated from calls from public payphones/telephone booths - by 67.1%;
- growth in the volume of revenue from wholesale services (including interconnection services - origination, termination, transit and physical interconnection) - by 23.8%.

Summary

In 2019, 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, already below 1 million by the end of 2019;
- the volume of traffic generated from calls included in subscriptions continues to increase,

with subscribers paying only 12.6% of the traffic beyond their subscriptions in 2019;

- the total consumption of the service, expressed in minutes of retail call traffic, shrinks, with growth being recorded only for calls to mobile networks.

2.2. Mobile telephony service

Market players

In 2019, no change was observed in the number and composition of undertakings licensed by CRC[20] for the provision of mobile telephony services in the country. These are A1, BTC, Bulsatcom EAD (Bulsatcom), Telenor and Ti.Com AD. The data they submitted to CRC in their activity reports for 2019 show that four of them (A1, BTC, Bulsatcom and Telenor) continued to offer and provide mobile telephony service on the market in 2019, while one company (Ti.Com AD) did not offer the service yet.

On the basis of number of subscribers, as of 31.12.2019, the largest market share for the provision of mobile telephony service continued to be held by A1 (Table 4), while Telenor held the largest market share on the basis of revenue from the provision of retail service.[21] The market share of Bulsatcom, calculated both by number of subscribers and by revenue, remained symbolic.

Table 4

Market shares of undertakings providing retail mobile telephony service

Undertaking	2018		2019	
	Share based on number of subscr.	Share based on revenue	Share based on number of subscr.	Share based on revenue
A1 BULGARIA EAD	39.4%	34.0%	38.5%	33.7%
TELENOR BULGARIA EAD	32.9%	38.9%	33.4%	41.2%
BTC	27.7%	27.0%	28.1%	25.2%
BULSATCOM EAD	0.01%	0.01%	0.01%	0.002%
TI.COM AD*	0.0%	0.0%	0.0%	0.0%

*The undertaking did not provide mobile telephony service in 2018 and in 2019.

Source: Data submitted to CRC

Table 4 shows that in 2019 Telenor increased its market share, both on a number of subscribers and on a retail revenue basis. A1 reported a decline from the previous year for both indicators, while BTC increased its market share based on number of subscribers, but on a revenue basis the company's market share decreased. The particular values of the changes in the market shares of A1, Telenor and BTC in 2019, compared to 2018, are as follows:

- the relative share of A1, calculated on the basis of number of subscribers, dropped by 0.9 percentage points, while the one calculated on the basis of revenue fell by 0.3 percentage points;
- the relative share of Telenor, calculated on the basis of number of subscribers, rose by 0.5 percentage points, whereas the one calculated on the basis of revenue grew by 2.3

[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 from the provision of the service bundled with other electronic communication services).

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 down by 1.8 percentage points.

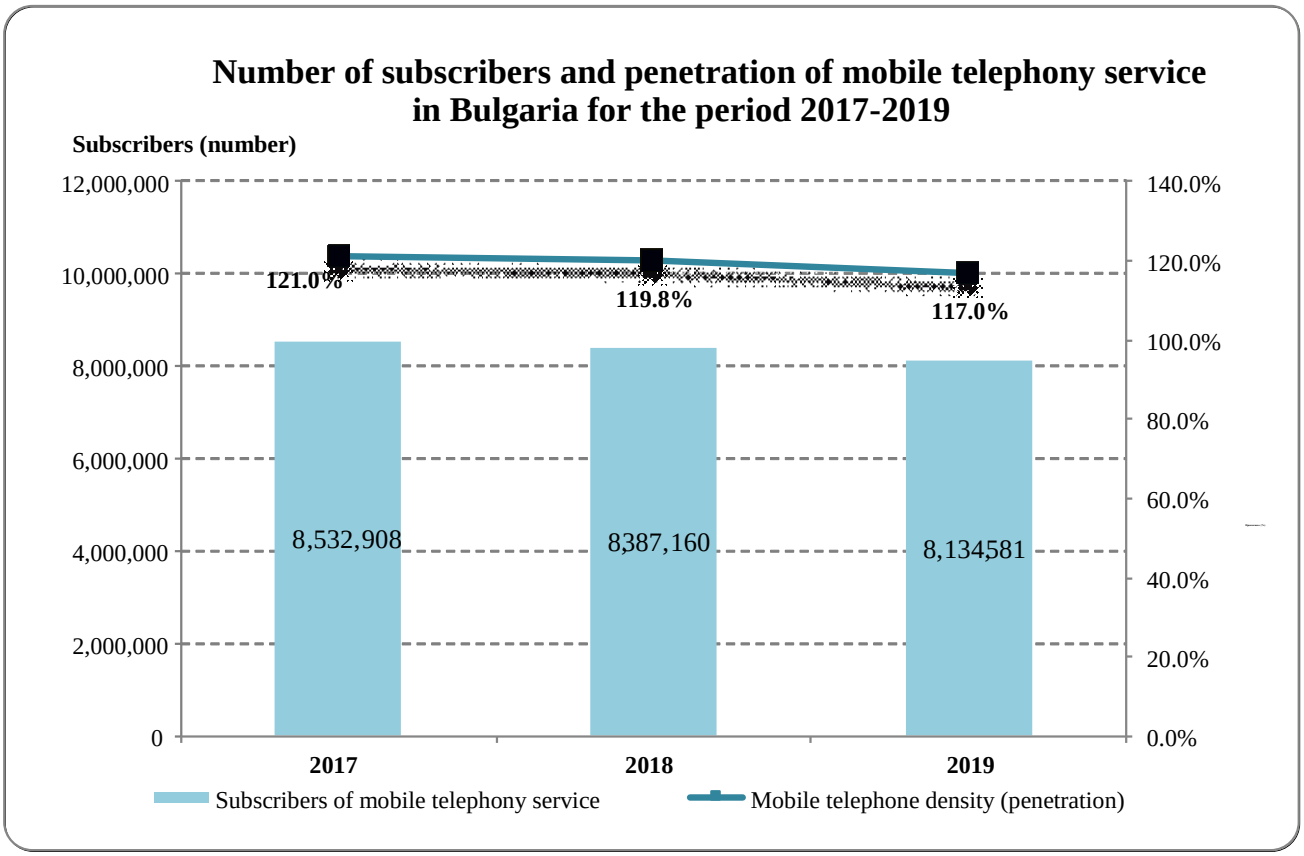
As is evident from the presented data on fluctuations in the market shares of mobile undertakings in 2019, these were not significant enough to lead to rearrangement of their positions in the segment compared to the previous year 2018.

Subscribers of mobile telephony service

As of 31.12.2019, the number of subscribers of mobile telephony service (number of unique SIM cards) amounted to 8,134,581, registering a drop for yet another year compared to the year before (by 3.0% compared to2018; as of 31.12.2018, the number of subscribers was 8,387,160). Data provided by undertakings to CRC show that the decline registered in 2019 is due both to a decrease in the number of postpaid subscribers who, as of 31.12.2019, were by 211 thousand less than the previous year (down by 3.0%), as well as to a reduction in the number of users of the prepaid service (down by 3.1% - at the end of 2019, they were by nearly 42 thousand less than in 2018). According to information submitted by the mobile undertakings, the significant reduction in the number of postpaid subscribers is mainly the result of deactivating unnecessary SIM cards of business users in order to optimise the cost of mobile services.

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 2017-2019.[22] As is evident from the data presented, the decline in the total number of mobile phone subscribers recorded in 2019 had a negative effect on the size of the service penetration among the population as well.

[22] The “mobile telephone density” indicator was calculated as the ratio between the number of subscribers of mobile telephony services 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).

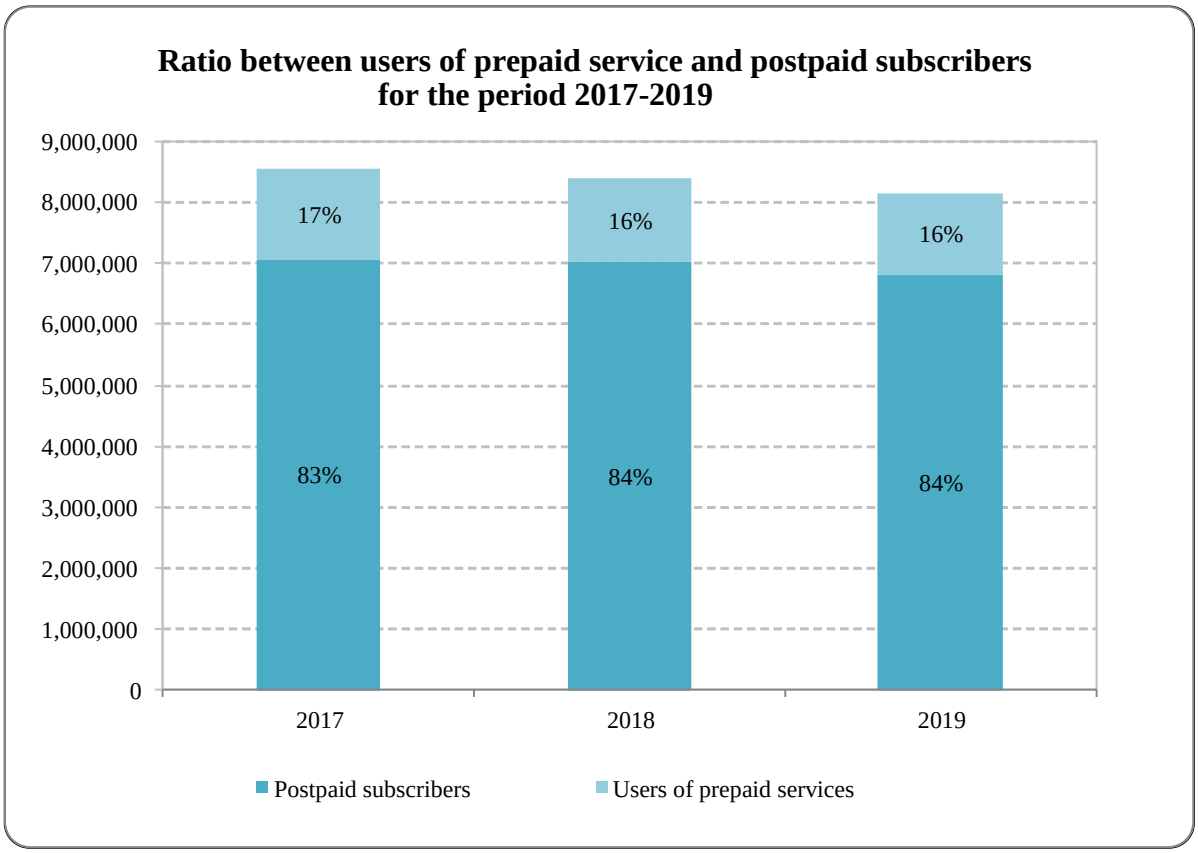


Source: Data submitted to CRC

Figure 10

At the end of 2019, the penetration of mobile telephony service in Bulgaria was 117.0%, down by 2.8 percentage points as compared to the penetration in 2018 (119.8%). This decline shows that in 2019 there was an acceleration in the drop rate of mobile telephone density compared to 2018, when it was 1.2 percentage points compared to 2017.

The ratio between users of prepaid mobile telephony service and postpaid subscribers, as of 31.12.2019, remained unchanged compared to the previous year: 16% of the users used a prepaid service and 84% had a monthly subscription contract with the service provider (Figure 11).



Source: Data submitted to CRC

Figure 11

In percentage terms, the decrease in the number of postpaid subscribers (by 3.0%) and in the number of users with prepaid cards (by 3.1%) in 2019 was almost the same. This circumstance also conditions the absence of a change in the ratio between users of prepaid mobile telephony service and postpaid subscribers in 2019 compared to the previous year 2018.

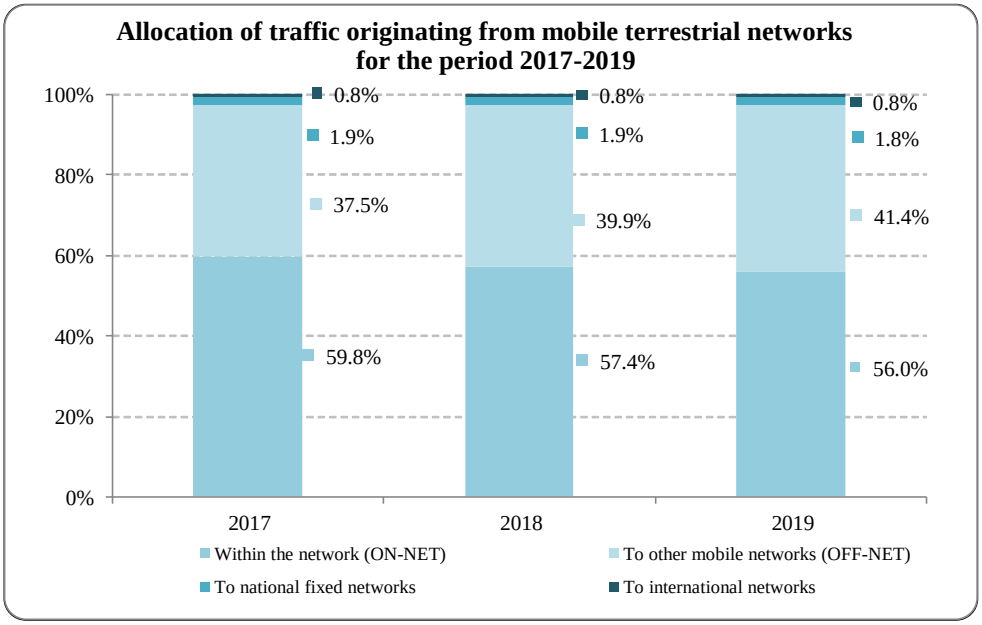
Consumption (traffic) of mobile telephony service

With an increase of 1.1% in 2019, the total volume of outgoing traffic from mobile networks in the country[23] was 19,589.35 million minutes. Compared to 2018, the growth rate of the mobile telephony service consumption slowed down in 2019 (the growth in 2019 was by 1.7 percentage points lower than in 2018 (2.8%)). This is due to a fall (by 5.5%) in the number of call minutes from mobile to fixed networks in the country. The number of call minutes to networks abroad for 2019 continued to increase, with the growth recorded remaining at the same level as in the year before - 3.5%. For yet another year, there was a decline in the consumption of mobile calls within a mobile network (by 1.3% compared to 2018). Although smaller, in 2019 there was again an increase (by 4.9%) in the number of call minutes to other mobile networks in the country (to compare with, the increase in the off-net traffic in 2018 was by 9.4%).

The share of consumption (number of call minutes) by subscribers with prepaid SIM cards in the total consumption of mobile telephony service in 2019 was reduced to 3.9% (4.1% in 2018), while the share of consumption by postpaid subscribers reached 96.1%. Unlike the previous year, when both categories of subscribers experienced an increase in the total volume of their call minutes, in 2019, an increase of 1.3% was observed in postpaid subscribers, while a drop of 3.0% was reported for prepaid subscribers.

[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.

The downward trend in the consumption of mobile calls within a given mobile network (on-net) in recent years has also led to a reduction in the share that this traffic holds in the total volume of traffic generated on mobile networks in the country. As is evident from the data presented on the figure below, the share of on-net traffic is the largest, but it has been steadily decreasing over the last 3 years (2017-2019) (from 59.8% in 2017 to 56.0% in 2019). At the same time, the share of off-net traffic increased over the period under consideration (from 37.5% in 2017 to 41.4% in 2019).



Source: Data submitted to CRC

Figure 12

The figure above shows that the share of traffic to fixed networks in the country (1.8% in 2019) and the share of traffic to networks abroad (0.8% in 2019) remained almost at the same levels over the three-year period under review.

The trend observed in recent years towards a decrease in the share of on-net traffic and an increase in the share of traffic generated to other mobile networks in the country (off-net) shows that the regulatory intervention of CRC in the market for wholesale voice call termination on individual mobile networks[24] has a positive effect on the competition in the mobile telephone market in Bulgaria. As a result, the problem of "market foreclosure" within the mobile operators' own network has been overcome, ensuring favourable conditions for end-users both in terms of on-net and off-net calls.

After a significant increase in the number of roaming minutes actually consumed by subscribers of Bulgarian mobile undertakings in 2018 (a growth of 57.2% for outgoing roaming calls and 46.3% for incoming roaming calls), in 2019, there was a decline in the volume of traffic generated for both types of calls. The decline recorded amounted to 9.1% for outgoing and 5.3% for incoming roaming calls, respectively. A possible cause of this decline may be the increasing use of the so-called 'Over the top (OTT)'[25] Internet call applications (Viber, Skype, etc.) which are preferred by users having the respective device (smartphone, tablet, portable computer).

[24] Regulation resulting from the first, second and third round of market analyses carried out in accordance with the regulatory framework in the field of electronic communications: https://crc.bg/bg/rubriki/216/pazarno-regulirane-elektronni-syobshtenija

[25] 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'.

Short multimedia and text messages

Over the last three years (2017-2019), the use of short message service (SMS) in Bulgaria has dropped by 18.2%, and the number of short multimedia messages (MMS) - by 9.7%. In 2019, the number of SMS sent in Bulgaria amounted to 382 million, which is by 3.7% less than in the previous year 2018. The number of MMS sent in 2019 was 4.3 million, with a 5.4% reduction recorded on a one-year basis. There was also a decline in the number of roaming SMS sent in 2019 (by 22.7%), while for roaming MMS sent, the decrease was more than 5 times.

Among the main reasons for the observed fall in the number of SMS or MMS sent is the increasing spread of smartphones and the offering of mobile telephony tariff plans with included "free" minutes for mobile calls and MB traffic for mobile Internet access. These two factors have a negative impact on the consumption of SMS and MMS messages, as users of mobile telephony services that have access to the Internet prefer to use text conversations (the so-called "chatting") or to send messages via OTT applications such as WhatsApp, Facebook Messenger, iMessage, Viber or Skype, rather than paying for traditional SMS or MMS.

According to the latest Eurobarometer survey on electronic communications conducted among households in EU Member States in April 2017,[26] 48% of the Bulgarians surveyed indicated that they use instant messages via the Internet (instant messaging services). With regard to the use of text messages for daily communication with people in another EU country, the survey showed that 3% of the Bulgarians use instant messages via the Internet, while 1% send SMS.

Revenue from mobile telephony service

In 2019, the total volume of revenue from the provision of mobile telephony service amounted to BGN 1,042.060 million, registering a drop for yet another year (by 2.6% as compared to the previous year 2018). The volume of revenue from the provision of retail mobile telephony service was BGN 863.246 million, while that of revenue from wholesale services amounted to BGN 178.814 million. The data available with CRC show that the decline in revenue from the provision of mobile telephony service registered in 2019 was again entirely due to a drop in revenue from retail services - by 3.2%. As for revenue from wholesale services (interconnection), there was a slight growth of 0.1% versus 2018. The data analysis shows that in 2019, the main reasons that have led to the registered decline in revenue from the provision of retail mobile telephony service were as follows:

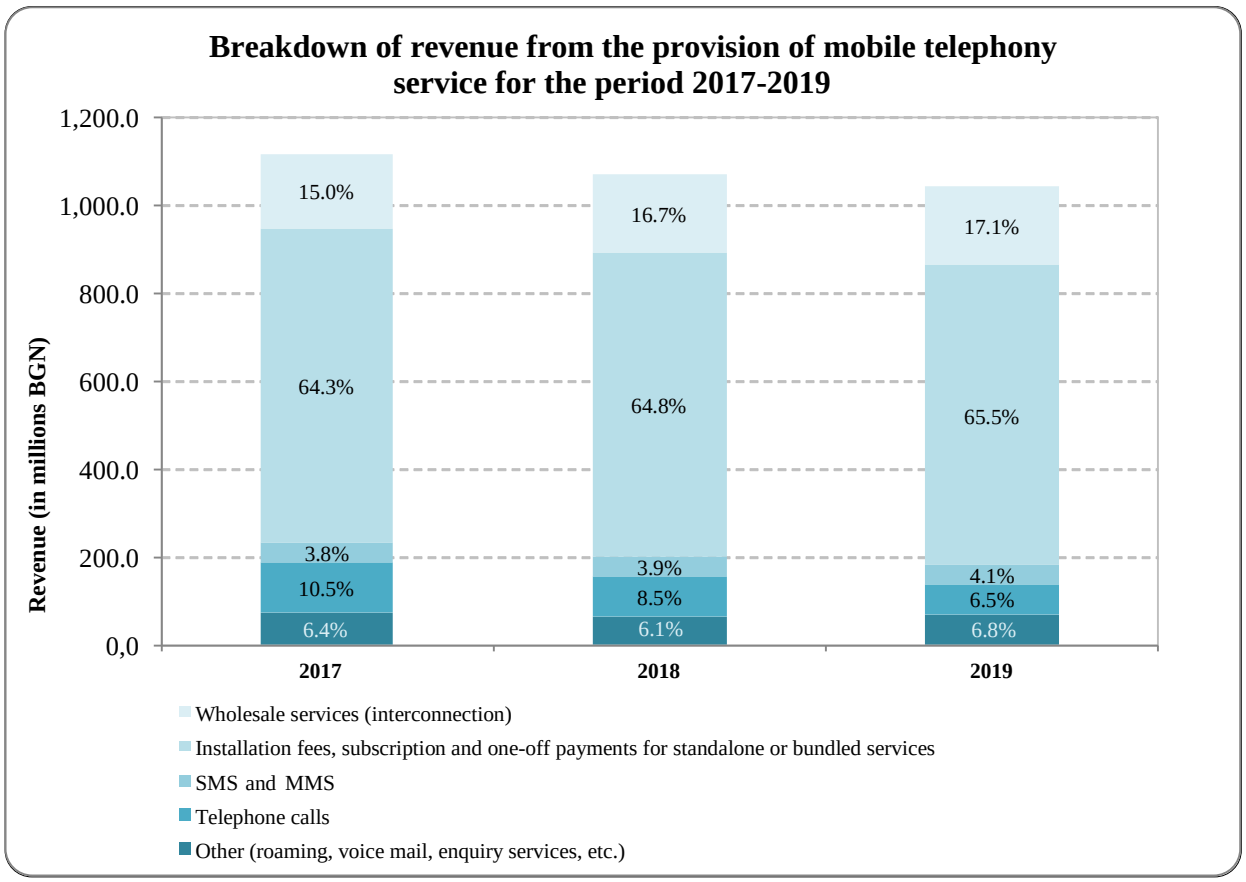
- decline in the number of subscribers (by 21.6%) and in revenue (by 15.9%) from monthly subscription and installation fees from standalone provision of mobile telephony services, along with insufficient growth rate in the number of subscribers (by 6.5%) and revenue (by 4.7%) from the provision of the service bundled with other electronic communication services;
- increased volume of consumed “free minutes”, included in the monthly subscription fee, up to 97.0% of the total consumption of mobile telephony service and a decline of 25.8% in the revenue from mobile calls compared to the previous year 2018;
- a 4.5% drop in revenue from mobile telephony roaming service.

In the context of the regulation of prices for international calls and short message service introduced on 15 May 2019,[27] it can be noted that in 2019 there was an increase (6.2% compared to 2018) in the consumption of mobile international calls within EU/EEA countries, combined with a 40.0% drop in revenue.

[26] Special Eurobarometer 462: E-Communications and Digital Single Market: https://data.europa.eu/euodp/en/data/dataset/S2155_87_2_462_ENG

[27] 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.

The breakdown (structure) of revenue from mobile telephony service for the period 2017-2019, by years, is presented in Figure 13 below. It shows that, in 2019, 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 (65.5%), continued to play a key role. The small growth of the total volume of wholesale revenue, reported in 2018, had a positive effect on their share in the segment which reached 17.1%. The share of revenue from telephone calls (6.5%) registered a decline for yet another year - by 2 percentage points.



Source: Data submitted to CRC

Figure 13

The share of revenue from SMS and MMS registered an insignificant increase in 2019 (by 0.2 percentage points), and so was the case with the share of revenue from other services (by 0.7 percentage points).

Summary

In 2019, the development of the mobile telephony service continued to be characterised by a fall in the total revenue and in the number of subscribers, accompanied by an increase in the total consumption of mobile telephone calls.

For yet another year, there was a reduction in the use of SMS and MMS. This is largely driven by the availability of tariff plans for users with a large volume of included 'free' call minutes and Internet MB, as a result of which the use of traditional text and multimedia messages in Bulgaria has been replaced by the use of 'over-the-top' applications, which allow for chatting and texting over the Internet.

The regulation of the prices of international calls and short message service within the EU, which was introduced on 15 May 2019, had a positive impact on the consumption of international mobile telephone calls in 2019. However, such positive effect on international SMS was not

observed. In view of the fact that this consumer-friendly price regulation does not cover the whole of 2019, its real impact will be reported next year.

3. Leased lines services

The 2019 data submitted by the undertakings providing the leased lines service, including international leased lines, show a change in the trend observed over the last more than ten years in this market segment. The total revenue from the provision of the service in 2019 amounted to BGN 15.202 million,[28] registering an increase of 6.8% compared to revenue generated the year before.

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 2019

Service	Number of undertakings providing the service in 2019	Number of leased lines as of 31.12.2019	Revenue in 2019 (in millions BGN, excl. VAT)
1. Wholesale leased lines	**21**	**2,390**	**10.473**
1.1. National leased lines	17	2,084	5.636
1.2. International leased lines	9	306	4.837
2. Retail leased lines	**12**	**2,069**	**4.729**
Total	**24**	///	**15.202**

Source: Data submitted to CRC

Market players

According to information submitted to the Commission, 24 undertakings (out of 104 that have notified CRC of their intention to provide the leased lines service, entered in the public register as of 31.12.2019) were active in the market segment. Nine undertakings provided the service both in the retail and in the wholesale market, and again nine undertakings provided the international leased lines service.

Tables 6 and 7 present the market shares of the major undertakings providing retail/wholesale leased lines in 2019.

[28] Including revenue from national wholesale and retail leased lines, as well as revenue from national sections of international leased lines. Excluding revenue from sections of international leased lines outside the territory of the country.

Table 6

Market shares of undertakings providing retail leased lines

Undertaking	2018		2019	
	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	74.7%	69.7%	76.8%	64.5%
A1 BULGARIA EAD	12.5%	9.7%	12.6%	17.1%
SOFIA COMMUNICATIONS EAD	8.3%	10.8%	4.7%	7.8%
All other	4.5%	9.7%	5.9%	10.6%

Source: Data submitted to CRC

In 2019, as opposed to 2018, the total market share (94.1%) based on number of retail lines of the three major undertakings dropped by 1.4 percentage points, with the most significant decrease registered in the share of Sofia Communications – by 3.6 percentage points. Based on retail revenue, the decline reported in the share of the three undertakings was less - by 0.9 percentage points. As a result, the remaining players increased their share proportionally,both by revenue and number of lines.

Table 7

Market shares of undertakings providing wholesale leased lines

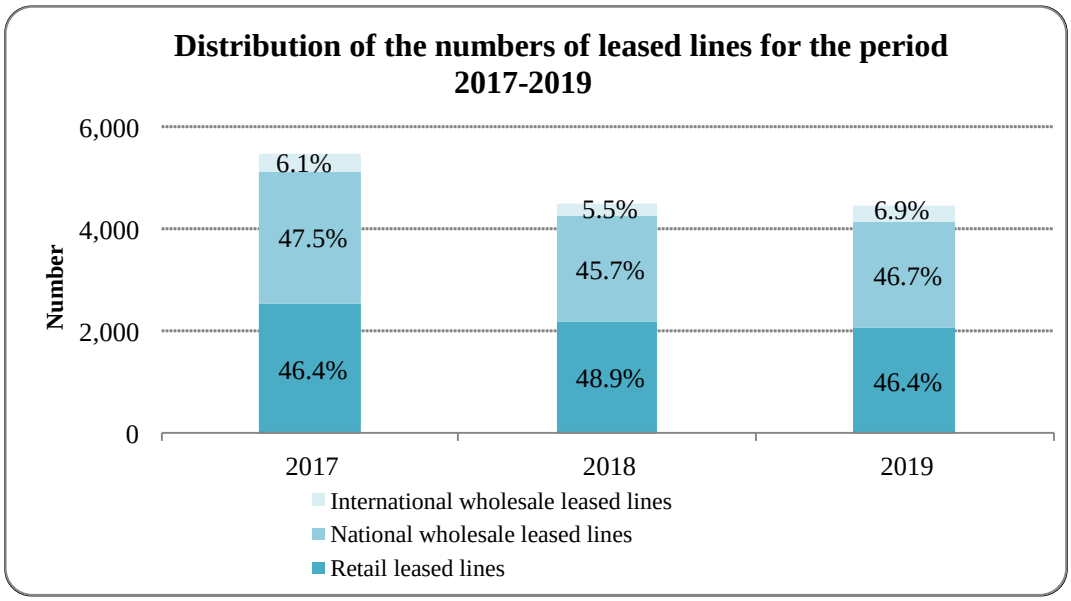
Undertaking	2018		2019	
	Share based on number of wholesale lines	Share based on wholesale revenue	Share based on number of wholesale lines	Share based on wholesale revenue
NOVATEL EOOD	25.1%	25.7%	26.9%	31.6%
SOFIA COMMUNICATIONS EAD	22.8%	9.6%	23.7%	9.3%
BTC	16.6%	33.8%	13.8%	28.8%
All other	35.5%	30.9%	35.6%	30.3%

Source: Data submitted to CRC

In 2019, as opposed to 2018, the total market share (64.4%) based on number of wholesale lines of the three major undertakings dropped by 0.1 percentage points, with the most significant decrease registered in the share of BTC – by 2.8 percentage points. Based on wholesale revenue, the increase reported in the share of the three undertakings was by 0.6 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 2019 year-on-year was by 0.9%, which is entirely due to the reduced number of retail leased lines.



Source: Data submitted to CRC

Figure 14

The breakdown of leased lines is displayed in Figure 14. Due to the decrease in the number of retail leased lines compared to the year before (by 5.9%), an increase of 2.5 percentage points in the share of wholesale leased lines was registered in 2019, at the expense of the share of retail lines.

Figures 15 and 16 present the distribution of the number of retail and wholesale leased lines provided for the period 2017 – 2019 by type of interface.

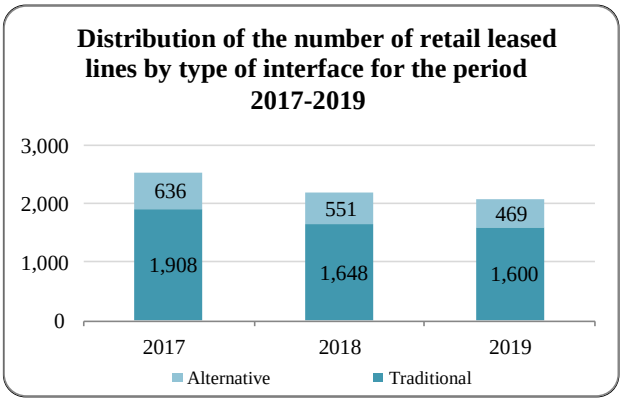


Figure 15

Source: Data submitted to CRC

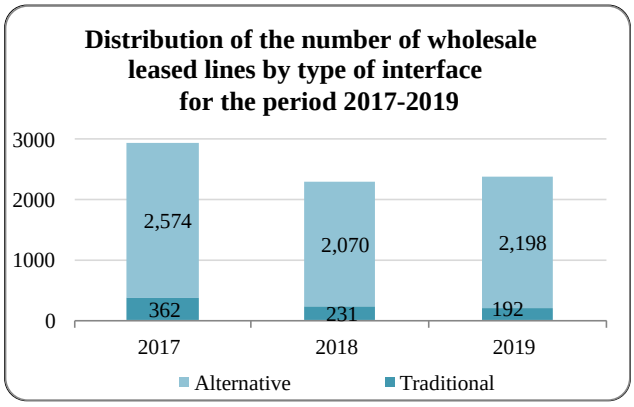


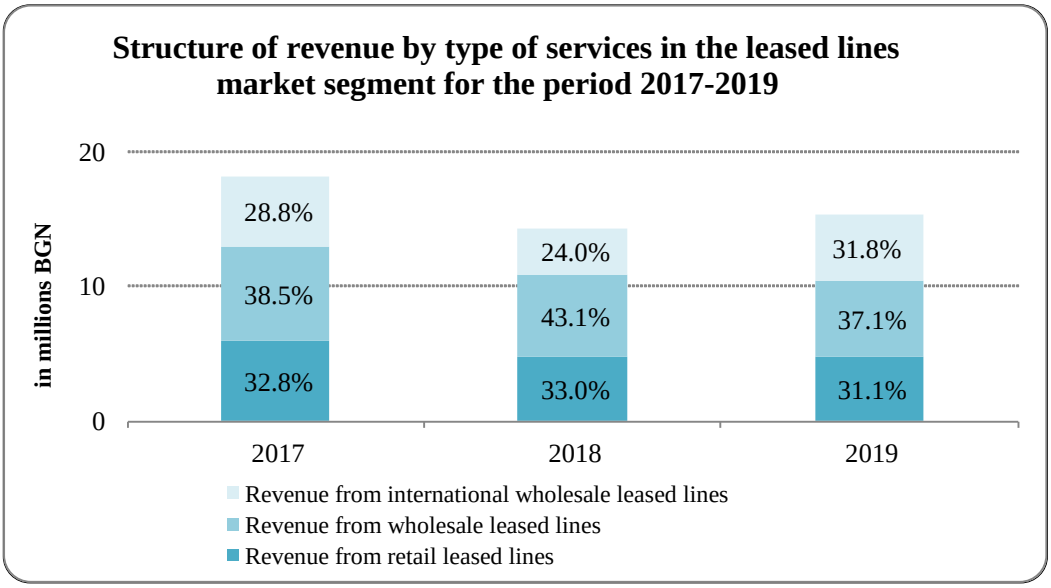
Figure 16

Source: Data submitted to CRC

The total decline in retail leased lines made up 5.9% in 2019, with traditional lines decreasing by 2.9% and alternative lines - by 14.9%, respectively. The reported growth (3.9%) in the number of wholesale leased lines was the result of the 6.2% increase in the number of alternative wholesale lines. The number of traditional wholesale leased lines continued to decrease (by 16.9%), but at a slower pace compared to the previous period (to compare with, the decrease in 2018 versus 2017 was by 36.2%).

Revenue from leased lines

Figure 17 presents the structure of revenue generated from the provision of leased lines services (wholesale and retail) for the period 2017-2019.



Source: Data submitted to CRC

Figure 17

This year, the decrease in the total number of leased lines does not lead to a drop in revenue in the market segment, but due to the significant increase in the capacity of the leased lines, an increase of 6.8% compared to the previous year is recorded. In 2019, the significant increase in revenue from international wholesale leased lines (41.8% compared to the 2018 figures) as well as the decrease in revenue from national wholesale leased lines (by 8.1%) had an impact on the ratio between revenues from the service. As a result, the share of international wholesale lines increased by 7.8 percentage points, at the expense of the decrease in the share of national wholesale lines (by 6 percentage points) and of retail lines (by 1.9 percentage points).

Summary

The following trends were observed in the leased lines services segment in 2019:

- entry of two new undertakings providing the leased lines service;
- increase in revenue generated both at wholesale and retail level;
- decline in the number of retail leased lines and increase in the wholesale leased lines;
- fall in the number of traditional wholesale lines and increase in alternative lines provided under similar parameters at significantly lower prices than traditional ones.

4. Data transfer and Internet access

The upward development of Data transfer and Internet access services in the country was preserved in 2019 as well. The total volume of revenue generated from services included in the data transfer and Internet access segment amounted to BGN 998.067 million, registering an increase of 12.5% compared to the previous year 2018.[29]

Table 8 presents summarised information about the number of undertakings which provided services in this market segment in 2019 as well as about the number of their subscribers/users and the revenue generated from them.

[29] The data for 2018 have been updated. Revenue from the segment in 2018 amounted to BGN 887.282 million

Table 8

Number of undertakings, subscribers/users and revenue by type of Internet access and data transfer services provided in 2019

Service	Number of undertakings providing the service in 2019	Number of subscribers/users as of 31.12.2019		Revenue (in millions BGN, excl. VAT)	
		Total [1]	incl. bundled services subscribers	Total [2]	incl. revenue from bundled services
1. Retail Internet access and data transfer services	**655**	///	///	**958.509**	**447.663**
1.1. Internet access[3], incl.:	649	8,482,748	6,086,407	900.751	447.663
1.1.1. Fixed	648	2,012,292	677,377	289.576	64.567
1.1.2. Mobile[4]	5	6,536,107	5,474,681	611.175	383.096
1.2. Data transfer services	58	///	///	57.543	///
1.3. Other services (hosting, e-mail, etc.)	10	///	///	215.281	///
2. Wholesale services	**116**	///	///	**39.557**	///
2.1. Provision of capacity for Internet connectivity (Peering and Transit)	84	///	///	27.148	///
2.2. Data transfer services	19	///	///	4.929	///
2.3. Wholesale provision of Internet access via next generation access networks (NGA)	46	///	///	5.983	///
2.4. Other wholesale services	9	///	///	1.496	///
Total	**686**	///	///	**998.067**	///

[1] Including bundled services subscribers.

[2] Including revenue from bundled services

[3] The data on the total number of subscribers and revenue from Internet access services is based on the data received by CRC from 90.6% of the registered undertakings.

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

Source: Data submitted to CRC

Market players

As of 31.12.2019, the total number of undertakings registered at CRC for their intention to provide data transfer and/or Internet access services was 920, by 2 more than those registered the year before. The number of undertakings actually providing Internet access and data transfer services in 2019 was 686,[30] by 2 undertakings more compared to 2018.[31] The number of undertakings providing retail services remained unchanged from the previous year (655), while the number of undertakings providing wholesale services was reduced by 2 undertakings over the one-year period.

In 2019, 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 2019 and declared revenue during the year.

[31] The data for 2018 have been updated.

Table 9

Market shares of undertakings providing retail fixed Internet access

Undertaking	2018		2019	
	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	27.1%	20.3%	27.2%	21.1%
A1 BULGARIA EAD	26.2%	19.7%	26.0%	17.6%
BULSATCOM EAD	8.9%	10.8%	8.4%	10.3%
All other	37.8%	49.2%	38.4%	50.9%

[1]Including bundled services subscribers
[2]Including revenue from bundled services

Source: Data submitted to CRC

As is shown in Table 9, in 2019, BTC reported an insignificant increase in its market share based on number of subscribers (by 0.1 percentage points). As for A1 and Bulsatcom, as opposed to the previous year, their market share fell by 0.2 percentage points and 0.5 percentage points, respectively, based on number of subscribers. 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 0.8 percentage points. The other two undertakings - A1 and Bulsatcom - registered a decline in the share of revenue from fixed access by 2.1 and 0.5 percentage points, respectively, compared to 2018. As for the other undertakings, a growth was reported both on the basis of fixed access subscribers (by 0.6 percentage points) and on the basis of revenue (by 1.7 percentage points).

In 2019, 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 2018 and 2019.

Table 10

Market shares of undertakings providing retail mobile Internet access

Undertaking	2018		2019	
	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 acess [2]
BTC	34.8%	36.8%	34.1%	33.9%
A1 BULGARIA	32.8%	34.0%	34.1%	36.3%
TELENOR	32.4%	29.1%	31.8%	29.7%
BULSATCOM	0.03%	0.04%	0.02%	0.02%
TI.COM*	0.03%	0.02%	0.06%	0.05%

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

[2]Including revenue from standalone services via data cards or modems, revenue from bundled services including fixed volume of data traffic at maximum speed and/or volume of data traffic per month and total monthly price and revenue from traffic.

Source: Data submitted to CRC

As is evident from the figures presented in the table, a shift was observed in the position of undertakings providing retail mobile Internet access in 2019, compared to 2018. Two undertakings registered a growth based on subscribers - A1 and Ti.Com - by 1.3 and 0.03 percentage points, respectively. This was at the expense of the other three undertakings - BTC, Telenor and Bulsatcom - which registered a slight decline ranging from 0.01 to 0.7 percentage points. With the above increase in the share of A1, calculated on the basis of the number of mobile access subscribers, the undertaking achieved the same share as that of BTC - 34.1%. The third place based on mobile access subscribers was occupied by Telenor, which registered a fall of 0.6 percentage points since 2018. In respect of market share based on revenue, including the part of revenue from the provision of mobile Internet bundled with other electronic communication services, A1 and Ti.Com reported an increase once again - by 2.3 and 0.03 percentage points, respectively. They were joined by Telenor, which also recorded an increase of 0.6 percentage points. The biggest drop in revenue–by 2.9 percentage points–was reported by BTC, thus conceding the first place to A1. As for Bulsatcom, the drop in revenue in 2019 was insignificant - by 0.02 percentage points.

Subscribers of Internet access services

The upward trend in the number of subscribers to Internet access services in the country continued in 2019, albeit to a lesser extent compared to 2018. As of 31.12.2019, the total number of subscribers to retail Internet services (fixed and mobile Internet access) was 8.483 million, up by 5.4% since the end of the previous year (a growth of 11.7% in 2018 compared to 2017). The number of bundled services subscribers (with fixed and/or mobile Internet access included) also increased in the past year by 6.9% in absolute value to reach 6.086 million. In 2019, bundled services subscribers already made up 71.8% of the total number of subscribers,[32] registering an increase of 1 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, subscribers increased by 5.7%, reaching 2.012 million. The increase in the number of subscribers to fixed access provided standalone was by 8.2% compared to the previous year, while the number of subscribers to fixed access provided in a bundle also showed an increase, but by only 1%. The significantly higher increase in the number of standalone fixed access subscribers compared to the number of subscribers using the bundled service can be explained by the possibilities offered by fixed Internet access - access to video and TV content, use of chat and call applications, which largely meet the users' requirements and need not be combined with other services. The share of fixed access subscribers in the total number of subscribers of Internet access remained unchanged from the previous year - at 23.7%.

In 2019, the number of subscribers using mobile Internet access services[34] rose by 5.1% compared to the year before, reaching 6.536 million. Such increase was mainly due to the increase of 7.3% compared to the 2018 data on the number of subscribers of bundled mobile Internet access which amounted to 5.475 million at the end of 2019. Users continued to reorient towards the use of mobile Internet in a bundle, mainly combined with mobile voice service, therefore a decline of 5.2% since 2018 was reported for yet another year in the number of subscribers using the service as a standalone service (via data cards and/or modem), and these subscribers dropped to 1.061 million at the end of 2019.

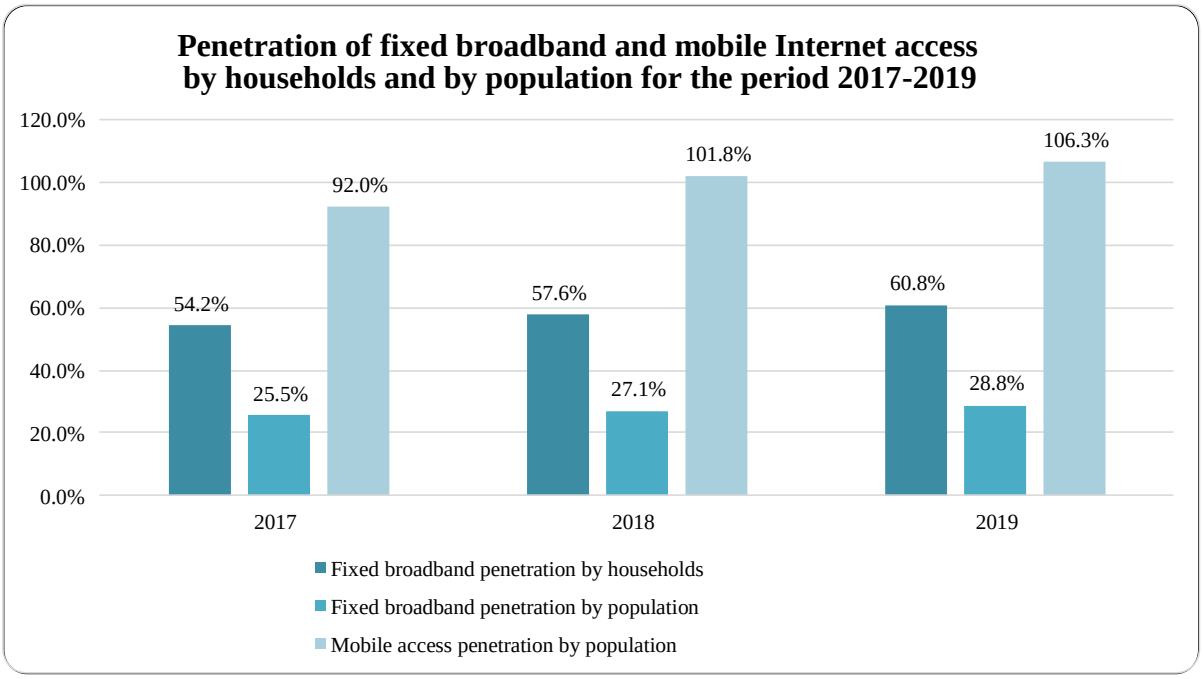
[32] To avoid duplication, subscribers of bundled services with both fixed and mobile Internet access are excluded from the total number of Internet access subscribers.

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

[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).

The number of subscribers of mobile Internet access via LTE, which is provided by all five mobile operators in Bulgaria, reported another growth of 13.7% year-on-year, to reach 4.038 million as of 31.12.2019. The share of LTE subscribers in the total number of mobile access subscribers was 61.8%, reporting a growth of 4.7 percentage points in relative terms.

Figure 18 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 2017-2019.



Source: Data submitted to CRC

Figure 18

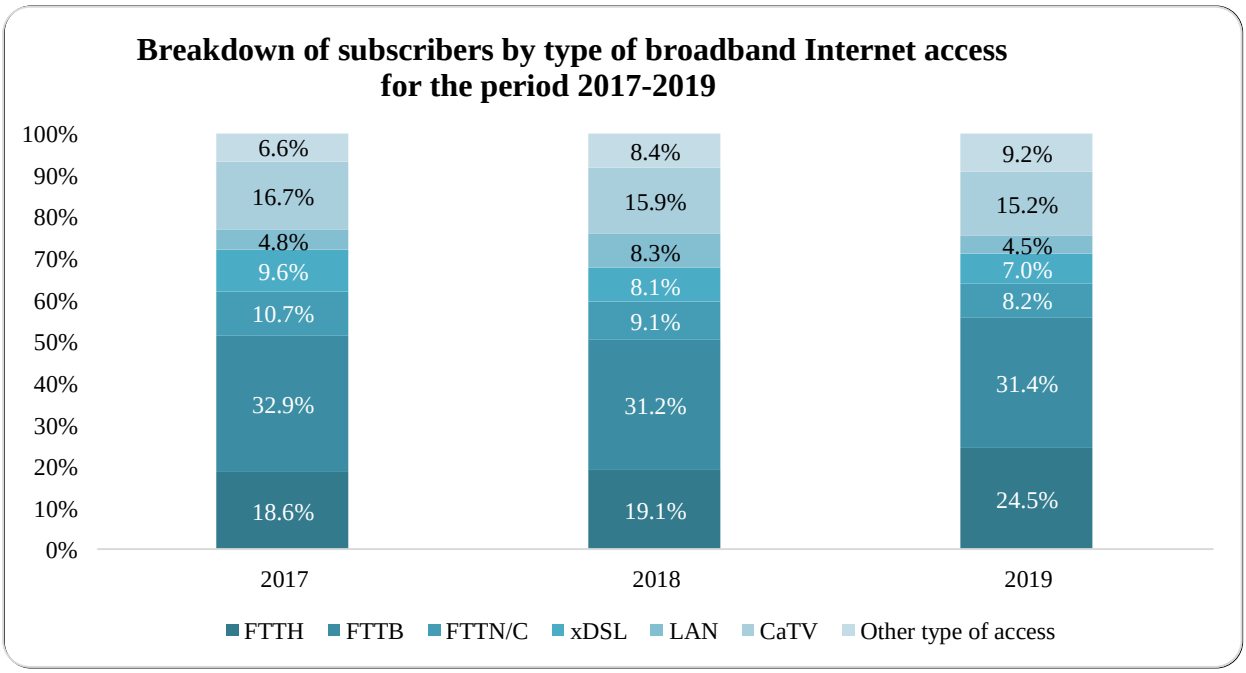
As a result of the continued increase in the number of mobile Internet access subscribers, the "penetration of mobile Internet access by population" indicator also reported a growth of 4.5 percentage points compared to 2018, and for the period 2017-2019, this growth was 14.3 percentage points. At the end of 2019, penetration of fixed broadband Internet access among households in the country was 60.8% compared to 57.6% 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 28.8%, which represents a growth of 1.7 percentage points.

The breakdown of subscribers by type of fixed Internet access for the period 2017-2019 is shown in Figure 19.

[35] This indicator was calculated as the ratio between the number of subscribers of fixed 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)

[36] This indicator was calculated as the ratio between the number of residential subscribers of fixed access as of 31.12.2019 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 standalone 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 19

At the end of 2019, the majority of subscribers of fixed Internet access in Bulgaria continued to use access via fibre-optical networks (FTTH, FTTB and FTTN/C) – 64.1%. The growth recorded versus 2018 was by 4.7 percentage points, as the number of subscribers using fibre-optical networks rose by 14.0% in absolute terms.

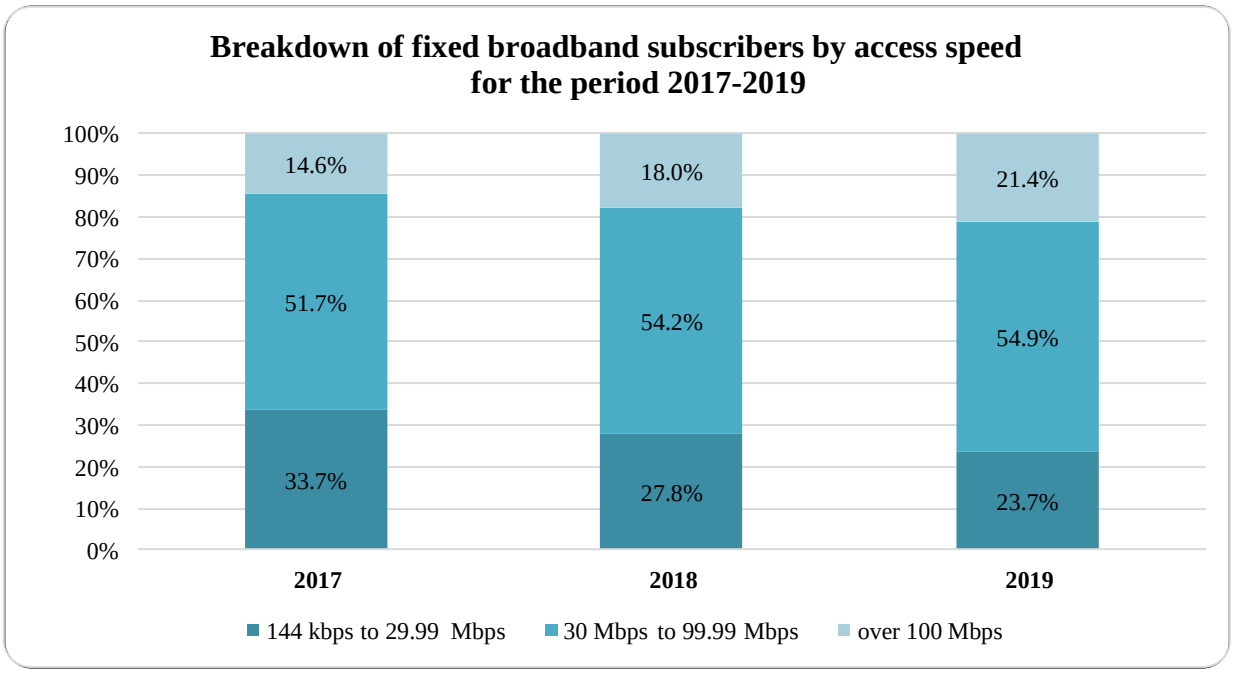
The share of CATV access subscribers (based on transmission and/or distribution of radio and TV programmes networks and DOCSIS standard) ranked next, as it reported a slight decline in the period 2017-2019. At the end of 2019, nearly all the CATV access subscribers (95.0%) used the DOCSIS 3.0 protocol, where the maximum speed to the subscriber may reach up to 200 Mbps. To compare with, at the end of 2017, the subscribers using DOCSIS 3.0 were 91.7% of the CATV access subscribers, with an increase of 3.3 percentage points for the period. The downward trend in the subscribers of xDSL access, provided only by BTC, continued in 2019 as well. Compared to the end of the previous year, the number of subscribers of that type of access dropped by 8.6%, thus registering a 18.8% decline for the period 2017-2019. Migration of ADSL subscribers of BTC to optical access was preserved as well, registering an increase of 9.9% in the number of BTC subscribers using fibre-optical networks over a one-year period. For the period 2017-2019, the growth was 23.2% in absolute value. In 2017, BTC began providing VDSL access in the country, and at the end of 2019, the share of BTC subscribers who used VDSL in the total number of the undertaking's subscribers was 8.3% - by 4.6 percentage points more than in 2018. As opposed to the year before, the share of the subscribers of LAN access decreased by 3.8 percentage points in 2019, down to 4.5% of the total number of subscribers of fixed broadband access. The share of subscribers to other types of access[38] in 2019 reached 9.2%, as for the three-year period, as presented in Figure 19, the subscribers to this access recorded the most significant increase - by 55.3%.

At the end of 2019, the subscribers of fixed broadband access using high-speed access via NGA networks[39] reached 88.7% of the total number of subscribers of fixed broadband Internet

[38]Including RLAN access, fixed access via mobile networks and satellite access.

[39]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, as well as fixed access via mobile networks with a minimum speed of 30 Mbps.

access, while their share was up by 5.4 percentage points compared to the end of 2018. 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 for the three-year period 2017-2019.



Source: Data submitted to CRC

Figure 20

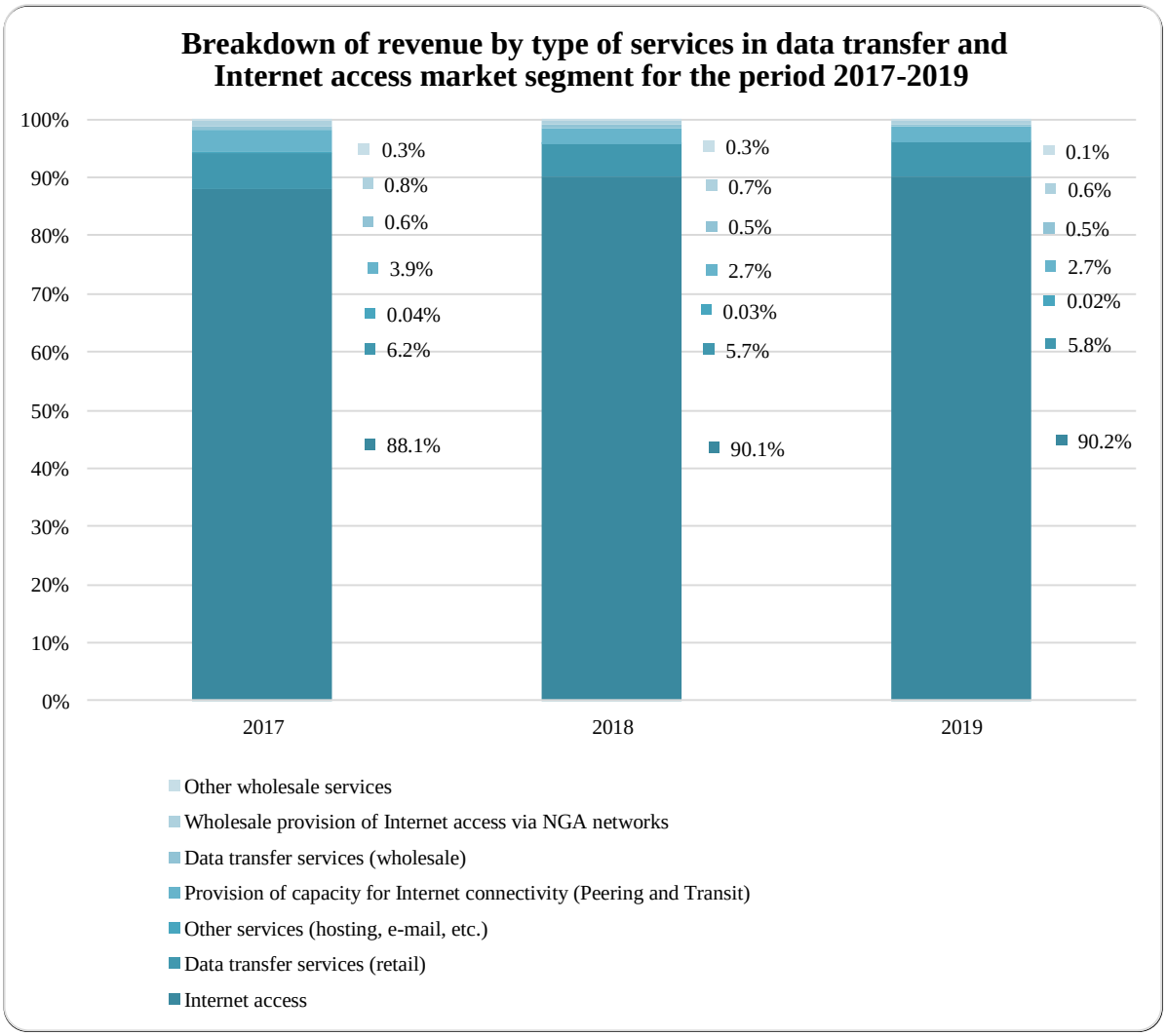
The number of subscribers using Internet access with a minimum speed of 30 Mbps continued to increase in 2019, which is the result of the growing number of subscribers using fibre connectivity and DOCSIS 3.0 cable access protocol. At the end of 2019, 76.3% of subscribers used a minimum speed of 30 Mbps, registering an increase of 10 percentage points compared to 2017. More than half (54.9%) of the subscribers of fixed broadband access used high-speed broadband access with international download speed from 30 Mbps to 99.99 Mbps, as their share increased by 3.2 percentage points in the period 2017-2019. The highest growth was observed in the share of users of ultra-high-speed access (over 100 Mbps), which rose by nearly 7 percentage points over the period under review, also registering the highest growth compared to 2018 - by 3.4 percentage points. The number of broadband access subscribers using speed of over 100 Mbps also grew in absolute value. Compared to 2018, 25.6% more subscribers used ultra-high-speed access (over 100 Mbps). Over the one-year period, an increase of 7.1% was observed in the number of subscribers using speed from 30 to 99.99 Mbps, while subscribers using speed up to 29.99 Mbps decreased by nearly 10%.

Revenue from data transfer and Internet access

In 2019, compared to 2018, revenue[40] from the data transfer and Internet access segment reached BGN 998.067 million. The registered increase of 12.5% compared to the 2018 data was mainly due to the increased revenue from retail services which reported a growth of 12.8%. The total amount of revenue from retail services was BGN 958.509 million, of which BGN 900.751 million was revenue from Internet access services. Revenue from wholesale services amounted to

[40] 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);

BGN 39.557 million, registering a growth for the first year since 2016. This growth was by 6.4% compared to 2018. Figure 21 presents the breakdown of revenue generated for the period 2017-2019.[41]



Source: Data submitted to CRC

Figure 21

In 2019, no significant changes were observed in the total structure of revenue in the segment and it remained stable. The highest share (90.2%) continued to be held by revenue from retail Internet access services which registered a growth of 12.7% in absolute value compared to 2018. This growth was mainly the result of the increase of total revenue from the provision of mobile Internet access compared to the year before, which was by 16.8%. A growth of nearly 30% versus 2018 was reported in revenue from bundled services including mobile Internet access, while these revenue grew by over 100% for the period 2017-2019. The total revenue from the provision of fixed Internet access also reported a growth (4.8%), albeit significantly lower than the growth in revenue from the provision of mobile Internet access. This was mainly due to the increase in revenue from a standalone service[42] by 6.7%, at the expense of the provision of bundled services with fixed Internet access included which dropped by 1.3% versus 2018.

[41] The data for 2018 have been updated.

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

Summary

The trends observed in the data transfer and Internet access segment in recent years were also preserved in the past year 2019. The following was reported compared to 2018:

- increase in the total number of subscribers of fixed and mobile Internet access which is due to the growth in the number of subscribers with standalone fixed Internet access, as well as the number of subscribers using bundled services with mobile Internet access included;
- continued increase in the share of LTE subscribers in the total number of mobile Internet subscribers due to the increasing coverage of LTE networks, both by territory and by population;
- increase in the share of subscribers using fixed high-speed and ultra-high-speed access within the total number of subscribers using fixed Internet access, due the continuing migration to NGA networks;
- increase in the total volume of revenue in the segment due to the increased revenue from Internet access and mainly due to the increased revenue from bundled services with mobile Internet access included.

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

In 2019, the volume of the "transmission and/or distribution of radio and TV programmes services" market segment reached BGN 424.531 million, registering a growth of 5.1% since 2018.

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 22 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 2019

Service	Number of undertakings providing the service in 2019	Number of subscribers/users as of 31.12.2019		Revenue (in millions BGN, excl. VAT)	
		Total [1]	incl. bundled services subscribers	Total [2]	incl. from bundled services
1. Retail distribution of radio and TV programmes[3]	**247**	**2,029,464**	**660,289**	**391.353**	**128.472**
1.1. Cable TV[4]	215	552,044	340,936	110.324	66.336
1.2. Satellite TV[4]	3	963,163	103,132	175.433	20.066
1.3. IPTV[4]	43	514,257	216,221	105.597	42.070
2. Terrestrial broadcasting of radio and TV programmes	**62**	///	///	///	///
3. Provision of transmission/distribution of radio and TV programmes	**12**	**197**	**///**	**33.178**	///
3.1. Transmission of radio and TV programmes services	5	79	///	4.717	///
3.2. Distribution of radio and TV programmes services, including wholesale TV service (via IPTV and/or DVB-C)	9	118	///	28.461	///
Total	///	///	///	**424.531**	///

[1] Including bundled services subscribers.

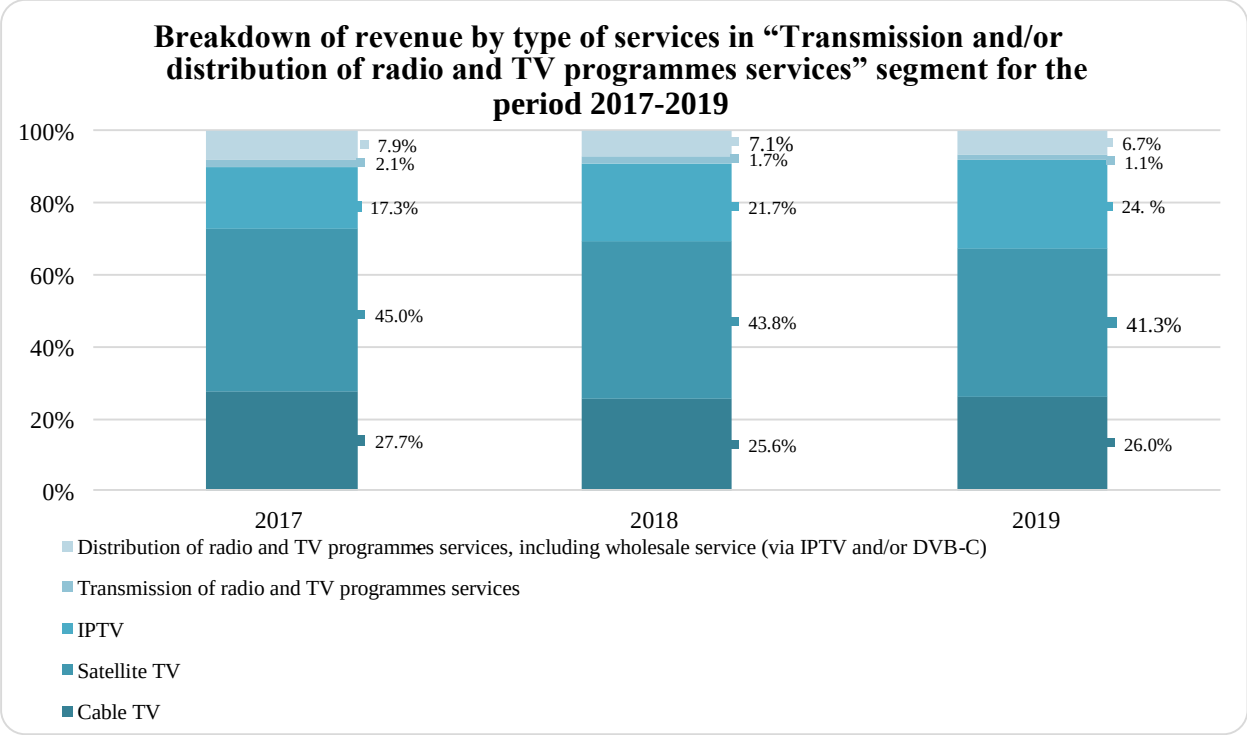
[2] Including revenue from bundled services.

[3] Data on the total number of subscribers and revenue from retail distribution of radio and TV programmes services are valid as oft 30.04.2020 based on information received from 90,9% of the registered undertakings.

[4] Revenue from bundled services by TV platforms is estimated based on the breakdown of bundled services subscribers by platforms.

Source: Data submitted to CRC

According to the data submitted by the undertakings, the growth in total revenue from the segment in 2019 was the result of an increase in revenue from two services - IPTV (by 20.2%) and cable TV (by 6.8%) over the one-year period under review. Revenue from all other services in the segment recorded a decline versus 2018. An insignificant drop was observed in revenue from satellite television - by 0.9%, as well as in revenue from wholesale distribution of radio and TV programmes services, including wholesale service via IPTV and/or DVB-C – by 1.3% compared to the previous reporting period. For yet another year, the most significant drop since 2018 was recorded in the revenue from wholesale transmission of radio and TV programmes services - 31%. This is due to the registered decline of 32.5% in revenue from wholesale satellite transmission, which occupy a significant share in the total revenue from wholesale transmission of radio and TV programmes services.



Source: Data submitted to CRC

Figure 22

In 2019, the largest share in the total volume of the segment (92.2%) continued to be occupied by revenue from the provision of retail radio and TV programmes services (Figure 22): 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 2.5 percentage points in relative terms for a one-year period to 41.3%, followed by the share of revenue from cable television which remained almost unchanged compared to 2018 and amounted to 26%. The share of revenue from the provision of IP television once again registered the most significant growth in relative terms compared to the year before - 3.2 percentage points, reaching 24.9% of the total segment volume and approaching the share of revenue from cable TV. The smallest share was held by revenue from wholesale services - 6.7% from distribution of radio and TV programmes services, including wholesale service via IPTV and/or DVB-C, and 1.1% 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 2.4% to 247[43] in 2019 (Table 11), as the observed downward trend reported in the last several years continued.

As of 31.12.2019, the total number of undertakings registered at CRC for the provision of cable television was 299, as the number of undertakings that actually provided this service was 215 (by 14 less than in 2018). For several years now, there has been a trend towards expansion of the activity of cable operators, which started offering IPTV to their subscribers, as the number of undertakings offering both cable TV and IPTV at the end of 2019 amounting to 11, half of which are among the largest 10 undertakings. Another 8 have fully reoriented their activity from provision of cable TV in 2018 to IPTV in 2019.

As of 31.12.2019, the undertakings that provided satellite television in Bulgaria remained the same compared to the previous years: Bulsatcom, BTC and A1.

As of 31.12.2019, 134 undertakings were registered for their intention to provide IPTV, as the number of those that actually provided this service grew by eleven to reach 43 for a one-year period. Another 8 declared their intention to start offering the service in 2020.

The table below presents the shares of the first three undertakings, calculated based on the number of subscribers and the revenue from the provision of retail television services, including the part of revenue from bundled services with television included, for the period 2018-2019.

Table 12

Market shares of undertakings providing retail pay TV for the period 2018-2019

Undertaking	2018		2019	
	Share based on subscribers	Share based on revenue	Share based on subscribers	Share based on revenue
BULSATCOM EAD	39.1%	39.9%	36.3%	36.7%
A1 BULGARIA EAD	24.1%	24.9%	25.0%	28.5%
BTC	23.1%	21.4%	24.1%	20.7%
All other	13.6%	13.8%	14.6%	14.1%

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 2019 as well. Notwithstanding the reported drop of 2.8 points in the share based on number of subscribers and 3.2 percentage points based on revenue, Bulsatcom continued to hold the highest share. The second position was held by A1. The share of the undertaking based on number of subscribers increased by 0.9 percentage points and based on revenue - by 3.6 percentage points from the previous year, covering 25% of subscribers and 28.5% of revenue generated from the provision of pay TV in 2019, respectively. Unlike the previous year, when there was a decline in the shares of the third largest undertaking in this market segment, BTC, a positive change in the share based on number of subscribers (by 1 percentage point) was observed in 2019, covering 24.1% of pay TV subscribers. However, the share based on revenue continued to decrease, although insignificantly, compared to the previous year - by 0.7 percentage points - and arrived at 20.7%. The observed decline in the share of Bulsatcom based on number of subscribers affects negatively the aggregate market share of the first three

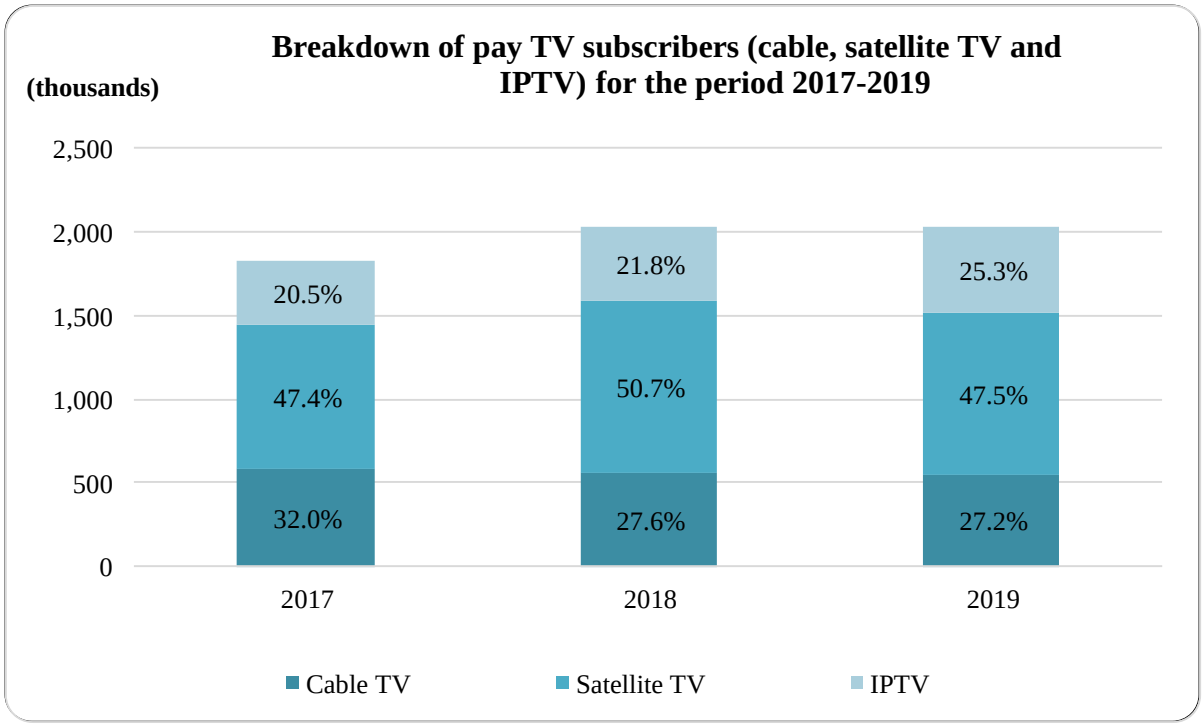
[43] Including undertakings that notified CRC for suspension of their activity in 2019 and declared revenue during the year.

undertakings, with a decline of 1 percentage point 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 31.12.2019, the number of retail pay TV subscribers remained almost unchanged compared to the year before, reaching 2.03 million subscribers,[44] as this indicator registered an insignificant growth of 0.1% compared to the end of 2018.

The figure below presents the shares of subscribers by platforms in the total number of pay TV subscribers for the period 2017-2019.



Source: Data submitted to CRC

Figure 23

Increase in the number of subscribers and in their share in the total number of pay TV subscribers in 2019 was recorded only for IPTV. The number of IPTV subscribers grew at almost the same rate as the previous one-year period – by 16.6%, but its share rose significantly – by 3.6 percentage points, reaching 25.3% as of 31.12.2019. The presence of 12 new undertakings which had declared subscribers by the end of 2019, as well as the registered increase in the number of subscribers by 83% of 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 2019 was mainly at the expense of a fall in the share of satellite TV subscribers, down by 3.2 percentage points over the one-year period, with the indicator's value returning to its 2017 levels. Nevertheless, as of 31.12.2019, satellite TV subscribers continued to occupy the largest share, covering almost half of the total number of pay TV subscribers in the country - 47.5% (Figure 23). In absolute terms, the number of subscribers of satellite television fell by 6.3% compared to 31.12.2018.

The downward trend in the number of cable TV subscribers was preserved, with a drop of 1.2% in the current reporting period, while their share in the total number of pay TV subscribers decreased slightly by only 0.4 percentage points to 27.2%. The difference between the number of

[44] The data on the number of subscribers have been assessed. Including subscribers of bundled services who amounted to 660,289 as of 31.12.2019.

IPTV and cable TV subscribers is minimal already, which is evident from the similarity between the shares of the two platforms in respect of the total number of pay TV subscribers, as presented in Figure 23.

For the period considered, the penetration[45] of pay TV among households in Bulgaria remained at the same level as in the previous one-year period. As of 31.12.2019, there was an increase 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 0.2 and 2.1 percentage points, respectively, versus 2018. IPTV penetration continued to grow, reaching 17.1% at the end of 2019 - an increase of 2.4 percentage points compared to the previous year (Figure 24). There was also a slight increase in the penetration of pay TV among the Bulgarian population,[46] reaching 29.2% in 2019 - up by 0.2 percentage points compared to 2018.

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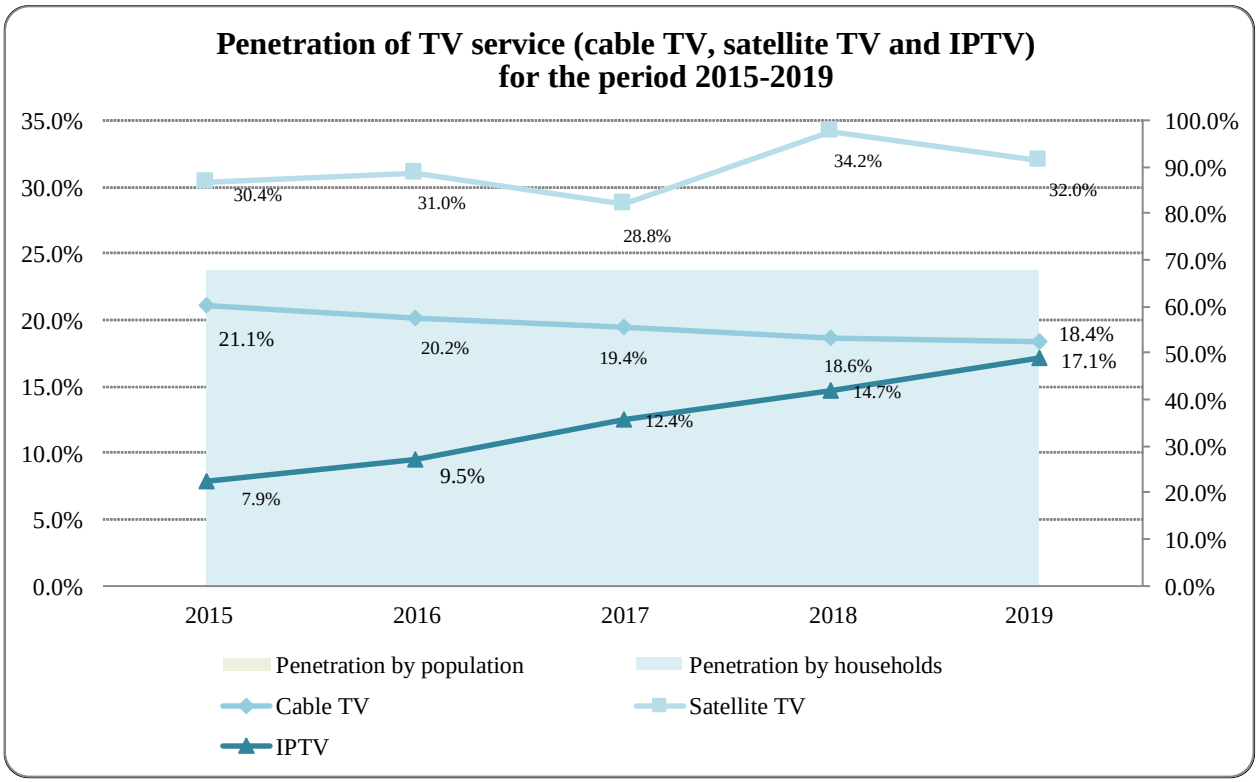


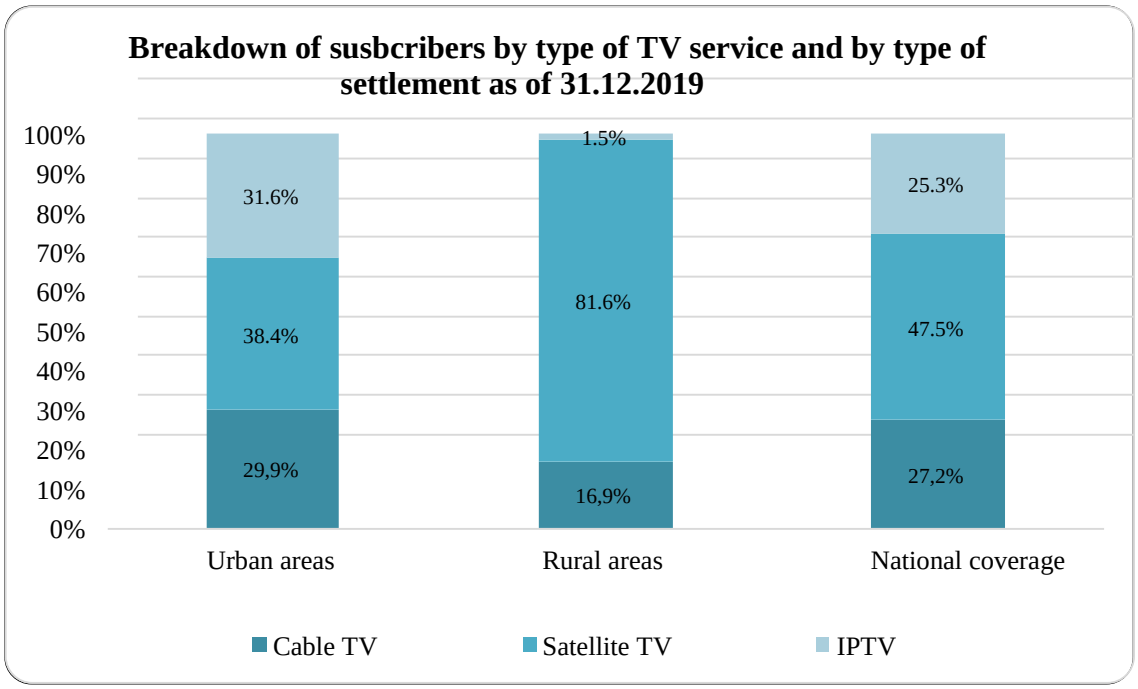
Source: Data submitted to CRC

Figure 24

Figure 25 displays the breakdown of subscribers of pay TV according to the settlement where they used this service as of 31.12.2019.

[45]This indicator was calculated as the ratio between the number of subscribers of pay TV as of 31.12.2019 and the number of households according to the last official census carried out by NSI in 2011 (3,005,589 - ordinary households).

[46] This indicator was calculated as the ratio between the total number of subscribers of pay TV 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)



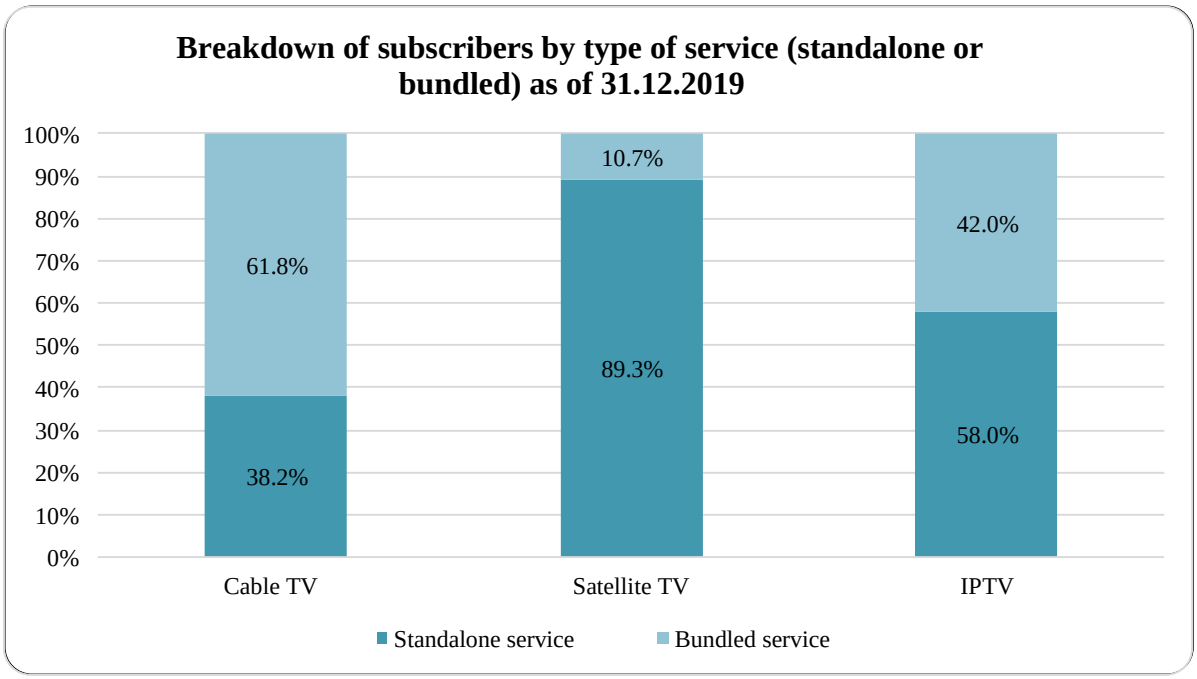
Source: Data submitted to CRC

Figure 25

For yet another year, the share of satellite TV subscribers in rural areas was several times as much as the shares of the other two platforms. However, unlike the previous 3 years, its share decreased by 2.8 percentage points over the one-year period, at the expense of the share of cable TV subscribers (despite their reduction in absolute terms by 2.9%) and IPTV. As a result of the launch of IPTV in 68 new rural areas and the reported increase in the subscribers of this platform in another 45 rural areas compared to 2018, the number of IPTV subscribers in rural areas almost doubled by the end of 2019, and this was also reflected in its share which more than doubled to reach 1.5% over the period considered.

The subscribers of all three platforms in urban areas have relatively similar shares, with the share of IPTV subscribers outstripping that of cable TV subscribers for the first year, accounting for 31.6% of the total number of pay TV subscribers in urban areas. The share of cable TV subscribers was down by 1.7 percentage points to 29.9%, while that of satellite TV subscribers dropped by 1.4 percentage points to 38.4%, in line with the general decline observed at national level (Figure 25).

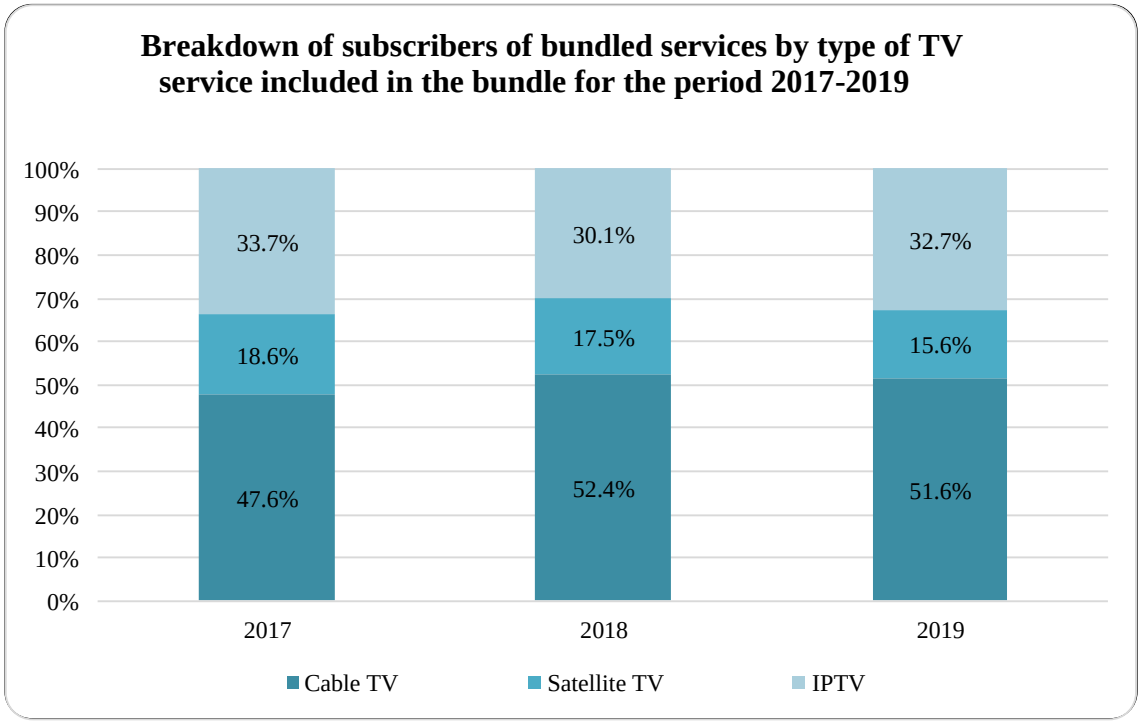
The number of subscribers of bundled services with television included registered an insignificant increase in 2019 compared to the year before - by 1.1%, to arrive at 33% of the total number of subscribers of pay TV. The figure below shows the share of subscribers of bundled services with television included in the total number of subscribers distributed by platforms, as of 31.12.2019.



Source: Data submitted to CRC

Figure 26

No significant changes in the structure of subscribers by type of service being consumed were observed over the period under review. Compared to the end of 2018, the shares of bundled services subscribers, with satellite and IPTV included, dropped by 0.4 and 2.5 percentage points to reach 10.7% and 42%, respectively, of the total number of subscribers of the respective platform as of 31.12.2019 (Figure 26). For the same period, the share of subscribers of bundled services with cable television included increased by 0.6 percentage points, reaching 61.8%.



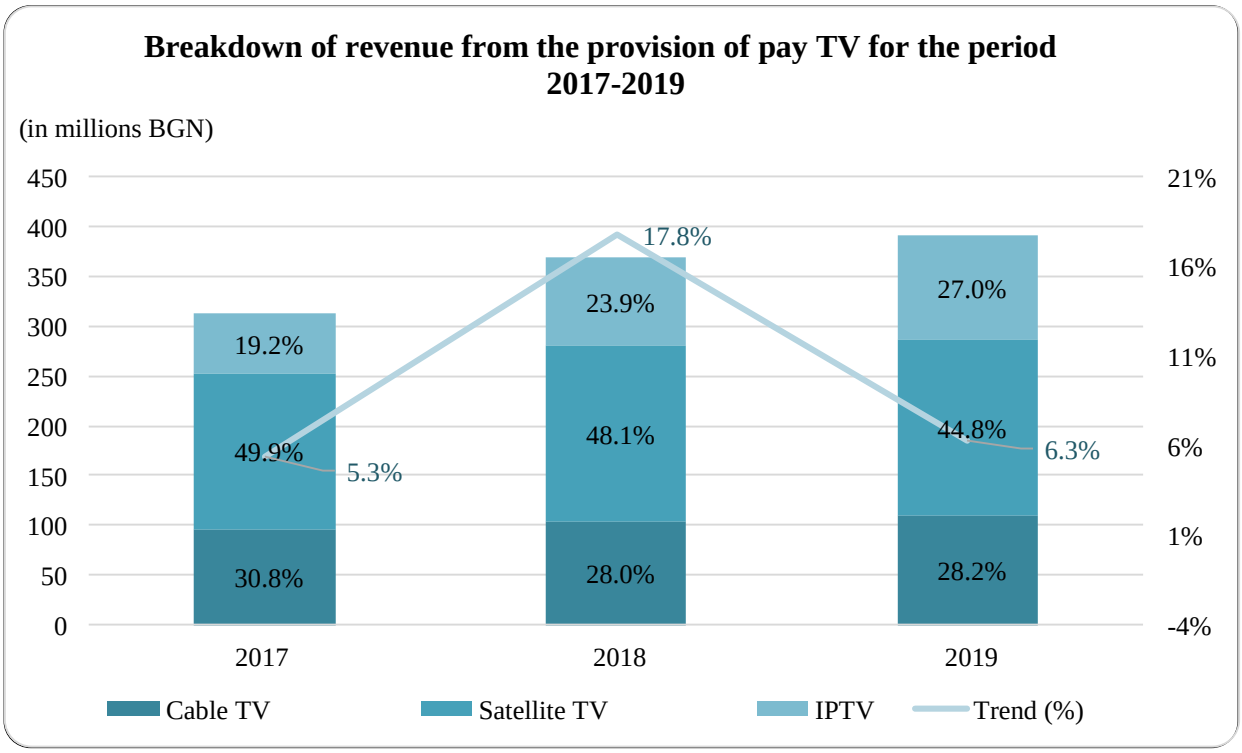
Source: Data submitted to CRC

Figure 27

In 2019, the share of subscribers of bundled services with cable TV included covered more than half of the total number of subscribers of bundled services with television included. Over the one-year period, it fell by 0.7 percentage points down to 51.6% as of 31.12.2019 (Figure 27). The number of bundled services subscribers with satellite television included continued to decline. Compared to 2018, they decreased by 10% (or by 11.3 thousand subscribers, due to the declared decline in the number of bundled services subscribers with satellite television included of two of the three undertakings providing services through this platform), whereas their share in the total number of bundled services subscribers with television included decreased by 1.9 percentage points down to 15.6%. At the end of 2019, compared to the end of 2018, a growth was registered only in the number of bundled services subscribers with IPTV included – by 10%, which had a positive effect on its share in the total number year-on-year, up by 2.6 percentage points to 32.7%.

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 391.353 million in 2019, up by 6.3% compared to 2018 (Figure 28). 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, estimated based on the breakdown of bundled services subscribers with television included, by platforms.*

Source: Data submitted to CRC

Figure 28

Revenue from two of the television platforms registered a growth in 2019 versus the year before, as the most significant growth was reported in revenue from IPTV which increased by 20.2% for a one-year period, and their share in the total volume of the retail market segment grew by 3.1 percentage points to arrive at 27%. A growth in absolute value was also reported in revenue from the provision of cable television - by 6.8% versus 2018, as their share in the total volume of the market segment remained almost unchanged. A decline was observed both in absolute and relative terms only in respect of revenue from satellite TV. Over the one-year period, the revenue

generated was by 0.9% less than the year before, and its share in the total volume of the market segment dropped by 3.3 percentage points, yet it remained the highest - 44.8%.

The share of revenue from the provision of bundled services with television included remained unchanged since the year before - 33% of the total volume of the retail segment. In terms of revenue generated from a standalone service, the revenue from IPTV and cable television increased, to reach 23.1% and 9.2%, respectively, in the past year. There is no significant change in revenue from standalone satellite TV – it fell by 0.4% compared to the previous year.

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

In 2019, the total number of undertakings providing wholesale transmission and/or distribution of radio and television programmes services, including via IPTV and/or DVB-C, was 12.

A detailed information on the number of undertakings which in 2019 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 29 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 2019

Types of wholesale transmission and distribution of radio and TV programmes service	Number of undertakings providing the service in 2019	Number of subscribers/ users of the service as of 31.12.2019	Revenue from the service in 2019 (in millions BGN, excl. VAT)
1.1. Transmission of radio and TV programmes services, including:	**5**	**79**	**4.717**
1.1.1. Terrestrial radio-relay transmission	1	///	
1.1.2. Satellite transmission	4	24	4.319
1.1.3. Other types of transmission	1	///	
1.2. Distribution of radio and TV programmes services, including wholesale IPTV service provided to other undertakings, including:	**7**	**83**	**26.288**
1.2.1. Terrestrial broadcasting	6	46	21.085
1.2.2. Satellite broadcasting	2	///	
1.3. Wholesale TV service (via IPTV and/or DVB-C) provided to other undertakings for resale purposes	2		
Total	**12**	**197**	**33.178**

Source: Data submitted to CRC

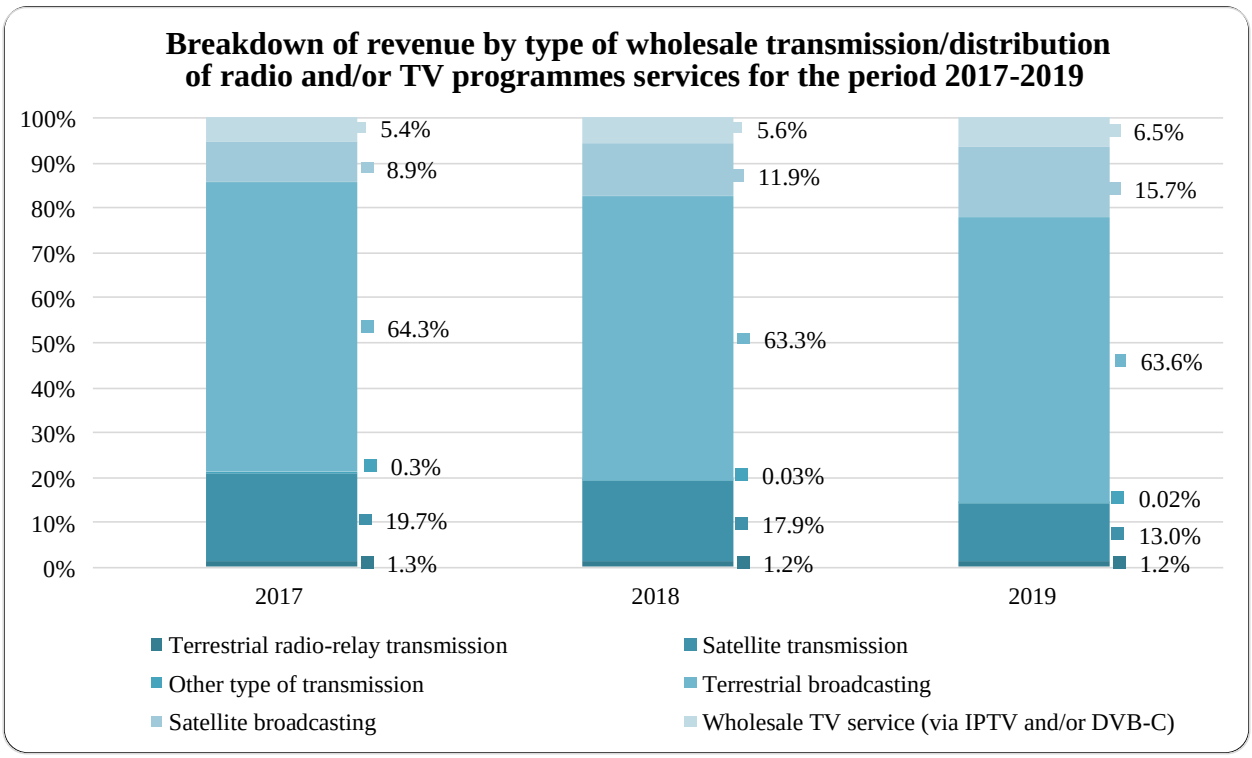
In 2019, the number of undertakings providing transmission of radio and TV programmes services was 5, down by one compared to the active undertakings in 2018. The number of users of these services, however, rose by 21.5% since the year before.

Compared to 2018, the number of undertakings providing distribution of radio and TV programmes services increased by one to arrive at 7, while the subscribers of this type of services grew by over 12%. Wholesale television services via IPTV and/or DVB-C in 2019 continued to be provided by two undertakings only.[47]

Revenue from the provision of the wholesale transmission and/or distribution of radio and TV programmes services amounted to BGN 33.178 million, registering a decline of 7% compared to the previous year. This decline is the result of a negative change reported in both the revenue

[47] Mitko.Com EOOD and Viora Interaktiv OOD

from transmission of radio and/or TV programmes services – 31%, and the revenue from distribution of radio and TV programmes – 2% compared to the previous year. A growth was recorded only for the third main category of wholesale TV services - those provided via IPTV and/or DVB-C. Over the year, 8.6% more revenues were generated, but they could not make up for the overall fall in revenue from the wholesale segment due to the still low share of these services in the volume of revenue from the provision of wholesale television services (Figure 29).



Source: Data submitted to CRC

Figure 29

The data in Figure 29 show that in 2019 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 – 63.6%, while the smallest share (0.02%) 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 2019, 61 undertakings were registered at CRC to provide services for terrestrial broadcasting of radio programmes, as 56 of these undertakings were active. As of 31.12.2019, two undertakings remained with national coverage – Bulgarian National Radio and Darik Radio AD.

Summary

In 2019, the following changes were observed in the “transmission and/or distribution of radio and TV programmes services" segment versus 2018:

- Increase in the total volume of revenue from the segment, as a result of the reported growth in revenue from retail distribution of cable TV and IPTV;
- Insignificant growth 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;
- Decrease in revenue from wholesale transmission and/or distribution of radio and TV programmes services and increase in the number of subscribers of these services.

6. Prospects for development of the Bulgarian electronic communications market

The Bulgarian electronic communications market continued its upward development in the past year 2019 as well. Driven by the ever-increasing demands of consumers, undertakings providing electronic communications services continue 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, undertakings expand their services by offering comprehensive and innovative solutions to consumers, going beyond traditional communication services such as smart home, digital wallet, Internet of things (IoT), etc. The deployment of 5G networks is also expected to boost the development of digital services offered by undertakings. The trends observed in 2019, which are expected to continue in the following year as well, are as follows:

- Strong competition among the major undertakings providing mobile telephony service in the country, increase in the amount of total consumption of mobile telephony service, and growth in the share of traffic to other mobile networks in the country (off net);
- 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 and because of the increasing coverage of these networks;
- Increase in the number of subscribers using fixed high-speed and ultra-high-speed access due to the ongoing migration to NGA networks providing services with enhanced performance, increased service quality and symmetry of download and upload speeds;
- Reduction in revenue from fixed retail telephony service, fall in the total number of fixed telephone lines and in the total consumption of the service, with a growth registered only in the calls to mobile networks;
- Maintaining the upward development of IPTV in terms of subscribers and revenue, and increase in the number of providers providing TV services through more than one platform, which will affect the dynamics of the segment and stimulate competition;
- Increase in revenue generated from the provision of the leased lines service and increase in the number of alternative lines (at the expense of traditional lines) provided under similar parameters, but at substantially lower prices;
- 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.

7. Provision of the universal service

7.1. Degree of satisfaction from the universal service provision

As at 31.12.2019, the undertaking obliged to provide the universal service,[48] BTC, ensured 81% coverage measured by the number of territorial units. No decline in coverage by number of territorial units was recorded in comparison to 2018. The above coverage includes settlements and settlement formations (resorts, etc.), which are included in the Unified Classification of Administrative-Territorial and Territorial Units[49].

In 2019, the telephone density by households[50] registered a decline of 3 percentage points

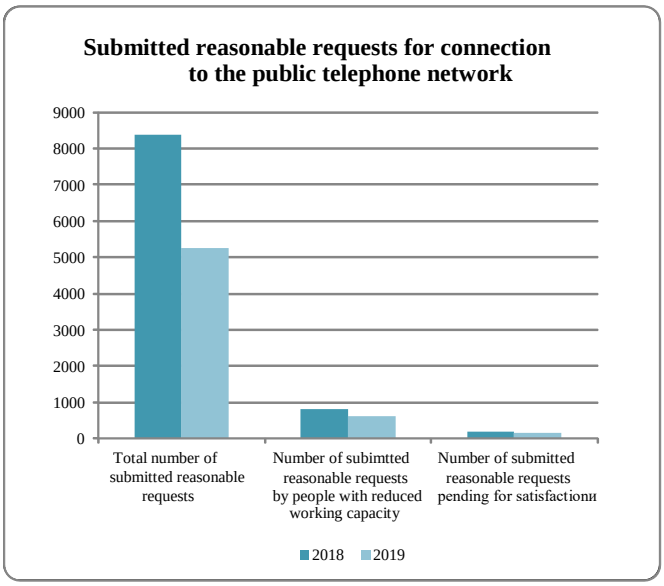
[48] Pursuant to §7 of the Law on Electronic Communications.
[49] https://www.ekatte.com/;
[50] The ”density by households“ indicator is measured by dividing the total number of residential lines by the number of households in the country (based on data from the last official census carried out by NSI in 2011).

since the year before, as a result of the steady downward trend in the number of residential subscribers of BTC. As at 31.12.2019, BTC ensured access and provided public telephony services to nearly 14% less residential subscribers compared to the previous year.

7.2. Analysis of the provision of the universal service

7.2.1. Access to and provision of the universal service

As is evident from Figure 30 below, at the end of 2019, the total number of submitted reasonable requests for connection decreased by 37% 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 for connection were almost 23% less than in 2018. This confirms the steady downward trend in the interest in services within the scope of the universal service.



Source: Data submitted to CRC

Figure 30

In 2019, the number of requests for connection awaiting approval was by 26% 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 25%, as the main part of this share (81%) 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 share of traffic generated to them was preserved in 2019 and amounted to 0.08% of the total volume of traffic to national numbers.

7.2.2. Access to public payphones

The steady trend of reduction in the number of public payphones owned by BTC continued in 2019 as well, as their number dropped by 4.3% versus 2018. As in 2018, in 2019, 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.[51] In the remaining categories, the criteria for a sufficient number of public payphones were not met.

[51] 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[52] 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 2019 has been fulfilled.

Table 14

Population	Number of municipalities	Sufficient number of public payphones
below 500 residents	1,979	1,979
from 500 to 1,500 residents	997	1,278
over 1,500 residents	451	3,590
Total:	3,427	6,847

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 6.9% on a one-year basis. As at 31.12.2019, these public payphones made up 59.4% 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 2019, no change in the quality parameter of the public payphones provided was observed as compared to the year before, 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,[53] the undertaking obligated to provide the universal service must issue at least one telephone directory in printed and/or electronic form. In 2019, CRC once again approved BTC's proposal for the release of a public telephone directory for 2019 in an electronic form. The telephone directory is available at the undertaking's official website.[54] 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.

In 2019, a considerable drop of 27.8% was observed in the number of calls to enquiry services made by end-users as well as a 7.3% decline in the number of free-of-charge calls to emergency numbers.

[52] 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

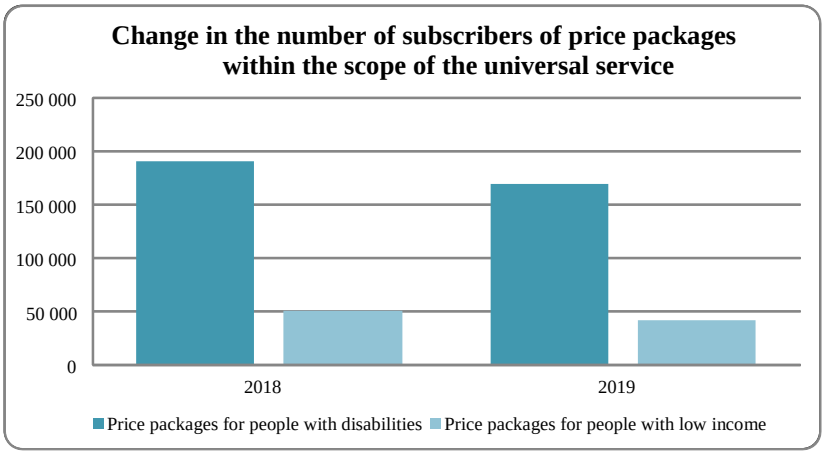
[53] Ordinance No 5 of 13.12.2007 on the terms and procedure for release of telephone directories, including working with database, their transfer and use, and for provision of telephone enquiry services.

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

7.2.4. Affordability of tariffs of the universal service

In 2019, in fulfilment of its obligation to provide price packages within the scope of the universal service at affordable[55] 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 at 31.12.2019, the subscribers of price packages within the scope of the universal service decreased by 12.7% compared to those in 2018. The chart below displays the trend in the number of subscribers of price packages within the scope of the universal service for 2018 and 2019.



Source: Estimates based on data submitted to CRC

Figure 31

The number of subscribers of price packages for people with low income and price packages for people with disabilities decreased in 2019 compared to the previous year by 17.4% and 11.5%, 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 31 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.

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.[56]

According to the data submitted by BTC, in 2019, the undertaking reported fulfilment of all target values.

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

In 2019, BTC did not submit to CRC a request for compensation of the unfair burden from the universal service provision within the statutory deadline - 30.06.2019. Thus, during the last year, the amount of net costs was not calculated and it was not established whether these

[55] 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

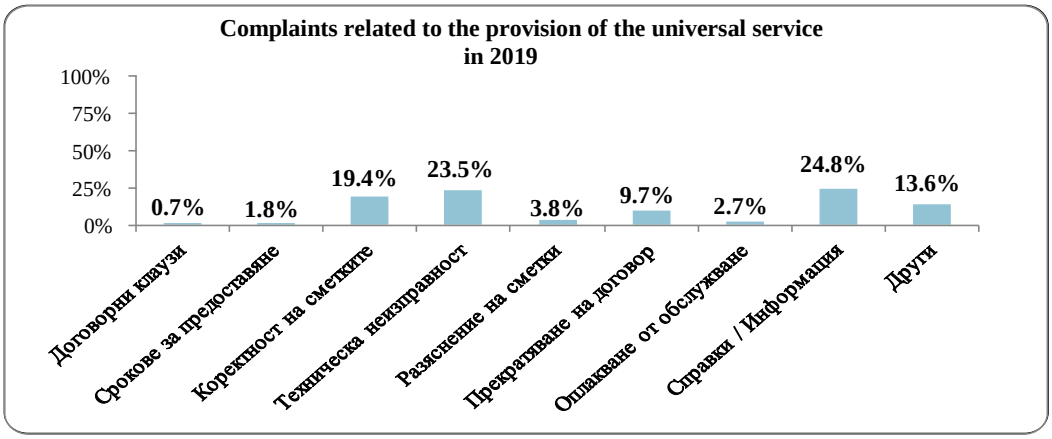
[56] http://www.crc.bg/section.php?id=904&lang=bg

expenditures represent an unfair burden for the incumbent undertaking. Taking into account the absence of a request for compensation of the unfair burden from the universal service provision, the activity of the Fund for compensation of the universal service did not start and no funds were deposited in it.

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

In 2019, the number of complaints filed with BTC regarding the provision of the universal service was by 41.1% less than in 2018. 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 32.



Source: Data submitted to CRC

Figure 32

During the year, the percentage of complaints regarding technical failures was 23.5% of the total number of complaints, registering a growth of 1.1% compared to 2018. The share of complaints regarding contract termination was 9.7% of the total number of complaints, not registering any change as compared to the same indicator in the previous year. There was a decline of over 74% in the number of complaints filed as a result of violation of contractual clauses.

In 2019, the percentage of unsatisfied complaints amounted to 61% of the total number of complaints filed, registering a decline of 10 percentage points compared to 2018.

7.6. Prospects for development of the universal service

The data show a general decline in the interest in the services within the scope of the universal service, as a result of the decreasing demand for services at a fixed location. It should be noted, however, that despite the persistent downward trend, price packages within the scope of the universal service remain essential as they provide preferential conditions for vulnerable social groups.[58] 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.

[57] The content of the itemised bill is defined in Article 260 (3) of the LEC.

[58] 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

II. LEGAL AND REGULATORY FRAMEWORK

1. EU regulatory framework for electronic communications

At the end of 2018, Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code was promulgated, constituting an essential revision of the applicable sector regulatory framework. Pursuant to Article 124 (1) of Directive (EU) 2018/1972, Member States shall 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.

At the end of 2018, 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[59]) and the Agency for Support for BEREC (BEREC Office), amending Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009, was promulgated. This Regulation was intended to reform BEREC and its Office, as well as their powers and/or activities, and also provided for an entirely new regulation of international calls within the EU.

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 European Electronic Communications Code and will be the subject of a separate regulation. The final text of the regulation has not been adopted yet.

The preparation of the necessary amendments to the Law on Electronic Communications was launched in 2019 with a view to implementing Directive (EU) 2018/1972, which are expected to be adopted by the National Assembly in the second half of 2020.

2. Legal and regulatory framework in Bulgaria

In 2019, the Law on Electronic Communications (LEC) was amended five times, yet the changes did not lead to major amendments in the regulatory framework. Among the most important amendments to the LEC, which became effective in 2019, is the transfer of jurisdiction from the Supreme Administrative Court to the Administrative Court of Sofia District which considers any legal actions initiated against CRC's decisions, constituting individual or general administrative acts, as of 01.01.2019. Other more substantial amendments to the LEC relate to the implementation of the General Data Protection Regulation (Regulation (EU) 2016/679).

The active implementation of the Law on Electronic Communications Networks and Physical Infrastructure by CRC pursuant to Chapter 8 "Dispute Resolution" of LECNPI started in that period.

For the same period, amendments to the following CRC secondary legislative acts became effective:

- *Technical requirements for the operation of electronic communications networks from a mobile radio service (SG, no. 19 of 05.03.2019);*
- *Technical requirements for carrying out electronic communications via radio equipment from the amateur radio service (SG, no. 6 of 18 January 2019);*
- *General requirements for the provision of public electronic communications (SG, no. 10 of 1 February 2019);*
- *Technical requirements for the operation of terrestrial networks permitting provision of electronic communications services (SG, no. 75 of 24 September 2019);*
- *Technical requirements for the operation of electronic communications networks from a fixed radio service and related equipment (SG, no. 4 of 11 January 2019);*

[59] Body of European Regulators for Electronic Communications

- *Ordinance No 1 of 22 July 2010 concerning the rules for use, distribution and the procedures under primary and secondary assignment for use, reservation and withdrawal of numbers, addresses and names (SG, no. 36 of 03.05.2019);*
- *Functional specifications for implementing portability of national significant numbers in the event of change of the provider of public mobile telephony service (SG, no. 10 of 01.02.2019);*
- *Functional specifications for implementing portability of geographic numbers in the event of change of the provider of the fixed telephony service and/or change of the address within one geographic national destination code (SG, no. 10 of 01.02.2019);*
- *Functional specifications for implementing portability of non-geographic numbers in the event of change of the respective service provider (SG, no. 10 of 01.02.2019).*

3. Leading regulatory decisions of CRC in 2019

The total number of CRC decisions adopted in 2019 was 493, 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 235 of 18 June 2019 concerning the designation, analysis and assessment of the market for wholesale local access provided at a fixed location in the Republic of Bulgaria, in accordance with the EU regulatory framework (market 3a of Recommendation 2014/710/EU of 9 October 2014);*
- *Decision No 281 of 01 August 2019 adopting a draft Decree amending and supplementing the Tariff of fees collected by the Communications Regulation Commission under the Law on Electronic Communications.*

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 2019 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	42	7	1	4
Electronic communications networks for terrestrial digital broadcasting of television signals with national and local coverage	5	1	-	-
Electronic communications networks from a mobile radio service - PMR	44*	16*	30	11
Electronic communications networks from the aeronautical mobile radio service	2	2	1	-
Electronic communications network from an aeronautical mobile radio service, radiolocation and radionavigation for the air traffic control and provision of aeronavigation service of flights in the civil air space with national coverage	1	-	-	-
Terrestrial networks in frequency band 2 GHz	2	-	-	-
Electronic communications networks from the fixed satellite radio service	3	1	-	-
Electronic communications networks from the fixed radio service of the "point-to-point" type	40**	1	14	-
Authorisation for the use of individually assigned scarce resource – numbers for provision of public electronic communications	4	2	-	-
Temporary authorisations	1*	31*	1	-
TOTAL:	**144**	**61**	**47**	**15**

** The total number of provided radio frequencies for these authorisations was 182;*

*** Amendments and supplements to the technical data of a total of 3,726 radio links, including provided radio frequency spectrum for new 643 links.*

4.2. Notifications on the provision of public electronic communications

The activities related to the notifications submitted in 2019 for the provision of public electronic communications are presented in Table 16.

Table 16

Type of activity	2019 (number)
Processed notifications for provision of public electronic communications	127
Processed notifications for termination of the provision of public electronic communications	81
Issued certificates for entry in the Register	14
Undertakings entered in the Register	64
Undertakings deleted from the Register	61

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	**2019 (number)**
Authorisations for radio amateur capacity	220
HAREC certificates	22
CEPT licenses	30
Allocated call signs	254*

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

In 2019, 11 amateur radio licence exams were held with 206 examined persons in the cities of Sofia, Plovdiv, Varna and Kazanlak.

4.4. Interconnection and access

In 2019, CRC approved a proposal for amendment of Reference Interconnection Offer (RIO), submitted by BTC concerning the closure of TDM interconnection points in the cities of Pernik, Pleven, Lovech, Veliko Tarnovo, Gabrovo, Targovishte, Vratsa, Vidin, Montana, Smolyan, Haskovo, Kardzhali, Stara Zagora, Sliven, Shumen, Dobrich, Burgas, Yambol, Razgrad and Silistra. No operating interconnections between BTC and any other undertaking at the twenty TDM interconnection points mentioned, which is why they were closed down.

CRC has examined two disputes between undertakings with regard to Articles 54 and 55 of the LEC with a request for assistance in reaching an agreement.

The subject of one of the disputes was the unilateral termination of interconnection agreements. CRC held a meeting between the parties, at which an agreement was reached. The new agreements signed were then presented to CRC.

The other dispute was related to the provision of a service provided under commercial agreements, and not to a failure to fulfil the obligations provided for in the LEC or Secondary

legislation. Meetings were held with the parties to the dispute, which contributed to the resumption of negotiations between them.

At the end of the year, a request was received for the issue of binding instructionsunder Articles 54 and 56 of the LEC. It is yet to be considered.

In 2019, CRC collected data from undertakings providing electronic communications networks and services concerning the network characteristics of their networks. BEREC used the data to provide a draft BEREC guidelines on the criteria that a network is to fulfil in order to be considered a very high capacity network. As a result of CRC working together with undertakings and BEREC to clarify the characteristics of networks, the wide-spread networks in Bulgaria having fibre to the building (FTTB) and UTP/FTP cable in the building of category 5 or higher were included as very high capacity networks.

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 our daily lives, wireless communications, in particular wireless Internet access services, which are used by various connected devices such as smart phones, tablets, computers, television sets, household appliances, cars, trains, etc., are getting more and more important. All of these services require one resource. A resource that is naturally restricted by its natural characteristics – the radio frequency spectrum.

As new technologies and applications requiring high speeds emerge, there is a continuously growing consumer interest in the increasingly diverse digital services, setting even higher requirements towards the networks that are used to provide them. Meeting the growing needs of citizens requires an increasing amount of frequency resource to enable the development of high-capacity networks. Wireless communications have become an indispensable product for the society, which has increased the social importance of radio frequency spectrum availability.

The 5G technology is opening up a new phase in the digital world with the creation of new low-power and low-latency networks. These networks will provide high data transmission speeds, high-quality and reliable communication, creating new connectivity opportunities. The Commission 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 performing the activities related to the radio frequency spectrum management, CRC takes into account the Updated Electronic Communications Policy, the Updated State Policy for Radio Spectrum Planning and Allocation in the Republic of Bulgaria, and the Regulatory policy for radio frequency spectrum management for civil needs.

In the Regulatory policy for radio frequency spectrum management for civil needs, adopted in 2019, the Commission defined its main objectives, mechanisms and approaches for radio frequency spectrum management for civil needs until 2021. The main objective of the Regulatory policy is to ensure good regulatory conditions for the use of radio frequency spectrum which in turn would contribute to the development of wireless communications, including the successful implementation and development of 5G networks as well as the development of digital TV, point-to-point networks, satellite networks, programme making and special events networks, the use of short-range devices, etc.

In 2019, in fulfilment of its priorities related to the effective radio frequency spectrum management, the Commission carried out a number of activities in order to promote the introduction of new technologies and services on the market.

At the end of 2018, by Decision No 887/06.12.2018 of the Council of Ministers, the National Roadmap was adopted, including detailed steps for the 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 radio frequency band 470-790 MHz in the Union (National Roadmap). The main objective of this document is to provide spectrum in the 700 MHz band (frequency band 694-790 MHz, the so-called "second digital dividend") for mobile broadband networks. In implementation of one of the tasks set out in the National Roadmap, CRC amended the authorisation issued to NURTS DIGITAL EAD for the use of individually assigned scarce resource – radio frequency spectrum for the provision of public electronic communications

via two electronic communications networks for terrestrial digital broadcasting with national coverage. In order to free frequency resource for mobile networks and ensure harmonised use of the 700 MHz band, the amendment changed the channels for 5 frequency allotments.

Public consultations on issues of public importance for the electronic communications development were conducted in the past year.

In relation to the completed process of replanning the frequency resource intended for terrestrial digital television broadcasting in the bands below 694 MHz in the Republic of Bulgaria and in order to promote competition and maximise the consumer benefit, in 2019, CRC, on its own initiative, announced a public consultation on the intention to hold competitions for the issue of two authorisations to use an individually assigned scarce resource - radio frequency spectrum for the provision of electronic communications via electronic communications network for terrestrial digital television broadcasting with national coverage. Within the public consultations period, one undertaking declared its intention to use radio frequency spectrum. As a result, CRC issued one authorisation for the use of individually assigned scarce resource – radio frequency spectrum for the provision of electronic communications via electronic communications network for terrestrial digital television broadcasting with national coverage to the BULGARIAN TELECOMMUNICATIONS COMPANY EAD.

In 2019, in the light of technological developments in the field of electronic communications and taking into account the state of the market, a comprehensive review of the Tariff of fees collected by CRC (the Tariff) was carried out. As a result of the performed study and analysis of the best European practices concerning the amount of fees for the provision and use of radio frequency spectrum, the Commission adopted a draft ministerial decree amending and supplementing the Tariff. The main objectives of the draft ministerial decree amending the Tariff are to create conditions for:

- *efficient and effective use of the radio frequency spectrum in the 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 1.5 GHz, 2.6 GHz, 3.6 GHz bands with a view to providing the conditions for the deployment of 5G networks and in the radio frequency bands intended for use by fixed satellite and mobile satellite radio services;*
- *promoting the business and the undertakings' investments in Bulgaria;*
- *encouraging the undertakings to use wider frequency bands to allow the entry of new technologies on the Bulgarian market;*
- *building networks to enable the undertakings to provide high-speed broadband services to consumers;*
- *promoting competitiveness, increasing the economic growth, developing the regions and achieving sustainable economic and social benefits from the provision of a digital single market;*
- *satisfying the needs of end-users for high-speed mobile broadband services.*

In the draft ministerial decree amending the Tariff, CRC proposed the following:

- *It determined fees for provision and use of frequency resource in the 700 MHz band, thus ensuring conditions for assignment of radio frequency spectrum from this range, and fulfilment of the obligations of Bulgaria to implement Decision (EU) 2017/899 of the European Parliament and of the Council on the use of radio frequency band 470 - 790 MHz in the Union;*[60]
- *It reduced the fees for the provision and use of resource in the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2.6 GHz and 3.6 GHz bands (excluding the annual fee in the 3.6 GHz band). It changed the manner of determining the one-off fee in the 1.5 GHz band, and the annual fee in that band was reduced. The proposals to change the fees collected in these bands aim to*

[60] In accordance with Decision (EU) 2017/899

provide the conditions for the introduction and development of 5G networks and to achieve the objectives set out in "5G for Europe: an Action Plan" of the European Commission;

- *To remove the minimum distance criterion for networks from fixed radio service of the point-to-point type (radio relay links), applied when determining the annual fees for the use of the radio frequency spectrum to match the technological trends for development of these networks and to provide conditions for access to a variety of frequency resources, including mm-waves (mmWave – 30-300 GHz);*
- *It changed the manner of determining the fees for the provision and use of resource in the bands allocated to fixed and mobile satellite radio services in order to create conditions for the development of satellite networks and the deployment of new digital satellite technologies, which play an important role in the global information infrastructure and provide a fast and easy way of communication, regardless of the distances and location of users;*
- *It reduced the fees for the provision and use of radio spectrum from the VHF networks in order to promote the development of VHF broadcasting networks and the radio business to guarantee the right of Bulgarian citizens to receive information and to allow more diverse programmes to reach a greater number of radio listeners;*
- *It changed the fees for the use of the radio spectrum by pan-European systems for the provision of mobile satellite services (MSS) in relation to the concept of setting up these systems.*
- *It changed the fees for the provision and use of resource in the 420 MHz and 450 MHz bands by professional networks from the mobile radio service - PMR/PAMR (Professional (Private) Mobile Radio/Public Access Radio) in order to comply with the technological developments of the networks from the mobile radio service and decisions of the Electronic Communications Committee on the harmonised use of radio spectrum.*

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:

- Rules for carrying out electronic communications via radio equipment using frequency spectrum which does not need to be individually assigned (the Rules);
- Technical requirements for the operation of terrestrial networks permitting provision of electronic communications services;
- Technical requirements for the operation of electronic communications networks from the mobile radio service.

With the amendment and supplement to the above regulations, the provisions of new decisions of the EC and of the Electronic Communications Committee (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.

The amendment of the Rules, which is in line with the annual update of the European Regulatory Framework for the use of radio spectrum which does not need to be individually assigned, ensures harmonised use of the frequency resource and guarantees an efficient single market throughout the Union. With these Rules, the following European Commission decisions were transposed into the Bulgarian legislation:

- *Implementing Decision (EU) 2019/785*[61] *repealing Decision 2007/131/EC,*[62] *which improves the consistency of limits and mitigation techniques between the different UWB regulations; allows for innovative solutions in the field of UWB technology; allows for the use of innovative UWB technology solutions; provides for regulatory limits; identifies mitigation techniques to ensure an efficient use of spectrum while ensuring coexistence of UWB equipment with other spectrum users.*
- *Implementing Decision (EU) 2019/1345*[63] *amending Decision 2006/771/EC*[64]*. The transposition of the Decision established conditions for the use of spectrum for new applications of short-range devices, including machine-to-machine and Internet of things applications, such as medical data acquisition devices, intelligent transport systems and road traffic safety applications. New frequency bands were assigned and conditions of use were determined for existing categories of devices and the conditions of use of already assigned bands were amended.*

The rules were updated in compliance with the new Bulgarian standards which introduce harmonised European standards, as well as in compliance with the new and updated standards of the European Telecommunications Standards Institute (ETSI).

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

- *Commission Implementing Decision (EU) 2016/687 of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union;*
- *Commission Implementing Decision (EU) 2019/235 of 24 January 2019 amending Decision 2008/411/EC as regards an update of relevant technical conditions applicable to the 3400-3800 MHz frequency band;*
- *Commission Implementing Decision (EU) 2019/784 of 14 May 2019 on harmonisation of the 24,25-27,5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services in the Union.*

By transposing the provisions of those Decisions into the Technical requirements for the operation of terrestrial networks capable of providing electronic communications services, the conditions for harmonised use of the 700 MHz, 3.6 GHz and 26 GHz bands for the deployment and development of 5G networks were provided.

In 2019, the amendment and supplement to the Technical requirements for the operation of electronic communications networks from fixed radio service and related equipment entered into force, amending the technical operating conditions of networks from fixed radio service in the 71-76 and 81-86 GHz bands.

In connection with the public consultation on a draft amendment and supplement to the National Plan for Allocation of the Radio Frequency Spectrum, following an analysis, the Commission drew up and submitted its opinion to the Ministry of Transport, Information Technology and Communications and coordinated the draft National Plan for Allocation of the Radio Frequency Spectrum.

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[61] Implementing Decision (EU) 2019/785 of 14 May 2019 on the harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union and repealing Decision 2007/131/EC.

[62] Commission Decision of 21 February 2007 on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community (OJ L 55, 23.2.2007, p. 33).

[63] Implementing Decision (EU) 2019/1345 of 2 August 2019 amending Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices

[64] Commission Decision 2006/771/EC of 9 November 2006 on harmonisation of the radio spectrum for use by short-range devices (OJ L 312, 11.11.2006, p. 66).

In 2019, the World Radiocommunication Conference (WRC-19) of the International Telecommunication Union (ITU) was held. CRC representatives participated actively both in preparing the position of the Republic of Bulgaria on the WRC-19 agenda items and in the holding of the conference sessions.

In the process of preparing for the conference, CRC prepared over 30 technical analyses of the ITU studies as well as analyses of the possibilities for implementing the proposed options for resolving the issues addressed at the WRC-19, depending on the national specificities of the Republic of Bulgaria. As a result, proposals and opinions were produced and included in the position of the Republic of Bulgaria on the WRC-19 agenda items. Representatives of CRC actively supported the successful adoption of Bulgaria's proposals for amending the Radio Regulations, concerning the national specificities of the country.

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.

Mobile radio service

In 2019, CRC issued three temporary authorisations for the use of individually assigned scarce resource – 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;
- Bulgarian Telecommunications Company 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.

In the 2.6 GHz band, three temporary authorisations for the use of individually assigned scarce resource – radio frequency spectrum - were issued respectively to:

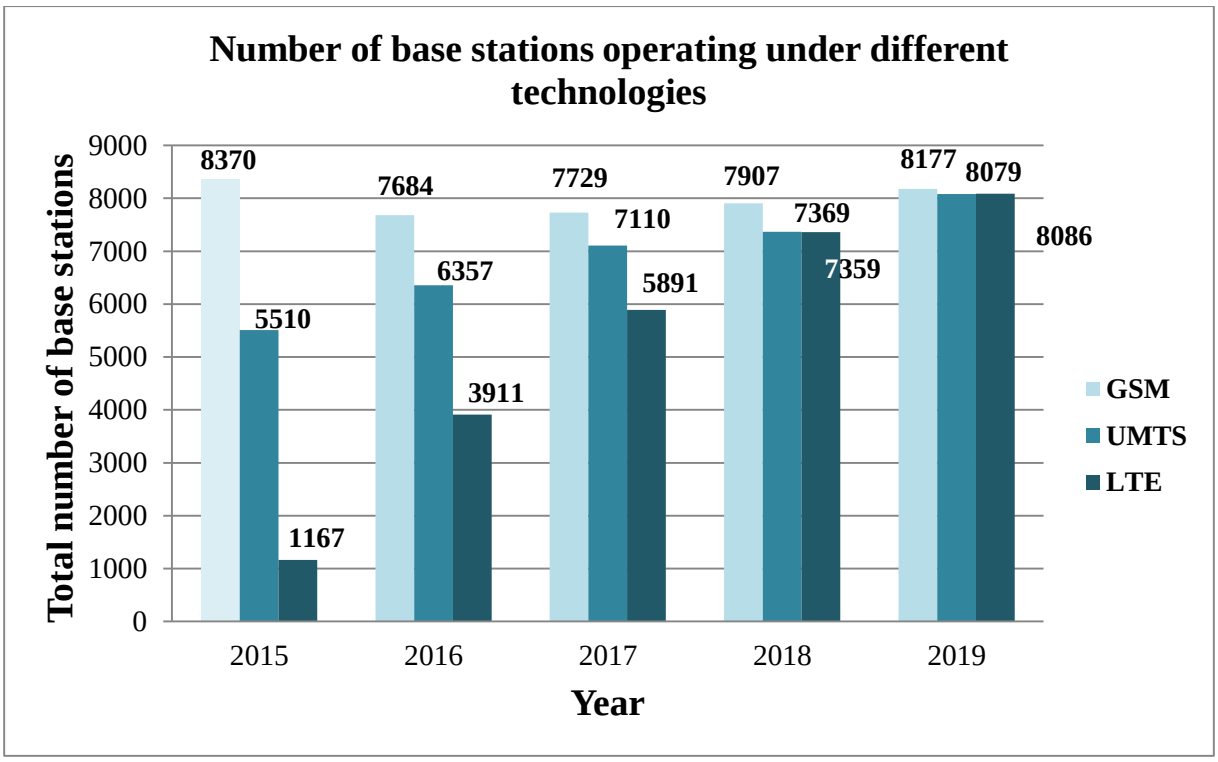
- A1 BULGARIA EAD was assigned frequency resource 2x20 MHz for the testing of new technical methods and/or technologies for the carrying out of electronic communications in the LTE network of the undertaking;
- TELENOR BULGARIA EAD was assigned frequency resource 2x20 MHz for the testing of new technical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

In 2019, CRC issued to A1 BULGARIA EAD, TELENOR BULGARIA EAD and Bulgarian Telecommunications Company EAD temporary authorisations for shared use of individually assigned scarce resource – radio frequency spectrum in the 3.6 GHz band. With the temporary authorisations, frequency resource 100 MHz was assigned for the testing of 5G. The authorisations were issued for the testing of: efficient traffic management between different technologies and frequency bands; mutual influence and interference between technical equipment operating in adjacent bands; technical methods and solutions for increasing data exchange speeds.

Based on data submitted by the undertakings, the initial results of the tests carried out show an achieved data download speed of 1.47 Gbps and a delay time of 6 ms. The practical tests of 5G included the first 5G mobile network call in Bulgaria, the first medical examination of a patient in Bulgaria to be performed through the new technology, virtual reality, video content streaming and gaming, remote mentoring sessions for amateur cooks, 360° video concert streaming, educational applications, etc.

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, 173 radio frequency channels (113 simplex and 30 duplex) were provided to undertakings, of which 41 radio frequencies were for the construction of 42 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 1,831.

A growing number of users use mobile devices to access a number of life-improving services. This is the reason for the rapid development of LTE technology and the high growth rate of LTE base stations, as is clear from the graph presented in Figure 33. Based on data[65] of the GSM Association (GSMA), in 2019, 4G was the dominant mobile technology worldwide, with over 4 billion links, representing 52% of all global links. Despite the emergence of 5G, 4G will continue to grow in the coming years, with its global links expected to reach 60% by 2023.



Source: CRC

Figure 33

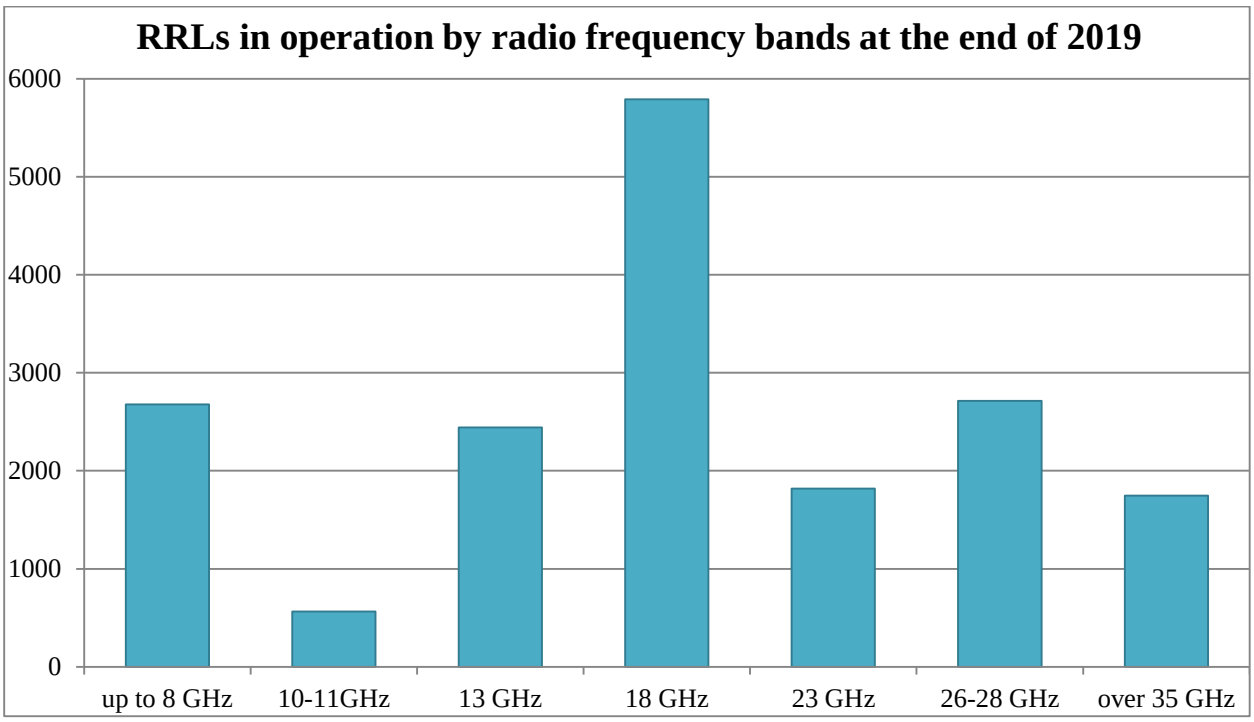
Fixed radio service

In 2019, one authorisation was issued and 40 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 3,727 one-way radio relay links (RRLs). With them, radio frequency spectrum was allocated to new 644 links, their total number reaching 17,750 versus 17,509 for 2018. The trend for deployment of high-tech digital systems using XPIC/CCDP technologies continued, as the number of RRLs using these systems reached 10,048 at the end of 2019 (an increase of 7% compared to 2018 – 9,384 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.

[65] The Mobile Economy 2020

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 5,790 (5,636 in 2018), preserving the 32% share in the total number of RRLs at the end of 2019. The construction 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 3,574. In 2019, the intensive use of the coupled radio frequency bands 71-76 GHz and 81-86 GHz for high-capacity RRLs continued, as their number reached 276 at the end of the year.

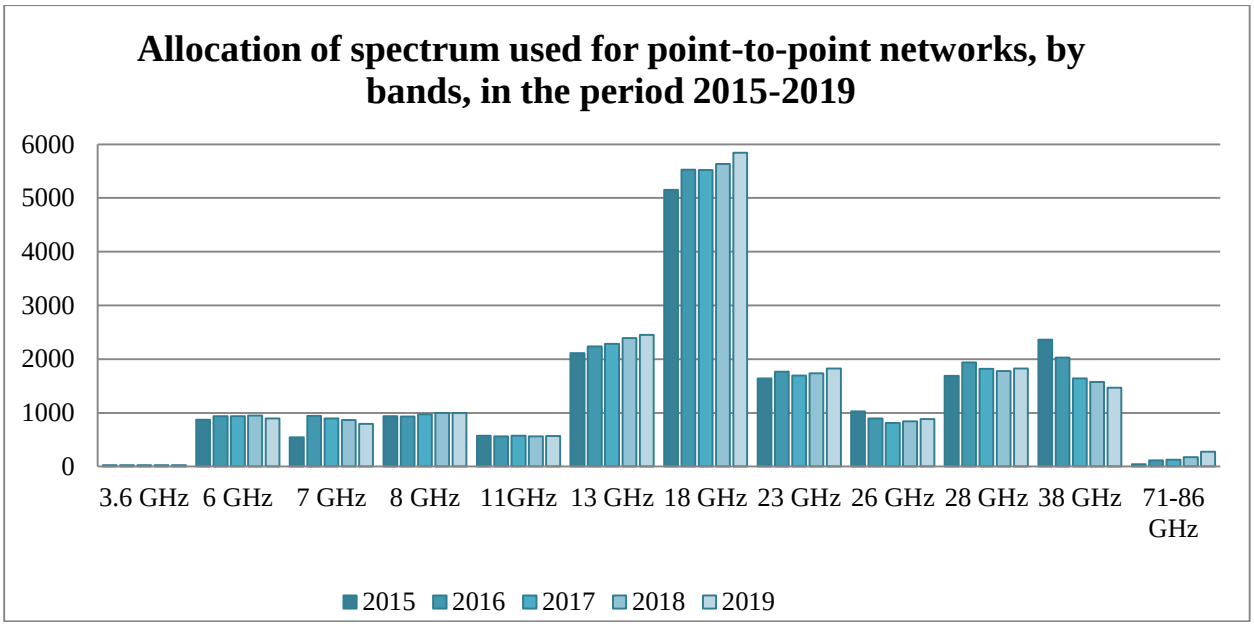
Figure 34 presents information on the number of active RRLs by radio frequency bands assigned with authorisations for the use of individually assigned scarce resource – frequency spectrum - for the provision of electronic communications via electronic communications network of the point-to-point type, at the end of 2019.



Source: CRC

Figure 34

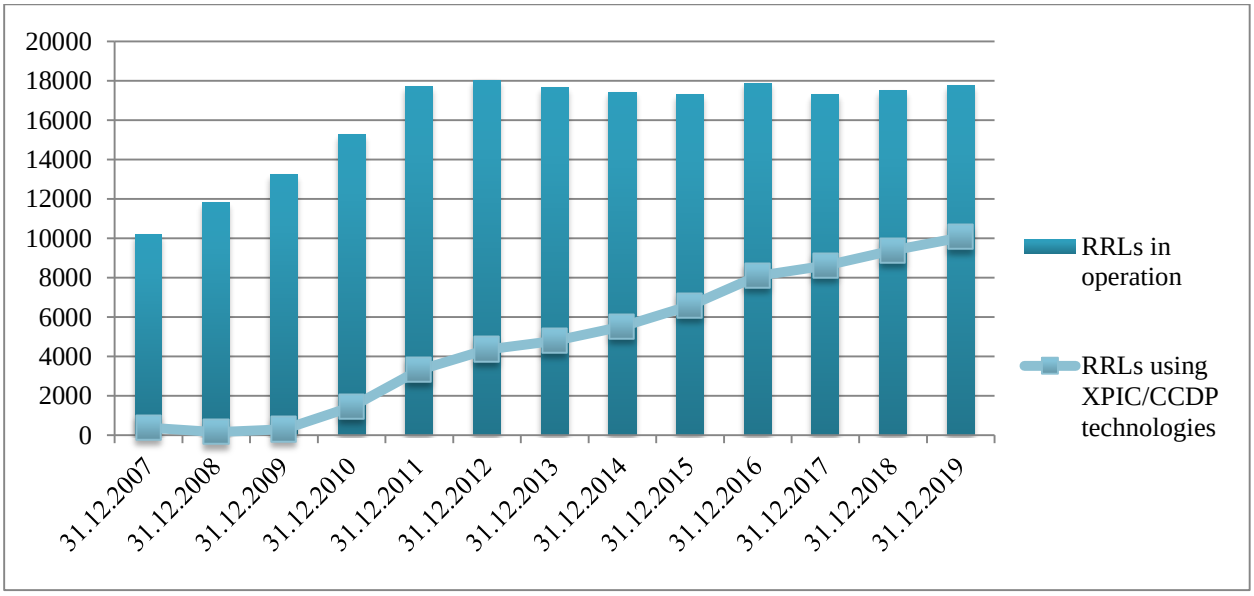
Figure 35 presents the allocation of spectrum used for point-to-point networks, by bands, in the period 2015-2019.



Source: CRC

Figure 35

Figure 36 displays the active RRLs by years, compared with the part of them which uses XPIC/CCDP technologies.



Source: CRC

Figure 36

The rapid development of 4G and higher generation electronic communications networks has led to the need to seek opportunities 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. With the amendment of the Technical requirements for the operation of electronic communications

networks from the fixed radio service and related equipment, in effect from the beginning of 2019, there was an increase in the amount of spectrum that can be allocated to the deployment of RRLs with higher capacity.

With regard to the increasing number of LTE base stations, the need for high-capacity links also increased. Over the past three 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, reaching 2,030 MHz at the end of 2019 (down by 49% compared to 2017).

Satellite radio services

In 2019, the activity related to regulation of satellite radio services continued to be focused on the coordination of the positions using geostationary orbit from the 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 interferences to the Bulgarian planned systems on position 1.2°W (BSS) and 56.02°E (FSS), as well as of the additional modification made to the planned position for BSS at 1.9º E.

WRC-19 adopted Bulgaria's proposal to replace 10 channels at 1.2°W in the AP30/30A Plan of the Radio Regulations with 10 channels at 1.9°E.

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 2019, 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 the past year, requests for international coordination of the BUL-BSS-1.9E satellite system operating in the BSS planned frequency bands under Appendices 30/30A of the Radio Regulations for geostationary orbit position 1.9E were submitted.

Due to the expiry of the nano-satellite ENDURO SAT ONE, located on non-geostationary orbit and operating within the range allocated to the amateur satellite radio service, an application was submitted for its removal from the international radio frequency register.

Broadcasting

In 2019, in relation to the request of the Council for Electronic Media (CEM) for the provision of free frequency resources for 9 settlements concerning procedures to hold a competition, technical analysis and frequency planning were performed for the assignment of frequency resources and the relevant technical parameters (admissible powers, points of broadcasting as well as other technical information). In implementation of the LEC provisions, information was provided to CEM on 10 frequency assignments in the VHF range to companies with rights under §9a of the Transitional and Final Provisions of the Law on Radio and Television (LRT) for the towns of Byala, Dobrinishte, Zlatitsa, Karlovo, Levski, Svishtov, Tryavna, Teteven and Borovets Holiday Resort, as well as 2 new frequency assignments - for the towns of Levski and Plovdiv, which also includes the necessary technical information.

As a result of an analysis carried out by the Commission on the availability of free frequency resource required for terrestrial analogue broadcasting of radio programmes for cities with more than 30,000 residents, the relevant information was provided to CEM.

A total of 71 technical characteristics of electronic communications networks for terrestrial analogue broadcasting of radio signals in the VHF band (frequency band 87.5-108.0 MHz) were examined and analysed, of which 28 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 43 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 2019, in view of the need to free the 694-790 MHz TV channels made available to NURTS DIGITAL EAD to be used by mobile networks, 21 technical characteristics were examined and analysed. As a result, two amendments were made to the authorisation issued to the undertaking for the use of individually assigned scarce resource – radio frequency spectrum for the provision of public electronic communications via two electronic communications networks for terrestrial digital broadcasting with national coverage. At the end of the year, at the request of NURTS DIGITAL EAD, the right to use radio spectrum for one of the networks was withdrawn from the authorisation, as a result of which NURTS DIGITAL EAD provides digital programmes via one network only.

Following public consultations, in 2019, CRC issued to the BULGARIAN TELECOMMUNICATIONS COMPANY EAD (BTC) authorisation for the use of individually assigned scarce resource – frequency spectrum for the provision of electronic communications via electronic communications network for terrestrial digital broadcasting on the territory of the Republic of Bulgaria.

National and international coordination

In 2019, in the Advisory Council for National Coordination and Agreement to CRC, 2,330 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 21 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 2 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:

- 71 radio frequency assignments of foreign administrations with their relevant technical parameters, in accordance with the Regional Agreement, Geneva 1984;
- 120 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);
- 1 radio frequency assignment with relevant technical parameters, according to the Regional Agreement on the use of frequencies in the LF/MF bands in Regions 1 and 3, and in the LF band in Region 1 (Geneva-1975).

The Radio Communication Bureau received applications for the addition of:

- 2 radio frequency assignments of Bulgarian VHF radio stations to Plan Geneva 1984, which were entered in Part B of Plan Geneva 1984.
- 11 DVB-T radio frequency allotments and assignments to 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). 50 DVB-T and 117 T-DAB radio frequency allotments and assignments were entered in Plan GE06D.

In accordance with the procedures under Article 12 of the ITU Radio Regulations, 195 (80 in season A and 115 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 12 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 Article 7 of Appendix 30A of the Radio Regulations – 10 objections for 18 satellite systems;
- Coordination between a satellite network on planned position from the broadcasting-satellite radio service and non-planned satellite network, pursuant to Article 7 of Appendix 30 of the Radio Regulations – 4 objections for 7 satellite systems;
- Coordination in exceeding the carrier-to-noise (C/N) ratio for satellite systems from the fixed-satellite radio service in frequency bands 4500-4800 MHz, 6725-7025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz, pursuant to Appendix 30B to the Radio Regulations – 2 objections for 2 satellite systems;

Objections submitted via specialised ITU applications

- Coordination of non-planned satellite station, potentially affecting another non-planned satellite station, pursuant to Article 9.7 and Article 9.41 of the Radio Regulations – objections were made for 88 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 Article 9.11 of the Radio Regulations – objections were made for 3 satellite systems;
- Coordination of satellite station using non-geostationary orbit and satellite system on geostationary orbit, pursuant to Article 9.12A of the Radio Regulations – objections were made for 17 satellite systems;
- Coordination of emitting satellite station and receiving station from fixed radio service included in the table of frequency assignments, pursuant to Article 9.14 of the Radio Regulations – objections were made for 28 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 74 Bulgarian and 51 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, 27 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

In 2019, Ordinance No 1 of 2010 regarding the rules for use, allocation and the procedures of primary and secondary assignment for use, reservation and withdrawal of numbers, addresses and names and of functional specifications (FSs) for portability of geographic, mobile and non-geographic numbers, was amended and supplemented.[66] The amendment regulates the possibility to use the geographic numbers for the provision of nomadic telephone services and the possibility to assign numbering resources to Mobile Virtual Network Enablers (MVNE). The FSs for portability regulate the possibility for portability of numbers to providers using secondary assigned numbers.

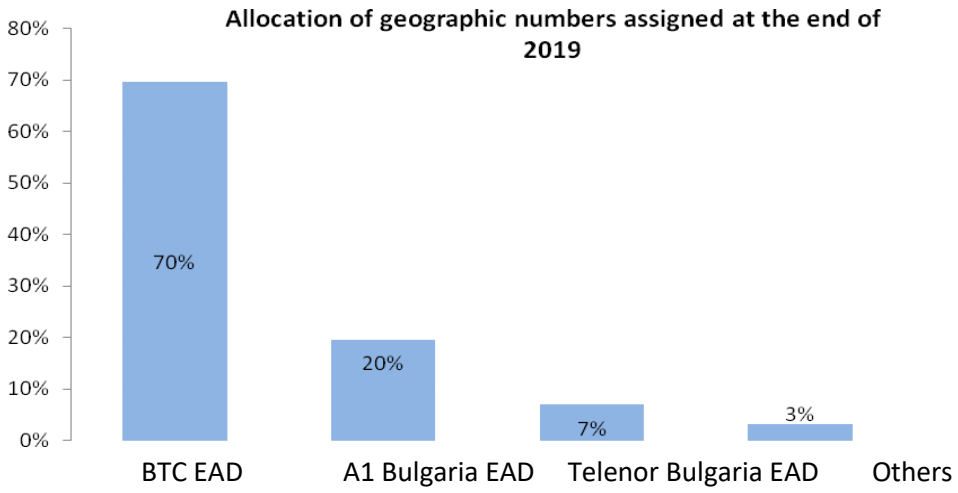
During the past year, two new undertakings were issued authorisations for the use of individually assigned scarce resource - numbers - INSPIRE COMMUNICATIONS EOOD and TENDO TELECOM EOOD.

At the end of 2019, the total number of undertakings authorised to use the individually assigned scarce resource - numbers for provision of public electronic communications, was 28.

In 2019, the following were allocated to undertakings:

- 4,400 geographic numbers;
- 2 national signaling point codes;

The allocation of geographic numbers assigned to undertakings at the end of 2019 is shown in Figure 37

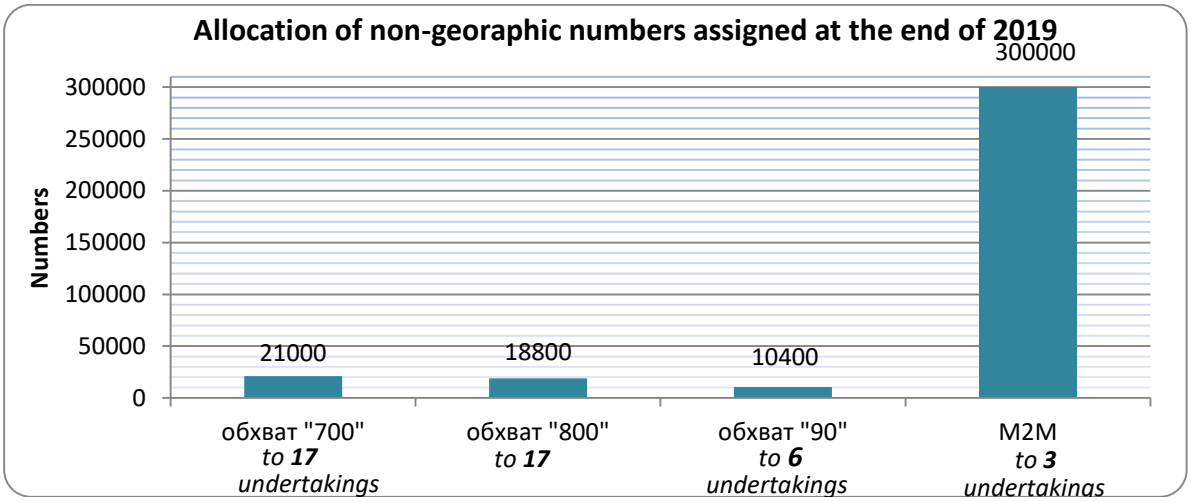


Source: CRC

Figure 37

[66] Functional specifications for portability of geographic numbers in case of changing the fixed telephony service provider and/or a change to the address within a geographic national destination code; Functional specifications for portability of nationally significant numbers in case of changing the public mobile telephony service provider; Functional specifications for portability of non-geographic numbers in case of changing the relevant service provider.

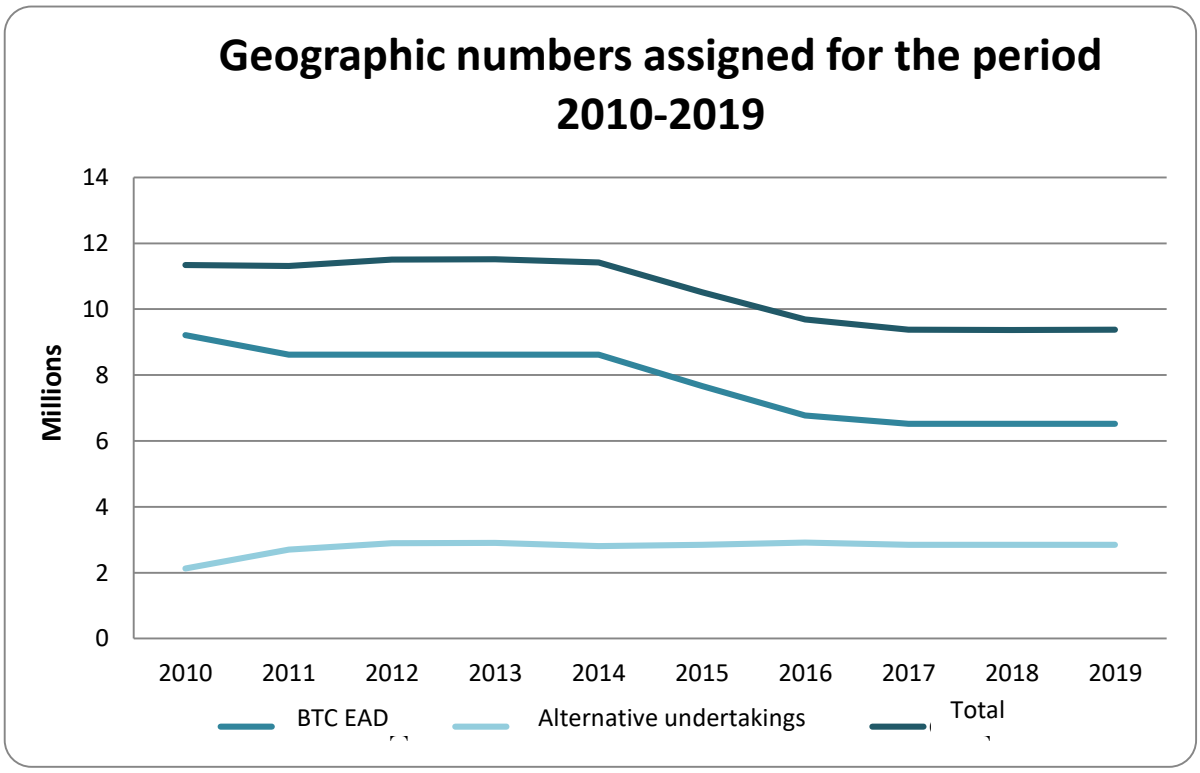
The allocation of non-geographic numbers assigned at the end of 2019 is displayed in Figure 38.



Source: CRC

Figure 38

Figure 39 displays the allocation of geographic numbers assigned for the period 2010-2019.

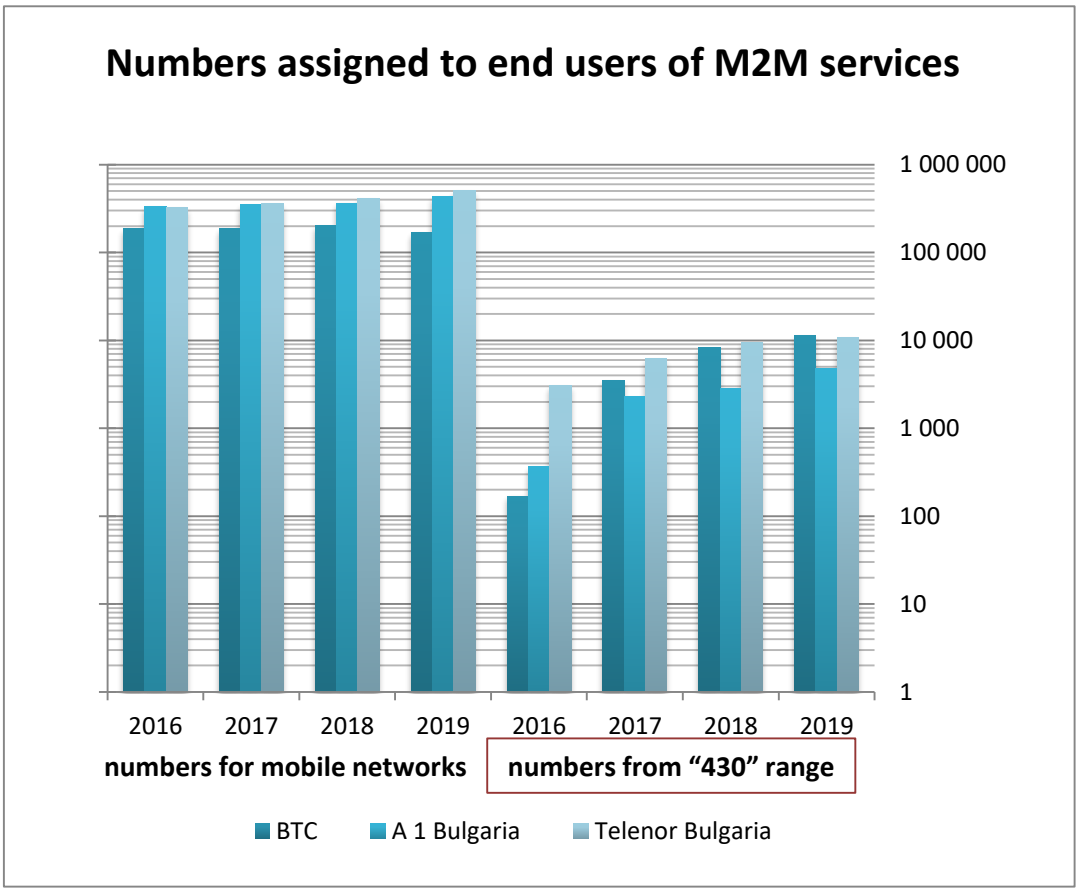


Source: CRC

Figure 39

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 such numbers assigned in 2019.

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, and Telenor Bulgaria EAD. Data on the numbers assigned to end-users over the last four years are presented in Figure 40:



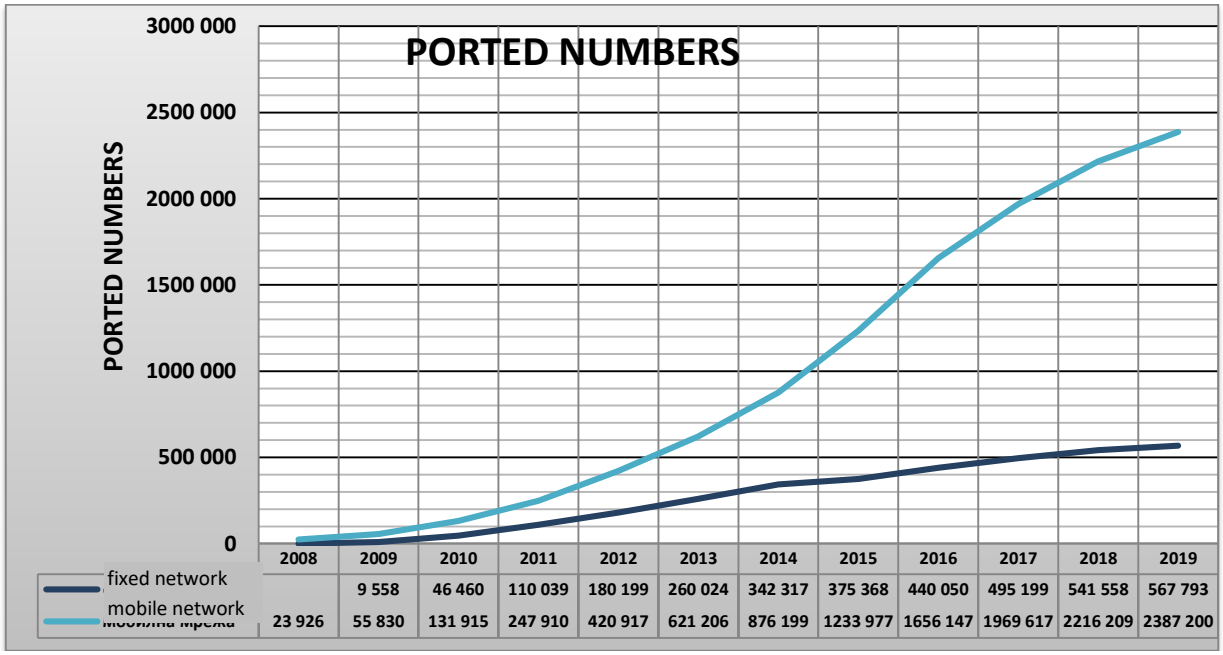
Source: CRC

Figure 40

In 2019, an insignificant 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 mobile networks continued. A reduction in the numbers assigned from the ranges for mobile networks was observed only in respect of BTC.

Number portability

In 2019, there was a decline, compared to 2018, 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.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
fixed network		9 558	46 460	110 039	180 199	260 024	342 317	375 368	440 050	495 199	541 558	567 793
mobile network	23 926	55 830	131 915	247 910	420 917	621 206	876 199	1233 977	1656 147	1969 617	2216 209	2387 200

Source: CRC

Figure 41

The total of ported numbers in mobile networks for the period 2008-2019 was 2,387,200. In the past year, the downward trend in the amount of numbers ported in mobile networks, compared to the previous year, was preserved. The share of consumers who took advantage of their right to portability was 21.83% of the total number of mobile users.

The total of ported numbers in fixed networks for the period 2009-2019 was 567,793. In 2019, the ported numbers decreased as compared to the year before. Some 25.54% of the total number of end-users of a fixed telephony service took advantage of their right to portability.

In respect of non-geographic numbers, a slight interest in portability was observed - a total of 53 numbers were ported in 2019.

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 2019 were:

Regulation of the electronic communications markets

In fulfilment of CRC's goals for 2019:

- the third review of the analysis and assessment of the market for wholesale local access provided at a fixed location was started (market 3a of Recommendation 2014/710/EU) was completed. Through its established toolbox, CRC reported that the market for wholesale local access provided at a fixed location was effectively competitive and, by Decision No 235/18.06.2019, abolished all specific obligations imposed on BTC by a previous decision.

- 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. The work on the analysis of these markets will be completed in 2020. In this respect, the EC is expected to adopt a delegated act on single maximum EU-wide voice call termination rates

in mobile and fixed networks by the end of 2020. CRC was invited to provide experts to advise the EC in drafting the legislative act.

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[67] (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 2019, the work on the implementation of the CRC's priority to automate the activities related to the regular collection and processing of information, continued. On 21.10.2019, a final bilateral protocol was signed for the acceptance of the activities under Contract 03-08-61/27.08.2018 as fulfilled and the start of the contractual warranty support. The Commission envisages that the actual use of the system will start in the second half of 2020.

Collecting information and overseeing the fulfilment of obligations arising from the Regulation on international roaming and the Regulation on regulated intra-EU communications

In 2019, CRC continued to exercise control for the implementation of the requirements of Regulation (EC) No 531/2012[68] and Implementing Regulation (EU) 2016/2286[69] in respect of the implementation of the "Roam Like At Home"[70] (RLAH) and the fair use policy[71] (FUP) introduced by the undertakings. CRC carried out inspections for compliance of the tariffs applied by undertakings with the requirements of the Implementing Regulation and carried out permanent monitoring of the undertakings' offers and of the requirements for provision of transparent information to the users via all communication channels. In addition, CRC collected and summarised data on the transparency and comparability of the offers for retail roaming services offered by undertakings.

While exercising the control, it was established that undertakings providing public electronic communications services via mobile networks:

- comply with the Roaming Regulation with regard to the RLAH and FUP requirements for subscription and prepaid plans with roaming included;
- comply with the requirements of Regulation (EU) No 531/2012 on transparency and on the prevention of bill-shock;
- apply prices in accordance with the regulated wholesale roaming services caps laid down in Regulation (EU) No 531/2012.

Regulation (EU) 2015/2120[72] of 15 May 2019 launched the regulation of international calls and short message service within the European Union (EU). In fulfilment of the Regulations' requirements, from that date, undertakings providing voice services to private subscribers should apply retail charges for international calls and short message service (SMS) not higher than:

- BGN 0.445 per minute of voice calls made to subscribers of EU operators;

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

[68] 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

[69] 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

[70] Roam like at home, RLAH

[71] Fair use policy, FUP

[72] 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

- BGN 0.14 per short message service (SMS) sent to to subscribers of EU operators.

In connection with the new Regulation, CRC published on its website useful information on the new Regulation aimed at the Bulgarian citizens.[73] In addition, CRC actively communicated with Bulgarian mobile and fixed operators, assisting and monitoring the process of introducing the regulation.

As a result of the follow-up control carried out by CRC in 2019, there were no inconsistencies found with the regulatory requirements, and maximum retail charges for intra-EU international calls and SMS are successfully applied by undertakings.

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

In 2019, the functional capabilities of the NMS were expanded by means of hardware update of 5 (five) of the mobile radio monitoring stations (MS) from the National Radio Frequency Spectrum Monitoring System for Civil Needs (NMS). The update was carried out by integrating new high-end broadband monitoring receivers into the measurement systems of the MS.

The functionalities for radio interference detection and localisation in the 31 GHz band were upgraded by supplying 3 (three) high-end spectrum analysers and 2 (two) portable monitoring systems in the 8 GHz band.

Possibilities for NMS expansion and modernisation as well as for performance of activities relating to maintenance and prophylaxis of the used equipment continued to be explored.

Regarding the technical and technological support of the activities relating to the control and monitoring of electronic communications networks, activities relating to the maintenance of the specialised technological equipment were carried out in 2019: fixed, mobile and transportable monitoring stations, portable measurement equipment, including prophylaxis and calibration, where applicable.

At the end of 2019, 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;
- 8 (eight) mobile stations for RFS monitoring in the bands from 10 kHz/20 MHz to 3000 MHz;
- 1 (one) portable system 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;
- 2 (two) portable monitoring systems in the bands from 8 kHz to 8 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,

[73] https://crc.bg/bg/rubriki/566/mezhdunarodni-povikvaniq-i-kratki-tekstovi-syobshteniq-v-ramkite-na-evropejskiq-syjuz

preventing the illegal use of spectrum and controlling the quality of services provided to end-users.

2. Development of the NMS by setting up additional fixed 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 monitoring system requires the investment of considerable funds in its development and maintenance. The funding provided in 2019 allowed more progress to be made to the update of mobile stations from the NMS which was started in 2018. In the period 2020-2023, 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 2019

One of the strategic objectives of CRC for the period 2019-2021 is to achieve "sustainable institutional development and international partnership" by maintaining effective and fruitful international cooperation and actively participating in the work of specialised organisations in the field of electronic communications and postal services at a global, European and regional level. In this way, the Commission contributes to the application of good regulatory practices, exchange of experience, development and better functioning of the internal market for electronic communications networks and services.

Participation in the work of European structures

In 2019, 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.

The Commission has actively participated both at the management and expert level in the work of IRG and BEREC, contributing to the development of common regulatory practices. During the four IRG General Assemblies and BEREC Plenary meetings as well as Contact Network meetings and the BEREC Stakeholder Forum, which were held during the year, a number of documents were discussed and adopted in implementation of the BEREC Work Programme for 2019, which were directly reflected in the work of CRC, the most important of which are:

- BEREC Guidelines on regulated intra-EU communications;
- BEREC Guidelines on the minimum criteria for a reference offer relating to obligations of transparency;
- BEREC Guidelines on the general authorisation notifications transmitted to competent authorities;
- BEREC Common position on infrastructure sharing;
- BEREC Opinion on the functioning of the roaming market as input to the European Commission's evaluation of the review of the Roaming Regulation (Regulation (EU) 531/2012);
- BEREC Report on terminating contracts and switching provider;
- BEREC Report on Internet of Things indicators;

- BEREC Report on access to physical infrastructure in the context of market analyses;
- BEREC Report on the data economy;
- Report on the implementation of Regulation (EU) 2015/2020 and BEREC Net Neutrality Guidelines;
- BEREC Report on the harmonised collection of data from both Authorised Undertakings and OTT operators;
- BEREC Report on the impact of 5G on regulation and the role of regulation in enabling the 5G ecosystem;
- BEREC Report on regulatory accounting in practice;
- BEREC Summary report on the outcomes of internal workshop on the use of E.164 numbers in cross-border fraud and misuse of electronic communications services;
- BEREC Study on the determinants of investment in very high capacity networks (Phase 1).

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

The participation of CRC in the two Plenary meetings and Contact Network meetings of the Group have enabled the establishment of CRC positions on the review of the regulatory framework in the postal sector and the need to amend Regulation (2018/644).[74]

In 2019, the ERPG Medium Term Strategy 2020-2022 was adopted. The document defines the following main strategic pillars: "Revisiting the postal sector"; "Promoting a competitive EU postal single market" and “Empowering end-users and ensuring a user oriented universal service”. CRC, together with the other ERGP members, has helped identifying the main areas in which the ERGP work will focus between 2020 and 2022, taking into account the development of the postal sector and the changes in consumer needs.

The other important documents adopted by ERGP in the past year are as follows:

- *ERGP Report on the quality of service, consumer protection and complaint handling for 2018;*
- *ERGP Report on cross-subsidisation practices;*
- *ERGP Report on core indicators for monitoring the European postal market;*
- *ERGP Report on the development of postal networks and access practices regarding infrastructure related to the parcel market;*
- *ERPG Work Programme 2020;*
- *Report on developments in the postal sector and implications for regulation;*
- *ERGP Opinion on the review of the regulatory framework for postal services.*

One of the most important events for ERGP in 2019 was the Stakeholder Forum, which took place on 18 September 2019 and brought together more than 200 key stakeholders in the postal sector. The purpose of the Forum was to exchange experience on what postal legislation was needed from the point of view of the recently published ERGP opinion on the future revision of the regulatory framework for postal services. During the event, CRC actively participated in discussions on the recommendations to the European Commission addressed in the ERGP Opinion on the review of the regulatory framework for postal services, namely:

1. Change the future regulatory framework by using a more fundamental, market-oriented

[74] Regulation (EU) 2018/644 of the European Parliament and of the Council of 18 April 2018 on cross-border parcel delivery services.

(greenfield) approach, in which the Directive's objectives and basic concepts should be reviewed;

2. Reorient the focus of the regulatory framework from the universal service provision to a proper functioning of the postal market and competition;
3. Set a clear scope of the postal sector;
4. Bring comparable services together in the same regulatory framework;
5. Strengthen and ensure minimum harmonisation of NRAs' powers to intervene in the market in order to promote competition and address market failures;
6. Guarantee that a minimum set of postal services is available to all European citizens, taking into account the national circumstances;
7. Ensure the consistency of the new regulatory framework with other regulatory frameworks such as those on consumer rights, VAT and customs, data protection, freight transport, security of goods, etc.;
8. Strengthen and harmonise NRAs' powers and regulatory instruments;
9. Strengthen the institutional framework for ensuring cooperation between NRAs and a consistent and coherent implementation and application of the regulatory framework;
10. NRAs' tasks and the role and function of ERGP as an independent advisory body to the European Commission to be taken into account.

In the past year, ERGP identified measures to increase the efficiency and transparency of its activities, part of which were aimed at strengthening the cooperation with relevant stakeholders and international organisations.

In this context, CRC took various actions to encourage the participation of national postal services providers in the ERGP forums, promoting the results of discussions and decisions taken during Plenary meetings.

Communication with the European Commission (EC)

In October 2019, 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 2019, CRC intensified its attendance and active position in forums organised by the International Telecommunication Union (ITU), Universal Postal Union (UPU), 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[75]), etc.

The Commission took part in the World Summit on Information Society 2019 (WSIS Forum 2019) in the city of Geneva, Switzerland. The Forum is the largest annual gathering of the ICT community and celebrated its 10th anniversary under the theme *"Information and Communication Technologies (ICT) for Achieving the Sustainable Development Goals"*. The event is yearly and has established as a global platform of all ICT stakeholders facilitating the implementation of the Action Lines for achieving the Global Goals, as defined in the United Nations (UN) 2030 Agenda for Sustainable Development. WSIS provides a platform for a "just and equal information society" for all stakeholders as set by the Geneva Action Plan. A meeting between the representatives of CRC and the ITU Secretary-General, Mr Houlin Zhao, took place during the event. Mr Zhao expressed gratitude for the support of our country for the Union's initiatives and underlined Bulgaria's key role in the region of Southeastern Europe. Opportunities for future joint initiatives were also discussed at the meeting. A meeting was also held with the President and CEO of the Internet Corporation for Assigned Names and Numbers (ICANN), Mr

[75] Réseau francophone de la régulation des télécommunications

Göran Marby, during which issues related to the reform of the WHOIS database in connection with the General Data Protection Regulation, building of 5G networks, protecting Internet users' rights, etc., were discussed.

Representatives of CRC also participated in ITU Telecom World 2019 entitled *"Better, Sooner"*, which was held in the city of Budapest, Hungary. ITU Telecom World is organised annually by ITU Telecom, part of ITU, the United Nations specialised agency for information and communication technologies. By participating in ITU Telecom World 2019, CRC was given the opportunity to hold bilateral meetings, establish new contacts to exchange best regulatory practices in the field of electronic communications, and take a harmonised approach to address the challenges of digital transformation. The event discussed the need to promote a dynamic global dialogue between NRAs, policy-making authorities, industry leaders and other key ICT stakeholders. It was highlighted that ITU Telecom World provides a platform for the public and private sectors to approximate their positions in terms of seeking and promoting innovation, in favour of the social and economic development of humanity.

Representatives of CRC participated in the official delegation of the Republic of Bulgaria at the ITU World Radiocommunication Conference (WRC-19) in the city of Sharm El-Sheikh, Egypt. WRC is an event that sets the direction for the development of radio communications and spectrum management worldwide over the next 3-4 years. The participation of CRC representatives in the work of WRC-19 contributed to the promotion and protection of our country's interests in the use of radio spectrum. A wide range of issues related to spectrum assignments for different satellite and terrestrial radio services were addressed. Decisions setting regulatory conditions for the use of radio spectrum appropriate to the rapid development of wireless technologies were adopted. The Conference took the necessary steps to facilitate the global and regional harmonisation of frequency bands for the maintenance of railway radio communications systems. WRC-19 considered and addressed key issues related to the definition of new bands for the future development of international mobile telecommunications (IMT), including those for 5G networks. Regulatory conditions for the use of radio spectrum for satellite communications, including for non-geostationary satellite systems, were determined. Bulgaria's proposal to replace 10 channels at 1.2°W with 10 channels at 1.9°E in the AP30/30A Plan of the Radio Regulations was accepted.

The Chairman of CRC, Ivan Dimitrov, signed on behalf of the Republic of Bulgaria the Final Acts of the WRC-19 of ITU, which set the direction for the development of radio communications, spectrum management and the introduction of innovative radio services worldwide over the next four years.

Within the national delegation of the Republic of Bulgaria, the Commission was represented at the sessions of the UPU Council of Administration (CA). UPU is the United Nation’s specialised agency for the postal sector. CA is one of the two elective governing bodies of UPU, which decides on matters related to the overall activity of the Union, approves proposals of the Postal Operations Council for new regulations or procedures, resolves urgent matters and ensures the consistency of the Union's work in the period between two Congresses, by controlling its activities and examining regulatory, administrative, legislative and legal matters. By participating in the work of CA, CRC is given the opportunity to take an active position, as an administration related to UPU, in the elaboration and discussion of key documents related to the implementation of the Union's mission, objectives and tasks.

A representative of the CRC administration, as part of the delegation of the Republic of Bulgaria, took part in the 3rd extraordinary UPU Congress in the city of Geneva, Switzerland. The Congress is the supreme authority of the Union, and the authorised representatives of the member countries having the right to vote take part in its activities. The main objective of the extraordinary Congress was the amendment of the Universal Postal Convention and its Rules of Procedure, in

the part of the provisions concerning the UPU remuneration system (terminal dues system). CRC, together with the members of the Bulgarian delegation, participated actively in the discussions of the proposed amendments to the relevant texts concerning the E-format mail rates[76] in accordance with the previously approved position of Bulgaria. By following up the discussions on the proposals for a change to the Postal Convention, an opportunity was provided to explore the views of member countries on various issues concerning the formation and application of terminal dues.

A CRC delegation took an active part in the 17th Annual Meeting of the International Organisation of the Francophonie (IOF) FRATEL, held in the city of Bucharest, Romania, on the *Challenges of coverage and quality of mobile services - the regulator's role.* The participation of the Commission representatives is in line with the commitments undertaken by CRC, as co-founder and full member of FRATEL, to implement the mission and work programme of the Network, to fulfil the tasks assigned to CRC as a sectoral regulatory body and to achieve the objectives set at national, European and international level.

The representatives of the Commission also participated in the annual International Regulatory Conference organised by the National Authority for Management and Regulation in Communications (ANCOM) of the Republic of Romania, which took place just before the annual meeting of FRATEL. The theme of the 2019 edition was *"A golden compass for the end-users in an interconnected world"*. The conference focused on consumer protection tools and mobile coverage mapping.

The ANCOM International Conference and the 17th Annual Meeting of FRATEL provided a forum for in-depth discussions and a number of formal and informal meetings between the heads of delegations and delegates from FRATEL member NRAs with the widest range of stakeholders. This participation was an opportunity not only to exchange information, experience and best practices to address the key regulatory challenges covered by the thematic programme issues, but also to promote the active position of CRC in the work of the FRATEL network, in which member countries are represented by the relevant national regulatory authority.

CRC was also represented at the annual Ministerial Programme at the Mobile World Congress in the city of Barcelona, Spain. The Congress is organised by the Global System for Mobile Communications Association (GSMA). Participants are presented with innovative solutions in the field of mobile technologies, services and products. The wide format of the event has provided an excellent opportunity for many informal meetings and talks with representatives of international and European organisations.

CRC took part in the 74th General Assembly of the European Telecommunications Standards Institute (ETSI) which was held in Sophia Antipolis, France. ETSI was created by CEPT in 1988 and is officially recognised by the European Commission as a European standards organisation. In compliance with Article 30, item 22 of the Electronic Communications Act, CRC performs the functions of a national standards organisation (NSO) for ETSI.

In 2019, CRC continued to work within the CEPT structures. Experts from the Commission participated in meetings of the Electronic Communications Committee (ECC) as well as in various working groups on radio spectrum management, numbers and networks, etc.

CRC took part in the work of the 50th Plenary meeting of ECC, which took place in early 2019 in the city of Brighton, the United Kingdom. The meeting adopted decisions concerning both the future introduction of 5G and the harmonised use of spectrum from a mobile radio service, including narrowband and broadband applications for civil networks and public safety, public protection and disaster response networks. Other solutions adopted at this meeting concern the use

[76] bulky letters (containing documents) and small packets (containing goods)

of a spectrum from a fixed radio service, uncoordinated earth stations from a fixed satellite radio service, the use of earth stations on board vessels, etc.

In 2019, the Commission hosted the 51st ECC Plenary meeting of CEPT. Representatives of 33 administrations from CEPT member countries, as well as 9 organisations with observer status, including the European Commission, the European Communications Office (ECO), the North Atlantic Treaty Organization (NATO), representatives of equipment manufacturers, etc. attended the meeting. The meeting, which was held in the city of Sofia, took a number of important decisions for the future introduction of 5G in Europe. Harmonised technical and regulatory conditions for the use of spectrum for mobile/fixed communications networks, including 5G networks, were finally adopted. An agreement was reached on guidelines to the CEPT administrations concerning coexistence between 5G networks and fixed lines in the 26 GHz band.

By hosting the 51st ECC Plenary meeting, the Bulgarian regulator demonstrated its commitment to taking important decisions concerning the regulation and harmonised use of radio spectrum in Europe.

At the 94th meeting of the Working Group on Frequency Management (WGFM), held in the city of Tallinn, Republic of Estonia, CRC experts participated in the preparation of documents which were subsequently submitted and finalised at the ECC Plenary meeting in the city of Sofia. Draft ECC decisions on the harmonised use of spectrum by earth stations aboard aircraft, from land and maritime earth stations on mobile platforms, the use of the 5875-5935 MHz band by safety-related intelligent transport systems, etc., were prepared.

CRC experts took part in the 18th and 19th meetings of the ECC Working Group Numbering and Networks (WG NaN). The work of the group 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 main focus of work in 2019 was on topics covered by the European Electronic Communications Code - numbering resources, emergency communications, OTT services, extraterritorial use of numbering resources, working with BEREC, etc.

Bilateral and regional cooperation and other significant international events

In 2019, CRC continued the tradition of developing and deepening the bilateral cooperation.

Representatives of the Commission took part, together with representatives of the Ministry of Transport, Information Technology and Communications, in the first meeting of the Bulgarian-North Macedonian Joint Intergovernmental Commission on Economic Cooperation in the city of Skopje, Republic of North Macedonia. During the meeting, the parties discussed the possibilities for deepening the bilateral cooperation between the Republic of Bulgaria and the Republic of North Macedonia in different areas of mutual interest, including in the field of information technology and communications.

A delegation from the Commission, led by its Chairman, paid a working visit to the Romanian regulator ANCOM in the city of Bucharest, Romania. The visit was organised on the basis of the Memorandum of Understanding on cooperation and exchange of information in the field of electronic communications signed between CRC and ANCOM. The meeting focused on the public early warning system for disasters and accidents in Romania, by sending text messages to users‘ terminal equipment – RO-ALERT,[77] NETOGRAF information system[78] for verifying the

[77] https://ro-alert.ro/en/about-ro-alert/; https://www.vodafone.ro/personal/magazin-online/utile/ro-alert/index.htm; https://www.orange.ro/termeni-si-conditii/cell-broadcast/
[78] http://www.netograf.ro/

quality of electronic communications received via fixed and mobile Internet by users, the laboratory for electromagnetic compatibility measurement and testing of radio equipment,[79] VERITEL[80] - the public database of all commercial offers for communications services available to consumers for comparison purposes, as well as cross-border interference. Following the meeting, a visit was organised to the accredited Laboratory for Electromagnetic Compatibility and Radio Equipment Testing to ANCOM in the village of Prejmer, Brașov District.

CRC representatives took part in the annual International Regulatory Conference of the Agency for Electronic Communications (AEC) of the Republic of North Macedonia under the theme "*More Connected for a Better Life*", which took place in the city of Ohrid, Republic of North Macedonia, as well as in the 17th edition of the International Conference on "Regulatory Activity in Electronic Communications Sector", held in the city of Budva, Montenegro, with a working title *"Future Regulation for Inclusive Connectivity"*.

In 2019, CRC participated actively in various international forums both at the highest level and at working group level. The focus of attention of the Commission representatives in the different formats was the strategic goals of NRA on a national and international scale. The implementation of good regulatory practices, the exchange of experience and the development and better functioning of the internal market for electronic communications networks and services will remain a strategic area for the development of international cooperation based on multilateral dialogue, but also on the basis of an in-depth bilateral partnership with other NRAs.

1.5. Information technology for 2019

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.

The implementation of these strategic objectives will contribute to reducing costs, improving the quality of the services offered and increasing the transparency in the activities of CRC. This creates conditions for a stable economic and social development in the communication sector.

The main activities related to the development of the information technologies are characterised by the execution of projects in the following fields:

Introduction, support and development of information systems

- Support and exploitation 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, LEDES and PSA;
- CRC participates in the Electronic Messaging System (EMS) and exchanges documents with other administrations only electronically;

[79] http://www.ancom.org.ro/en/laboratory-for-electromagnetic-compatibility-and-radio-equipment-testing-_5510
[80] http://www.veritel.ro/

- CRC has a profile created in the Secure Electronic Service System;
- Updating and developing the CRC website and the internal content management system. The new page allows easy access for users and will be accessible from devices with different screen resolutions;
- Analysis, development and support of other main and subordinate information systems: specialised software in the sphere of electronic communications, technological software used by specialised directorates, legal information systems, accounting systems, payroll systems, etc.

Technical and communication procurement and support

- Support of VPN connectivity between the Commission's offices throughout the country;
- Support and monitoring of available communication networks and resources and structural cable lying. Installation and set-up of communication and network operating systems;
- Purchase, installation, commissioning and service of computer equipment and technical devices that come in support of the regulator's activity.

In 2019, CRC carried out projects related to improving the information and communication environment:

- Renewal of anti-spam and web filter licenses, and provision of an additional license for e-mail protection;
- Updating an Oracle licensed software;
- Providing post-warranty support for communications equipment manufactured by Cisco Systems;
- Supply of computer equipment.

CRC plans and implements projects related to e-government:

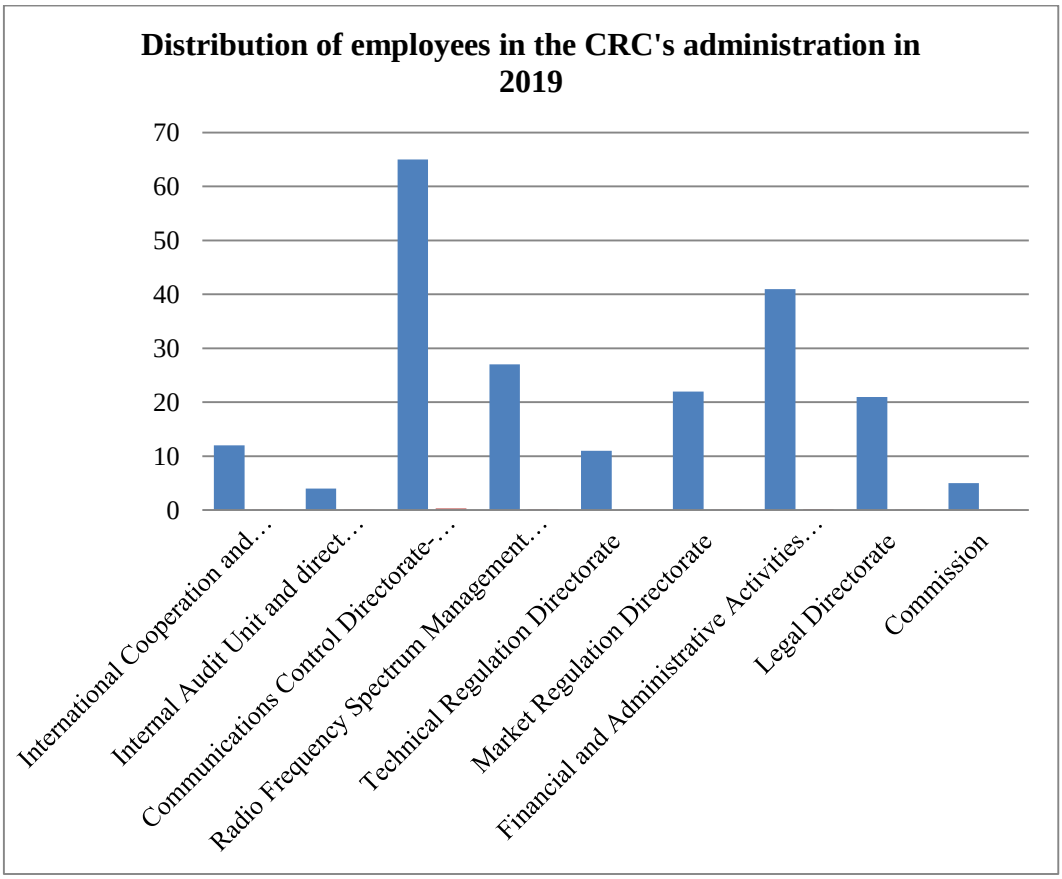
- CRC is involved in implementing a project under the Operational Programme "Good Governance", according to measure 74 of the Updated Roadmap for implementation of the updated strategy for development of e-government in the Republic of Bulgaria 2019-2023. The project aims to build and develop the information systems and registers of CRC to increase the efficiency of regulatory activity and improve the quality of administrative services.
- Maintenance and operation of the CRC "Licensing and Registers" information system in connection with the development of application software for notification, authorisation, licensing and registration activities for the provision of electronic administrative services to citizens and businesses;
- CRC participates in the Electronic Messaging System (EMS) and exchanges documents with other administrations only electronically;
- CRC has created a profile in the Secure Electronic Service System, with the possibility of receiving/sending documents from/to citizens and businesses.
- Implementation of a project with subject: "Development, deployment, guarantee and maintenance of a 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", which will be brought into operation in 2020.

1.6. CRC's administrative capacity

The effective implementation of the Commission's functions and tasks is the result of continuous improvement in human resource management and an increase in the administrative capacity.

In 2019, CRC performed its activities with the following distribution of employees:

- Commission 5
- Internal Audit Unit and direct subordination positions 4
- International Cooperation and Communications Directorate 12
- Legal Directorate 21
- Communications Control Directorate-General 65
- Radio Frequency Spectrum Management Directorate 27
- Technical Regulation Directorate 11
- Market Regulation Directorate 22
- Financial and Administrative Activities Directorate 41

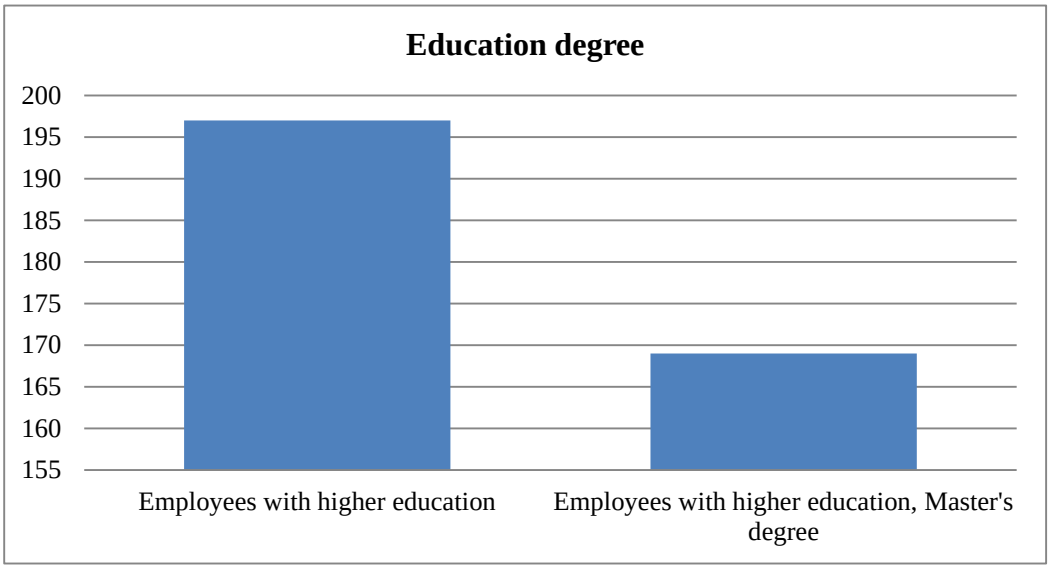


Source: CRC

Figure 42

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

Of the total number of CRC employees, 197 employees had higher education, as 169 of them had a Master's degree (Fig. 43).



Source: CRC

Figure 43

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.

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.

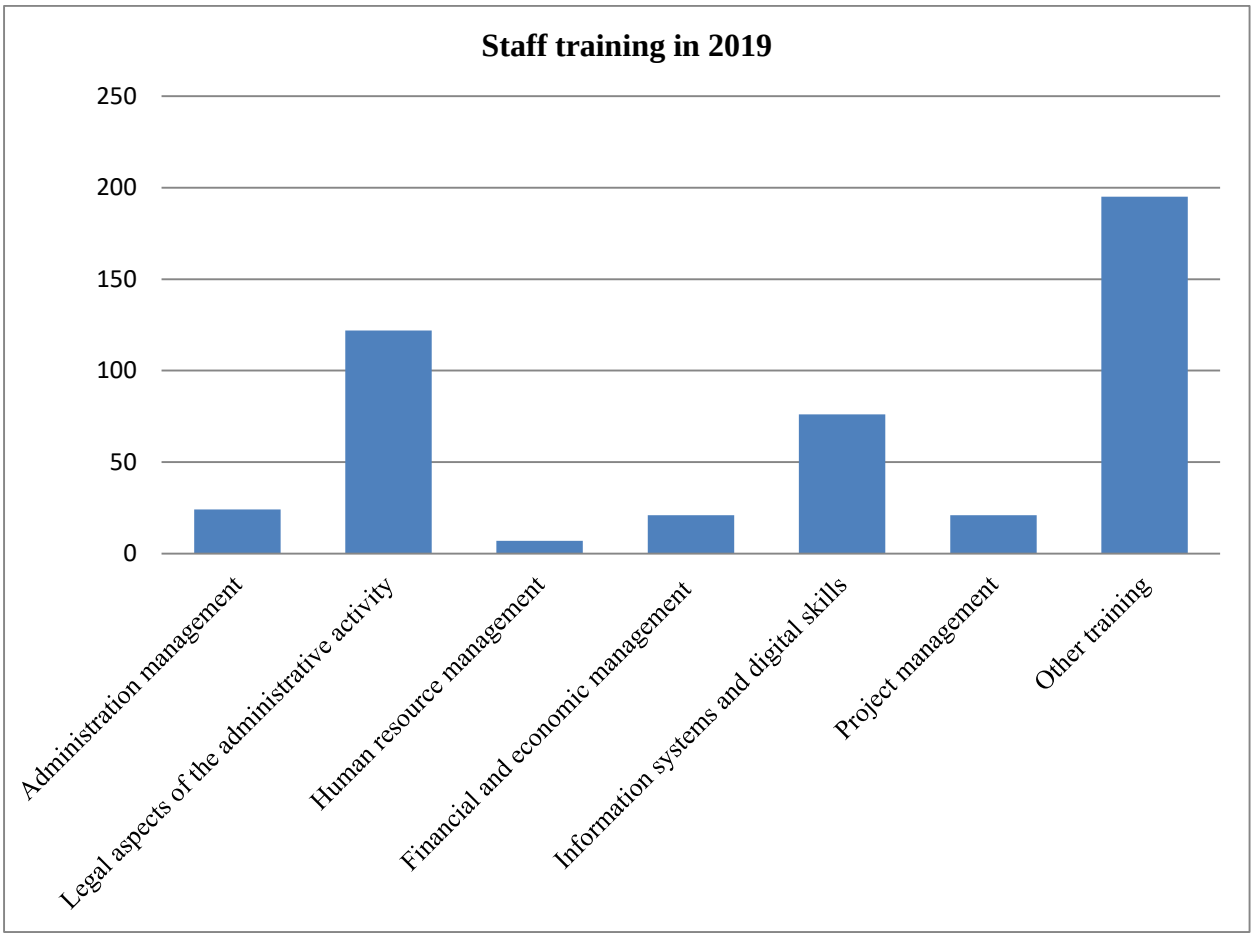
In 2019, a total of 14 (fourteen) competitions and selection procedures were organised and held in CRC, as a result of which 13 (thirteen) new employees were appointed by the end of the year. Employees admitted from other administrations under the provisions of Article 81a LCS were 5 (five). Terminated employment relationships based on various legal grounds for the same period - 16.

Remunerations of employees are determined in accordance with the provisions of the Ordinance on the Salaries of Civil Servants and the Regulation on the conditions and procedure for assessing the performance of civil servants.

A functional analysis of the administrative structure, the organisation of work and the commitment of the Commission was carried out in 2019 to improve processes and optimise activities. The implementation of the planned activities started in the first half of 2020.

In 2019, 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 24
- Legal aspects of the administrative activity 122
- Human resource management 7
- Financial and economic management 21
- Information systems and digital skills 76
- Project management 21
- Other training 195



Source: CRC

Figure 44

In order to increase the effectiveness and efficiency of training, the needs for participation in new trainings are studied and trainings are planned and provided in accordance with the specificities and possibilities. The new knowledge acquired during the training is shared in a working environment to be applied by all experts.

Ensuring health and safety at work is part of the process for improving the working conditions at CRC. The Commission's management is aimed at continuously improving the organisation and management of operations to ensure health and safety at work. Periodically, including in 2019, risk assessment at work as well as employee medical examinations for prevention and prophylaxis purposes are carried out.

2. Other important activities

2.1. Standardisation

In 2019, CRC, in implementation of its duties as a National Standards Organisation (NSO) for the European Telecommunications Standards Institute (ETSI) under Article 30, item 22 of the LEC and the rules of ETSI, took part in the following activities:

- 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;
- Ensuring the implementation of approved and published European standards as national, and providing information on their transposition to ETSI.

CRC is working in conjunction with the Bulgarian Institute for standardization (BDS) for the implementation of ETSI standards as Bulgarian. In the past year, 46 standards were introduced by endorsement. 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 2019, CRC did not receive any notifications for security breaches and loss of integrity of networks and/or services which meet the criteria set out in the General Requirements for Provision of Public Electronic Communications.[81] In fulfilment of its obligation under Article 243b (5), CRC sent this information to the European Commission and ENISA.

In 2019, the European Commission adopted Recommendation (EU) 2019/534 on cybersecurity of 5G networks[82] (the Recommendation), which provides for a common approach to addressing cybersecurity risks in relation to 5G networks. In implementation of point 3 of the Recommendation, CRC has gathered information from the mobile network and service providers and has assisted the Ministry of Transport, Information Technology and Communications in preparing a risk assessment for the 5G network infrastructure, including the identification of the most sensitive elements where security gaps will have significant negative consequences. In addition, CRC experts participated in an interdepartmental working group supporting the Cooperation Group under point 14 of the Recommendation in developing the Toolbox[83] of appropriate, effective and proportionate risk management measures.

2.3. Electronic trust services

In fulfilment of its powers under the Law on Electronic Document and Electronic Trust Services Act, in 2019, CRC confirmed the qualified status of the trust services providers Borica AD, InfoNotary EAD and Evrotrust Technologies AD and of the trust services provided by them.

CRC maintains an up-to-date national trusted list that contains information about the qualified trust services providers and the services provided by them.

During the past year, the total number of the issued certificates for qualified electronic signature was over 241,000, and for qualified electronic seals - over 100. The issued qualified electronic time stamps were above 14,750,000, and the qualified certificates for website authentication - over 200. The electronic proofs of qualified validation of qualified electronic signature issued were almost 48,000.

2.4. Communications control

In 2019, the control carried out by CRC on the entire territory of the country regarding compliance with the LEC and the secondary legislation requirements in the area of electronic communications was traditionally focused mainly on protecting the interests of end-users in accordance with the principles of legality, non-discrimination and transparency. For the fulfilment of its control functions, the Commission has built a territorial structure - a central unit in the city of Sofia and five territorial units in the cities of Plovdiv, Burgas, Varna, Veliko Tarnovo and Vratsa.

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[81] https://crc.bg/files/%D0%9E%D0%91%D0%A9%D0%98%20%D0%98%D0%97%D0%98%D0%A1%D0%9A%D0%92%D0%90%D0%9D%D0%98%D0%AF%20%D0%9F%D0%A0%D0%98%20%D0%9E%D0%A1%D0%AA%D0%A9%D0%95%D0%A1%D0%A2%D0%92%D0%AF%D0%92%D0%90%D0%9D%D0%95%20%D0%9D%D0%90%20%D0%9E%D0%91%D0%A9%D0%95%D0%A1%D0%A2%D0%92%D0%95%D0%9D%D0%98%20%D0%95%D0%9B.pdf

[82] https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:32019H0534&from=GA

[83] https://ec.europa.eu/digital-single-market/en/news/cybersecurity-5g-networks-eu-toolbox-risk-mitigating-measures

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

CRC is performing its main control functions with regard to the RFS through the established NMS. Periodic preventive control of the status of RFS for civil needs is carried out through daily monitoring via the radio monitoring stations. 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.

As the number of users of services provided by the use of RFS continues to grow, there is also an increase in the substantial role of RFS monitoring and control in respect of effective management by ensuring up-to-date data about its occupancy.

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 2019, 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 spectrum users; guaranteeing a certain quality of services provided to end-users, as well as preventing the occurrence of illegal broadcasting through the exercise of preventive and follow-up monitoring and control.

In 2019, due to the regular scheduled monitoring carried out, the undertakings were provided electronically with 12,909 measurement results concerning the monitoring of the basic technical parameters of the countrywide radio broadcasting stations. As a result of the preventive control, 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 analogue terrestrial broadcasting of radio signals and digital terrestrial broadcasting of television signals with the approved technical characteristics

- Measurements of basic technical parameters of 88 broadcasting stations were carried out in fulfilment of CRC's decisions to assess their compliance with the approved technical specifications; CRC found discrepancy and gave only one prescription to bring the broadcasting station in compliance, and during the follow-up inspection, it was established that the undertaking had taken the necessary steps to bring the broadcasting station in compliance.
- Compliance with the terms and conditions of the authorisations for radio and TV broadcasting stations - 159 inspections were carried out and 40 prescriptions were given for deviations from the technical parameters; the control inspections established that all prescriptions given have been fulfilled.

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 border country areas, annual measurements are conducted in order to assess the penetration of signals from 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 2019, measurements carried out in the territory of 32 settlements to assess the electromagnetic environment and register cross-border penetration from the territories of Turkey, Serbia, Romania, Ukraine, Russia, Republic of North Macedonia and Greece were summarised and analysed. The results were included in the drafted 359 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. Regular measurements were carried out in 7 settlements along the Black Sea coast, as the analysis of the results did not register any interference to the Bulgarian broadcasting stations in their areas of service. The trend for registration of relatively low levels of received cross-border signals on our territory from the Turkish broadcasting stations was preserved.

Measurements are carried out annually in different settlements in the country to assist with spectrum management to assess the electromagnetic environment. In 2019, measurements were carried out in 47 settlements and their results were included in 492 measurement reports.

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

In 2019, frequency ranges intended for mobile PMR networks were monitored in 31 settlements. The results of the monitoring were summarised in 264 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÷137 MHz frequency band.

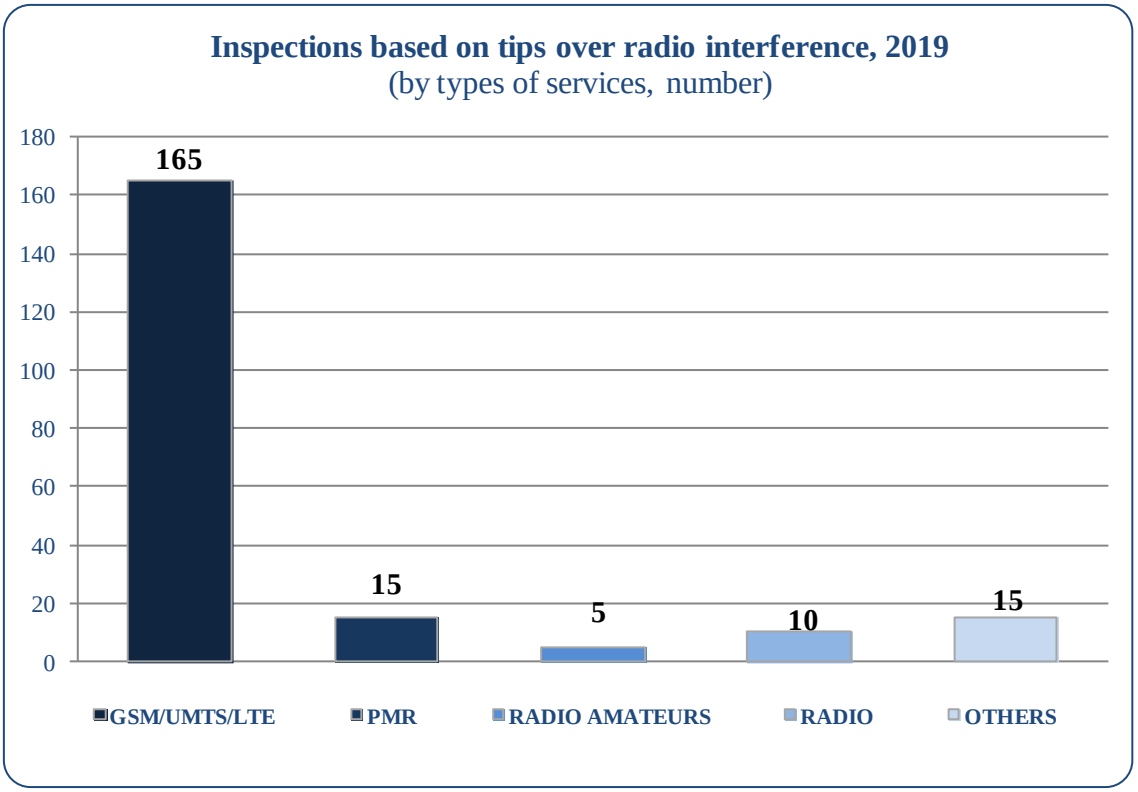
To ensure electromagnetic compatibility and smooth operation of radio navigation and communication equipment of the aeronautical services, measurements were carried out on 7 radio transmission sites. Measurements were carried out according to the *Methodology for measuring intermodulation products of the A1 type, occurring during the operation of closely situated VHF radio broadcasting stations* (according to point 2.5 of Appendix 1 to the Technical requirements for the operation of electronic communications networks from a Radio broadcasting service and related equipment.

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 tips for radio interference received from lawful spectrum users, citizens, organisations and institutions.

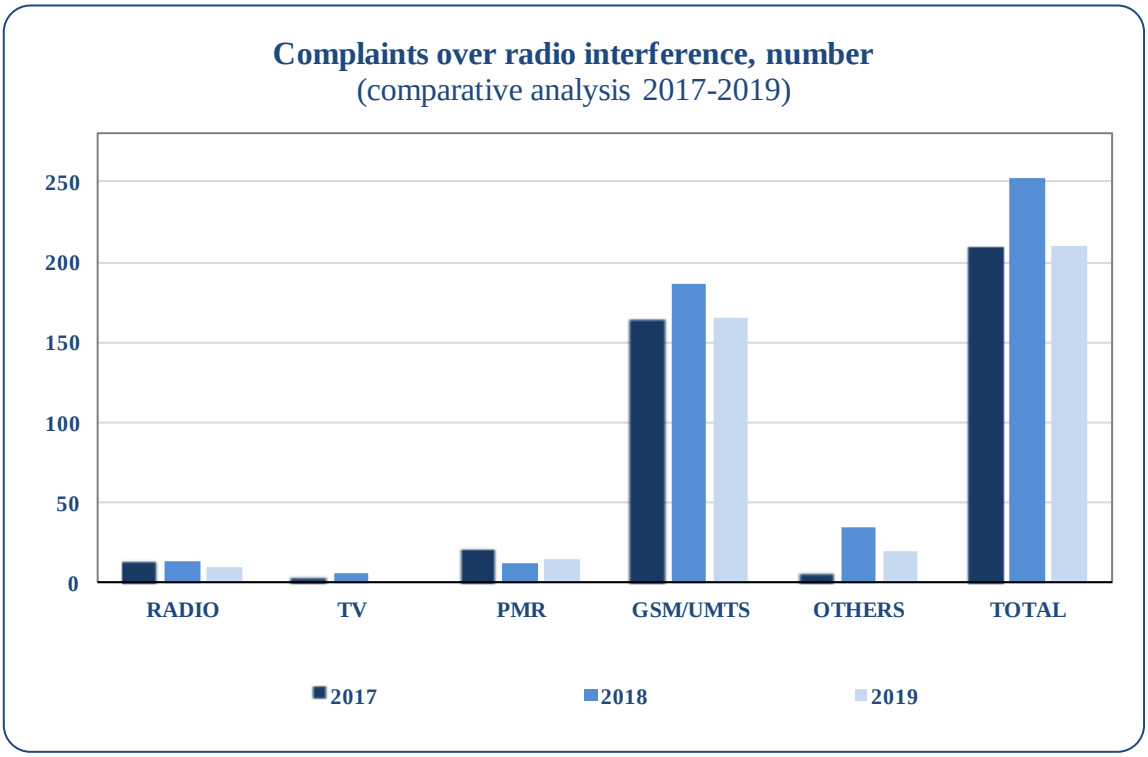
In 2019, 233 cases of radio interference were examined, and the results were included in 210 measurement reports (Figure 45). The necessary measures for quick localisation and elimination of interfering sources were timely undertaken. The interferences from radio frequency jammers transmitting in frequency ranges intended for public electronic communications through mobile terrestrial networks had a relatively high share in 2019. The next place was occupied by cases of registered interferences from defective (household and network) equipment in the frequency ranges intended for public electronic communications through mobile terrestrial networks.

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. A comparative analysis of the solved cases of interference in connection with the received tips, by types of services for the period 2017-2019, is presented in Figure 46



Source: CRC

Figure 45



Source: CRC

Figure 46

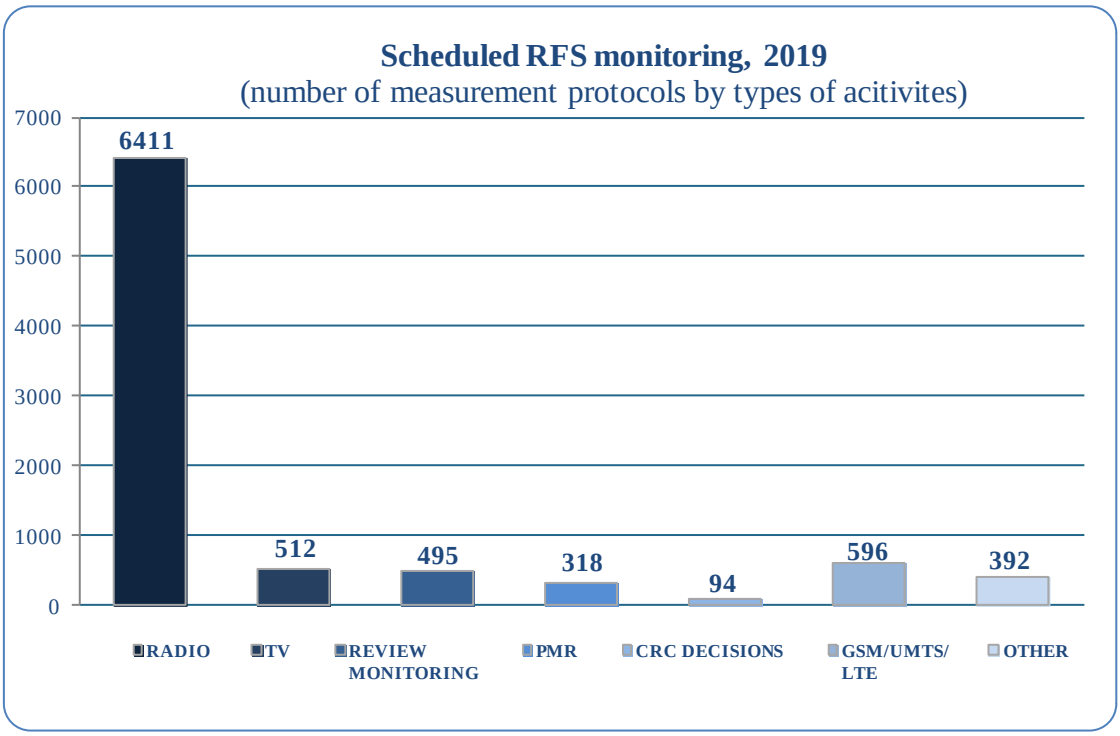
- Monitoring and inspections concerning received tips related to the ensured coverage of terrestrial digital television of DVB-T standard:

In 2019, measurements and inspections were carried out under 22 tips submitted by complainants and/or forwarded by other institutions (CEM, MTITC, etc.); 37 measurement reports were drawn up for the results of scheduled measurements and inspections under complaints.

- Coverage of mobile terrestrial networks:

In connection with the received 12 tips about lack of coverage of mobile terrestrial networks (GSM/UMTS/LTE) in 2019, an analysis of the declared coverage was carried out and 96 measurement reports were drawn up on the on-site measurements performed. Scheduled measurements of the coverage and quality of GSM/UMTS/LTE mobile networks were carried out in 60 settlements and 8 routes of the national road network, and the results were included in 602 measurement reports.

The results from the RFS monitoring and control carried out in 2019 were summarised in a total of 9,145 measurement reports, and 8,818 measurement reports were drawn up for the conducted scheduled monitoring, the analysis of which, by types of activities, is presented in Figure 47.



Source: CRC

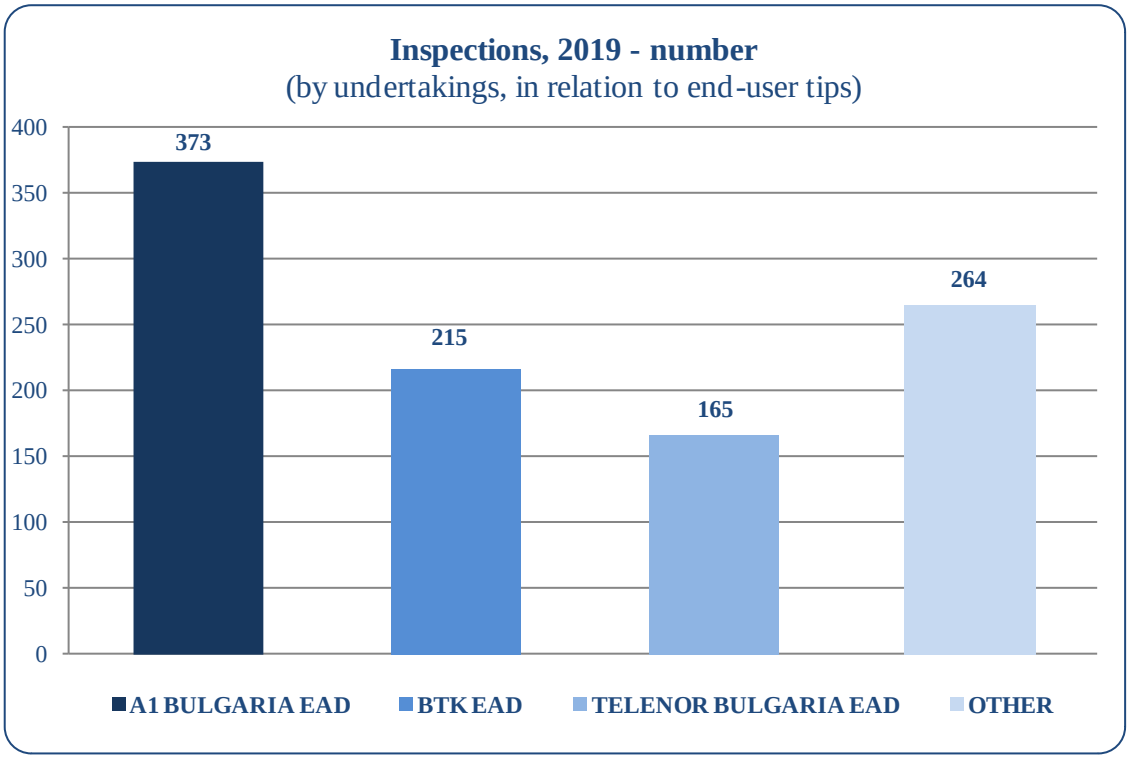
Figure 47

2.4.2. Inspection activity

In 2019, in connection with the CRC functions related to the control over electronic communications provision pursuant to the LEC, 3,204 inspections were carried out with regard to: implementation of CRC decisions; compliance with the provisions of the authorisations issued; inspections based on risk analysis; provision of services without notification/authorisation; inspections regarding detection and removal of interference; inspections concerning coverage from mobile terrestrial networks and digital television networks, etc.; non-provision of information to CRC; inspections with relation to submitted tips 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; portability of geographic and mobile numbers; problems with the coverage and quality of the service provided to end-users, etc.;

The main share (around 74%) of inspections in connection with tips received were performed to the three largest undertakings providing electronic communications services (Figure 48). Some 1,017 inspections were carried out in relation to end-user tips submitted to CRC concerning the services they offer: A1 BULGARIA EAD - 373 inspections, BULGARIAN TELECOMMUNICATIONS COMPANY EAD – 215 inspections, and TELENOR BULGARIA EAD – 165 inspections.



Source: *CRC*

Figure 48

In 2019, 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 2019, the greatest number of inspections were carried out in respect of problems with used roaming mobile services - 434 inspections (by about 17% less than in 2018), of which to A1 BULGARIA EAD - 211 inspections (49%), to TELENOR BULGARIA EAD - 128 inspections (29%), and to the BULGARIAN TELECOMMUNICATIONS COMPANY EAD - 95 inspections (22%); 11 administrative offence acts (AOAs) were 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 tips received regarding compliance with the requirements of Chapter 15 of the LEC was reported, as 140 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 - 92 inspections were carried out;

- free-of-charge **provision of itemised bills** for services used – 48 inspections were carried out;

For ascertained violations of Chapter 15 of the LEC, in 2019, 13 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 tips received in 2019, as 145 inspections were carried out (by nearly 16 % less than in 2018).

For ascertained violations of Chapter 14 of the LEC, in 2019, 16 administrative offence acts (AOAs) were drawn up.

Dispute of bills and charged penalties - in 2019, there was a decline in the number of tips received in connection with dispute of bills and charged penalties; a total of 60 inspections were carried out (by about 30% less than in 2018).

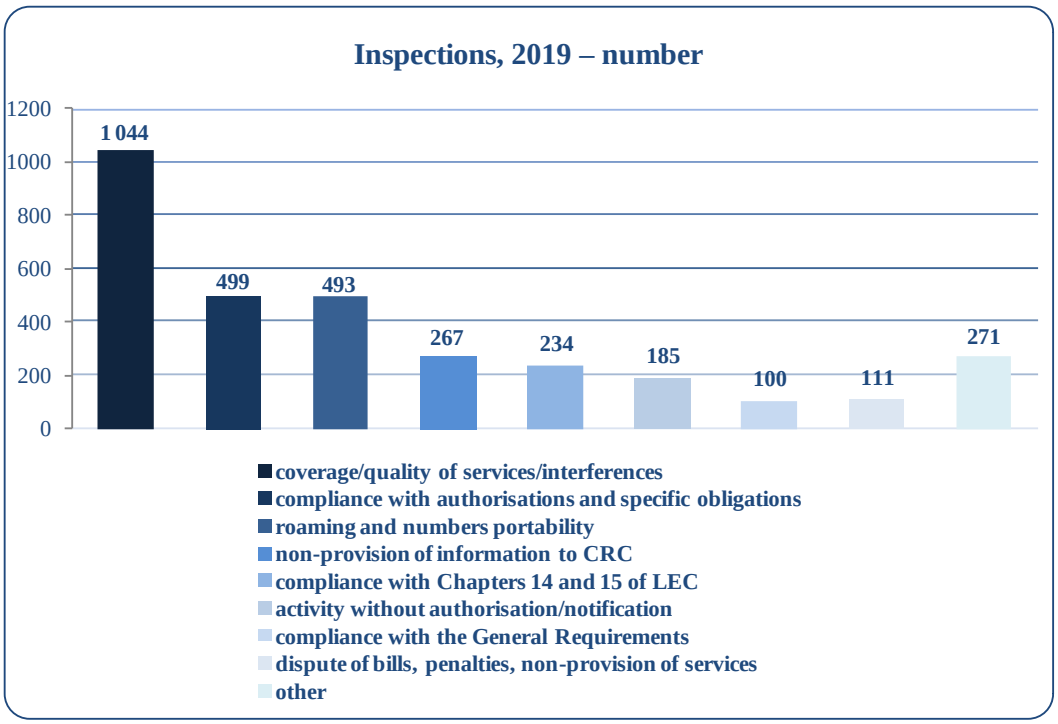
- Inspections concerning the compliance with the **General Requirements** for the provision of public electronic communications - 100 inspections were carried out (by about 45% more than in 2018).

For ascertained violations of the General Requirements for the provision of public electronic communications, in 2019, a total of 37 AOAs were drawn up.

- Inspections related to solving problems in the **number portability** implementation in case of changing the telephony service provider - in 2019, 59 inspections were carried out under tips related to obstructing the users' right to portability of mobile and fixed numbers, and 3 AOAs were drawn up.
- Inspections on **compliance with the authorisations' conditions and CRC decisions** - in 2019, 499 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, 6 AOAs were drawn up.
- Inspections under tips 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 **tips on radio interferences** – a total of 298 inspections were carried out.
- Inspections of undertakings for **non-provision of information to CRC** - in 2019, 267 inspections were carried out of undertakings that have failed to provide information or have provided incomplete or inaccurate information, and 27 AOAs were drawn up.

In 2019, 909 of the inspections performed (or about 28%) 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, 10 AOAs were drawn up.

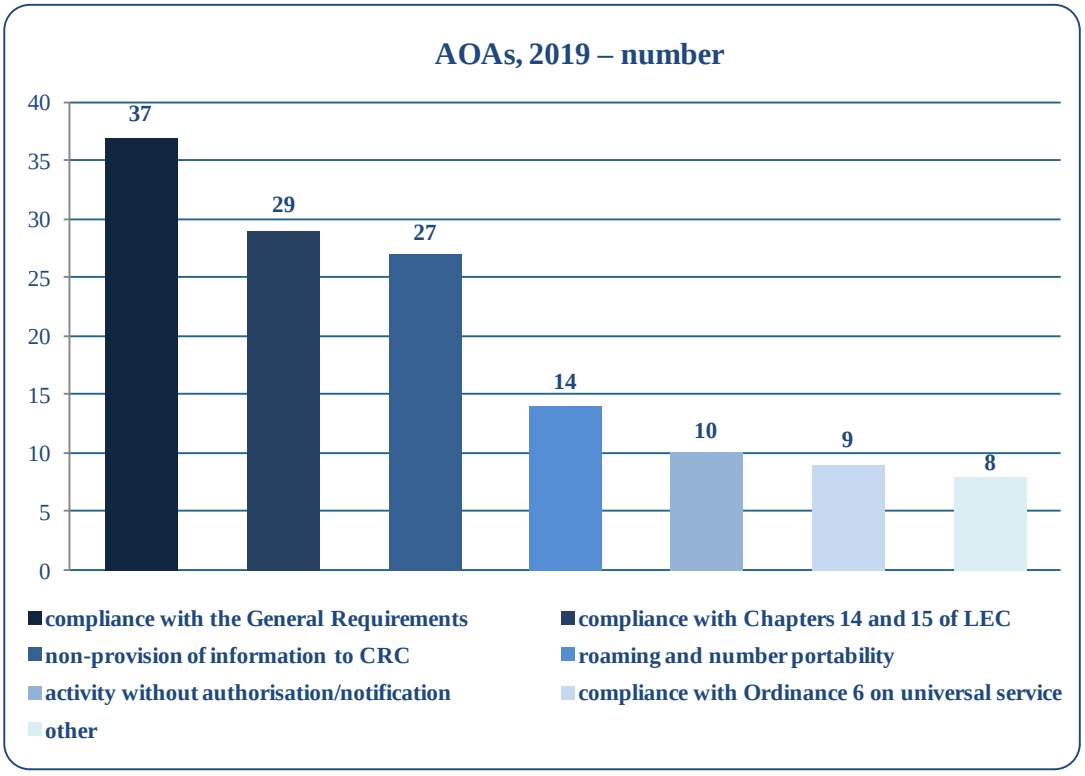
Summarised data for the performed control activity and the engaged administrative and punitive liability in offences of the LEC and secondary legislative acts in 2019 are displayed in Figures 49 and 50.



Source: *CRC*

Figure 49

As a result of the inspections, for the administrative violations of the LEC found, 134 **administrative offence acts** were drawn up in 2019, with the main share (36%) once again being held by acts regarding non-compliance with the *General Requirements for the Provision of Electronic Communications.*



Source: *CRC*

Figure 50

2.5. Quality of the Internet access and net neutrality service

In implementation of Article 5 of Regulation (EU) 2015/2120 (the Regulation) on safeguarding open Internet access, CRC prepared an annual report on the implementation of obligations and traffic management practices by the Internet access providers. The report is based on the information collected through the 2018 annual activity report questionnaires and annual complaints filed by end-users during the year. CRC sent the report to the European Commission (EC) and BEREC and published it on its website.[84] In order to achieve a greater clarity, transparency and equality of contractual terms applied to end-users which are to be drafted by providers of Internet access to end-users in implementation of the Regulation, by its Decision No 170/18.04.2019, the Commission adopted a "*Position on the implementation of the requirements of Article 3 and Article 4 of Regulation (EU) 2015/2120 by providers of Internet access to end-users*". The aim of the adopted document is to publicly declare the criteria on the basis of which CRC will assess its implementation. The guidelines given in this position are also a consequence of the analysis performed of the implementation of the requirements of Article 3 and Article 4 of the Regulation by providers of Internet access.

Throughout the year, in the framework of its monitoring of the implementation of Regulation (EU) No 596/2014, CRC found a practice which is in breach of Regulation (EU) 2015/2120 and is linked to an incorrectly chosen method for restricting the access to websites which have been identified by a court decision. After a check performed by CRC, the provider changed the method of restricting the access to such websites in a voluntary manner, therefore no sanctions were imposed.

2.5. Quality of the Internet access and net neutrality service

According to Article 5 of Regulation (EU) 2015/2120 (the Regulation) to ensure open Internet access, CRC prepared an annual report on the implementation of obligations and traffic management practices by the Internet access service providers. The report is based on the information collected through the 2018 with annual questionnaires and complaints filed by end-users during the year. CRC sent the report to the European Commission (EC) and BEREC and published it on its website.[85] In order to achieve a greater clarity, transparency and equality of the applied contract conditions with end-users which internet access service providers are required to draw up pursuant to the implementation of the Regulation, by its Decision No 170/18.04.2019, the Commission adopted a "*Position on the implementation of the requirements of Article 3 and Article 4 of Regulation (EU) 2015/2120 by providers of Internet access to end-users*". The aim of the adopted document is to announce publicly the criteria on the basis of which CRC will assess its implementation. The guidelines given in this position are also a consequence of the analysis performed of the implementation of the requirements of Article 3 and Article 4 of the Regulation by providers of Internet access service.

Throughout the year, in the framework of its monitoring of the implementation of Regulation (EU) 2015/2120, CRC found one practice that is in violation. The practice is linked to an incorrectly chosen method for restricting the access to websites which have been determined by a court decision. After a check performed by CRC, the provider changed the method of restricting the access to such websites in a voluntary manner, therefore no sanctions were imposed.

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

In 2019, a total of 2,245 tips were filed with CRC by users against different undertakings providing electronic communication services.

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[84] https://crc.bg/files/TR/NNeutrality/Annual%20Report%20OI%202018%20-2019%20BG.pdf
[85] https://crc.bg/files/TR/NNeutrality/Annual%20Report%20OI%202018%20-2019%20BG.pdf

In 2019, a significant decline (about 30%) was observed in the number of tips submitted as compared to 2018 (2,935 pcs).

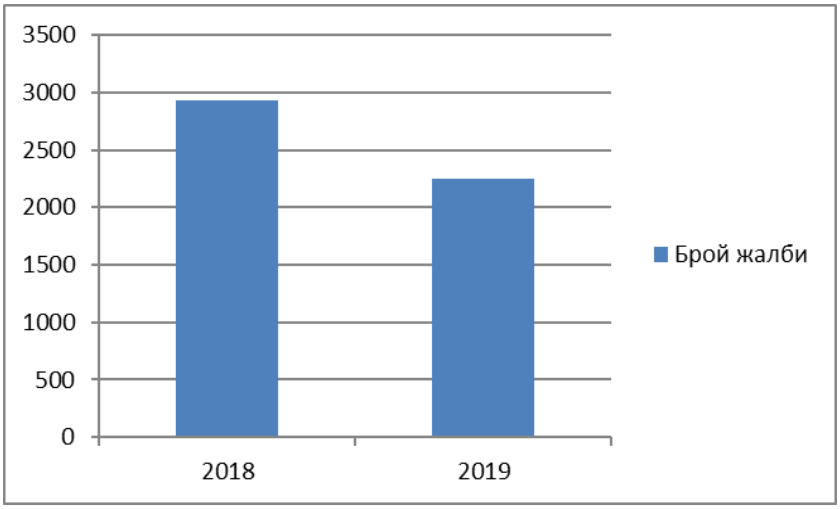

Figure 51

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

The trend for a considerable part (approximately 1/2) of tips received during the year to concern matters that fall outside the control and regulatory powers of CRC,[86] continued. In these cases, the regulator requested an opinion from the relevant undertaking with the purpose of providing assistance to the affected end-user. Most of the opinions requested by the Commission were in favour of the complainant, which has led to the settlement of the dispute.

A number of tips were forwarded by competence to other state bodies (Commission for Consumer Protection,[87] National Construction Supervision Directorate, Commission for Personal Data Protection, Ministry of Health, Prosecutor's Office of the Republic of Bulgaria, etc.).

The reduction in the number of tips 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, BULGARIAN TELECOMMUNICATIONS COMPANY EAD and TELENOR BULGARIA EAD. The aim of the meetings is to prevent breaches in the sector as well as to address common issues in the customer service process.

In 2019, CRC held three meetings, in which a number of issues were resolved concerning the charging and provision of roaming services, the improved protection of consumer data, the secure provision of itemised bills and statements, and the servicing of consumers in the store network of providers.

Amendments and supplements to the General Requirements for the provision of public electronic communications (the General Requirements)

By Decision No 405 of 31.10.2019, the Commission launched a public discussion of a draft decision for amendments and supplements to the General Requirements in the part protecting the interests of end-users.

The proposed amendments to the General Requirements aim to fine-tune the contract procedure in the telecommunications sector, reduce the administrative burden for operators and

[86] Termination/amendment of individual contracts, dispute of monthly bills, complaints from the customer service provided, charging of penalties, etc.

[87] Tips concerning unfair trade practices, unsolicited services and other complaints concerning the Law on Consumer Protection.

ensure a higher level of protection of consumer personal data in accordance with the General Data Protection Regulation (GDPR).

In the framework of the public discussion on the draft decision, opinions were received from the Bulgarian Telecommunications Company EAD, A1 BULGARIA EAD and the Bulgarian National Association "Active Consumers". The above entities supported in essence the amendments proposed by CRC and proposals were also made to fine-tune the regulatory framework.

By Decision No 122/26.03.2020, CRC adopted a final decision amending and supplementing the General Requirements, which reflected part of the proposals made in line with the regulatory framework.

Amendment of the general terms and conditions of one of the mobile telephone services providers in order to protect the interests of its subscribers

Under an agreement concluded and approved by the court between CRC and the provider, starting from 16.05.2019, the regulator has obliged the mobile operator to amend its general terms and conditions. As a result of the amendment made, the subscribers of the operator have the right to terminate the individual contract without penalty if the undertaking increases the amount of the compensation charged by it to the amount of BGN 2.00 which is due in the event of non-payment of the monthly bill within the time limit given.

Cooperation with the Commission for Consumer Protection

There is a shared competence between CRC and 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, fall within the competence of CCP. In this respect and in implementation of the law, CRC has referred many consumers' issues to CCP.

Implementing the provision of Article 37a of the LEC, CRC informed CCP of the launch of a procedure on amendment of the General Requirements pursuant to Decision No 405 of 31 October 2019, giving it the opportunity to express an opinion on the provisions related to consumer protection.

CRC and CCP also 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.

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

In implementation of its powers, in 2019, CRC conducted 41 dispute resolution procedures, mainly between operators of electronic communications networks (ECN) and CEZ BULGARIA AD, ELEKTRORAZPREDELENIE SEVER AD and ELEKTRORAZPREDELENIE YUG EAD.

As a result of the CRC's intervention, the three electricity distribution companies substantially amended their general terms and conditions under Article 15 (2) of the LECNPI on the provision of access to the pole and duct network in favour of the ECN operators. Thus, in addition to the results achieved in the 2018 assistance (mediation) procedures, the following substantial results were achieved in 2019:

- Removal of the requirement to survey the physical infrastructure of the EDCs at the expense of the ECN operators;
- Removal of a ban on positioning the ECN pole infrastructure consisting of copper cables and wires;
- Amendment of pricing mechanisms;
- Increasing the maximum distance for direct positioning of the ECN local loops to buildings;
- Allowing the building of ECN on all types of ECD poles;
- Removal of arbitration clauses and texts on payment for the right-of-way;

- Including texts on the maximum protection of the health and safety of employees of the ECN operators;
- Termination of access to the electricity distribution network not automatically, but after late payment of the monthly fee, including introduction of a penalty cap payable in case of delay;
- Calculating the residual (free) capacity of network operators in a transparent manner, including by indicating the planned capacity of the equipment at the Single Information Point;
- Removal of the obligation for coordination of a project under Article 52 (1) (1) of the LECNPI, including the payment of fees for networks already deployed in accordance with the LECNPI;
- Charging the use of the low voltage network per number of ECN and not per number of cables, to avoid the payment of excessive access rates;
- Removal of the ban on the installation of distribution boards on poles which are part of the low-voltage overhead network, and the ban on the installation of more than one cable coupling per pole, in order to avoid the risk of the removal of all previously mounted boards;
- A number of other amendments containing additional guarantees for the ECN operators using or seeking access.

The reduction of monthly rental prices for physical infrastructure is also particularly noteworthy. As a result of CRC's intervention, the rental price for the CEZ's pole infrastructure was reduced by **about 46%** and the rental prices per 1 linear meter of pipe network was decreased by **over 120**%. The company also lifted the restriction on the deployment of ”up to 3 networks” on its pole infrastructure. CEZ RAZPREDELENIE further amended the way in which its single prices were formed - from a price per number of poles to a fixed sum.

In 2019, CRC was actively involved in the elaboration of a number of secondary legislative acts which, along with those adopted in 2018, will be important for the electronic communications sector:

- *Ordinance on the rules and regulations for the design, deployment and dismantling of electronic communications networks (adopted with Ministerial Decree No 286/18.11.2019, prom. SG, no. 92 of 22 November 2019);*
- *Ordinance No 21 of 10 October 2019 on the content, conditions and procedure for the creation and maintenance of specialised maps and registers for electronic communications networks, facilities and associated physical infrastructure (prom. SG, no. 83 of 22 October 2019);*
- *Ordinance No 6 of 13 June 2019 on the easements arising for the benefit of the operators of electronic communications networks under the LECNPI (prom. SG, no. 49 of 21 June 2019);*
- *Ordinance on data formats, conditions and procedures for the provision of access to the information at the Single Information Point (adopted by Ministerial Decree No 227/10.09.2019);*
- *Updated list of independent consultants and external experts under Article 87 (1) of the LECNPI (prom. SG, no. 90 of 15 November 2019).*

IV. BUDGET

CRC budget implementation for 2019

The Commission Chairman is a primary budget administrator. By the Law on State Budget of the Republic of Bulgaria for 2019, CRC was allocated with:

- Revenue in the amount of BGN 63,200 thousand;
- Expenses in the amount of BGN 11,080 thousand.

The Commission administers revenue pursuant to Article 51(1) of the LEC, Article 62 of the PSA, and Article 81(8) of the Law on Electronic Communications Networks and Physical Infrastructure.

In 2019, the revenue earned from fees, fines, financial penalties and interest amounted to BGN 58,426 thousand - 92% fulfilment of the annual plan.

The free resource in the 1.5 GHz, 1.8 GHz, 2 GHz, 2.6 GHz and 3.6 GHz bands was not taken up by undertakings, which did not allow the annual budget revenue target to be achieved.

Good practices applied by CRC to increase revenue collection:

- Quarterly information on the terms and conditions of payment of the fees is made available to undertakings through publications on the Commission's website and through the generation of automatic electronic messages;
- Personalised e-mails about the specific obligations of the companies are being sent on an ongoing basis in case of late payments and final penal decrees;
- Electronic invoices are issued on request;
- Where an authorisation to use an individually assigned scarce resource is issued and/or amended, a personalised electronic message about the fees due is sent.

The Commission:

- Issues acts establishing public state receivables (AEPSRs) in case of non-payment of public debts to CRC within the specified time limit;
- Sends AEPSRs and final penal decrees to the National Revenue Agency to be enforced. In 2019, additional revenue in the amount of BGN 1,221 thousand was collected in the framework of enforcement proceedings.

Distribution of revenue receipts and costs incurred in 2019

The structure of the revenue part of the CRC budget for 2019 was as follows:

Table 18

Type of revenue	Value (BGN '000)	Share (%)
1. Own revenue approved with the CRC budget for 2019	**63,200**	
2. Revenue generated for 2019, incl.:	**58,426**	**100.00**
- one-off fees under the Law on Electronic Communications	1,153	1.97
- one-off fees under the Postal Services Act	20	0.03
- one-off fees under the Law on Electronic Communications Networks and Physical Infrastructure	5	0.01
- administrative annual charge - control	7,987	13.67
- charges for the use of an individually assigned scarce resource - radio frequency spectrum	38,509	65.91

- fees for the use of an individually assigned scarce resource - positions on a geostationary orbit assigned for the Republic of Bulgaria according to international agreements	228	0.39
- charges for the use of individually assigned scarce resource following tender calls	2,375	4.07
- charges for the use of an individually assigned scarce resource - numbers from the National Numbering Plan (NNP);	7,263	12.43
- fines and property sanctions	571	0.98
- interest	315	0.54

Pursuant to Article 148 (edited, SG, no. 11 of 2014) of the LEC and Article 64 (edited, SG, no. 102 of 2010) of the PSA, in 2019, transfers were made to the state budget of BGN 12,132 thousand and to the Ministry of Transport, Information Technology and Communications - BGN 14,223 thousand.

By the end of 2019, transfers took place monthly on the basis of the revenue generated during the previous month, with funds transferred in January on the basis of data reported for December of the previous year. In accordance with the changes made to Article 19 and Article 148 of the LEC (amended, SG, no. 100 of 2019, effective from 01.01.2020) and Article 64 PSA (amended, SG, no. 100 of 2019, effective from 01.01.2020), this approach has changed and in 2020 transfers will be made in four equal instalments within the current year to which they relate.

The Commission's budget funds, as allocated in the Law on State Budget of the Republic of Bulgaria, were spent on financing its activities (including projects related to market regulation and liberalisation), for participation in the work of the Body of European Regulations for Electronic Communications and to ensure effective and efficient control.

The structure of expenses for 2019 was as follows:

Table 19

Type of expenses	Value (BGN '000)	Share (%)
1. Salaries	4,774	45.22
2. Social security contributions	1,364	12.92
3. Other remunerations and payments	287	2.72
4. Operating costs	2,138	20.25
5. Membership fee	67	0.63
6. Capital expenditure	1,928	18.26
Total costs	**10,558**	**100.00**

In 2019, 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's investment policy has allowed the continuation of the replacement of amortised measurement equipment (measurement receivers and direction finders) of mobile radio monitoring stations from the National Radio Frequency Spectrum Monitoring System for civil needs which was started in 2018, which has helped increase the effectiveness of the control and monitoring of radio spectrum and the services provided through it. Given the dynamic evolution of electronic communication technologies, the purchase of modern equipment with the necessary functionalities to measure and control the next-generation digital networks in a higher frequency range was also ensured.

In the context of the 2020 Budgetary Procedure, in September 2019, with the draft budget for 2020, an increase in the CRC budget for 2020 by BGN 3,648 thousand or 33%, including the envisaged changes in income policy, was reasonably put forward to the Ministry of Finance. The requested increase was approved through the Law on State Budget of the Republic of Bulgaria for 2020.

The additional funds will allow the delivery of measuring equipment in 2020 in order to develop and renew the National Radio Frequency Spectrum Monitoring System, which will in turn contribute to:

- The development of the National Radio Frequency Spectrum Monitoring System, in line with the entry of new technologies (including 5G networks), the consistentimprovement of electronic communications which will provide high-speed data transmission, high capacity and high quality services;
- 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.

CONCLUSION

The rapid development of wireless technologies, in the form of new products and services, is due to new trends in the communications sector. The consumer demand for universal connectivity, the spectrum resource crisis, future efficient wireless systems and technologies for radio access and IoT stimulate innovations in spectrum use.

In its work, the Commission will continue to be guided by one of its main strategic objectives: to ensure an effective and forward-looking regulatory environment by continuing to implement a policy for radio frequency spectrum for civil needs, thereby enabling ease of use of spectrum resources in bands where possible, to facilitate the introduction of new digital technologies and services, to promote investment and competition, and the benefits for consumers of high quality services, and to engage in active dialogue with stakeholders.

In the Regulatory policy for radio frequency spectrum management for civil needs, adopted in 2019, the Commission defined its main objectives, mechanisms and approaches for radio frequency spectrum management for civil needs until 2021. Its main objective is to ensure good regulatory conditions for the use of radio frequency spectrum which in turn would contribute to the development of wireless communications, including the successful implementation and development of 5G networks as well as the development of digital TV, point-to-point networks, satellite networks, programme making and special events networks, the use of short-range devices, etc.

The main objectives of electronic communications policy are to ensure the provision of modern and quality electronic communications services to the public and the business, by creating conditions for the development of an electronic communications network and services market as part of the EU internal market, leading to the deployment and use of very high capacity networks, provision of 5G services which 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 information contained in this report gives a true notion that the reporting year 2019 was another year of intensive work in which CRC continued to pursue its mission, contributing to the creation of a predictable and well-functioning regulatory environment in the field of electronic communications.