AN OVERVIEW OF THE
**TELECOM AND**
**POSTAL SERVICES**
MARKET IN THE
REPUBLIC OF SERBIA
IN 2015

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# A WORD OF INTRODUCTION

Electronic communications or telecommunications sector was marked by an extremely fast growth and constant technological progress. 2015 continued to follow the same tendency. This year was especially important because the analogue to digital switchover, which had formally begun in 2006 in RRC-06 held in Geneva, was completed as scheduled, enabling a higher quality of TV signal reception in every household in Serbia and providing the digital dividend, by vacating the 791-821/832-862 MHz frequency band. Upon the completed public bidding procedure for this frequency band, the mobile operators gained a considerable and valuable part of the RF spectrum and the further development of the wireless broadband systems was thus enabled.

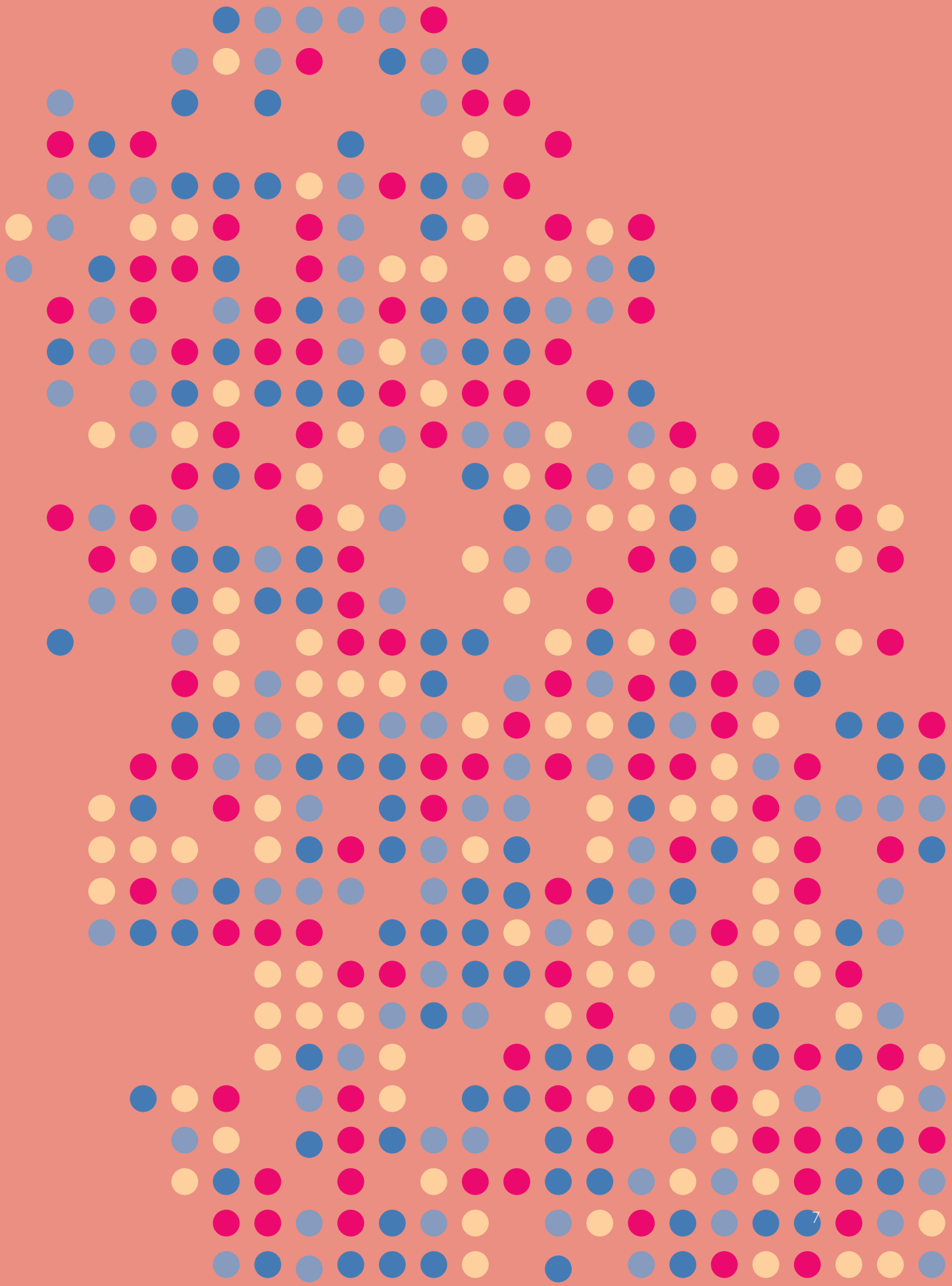
The total revenues made in the electronic communications market in the Republic of Serbia in 2015 amounted to 187.6 billion dinars (1.55 billion euros), which is an 8.3% growth year on year, with a share in GDP of 4.72%.

The total investments made in the electronic communications sector in 2015 amounted to 276 million euros, by 48% more than a year before, which is a promising signal for the future period.

Fixed telephony services are marked by stagnation in terms of the number of users, however the growth of competition can be expected in the years ahead, owing to the number portability service. The biggest revenues and investments were made in mobile telephony, which is thus one of the key generators of the further development of the electronic communications sector. The number of users is slightly lower compared with 2014, yet the user structure shows that the number of prepaid and postpaid users is almost the same for the first time, which indicates a high level of development and competition in this market segment. It is worth noting that the data traffic average growth rate in the past four years has been 45%. The total number of portings was over 400 thousand. The number of the Internet users, revenues, investments and access rates are constantly increasing and, it should also be noted that dial up technology became officially nonexistent in the Serbian market. The prevailing technology in the media content distribution are cable, IPTV and DTH. However, cable distribution systems are expected to become fully digital, providing the end users with a better quality of service and the possibility to access new services.

The postal market continues to grow in terms of revenues, which amounted to approximately 16 billion dinars in 2015. The total number of postal services provided dropped by 2%, while the biggest decrease of 3% was seen in the universal postal service. Commercial services continue to grow, showing a 14% rise in volume year on year.

The Overview provides the most important data that reflect the situation in the electronic communications market in terms of types of services (fixed and mobile telephony, Internet, media content distribution, value added services), the situation in the postal market and the QoS analysis for both markets. Moreover, it provides the data on the general availability and usage of the ICTs in Serbia (using both statistical data and indexes) and introduces the concept of shared use of the electronic communication infrastructure.



01

# BASIC FEATURES OF TELECOMMUNICATIONS MARKET IN THE REPUBLIC OF SERBIA

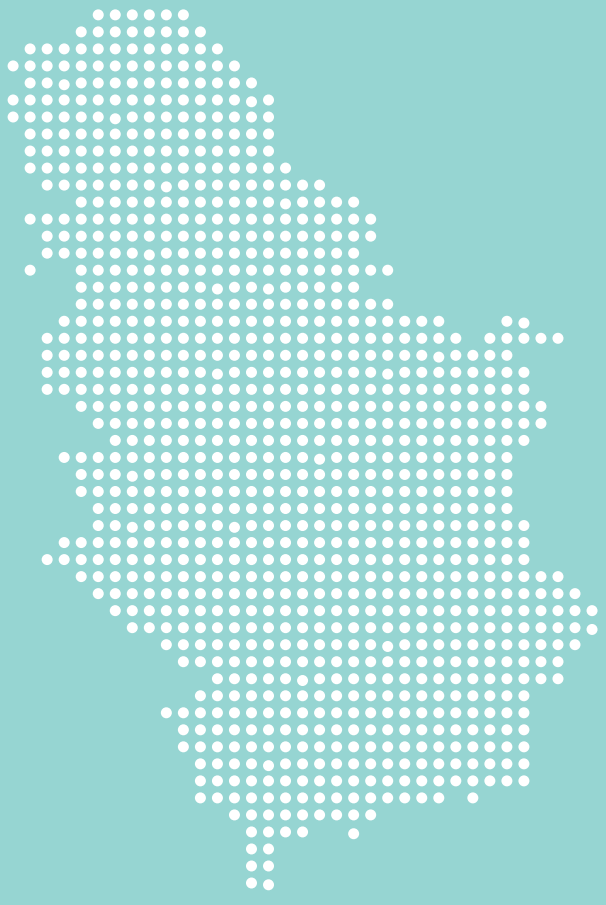


**Figure 1.**
**Republic of Serbia – Basic Facts**

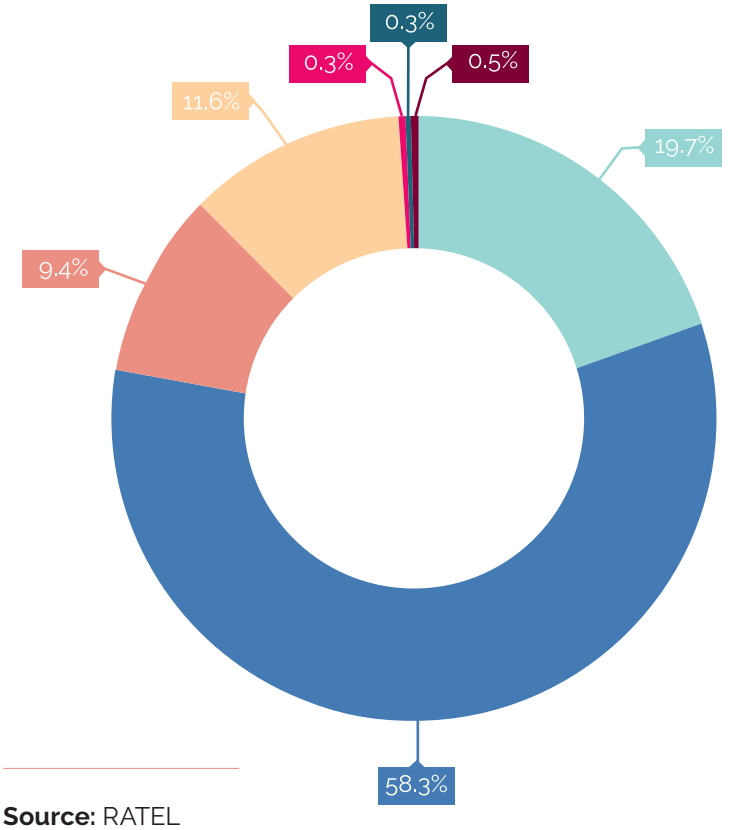
| | |
|---|---|
| **Name** | Republic of Serbia |
| **Capital** | Belgrade |
| **Area** | 88 361 km² |
| **Population (without AP Kosovo and Metohija), estimated by the Statistical Office** | 7 076 372 |
| **Country code:** | +381 |
| **Internet domain:** | .rs<br>.срб |
| **GDP in 2015** | 3 973 billion dinars (33 billion euros) |
| **Average net income in 2015** | 44 437 dinars (368 euros) |

**Table 1. An overview of the low basket users in the Republic of Serbia (2012-2015)**

| | 2012 | | 2013 | | 2014 | | 2015 | |
|---|---|---|---|---|---|---|---|---|
| | Number (mil) | Per 100 inhabitants | Number (mil) | Per 100 inhabitants | Number (mil) | Per 100 inhabitants | Number (mil) | Per 100 inhabitants |
| **Fixed telephone - subscribers** | 2.83 | 39.04 | 2.79 | 38.85 | 2.72 | 37.99 | 2.60 | 36.80 |
| **Mobile telephone - users** | 9.14 | 126.19 | 9.20 | 128.09 | 9.34 | 130.76 | 9.16 | 129.38 |
| **Broadband - subscribers** | 1.36 | 18.72 | 1.46 | 20.36 | 1.51 | 21.19 | 1.56 | 22.09 |
| **Media content distribution – subscribers** | 1.44 | 19.92 | 1.55 | 21.62 | 1.50 | 20.95 | 1.60 | 22.55 |

The total revenues made in the electronic communications market of the Republic of Serbia in 2015 amounted to approximately 187.6 billion dinars, which is an increase of 8.3% compared with the previous year. According to the annual average middle exchange rate the total revenues amounted to 1.55 billion euros, which is thus a market growth of 5.2% compared with 2014.

The share of revenues from electronic communications in the Serbian GDP was around 4.72% in 2015.

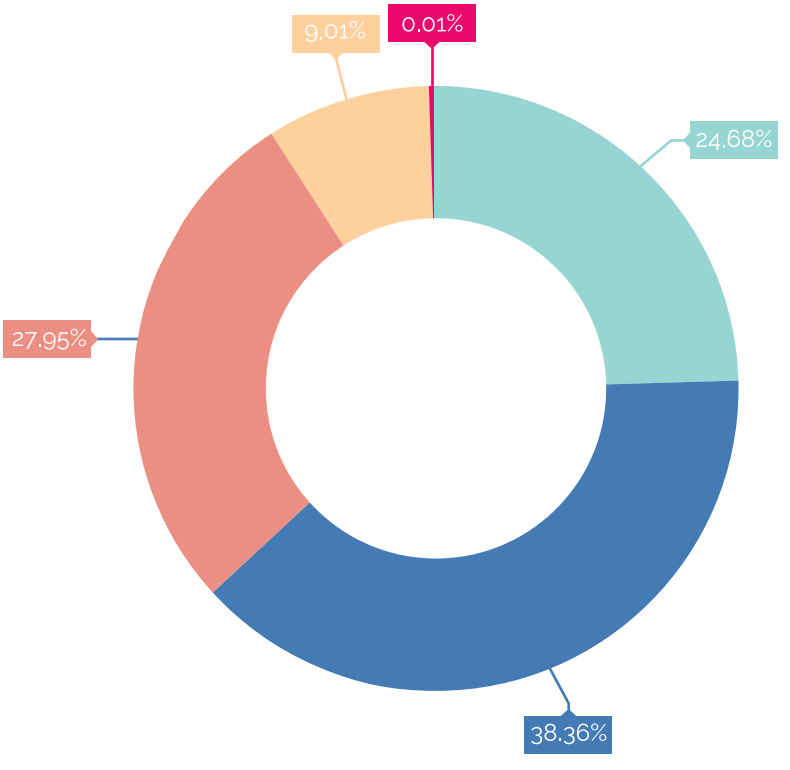



**Source:** RATEL

## Figure 2. Structure of revenues by services in 2015

- Fixed
- Mobile
- Media content distribution
- Internet
- VoIP
- Leased lines
- VAS

In terms of market share accounted for by different services in the Serbian electronic communication market in 2015, same as in the previous years, the revenues from the mobile services accounted for the largest share in the total revenues, amounting to 902 million euros, which equals 58% of the total revenues.




## Figure 3. Structure of investments by services in 2015

- Fixed
- Mobile
- Media content distribution
- Internet
- VoIP

The total investments made in the electronic communications sector in 2015 amounted to approximately 276 million euros, which is by 48% more compared with the previous year. More than 60% of investments were made in mobile and fixed telephony, amounting to 106.8 and 68.7 million euros, respectively.

Low usage basket of electronic communications services shows average monthly expenses of a subscriber/inhabitant for telecommunications services. Tables 2 and 3 illustrate low usage and high usage baskets, representing monthly expenditure per subscriber of electronic communication services in Serbia in 2015, compared with the data retrieved in 2012, 2013 and 2014. According to the obtained data and the data received from the Statistical Office, in 2015, the cost of the low basket equalled 2.74% and the cost of the high usage basket equalled 10.38% of the net average annual salary.

## Table 2. Low usage basket of electronic communications services

| LOW USAGE BASKET | 2012 | | 2013 | | 2014 | | 2015* | |
|---|---|---|---|---|---|---|---|---|
| | Average bill | % of the monthly salary | Average bill | % of the monthly salary | Average bill | % of the monthly salary | Average bill | % of the monthly salary |
| Fixed phone | 880.86 | 2.13% | 837.88 | 1.91% | 986.22 | 2.21% | 882.77 | 1.99% |
| Mobile phone (prepaid) | 261.95 | 0.63% | 271.35 | 0.62% | 238.8 | 0.54% | 334.43 | 0.75% |
| TV (national TV subscription) | 500.00 | 1.21% | 500.00 | 1.14% | / | / | / | / |
| Total | 1,642.81 | 3.97% | 1.609.23 | 3.66% | 1,225.02 | 2.75% | 1,217.20 | 2.74% |
| Average net salary | | 41,386 | | 43,948 | | 44,525 | | 44,437 |

*Average bill amounts for 2015 are based on weighted average / **Source:** RATEL

**Source:** RATEL

## Table 3. High usage basket of electronic communications services

| HIGH USAGE BASKET | 2012 | | 2013 | | 2014 | | 2015* | |
|---|---|---|---|---|---|---|---|---|
| | Average bill | % of the monthly salary | Average bill | % of the monthly salary | Average bill | % of the monthly salary | Average bill | % of the monthly salary |
| Fixed phone | 880.86 | 2.13% | 837.88 | 1.91% | 986.22 | 2.21% | 882.77 | 1.99% |
| Mobile phone (postpaid) | 1,817.72 | 4.39% | 1,666.05 | 3.79% | 1,478.04 | 3.32% | 1,297.01 | 2.92% |
| TV (national TV subscription) | 500.00 | 1.21% | 500.00 | 1.14% | / | / | / | / |
| Internet | 1,224.69 | 2.96% | 1,302.59 | 2.96% | 1,305.24 | 2.93% | 1,380.11 | 3.11% |
| Media content distribution | 727.34 | 1.76% | 911.40 | 2.07% | 1,093.57 | 2.46% | 1,054.89 | 2.37% |
| Total | 5,150.61 | 12.45% | 5,217.92 | 11.87% | 4,863.07 | 10.92% | 4,614.77 | 10.38% |
| Average net salary | | 41,386 | | 43,948 | | 44,525 | | 44,437 |

* Average bill amounts for 2015 are based on weighted average / **Source:** RATEL

**Note**: With the entry into force of the Law on Public Media Service (*Official Gazette*, no. 83/14), on 13 August 2014, the Law on Broadcasting (*Official Gazette*, nos. 42/02, 97/04, 76/05, 79/05, 62/06, 85/06 and 41/09) ceased to be valid. As the Law on Broadcasting ceased to be valid, the monthly national TV subscription is no longer collected since August 2014.

# 02
# ICT DEVELOPMENT INDEX

*With the aim of measuring and monitoring the development of information society and determining the digital divide among the UN Member States, the International Telecommunication Union (ITU) publishes the indicators of ICT development on a regular basis. The indicators are obtained based on a representative sample of the households and population. The list of core indicators for households and individuals in the Republic of Serbia for 2015, along with the reference indicator HHR1 which is a general indicator, are given in Table 4. The indicators are presented according to the ITU Manual for Measuring ICT Access and Use by Households and Individuals[1], which defines the key parameters and the methodology for data collection and analysis.*

1 Manual for Measuring ICT Access and Use by Households and Individuals, International Telecommunication Union, 2009

## Table 4. ICT development indicators

| INDICATOR | | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH1 | Proportion of households with a radio | The *proportion of households with a radio* is calculated by dividing the number of in-scope households with a radio by the total number of in-scope households.<br><br>A *radio* is a device capable of receiving broadcast radio signals, using popular frequencies, such as FM, AM, LW and SW. It includes a radio set integrated in a car or an alarm clock but excludes radios integrated with a mobile phone, a digital audio player (MP3 player) or in a computer. | 83.8% |
| HH2 | Proportion of households with a TV | *The proportion of households with a* TV is calculated by dividing the number of in-scope households with a TV by the total number of in-scope households.<br><br>A *TV* (television) is a stand-alone device capable of receiving broadcast television signals, using popular access means such as over-the-air, cable and satellite. It excludes TV functionality integrated with another device, such as a computer or a mobile phone. | 99.3% |
| HH3 | Proportion of households with fixed telephone | The *proportion of households with fixed telephone only* is calculated by dividing the number of in-scope households with a fixed telephone only by the total number of in-scope households.<br><br>A *fixed telephone line* refers to a telephone line connecting a customer's terminal equipment (e.g. telephone set, facsimile machine) to the public switched telephone network (PSTN) and which has a dedicated port on a telephone exchange. It may not be the same as an access line or a subscriber. | 81.8% |
| | Proportion of households with mobile cellular telephone | The *proportion of households with mobile cellular telephone* only is calculated by dividing the number of in-scope households with a mobile cellular telephone only by the total number of in-scope households.<br><br>A *mobile cellular telephone* refers to a portable telephone subscribing to a public mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems, as well as IMT-2000 (3G). Users of both post-paid subscriptions and pre-paid accounts are included. | 90.3% |
| HH4 | Proportion of households with a computer | The *proportion of households with a computer* is calculated by dividing the number of in-scope households with a computer by the total number of in-scope households.<br><br>A *computer* refers to a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants (PDAs) or TV sets. | 63.2% |

| INDICATOR | | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH5 | Proportion of individuals who used a computer (from any location) in the last 12 months | The *proportion of individuals who used a computer* is calculated by dividing the total number of in-scope individuals who used a computer from any location in the last 12 months by the total number of in-scope individuals.<br><br>A *computer* refers to a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants or TV sets. | 68.8% |
| HH6 | Proportion of households with Internet access at home | The *proportion of households with Internet access* at home is calculated by dividing the number of in-scope households with Internet access by the total number of in-scope households.<br><br>The *Internet* is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile phone, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network. | 63.8% |
| HH7 | Proportion of individuals who used the Internet (from any location) in the last 12 months | The *proportion of individuals who used the Internet* is calculated by dividing the total number of in-scope individuals who used the Internet (from any location) in the last 12 months by the total number of in-scope individuals.<br><br>The *Internet* is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile phone, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network | 66.3% |
| HH8 | Location of individual use of the Internet in the last 12 months | The proportion of individuals who used the Internet at each location can be calculated as either: the proportion of in-scope individuals or the proportion of Internet users, using the Internet at each location. Access to the Internet is not assumed to be only via a computer – it may also be by mobile phone, PDA, games machine, digital TV etc.<br><br>Individuals should be asked about all locations of Internet use (that is, the survey question used by countries should specify multiple responses). Note that, except for mobile access, the locations are associated with the equipment used e.g. a PC installed at work or at an Internet café. | 34.2% |
| | Home | | 91.8% |
| | Work | Where a person's workplace is located at his/her home, then he/she would answer yes to the home category only. | 34.2% |

| INDICATOR | | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH8 | Place of education | For students. Teachers (and others who work at a place of education) would report 'work' as the place of Internet use. | 13.1% |
| | Another person's home | The home of a friend, relative or neighbour. | 36.1% |
| | Community Internet access facility | Internet use at community facilities such as public libraries, publicly provided Internet kiosks, non-commercial telecentres, digital community centres, post offices and other government agencies; access is typically free and is available to the general public. | 3.2%[1] |
| | Commercial Internet access facility | Internet use at publicly available commercial facilities such as Internet or cyber cafés, hotels, airports etc, where access is typically paid (i.e. not free of charge). | 19.6%[2] |
| | Any place via a mobile cellular telephone | Use of the Internet at any location via a mobile cellular telephone (including handheld devices with mobile phone functionality). | n/a |
| | Any place via other mobile/ wireless access devices | Use of the Internet at any location via other mobile access devices, e.g. a laptop computer or handheld device that uses wireless access (at a WiFi 'hotspot') or a laptop computer connected to a mobile telecommunications network. | n/a |
| HH9 | Internet activities undertaken by individuals in the last 12 months | The proportion of individuals who undertook each activity can be calculated as either: the proportion of in-scope individuals or the proportion of Internet users who undertook each activity. | |
| | Getting information about goods or services | | 67.7% |
| | Getting information related to health or health services | Includes information on injury, disease, nutrition and improving health generally. | 56.8% |

| | INDICATOR | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH9 | Getting information from general government organizations | *General government organizations* should be consistent with the SNA93 (2008 revision) concept of general government. According to the SNA "… the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production." (General) government organizations include central, state and local government units. | 38.9% |
| | Interacting with general government organizations | Includes downloading/requesting forms, completing/lodging forms on line, making on-line payments and purchasing from government organizations. It excludes getting information from government organizations.<br><br>*General government organizations* should be consistent with the SNA93 (2008 revision) concept of general government. According to the SNA "… the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production." (General) government organizations include central, state and local government units. | 33.2% |
| | Sending or receiving e-mail | | 66.0% |
| | Telephoning over the Internet/VoIP | The use of Skype, iTalk, etc. Includes video calls (via webcam). | 52.7% |
| | Posting information or instant messaging | Posting messages or other information to chat sites, blogs, newsgroups, on-line discussion forums and similar; use of instant messaging. | 75.6% |
| | Purchasing or ordering goods or services | Refers to purchase orders placed via the Internet whether or not payment was made on line. Orders that were cancelled or not completed are excluded. Includes purchasing of products such as music, travel and accommodation via the Internet. | 33.3% |
| | Internet banking | Includes electronic transactions with a bank for payment, transfers, etc. or for looking up account information. Excludes electronic transactions via the Internet for other types of financial services such as share purchases, financial services and insurance. | 12.9% |

| INDICATOR | | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| | Education or learning activities | Refers to formal learning activities such as study associated with school or tertiary education courses as well as distance education involving on-line activities. (A more narrow interpretation is likely to be less meaningful as it could include a range of activities such as using the Internet to search for information.) | 22.7%[3] |
| | Playing or downloading video games of computer games | Includes file sharing games and playing games on line, either paid or free of charge. | n/a |
| HH9 | Downloading movies, images, music, watching TV or video, or listening to radio or music | Includes file sharing and using web radio or web television, either paid or free of charge. | 38.1% |
| | Downloading software | Includes the downloading of patches and upgrades, either paid or free of charge. | 18.8% |
| | Reading or downloading on-line newspapers or magazines, electronic books | Includes accessing news websites, either paid or free of charge. Includes subscriptions to on-line news services. | 62.3% |
| HH10 | Proportion of individuals who use a mobile cellular telephone | The *proportion of individuals with use of a mobile cellular telephone* is calculated by dividing the total number of in-scope individuals with use of a mobile cellular telephone by the total number of in scope individuals.<br><br>A *mobile cellular telephone* refers to a portable telephone subscribing to a public mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems, as well as IMT-2000 (3G). Users of both post-paid subscriptions and pre-paid accounts are included.<br><br>*Use of a mobile cellular telephone* does not mean that the telephone is owned or paid for by the person but should be reasonably available through work, a friend or family member, etc. It excludes occasional use, for instance, borrowing a mobile phone to make a call. | 91.4% |

| | INDICATOR | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH11 | Proportion of households with access to the Internet by type of access (narrowband, broadband (fixed, mobile)) | This indicator should be calculated as the proportion of in-scope households with Internet access that use each type of access service, for instance, the proportion of households with Internet access that use a broadband service as their means of access.<br>It is expected that countries will collect data at a finer level than shown here.<br><br>The categories chosen by countries should allow aggregation to total narrowband and total broadband, as well as to fixed and mobile broadband, as defined below.<br><br>As households can use more than one type of access service, multiple responses are possible. | |
| | *Narrowband* | *Narrowband includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s.*<br><br>Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-*mode*. | <1% |
| | *Fixed broadband* | *Fixed broadband refers to technologies at speeds of at least 256 kbit/s, in one or both directions, such as DSL (Digital Subscriber Line), cable modem, high-speed leased lines, fibre-to-the-home, powerline, satellite, fixed wireless, Wireless Local Area Network and WiMAX.* | 89.2% |
| | *Mobile broadband* | Mobile broadband refers to technologies at speeds of at least 256 kbit/s in one or both directions, such us Wideband CDMA (W-CDMA), known as Universal Mobile Telecommunications System (UMTS) in Europe; Highspeed Downlink Packet Access (HSDPA), complemented by High-Speed Uplink Packet Access (HSUPA); CDMA2000 1xEV-DO and CDMA 2000 1xEV-DV. Access can be via any device (handheld computer, laptop or mobile cellular telephone etc.). | 18.7% |
| HH12 | Frequency of individual use of the Internet in the last 12 months (from any location) | The frequency of individual use of the Internet can be calculated as either: the proportion of in-scope individuals or the proportion of Internet users, using the Internet with each frequency.<br><br>It is recommended that countries collect this information in respect of a typical period; therefore, respondents should ignore weekends (if they only use the Internet at work) and breaks from their usual routine, such as holidays.<br><br>Access to the Internet is not assumed to be only via a computer – it may also be by mobile phone, PDA, games machine, digital TV etc. | 38.1% |

| INDICATOR | | DEFINITIONS AND NOTES | 2015 |
|---|---|---|---|
| HH12 | *At least once a day* | Once a working day for respondents who only (or most frequently) use the Internet from work | 83.6 % |
| | *At least once a week but not every day* | | 11.5 % |
| | *Less than once a week* | | 3.1 % |
| **Reference indicator** | | | |
| HHR1 | Proportion of households with electricity | Electricity is not an ICT commodity, but is an important prerequisite for using many ICTs. It is therefore included in the core list as a reference indicator.<br><br>Electricity access may be enabled by a grid/mains connection, or by power generated locally (including at the dwelling). Local power includes electricity generated by a fuel-powered generator, or from renewable resources such as wind, water or solar. It excludes sole use of energy storage devices, such as batteries (though these may be used to store electricity from other sources). | 99.9 % |

1 The percentage refers to public libraries. 3.8% of respondents used the Internet in the post offices, and 5.8% in the public institutions, parliament, government, etc.

2 The percentage refers to Internet cafes. 15.4% of respondents used hotspots (hotel, airport, etc.).

3 The percentage refers to collecting audio-visual materials, online learning software, e-textbooks, etc. In particular, 56.8% of respondents used the Internet to search for the information related to education and courses, whereas 5.3% of respondents followed online courses.

**Source:** The Statistical Office of Serbia, RATEL

In 2007, the International Telecommunication Union (ITU) initiated the process of creating a single Index which can be utilized in measuring the development of information society, the so-called ICT Development Index (IDI), which serves as a substitute for the previous two, namely the Digital Opportunity Index (DOI) and the ICT Opportunity Index (ICT-OI). This single IDI Index serves as a benchmarking tool for measuring:

- the development of the ICT market in UN Member States
- digital divide between the developed and developing countries
- developmental potential of the ICT market.

This Index combines 11 indicators divided into three sub-groups:

1. ICT Readiness (infrastructure and access)
2. ICT use (primarily by individuals, but also households and undertakings) and the intensity of use
3. ICT Capability (skills necessary for the effective use of ICTs)

Given the fact that these three sub-groups of ICT development cannot be monitored by means of a single index, there is a necessity for the establishment of a single composite index for monitoring the development of information society in each country. Infrastructure, developed to meet the needs of end-users as well as an appropriate level of education, act as prerequisites for the use of ICTs and evolution towards an information society (Figure 4).

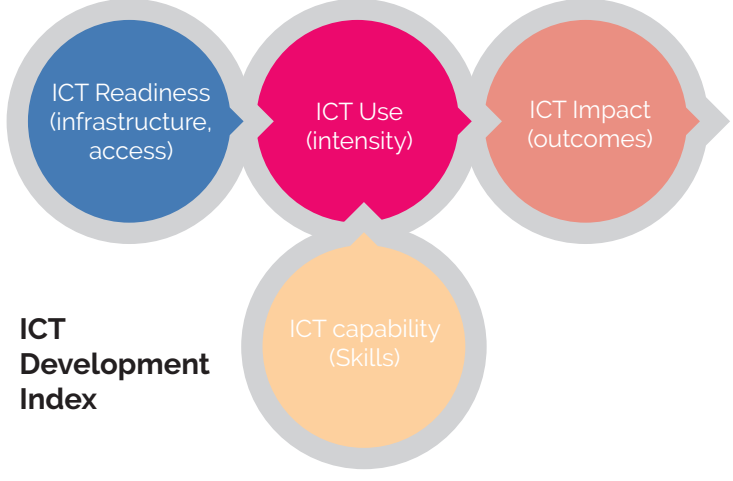



**Figure 4.**
**IDI structure**

**Source:** Measuring the Information Society - The ICT Development Index, ITU

The list of 11 indicators is given in Table 5 below, along with reference (normalized) values prescribed by the ITU, sub-indices value and IDI Index value for the Republic of Serbia in 2015. The values of the sub-indices were calculated by normalizing the 11 indicators by means of reference values. The final value of IDI Index is calculated as a sum of sub-indices multiplied by weight coefficients. The ICT Access and ICT use sub-indices are given 40% weight each, whereas the skill sub-index is given 20% weight.

**Tabela 5. 2015 IDI for the Republic of Serbia**

| | Indicator | ITU ideal value | Value for Serbia in 2015 |
|---|---|---|---|
| ICT Access | | | |
| a | Fixed telephone lines per 100 inhabitants | 60 | 36.80 |
| b | Mobile cellular telephone subscriptions per 100 inhabitants | 120 | 129.38 |
| c | International Internet bandwidth per Internet user | 962 216 | 180 570 |
| d | Proportion of households with a computer | 100 | 64.40 |
| e | Proportion of households with Internet access at home | 100 | 63.80 |
| ICT Use | | | |
| f | Internet users per 100 inhabitants | 100 | 53.36 |
| g | Fixed broadband Internet subscriptions per 100 inhabitants | 60 | 22.09 |
| h | Mobile broadband subscriptions per 100 inhabitants | 100 | 71.10 |
| ICT Skills | | | |
| i | Adult literacy rate | 100 | 98.0 |
| j | Secondary gross enrolment ratio | 100 | 88.7 |
| k | Tertiary gross enrolment ratio | 100 | 47.9 |

| | Indicator | ITU ideal value | Value for Serbia in 2015 |
|---|---|---|---|
| ICT Access – Normalized values | | Formula | |
| z1 | Fixed telephone lines per 100 inhabitants | a/60 | 0.61 |
| z2 | Mobile cellular telephone subscriptions per 100 inhabitants | b/120 | 1.08 |
| z3 | International Internet bandwidth per Internet user | log(c)/5.98 | 0.88 |
| z4 | Proportion of households with a computer | d/100 | 0.64 |
| z5 | Proportion of households with Internet access at home | e/100 | 0.64 |
| ICT Use – Normalized values | | Formula | |
| z6 | Internet users per 100 inhabitants | f/100 | 0.53 |
| z7 | Fixed broadband Internet subscriptions per 100 inhabitants | g/60 | 0.37 |
| z8 | Mobile broadband subscriptions per 100 inhabitants | h/100 | 0.71 |
| ICT Skills – Normalized values | | Formula | |
| z9 | Adult literacy rate | i/100 | 0.98 |
| z10 | Secondary gross enrolment ratio | j/100 | 0.89 |
| z11 | Tertiary gross enrolment ratio | k/100 | 0.48 |
| L | ICT Access – Sub-index | y1+y2+y3+y4+y5 | 0.771 |
| y1 | Fixed telephone lines per 100 inhabitants | z1*0.2 | 0.12 |
| y2 | Mobile cellular telephone subscriptions per 100 inhabitants | z2*0.2 | 0.22 |
| y3 | International Internet bandwidth per Internet user | z3*0.2 | 0.18 |
| y4 | Proportion of households with a computer | z4*0.2 | 0.13 |
| y5 | Proportion of households with Internet access at home | z5*0.2 | 0.13 |
| M | ICT Use – Sub-index | y6+y7+y8 | 0.532 |
| y6 | Internet users per 100 inhabitants | z6*0.33 | 0.18 |

| | Indicator | ITU ideal value | Value for Serbia in 2015 |
|---|---|---|---|
| y7 | Fixed broadband Internet subscriptions per 100 inhabitants | z7*0.33 | 0.12 |
| y8 | Mobile broadband subscriptions per 100 inhabitants | z8*0.33 | 0.23 |
| N | ICT Skills – Sub-index | y9+y10+y11 | 0.774 |
| y9 | Adult literacy rate | z9*0.33 | 0.32 |
| y10 | Secondary gross enrolment ratio | z10*0.33 | 0.29 |
| y11 | Tertiary gross enrolment ratio | z11*0.33 | 0.16 |
| IDI | ICT DEVELOPMENT INDEX | ((L*0.4)+(M*0.4)+(N*0.2))*10 | 6.76 |

**Source:** RATEL

The value of IDI for the Republic of Serbia in 2015 amounted to 6.76, which shows a growth trend compared with 5.62 in 2012, 6.03 in 2013 and 6.21 in 2014. Considering the ITU data for the previous years, it may be anticipated that Serbia will secure a place among the first 50 countries on the list based on the IDI value.

Figure 5 illustrates normalized values of 11 indicators with values ranging from 0 to 1, whereby 1 represents the maximum value of an indicator. The fact that ICT access indicators (a to e) have significantly higher values than ICT use indicators (f to h) is quite apparent and serves as an illustration of the disparity between the existing telecommunications infrastructure capacity and the use of such capacity in terms of telecommunications services transmitted by such infrastructure in Serbia, as is the case with the use of broadband Internet services. The value of ICT skills indicators (i to k) is satisfactory.

Digital Economy and Society Index (DESI) is another composite index that has gained importance lately, summarizing over thirty indicators in five main dimensions: Connectivity; Human Capital; Use of Internet; Integration of Digital Technology and Digital Public Services. This composite index enables measuring of the economy and society digitalization rate, identifying room for improvement and comparative analysis between countries in similar development stages. The requirements for calculating the index for the Republic of Serbia will be met next year.

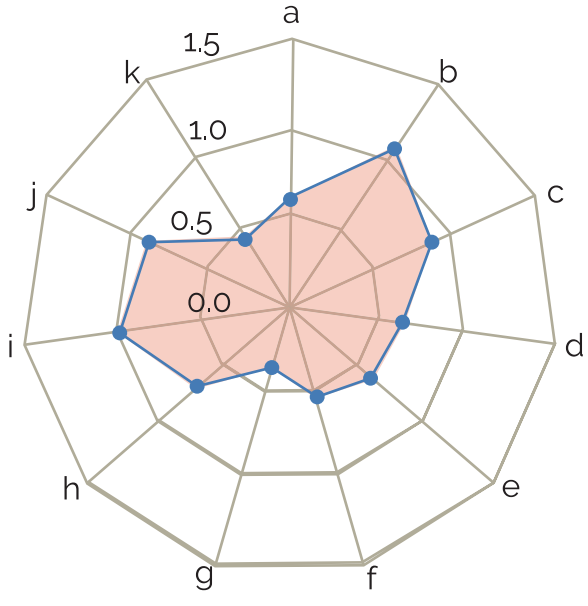



**Figure 5. Graphical representation of 11 Indicators (normalized values)**

**Source:** RATEL

# 03
# PUBLIC FIXED TELECOMMUNICATIONS NETWORKS AND SERVICES

*In 2015 the public telephone service over fixed-line network was provided by 17 operators.*

*The following operators are holders of the licence for public fixed telecommunications network and services:*

- *Telecommunications Company "Telekom Srbija" Joint Stock. Co. holds a licence to build, own and operate a public fixed telecommunications network and provide public fixed telecommunications network services provision, issued in 2007, and a licence for public fixed wireless access (FWA) network in 411.875-418.125/ 421.875-428.125 MHz frequency bands and voice services, data transmission services and simultaneous voice and data transmission, issued on 17 June 2009;*
- *Orion telekom, Ltd., Belgrade, (previously Media Works, Ltd.), who was issued a licence for public fixed wireless access (FWA) network in 411.875-418.125/ 421.875-428.125 MHz frequency bands and voice services, data transmission services and simultaneous voice and data transmission, in 2009;*
- *Telenor, Ltd., Belgrade, holds a licence for public fixed telecommunications network and services, issued in 2010.*

Pursuant to Art. 149 of the Law on Electronic Communications, since 1 January 2012 the provision of public fixed telecommunications network and services has been under the general authorization regime, hence, in addition to the above licence holders, public voice service via fixed network was also provided by the following operators (as by the end of 2015):

- Serbia Broadband - Srpske kablovske mreže d.o.o. (SBB),
- Interaktivne kablovske objedinjene mreže - I.Kom d.o.o.,
- Radijus vektor d.o.o.,
- KOPERNIKUS TECHNOLOGY d.o.o.,
- BeotelNet-ISP d.o.o.,
- Telemark systems d.o.o.,
- Masko d.o.o.,
- Invest-Inženjering d.o.o.,
- ABA TEL d.o.o.,
- Softnet d.o.o.,
- Sat Trakt d.o.o.,
- ASG NET d.o.o. (began with service provision in late 2015),
- BPP Ing d.o.o. (began with service provision in late 2015),
- JP Pošta Srbije (began with service provision in late 2015).

Telekom Srbija is still the largest active operator of the fixed telecommunications network, hence its business activities had the biggest impact on the fixed telephony market in 2015, both in financial and technical terms. In addition to the Serbian market, Telekom Srbija is also present in Republic of Srpska and Montenegro.

Since Telekom Serbia remained an SMP operator in 2014, the decisions stipulating the conditions for service provisions adopted in late 2011 remained in force. Following the public consultation procedure on the Report on the analysis of the wholesale market for call termination on the public telephone network, in 2014 RATEL adopted the Decision designating SMP operators on the wholesale market for call termination on the public telephone network and imposing relevant obligations on the SMP operators. All public voice service operators were designated SMP operators in the relevant market.

Telekom Srbija provided services over public fixed telecommunications network and public fixed wireless (FWA) telecommunications network and the operator Orion telekom provided the services over FWA network. At the end of 2015, in the operators' register kept by RATEL the number of public fixed wireless network stations was 294 (99 Orion telekom and 195 Telekom Srbija), which was an increase compared with 283 stations in the previous year. Telenor provided the services over its public fixed telecommunications network to business users only. In 2015 SBB increased the number of users of the public telephone service provided over its own public fixed telecommunications network. Considering the small number of users, the data provided by other operators do not have a significant impact on the market of fixed network and services in 2015 and will not be further analysed in this Overview.

The total revenue from fixed telephone services provided by all operators in the territory of the Republic of Serbia in 2015 amounted to 37.4 billion dinars. The revenues from the international traffic in 2015 amounted to approximately 2 billion dinars, which is almost equal to those in the previous year. The investments made in the fixed telephony services in 2015 amounted to approximately 8.3 billion dinars, which is by 2.6 billion dinars more when compared with the previous year. The revenues made from VoIP services amounted to 528 million dinars.

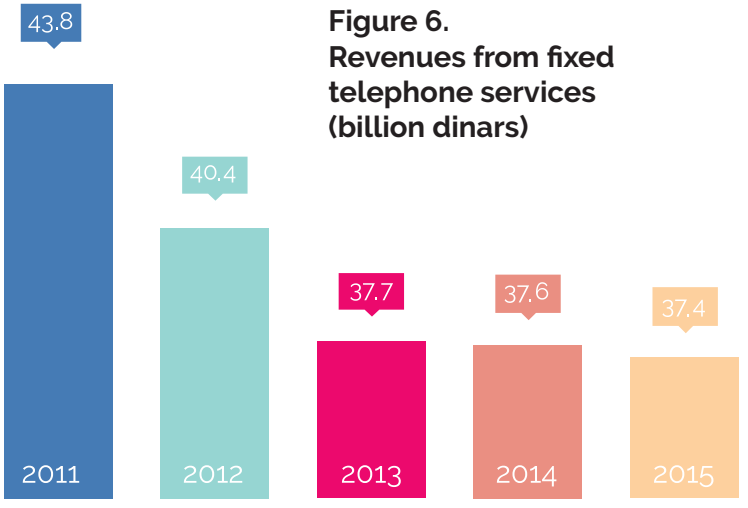



**Figure 6.**
**Revenues from fixed telephone services (billion dinars)**

**Source:** RATEL

The largest share in the total revenues goes to the subscription charges, accounting for almost one half of total revenues in 2015. The revenues amounted to 18.2 billion dinars, which is by 1.5 billion dinars higher than in 2014. The revenues from the national traffic dropped from 21% to 17% year-on-year, whereas the share of the revenues from the international traffic remained the same. Along with the decrease in the revenues from the national traffic, there was also a decrease in the number of subscribers and the number of minutes in the national traffic.

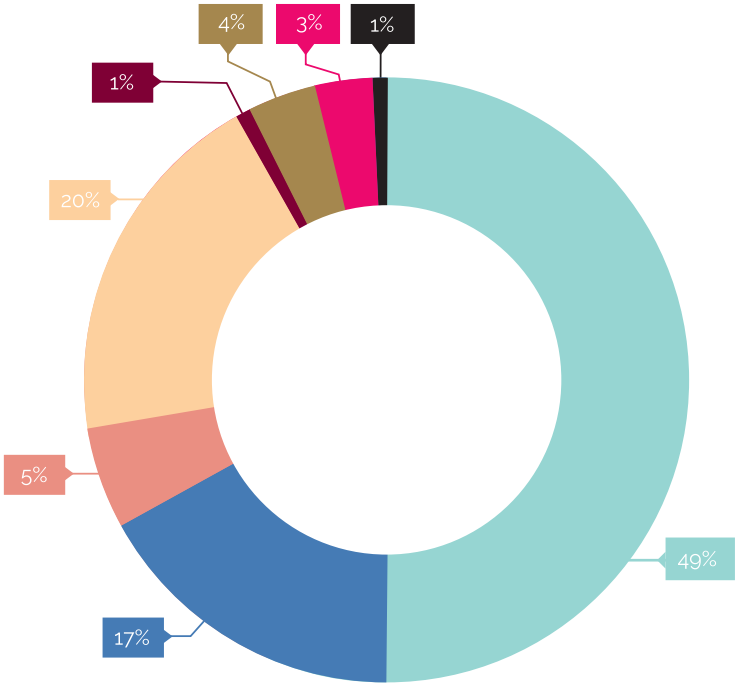


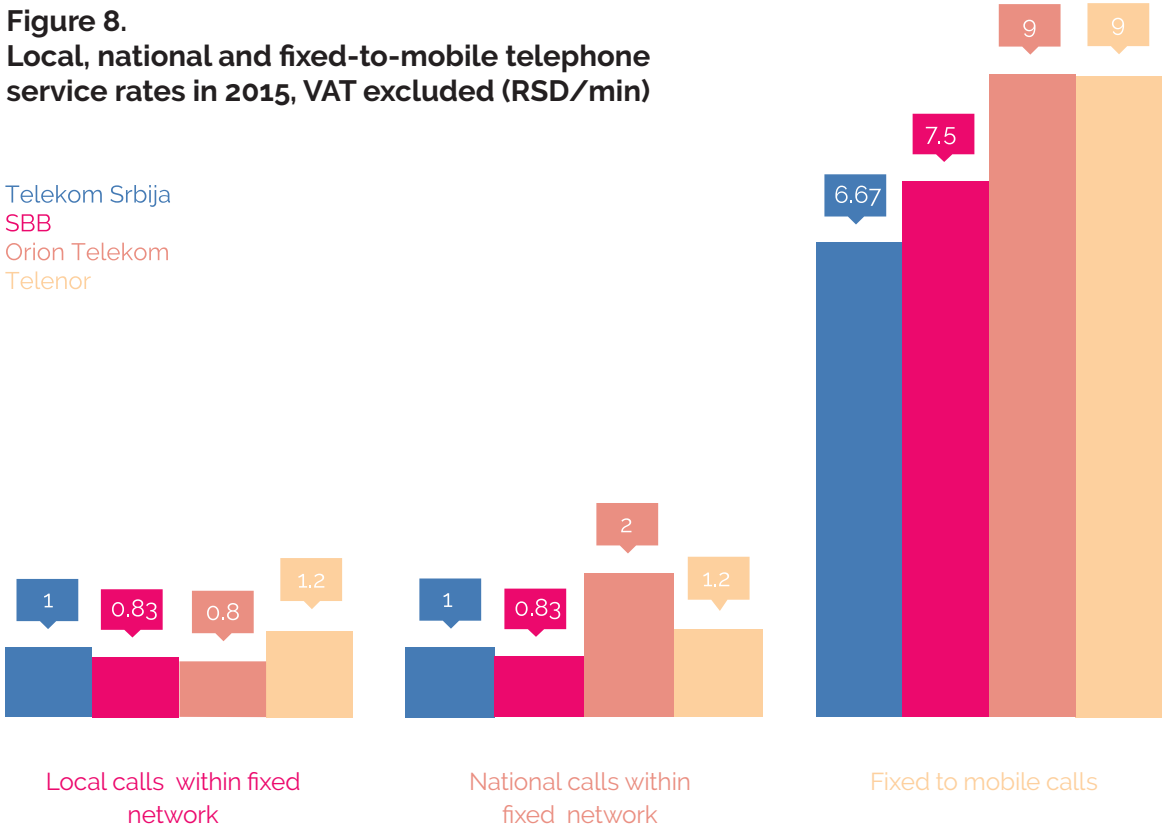

**Figure 7.**
**Distribution of revenues from fixed telephone services in 2015**

- Connection charge
- Subscription charge
- National traffic
- International traffic
- Interconnection
- Leased lines
- Data transmission
- Other services

**Source:** RATEL

The revenues from interconnection in 2015 include the revenues from interconnection in the national and international traffic and account for 20% of the total revenues. The revenues from other services include the revenues made from leased capacities, leased cable ducts, collocation, public payphones, etc.

**Figure 8.**
**Local, national and fixed-to-mobile telephone service rates in 2015, VAT excluded (RSD/min)**




**Source:** RATEL

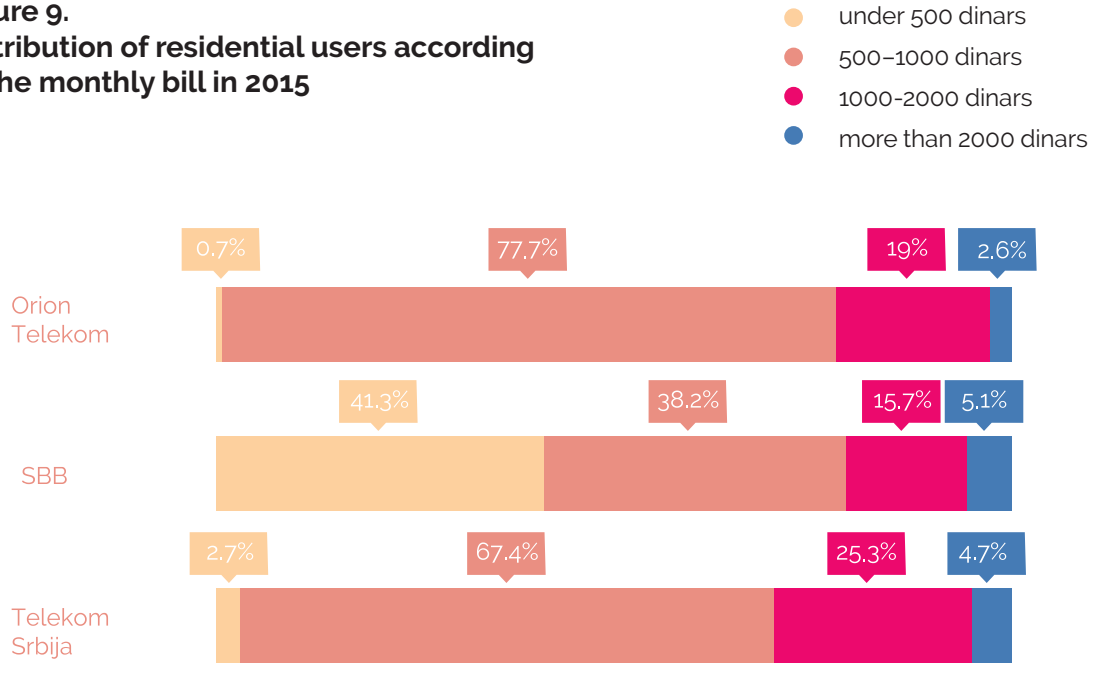
Per-minute rates (VAT excluded) for the local and national calls, and for calls to mobile networks remained unchanged (Figure 8). The rates ranged between 0.8 – 1.2 dinars per minute for the local and national calls, and between 6.67 - 9 dinars per minute for the calls made to mobile networks.

The rates for the international calls have not been significantly modified compared with the previous year. The information on the rates is available on the official websites of the operators.

Telekom Srbija's connection charge in the amount of 5,000 dinars (excluding VAT) was the same for both residential and business users, and the CDMA connection charge was 12,000 dinars (exluding VAT). As for Orion telekom, the connection charge ranged between 2,665 and 5,832 dinars (excluding VAT) for residential users and amounted to 8,333.33 dinars (excluding VAT) for business users, excluding VAT. There was no connection charge with Telenor, whereas SBB and Telekom Srbija offered a connection for 1 dinar when signing a 24-month user contract.

The number of Telekom Srbija's residential users with monthly bills for fixed-line services ranging between 500 and 1,000 dinars continued to increase, amounting to 67% in 2015. On the other hand, the number of residential users paying less than 500 dinars in 2015 dropped to 3% of the total number of subscribers. The number of Telekom Srbija's users with bills ranging between 500 and 1,000 dinars continued to rise reaching around 67% in 2015. SBB had a slightly different distribution: most subscribers (41%) paid for subscription and bills under 500 dinars, whereas 38% paid for bills ranging between 500 and 1,000 dinars. As for Orion Telekom, the majority of residential users (78%) paid between 500 and 1,000 per month. The distribution of residential users according to the monthly bill, for all three operators, is given in figure 9 below.

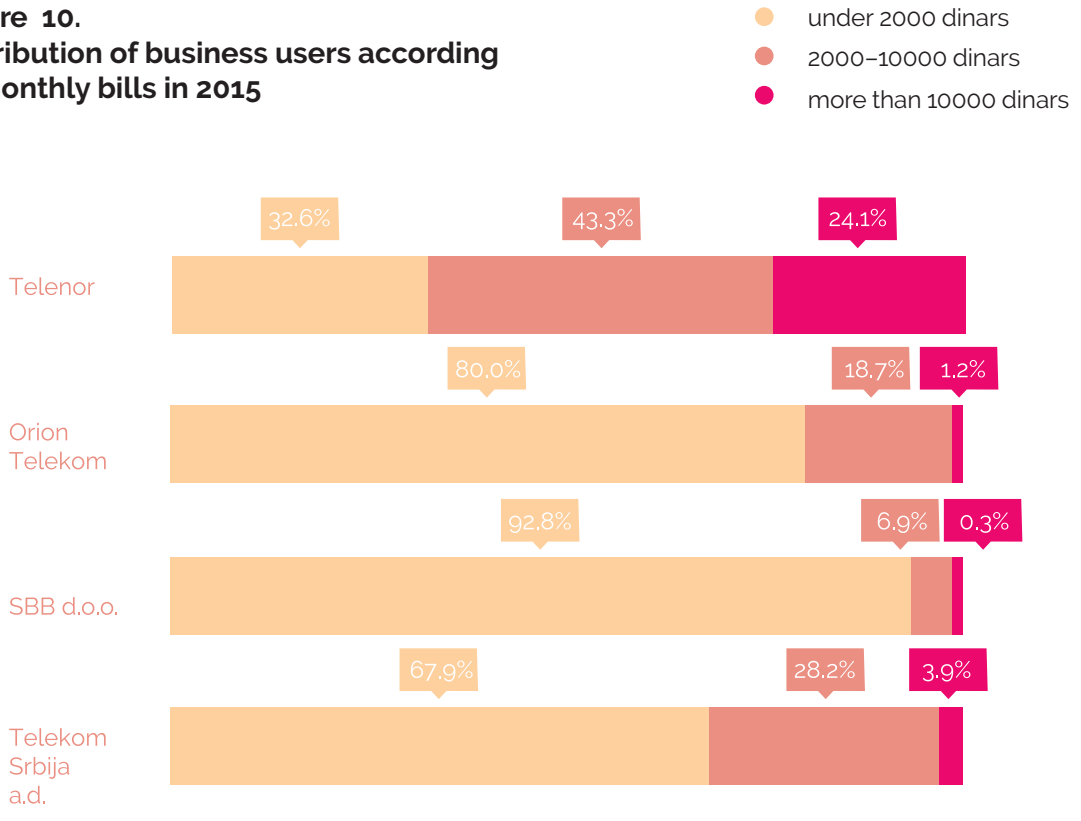
**Figure 9.**
**Distribution of residential users according to the monthly bill in 2015**




**Source:** RATEL

Most business user of all three operators had monthly bills under 2,000 dinars for fixed-line services. The distribution of business users according to the monthly bill in 2015 is given in Figure 10. below.

**Figure 10.**
**Distribution of business users according to monthly bills in 2015**




**Source:** RATEL

The average monthly bill paid by residential users ranged between 500 and 1 000 dinars (VAT excluded). The business users' average monthly bill was around 9.700 dinars for Orion Telekom users and around 18,000 for Telenor users. The average monthly bills charged by Telekom Srbija, SBB and Orion Telekom are given in Figure 11.

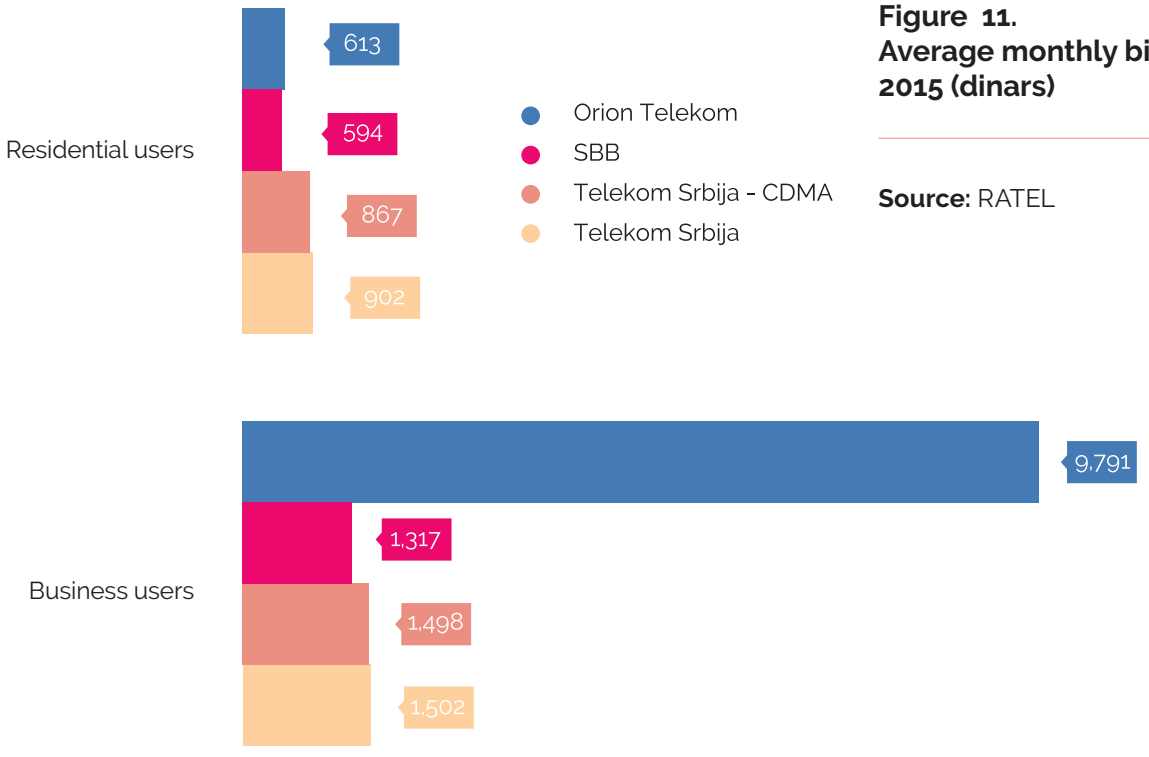



**Figure 11.**
**Average monthly bills in 2015 (dinars)**

**Source:** RATEL

The number of users continued to decrease, amounting to 2.6 million in 2015. Residential users are still dominant with 90% share in the total number of users. In 2015, the digitalization rate reached to 99.87% in Telekom Serbia's network, whereas all other operators have a 100% digitalization rate. The number of public payphones continued to decrease, amounting to 2,784 in 2015.

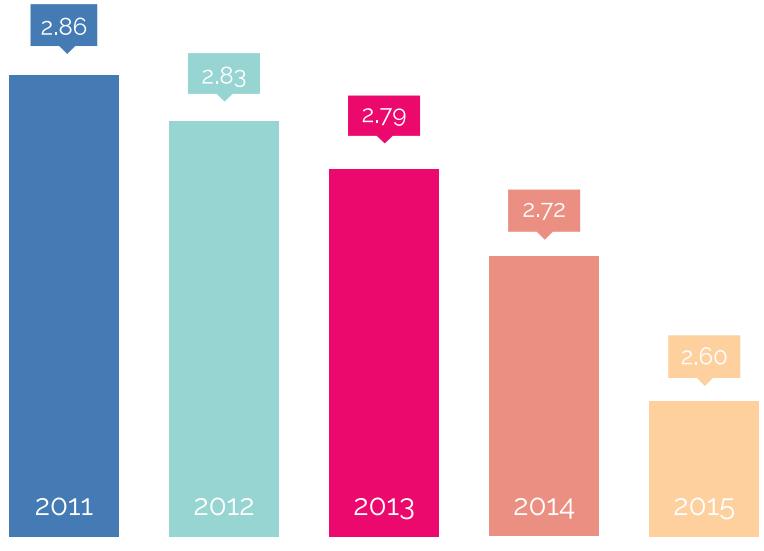



**Figure 12.**
**Number of fixed line subscribers (million)**

**Source:** RATEL

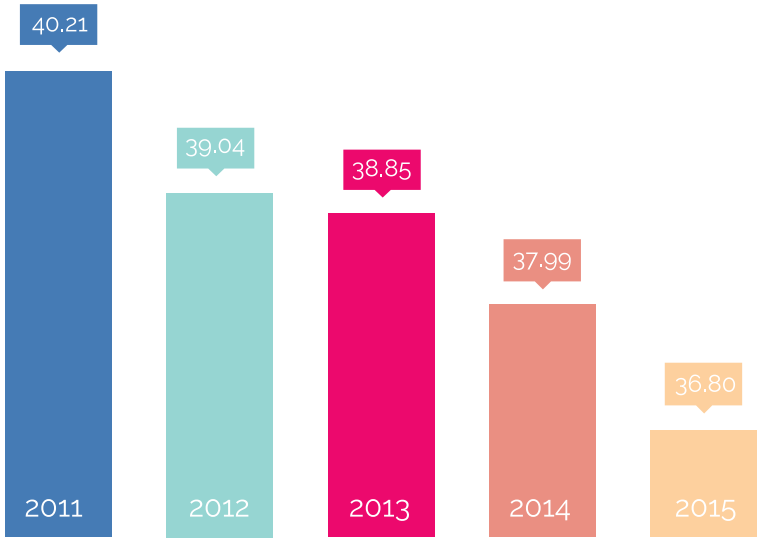



**Figure 13. Fixed line penetration (%) – number of users**

**Source:** RATEL

Fixed line penetration rate was 36.8%, based on the number of users.

The number of ISDN subscribers in 2015 was 48 thousand, which is by 17% less year on year. Around 96% of ISDN subscribers have a basic rate access, whereas other users have primary rate access. ISDN connections are following a downtrend, which is reflected by the drop in the number of ISDN users.

In 2015, the number of unmet requests for new fixed-line connections made to Telekom Srbija was almost 98 thousand. The number of malfunctions per 100 lines with Telekom Srbija in 2015 was 19. The percentage of malfunctions repaired within 24 hours was 53% (cf. 50% in 2014). Since other operators have a considerably smaller number of users, their data is incomparable with the data received from Telekom Srbija.

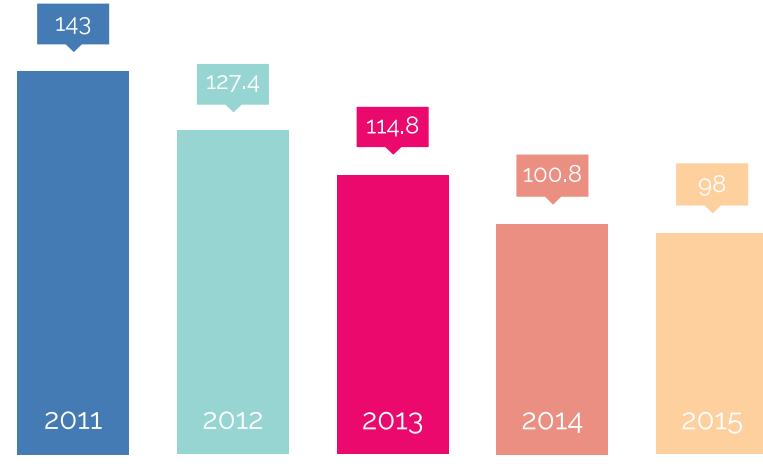



**Figure 14. Number of unmet requests made to Telekom Serbia for new fixed line connections (thousands)**

**Source:** RATEL

The total traffic over fixed network in 2015 decreased by approximately 5% year on year, the national traffic being estimated to 5.8 billion of minutes and the international traffic to 485 million minutes. As shown in Figure 15, the downward trend continued, mainly due to other types of services available, such as mobile telephony, messaging, VoIP, etc.

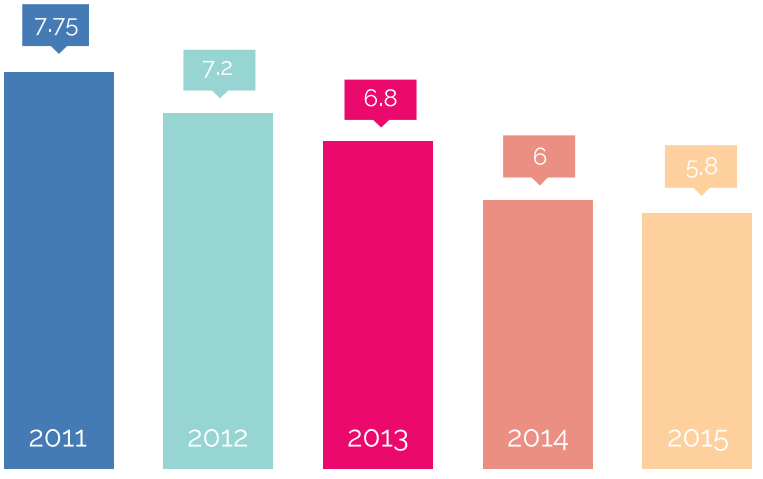
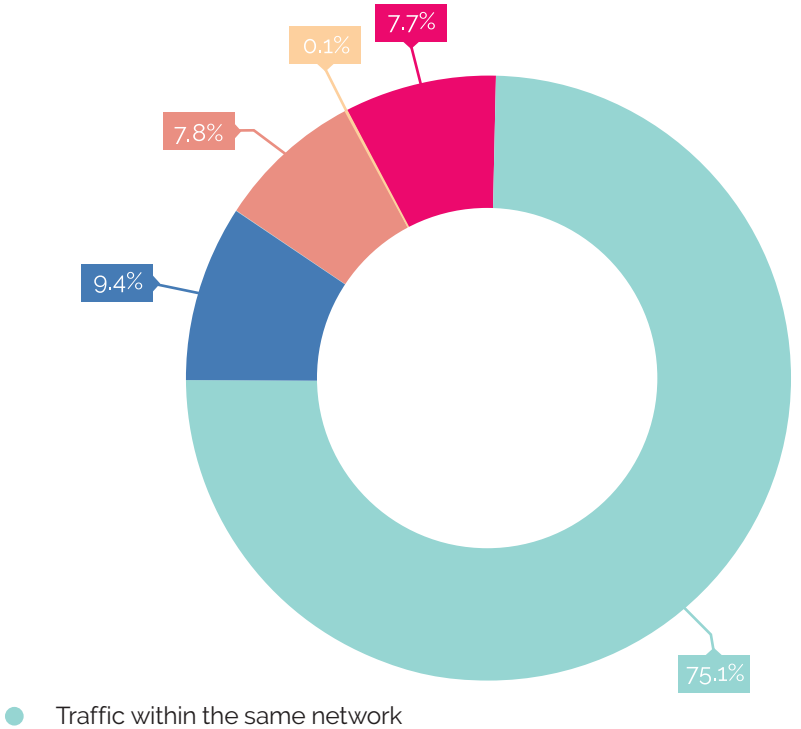



**Figure 15. Total national traffic (billion minutes)**

**Source:** RATEL




- Traffic within the same network
- Traffic made to other fixed networks
- Fixed to mobile traffic
- Traffic made to nongeografic numbers and short codes
- International traffic

**Figure 16. Distribution of fixed line traffic in 2015**

**Source:** RATEL

The average call duration was 3.15 minutes.

The biggest share in the total traffic in 2015 went to the traffic made within the same network (75%), whereas the least traffic was made to nongeographic numbers and short codes. The distribution of the fixed network traffic is given in Table 16.

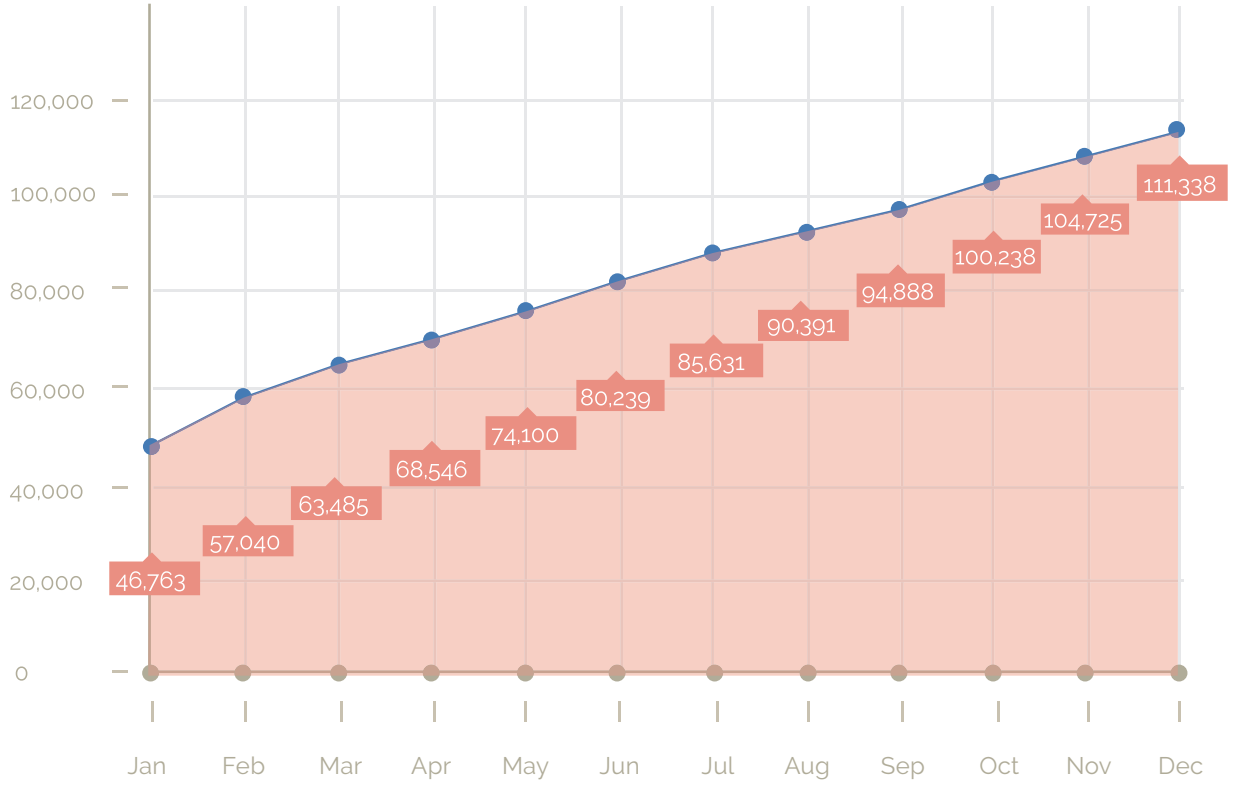
The total number of VoIP operators at the end of 2015 was approximately 66 thousand, which is a 12% decrease year on year. There were 7.8 million of minutes of traffic, which is 60% less compared with the previous year. However, there were 41 million minutes of international transit in 2015 which is four times more than previous year.

The users remained interested in the number portability service on public telephone networks at a fixed location. In 2015, there were occasional oscillations in the number of ported numbers ranging between 4,487 in November and 10,277 in February, the monthly average thus being 5,819 ported numbers, which is an increase compared to the monthly average of 4,613 in the previous year.

In the beginning of 2015, there were 41,513 fixed-line subscribers who changed the operator keeping the same number, whereas in the end of the year the number of ported numbers reached 111,338. The fact that the requests for number portability on fixed networks continue to grow, shows that this is a rather important mechanism for enhancing competition, enabling the users to change the operator and to opt for better conditions.

**Figure 17. Number of portings in 2015**

**Source:** RATEL



# 04
# PUBLIC MOBILE TELECOMMUNICATIONS NETWORKS AND SERVICES

*There were three mobile operators in 2015 in the mobile market in the Republic of Serbia:*

- ***Telecommunications Company Telekom Srbija Joint Stock Co. - Mobilna telefonija Srbije MTS**, 58.11% owned by the Republic of Serbia – the Government of the Republic of Serbia, 20% owned by Telekom Srbija, 14.95% owned by the citizens of the Republic of Serbia and 6.94% owned by the current and former employees of Telekom Srbija and its predecessor[1] (licence valid as of 15. 08. 2006)*
- ***Telenor Ltd., Belgrade**, 100% owned by Telenor A/S, Denmark, (licence issued on 31. 08. 2006)*
- ***Vip mobile Ltd.**, 100% in the ownership of Mobilkom CEE Beteiligungsverwaltung GmbH, Austria (licence issued on 01. 12. 2006)*

*All three operators were granted licences for public mobile telecommunications networks and public mobile telecommunications network services in accordance with GSM/GSM1800 and UMTS/IMT-2000 standards, issued by RATEL (hereinafter: licence). The licences were issued for the territory of the Republic of Serbia, for a period of 10 years, and, upon expiration, they may be extended for another 10 years without a request by the licence holder, provided the requirements under the licence are fulfilled.*

*In 2015, 4G network was launched in the Republic of Serbia. In the beginning of 2015, the public bidding procedure for the issuance of individual licences for the usage of radio frequencies in the 1710-1785/1805-1880 MHz frequency bands, in which all three mobile operators had participated, was completed. In March 2015, individual decisions were awarded to all three operators, granting the usage of two 5 MHz-radio frequency blocks, each. The requirements were thus met for the 4G mobile technology to be launched, enabling better coverage and faster Internet on the territory of the Republic of Serbia. In the second half of 2015, public bidding procedure for the issuance of individual licences for the usage of radio frequencies in the 791-821/832-862 MHz frequency bands in the territory of the Republic of Serbia, in which all three mobile operators had participated, was successfully carried out. Upon the completed procedure, in January 2016 individual decisions were awarded to all three operators, granting the usage of radio frequencies in the 791-821/832-862 MHz frequency bands.*

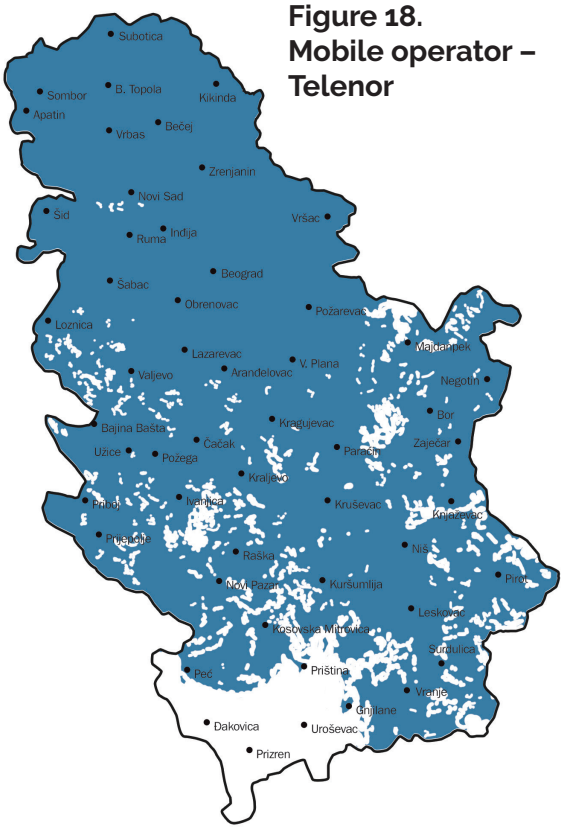
*The operators are increasing the number of base stations each year, enlarging their networks and the coverage of the territory and population.*

1 Source: www.mts.rs

Telenor has been active in the Serbian telecoms market since 2006, as part of Telenor Group which is present in 13 countries across Europe and Asia and another 14 countries through ownership in VimpelCom. The mobile operators from Telenor Group present in the neighbouring countries are Telenor Hungary (ex Panon), Telenor Montenegro (ex Promonte) and Telenor Bulgaria (ex Globul).

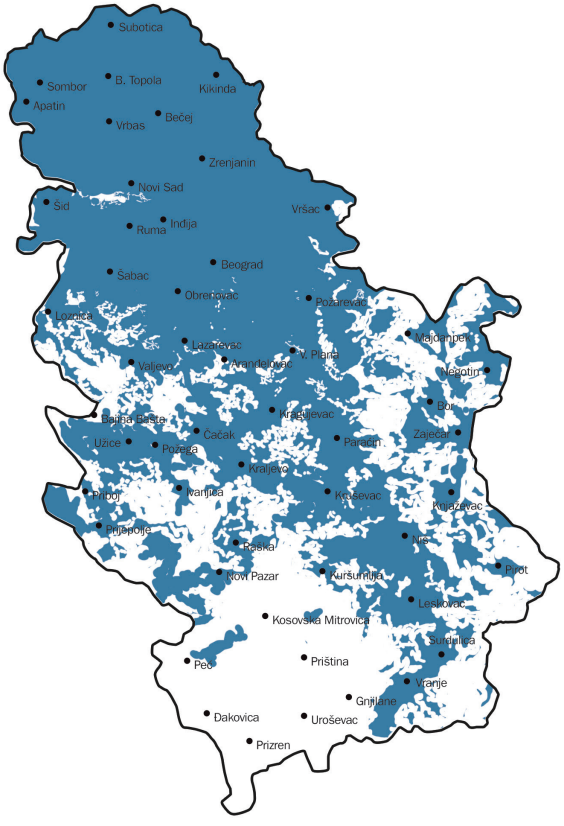
The coverage maps for Telenor are given in figure 18.

**Figure 18. Mobile operator – Telenor**




GSM signal coverage map

**Source:** Telenor Ltd.



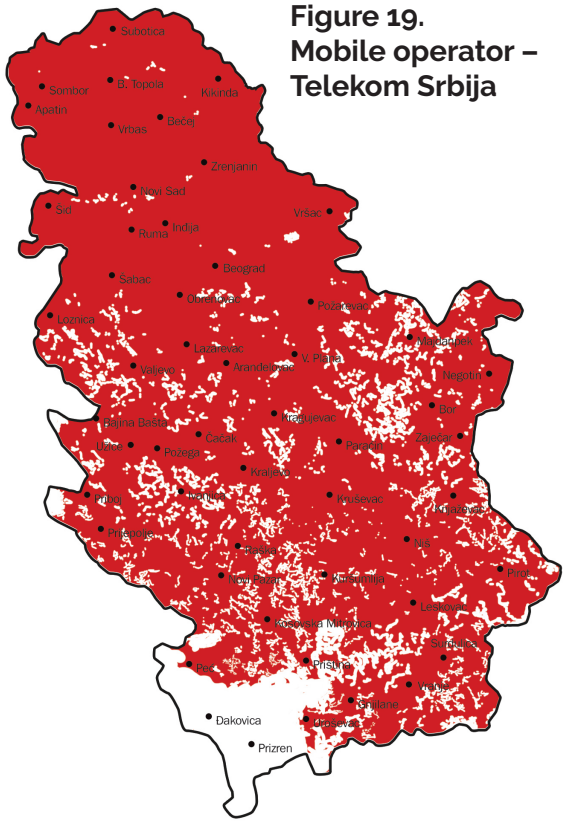

UMTS signal coverage map


LTE signal coverage map

| **OFFICIAL DATA** | |
|---|---|
| Name | **Telenor Ltd.** |
| Head office | Belgrade |
| Ownership | 100% Telenor A/S, Denmark |
| Percentage of territory covered by GSM network signal | 91.90% |
| Percentage of population covered by GSM network signal | 99.42% |
| Percentage of territory covered by UMTS network signal | 90.95% |
| Percentage of population covered by UMTS network signal | 94.72% |
| Percentage of territory covered by LTE network signal | 0.37% |
| Percentage of population covered by LTE network signal | 6.47% |

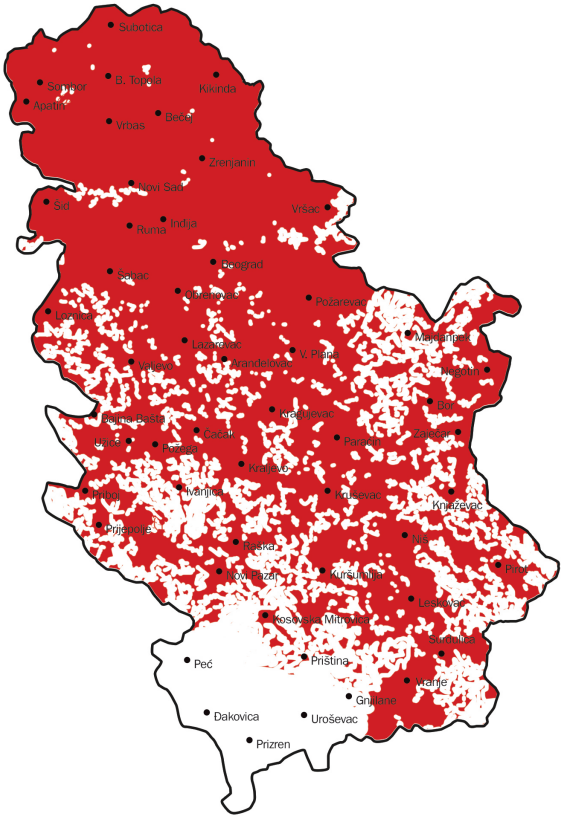
Telecommunications Company Telekom Srbija, Joint Stock Co. has been providing mobile telephony services since 1998. In addition to Serbian market, Telekom Srbija is also present as a mobile operator in the region, in Republic of Srpska and Montenegro. The coverage maps for Telekom Srbija are given in Figure 19.

**Figure 19.**
**Mobile operator – Telekom Srbija**

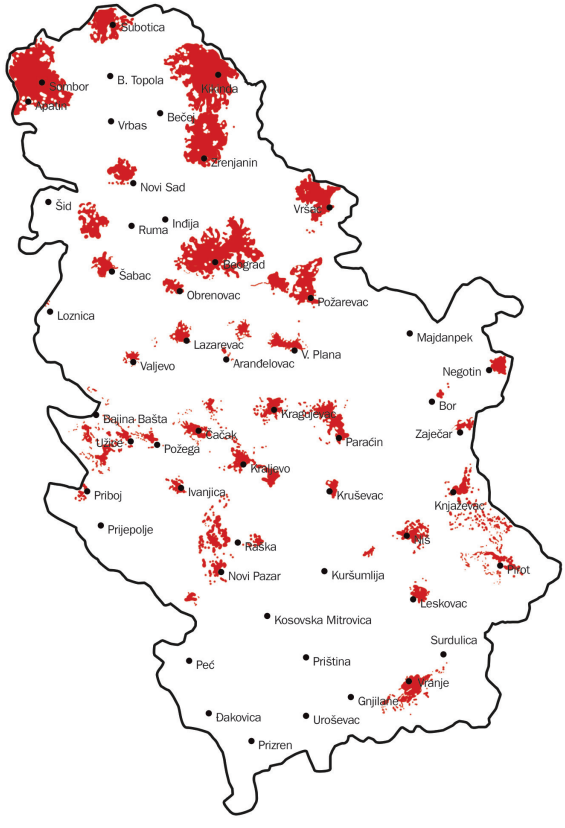



GSM signal coverage map

**Source:** Telekom Srbija, Joint Stock Co.




UMTS signal coverage map




LTE signal coverage map

| OFFICIAL DATA | |
|---|---|
| Name | **Telecommunications company "Telekom Srbija", Joint Stock Co.** |
| Head office | Belgrade |
| Ownership | 58.11% the Republic of Serbia, 20% Telekom Srbija, 14.95% the citizens of the Republic of Serbia and 6.94% current and former employees of Telekom Srbija and its predecessor. |
| Percentage of territory covered by GSM network signal | 89.75% |
| Percentage of population covered by GSM network signal | 99.75% |
| Percentage of territory covered by UMTS network signal | 85.57% |
| Percentage of population covered by UMTS network signal | 97.29% |
| Percentage of territory covered by LTE network signal | 9.28% |
| Percentage of population covered by LTE network signal | 56.74% |

Vip mobile Ltd. is a member of the Telekom Austria Group, present in eight European countries, including the following countries in the region: Croatia, Bulgaria and Macedonia. Vip mobile has been present in the Serbian market since 2006. The coverage maps for Telekom Srbija are given in figure 20.

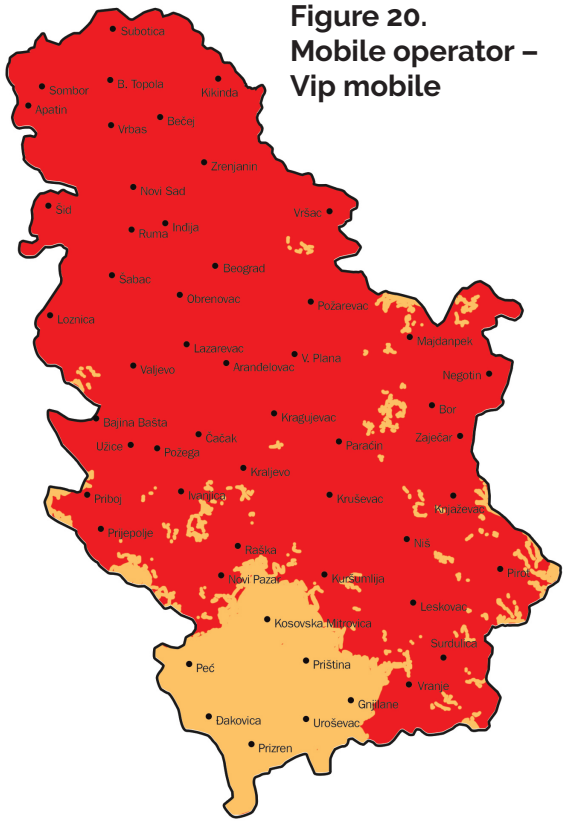
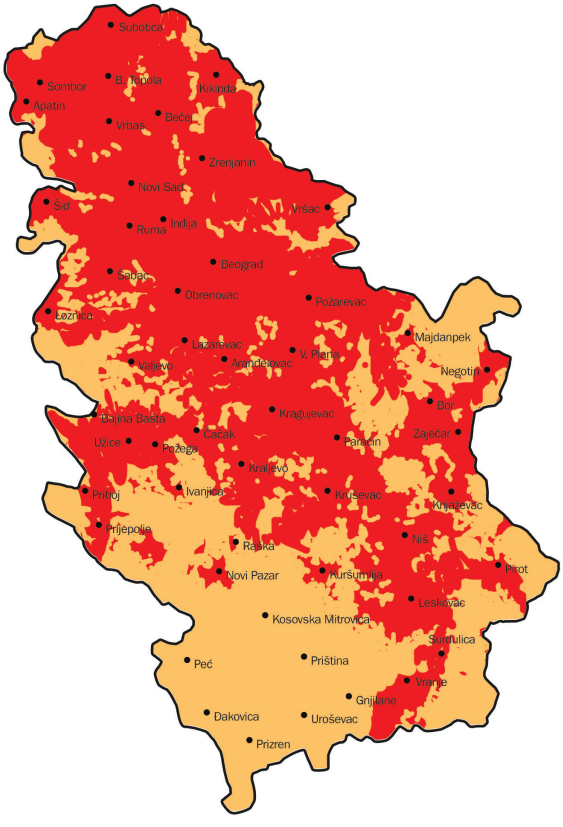



**Figure 20. Mobile operator – Vip mobile**

**Source:** Vip mobile Ltd.

GSM signal coverage map




UMTS signal coverage map


LTE signal coverage map

| **OFFICIAL DATA** | |
|---|---|
| Name | **Vip mobile Ltd.** |
| Head office | Belgrade |
| Ownership | 100% Mobilkom CEE Beteiligungsverwaltungs GmbH, Austria |
| Percentage of territory covered by GSM network signal | 87.2% |
| Percentage of population covered by GSM network signal | 99.0% |
| Percentage of territory covered by UMTS network signal | 55.2% |
| Percentage of population covered by UMTS network signal | 88.7% |
| Percentage of territory covered by LTE network signal | 4.1% |
| Percentage of population covered by LTE network signal | 26.3% |

**Table 6. An overview of wireless access network for all three operators as on 31 March 2016**

| | | OPERATORS | | |
|---|---|---|---|---|
| | | Telekom Srbija | Telenor | Vip mobile |
| 1 | Total number of sites with base stations | 2290 | 1936 | 1629 |
| 1.1 | Raw land sites | 1422 | 1174 | 957 |
| 1.2 | Rooftop sites | 834 | 735 | 658 |
| 1.3 | Indoor sites | 24 | 16 | 9 |
| 1.4 | Sites with both rooftop and indoor installations | 10 | 11 | 5 |
| 2 | GSM base station sites | 1878 | 1918 | 1628 |
| 3 | UMTS base station sites | 2132 | 1914 | 1343 |
| 4 | LTE base station sites | 203 | 197 | 401 |
| 5 | Indoor repeater sites | 281 | 163 | 90 |
| 6 | Outdoor repeater sites | 25 | 13 | 0 |
| 7 | Wi-Fi sites | 413 | 12 | 0 |
| 8 | GSM900 network base stations | 1847 | 1882 | 774 |
| 9 | GSM1800 network base stations | 305 | 600 | 1225 |
| 10 | UMTS900 network base stations | 3 | 1880 | 0 |
| 11 | UMTS2100 network base stations | 2129 | 1627 | 1343 |
| 12 | LTE800 network base stations | 1 | 17 | 2 |
| 13 | LTE1800 network base stations | 203 | 202 | 401 |
| 14 | Wi-Fi network access points | 992 | 21 | 0 |

The revenues from mobile networks in 2015 amounted to around 109 billion dinars or 902 million euros. Observed in the national currency (RSD), the revenues increased by 9.6% compared with 2014, when the total revenues from mobile telephony service amounted to 99.35 billion dinars, whereas the revenues observed in euros showed a 6.5% rise. The difference in revenues in the two currencies is a consequence of the increase in the average exchange rates for euro in 2015, compared with the previous year.

The total investments in the mobile market increased by 67% in respect to the previous year, amounting to 12.9 billion dinars.

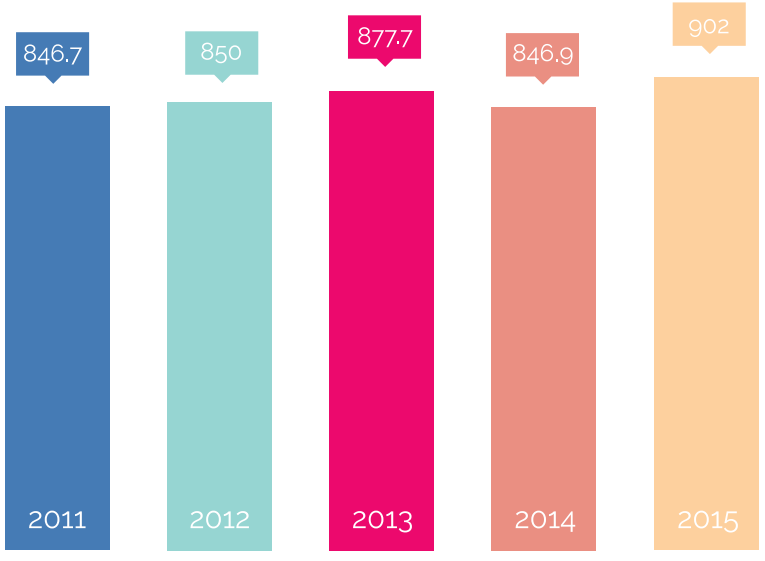



**Figure 21. The total revenues from the mobile telephony (EUR million)**

**Source:** RATEL

The total number of mobile users dropped by 2% year on year, amounting to 9,155,664 at the end of 2015. The total number of users dropped due to a decrease in the number of prepaid users. This is an expected trend and it should not raise concern, given that the penetration rate remains high and that the outgoing traffic is growing in terms of minutes.

Figure 22 shows the trend followed by the total number of users in the previous period.

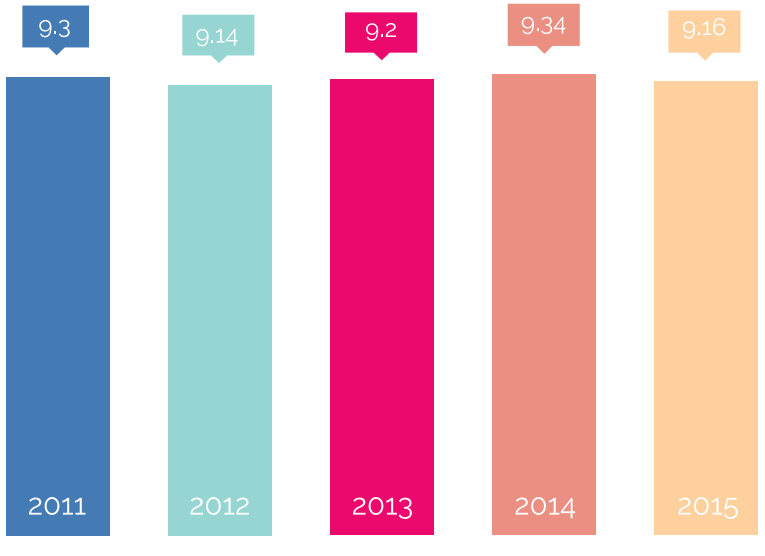


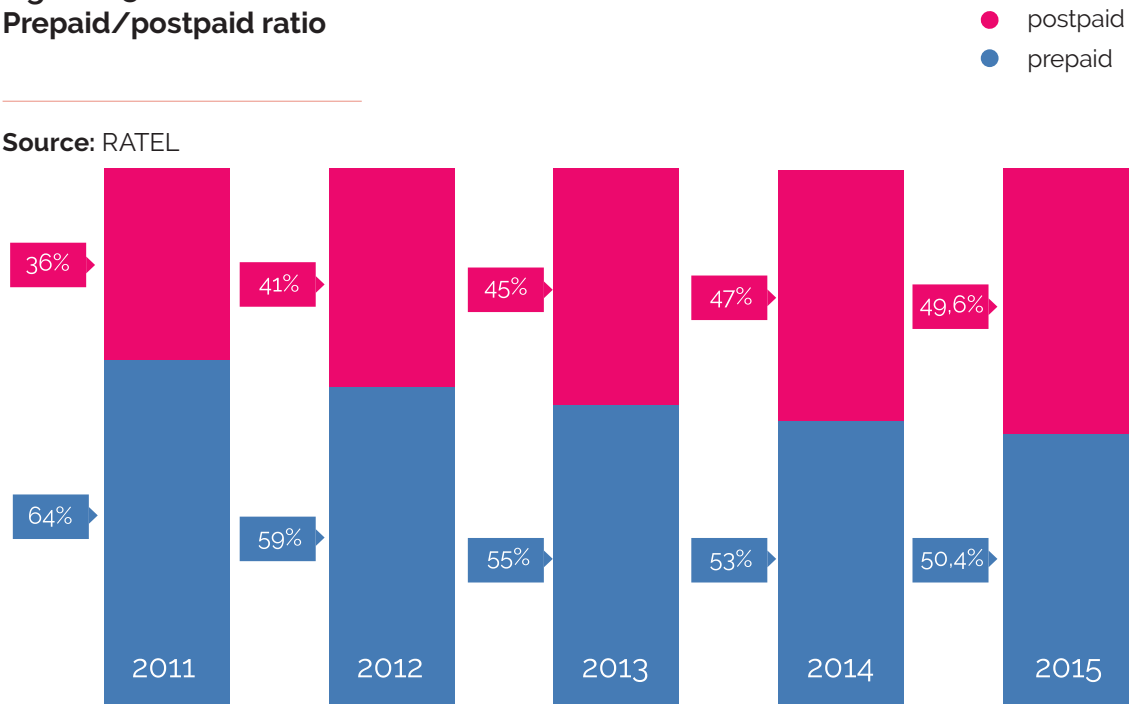

**Figure 22. The total number of active mobile users (million)**

** The total number of prepaid and postpaid users active in the last 3 months of each year.*

**Source:** RATEL

The total number of users consists of postpaid and prepaid users active in the last three months of the observed year, the number of prepaid users being higher than the number of postpaid users. This has been the trend during the entire observed period. However, the share of the postpaid users has been growing year after year, practically reaching the share of the postpaid users at the end of 2015 (Figure 23), when 50.4% went to prepaid and 49.6% went to postpaid users.

**Figure 23.**
**Prepaid/postpaid ratio**




**Source:** RATEL

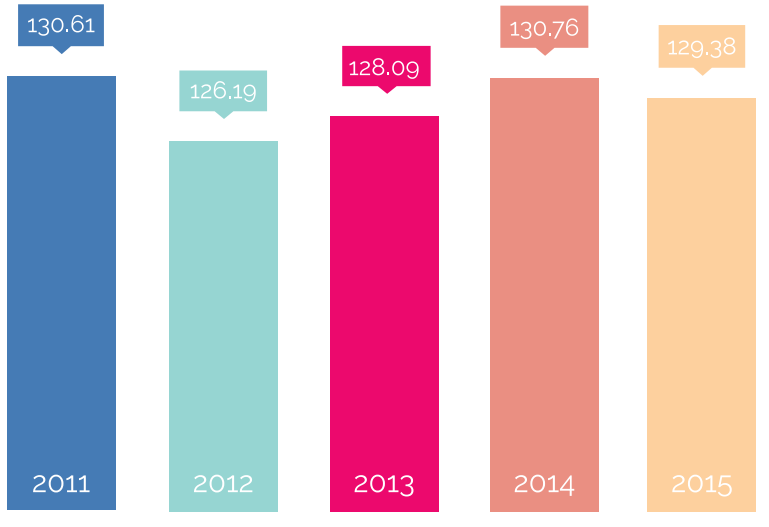



**Figure 24.**
**Mobile penetration rate**

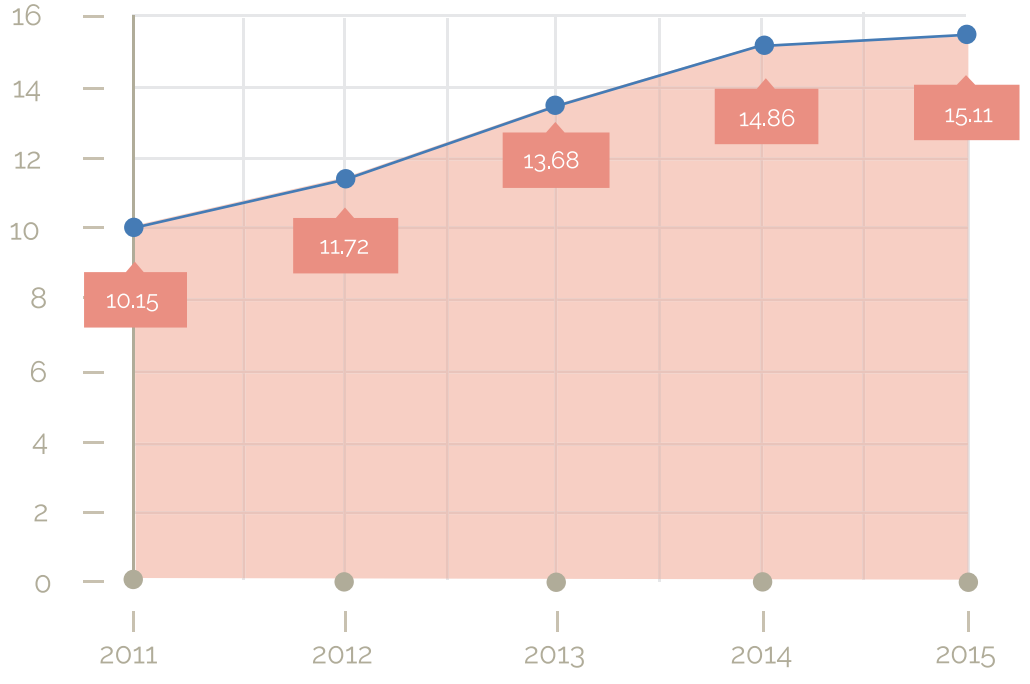
**Source:** RATEL

The mobile penetration rate of 129.4% was calculated by comparing the number of users with the total population. This indicates that some people are using more than one mobile number, which results in the number of users being higher that the number of inhabitants.

The minutes of calls are constantly increasing year after year. In 2015, the total outgoing traffic on the mobile network amounted to 15.11 billion minutes, which is an increase of 1.7% compared with the previous year (14.86 billion minutes in 2014). The annual average of traffic per user in 2015 was 1 650 minutes or approximately 4 minutes and 32 seconds a day.

**Figure 25.**
**Total outgoing traffic (billion minutes )**

**Source:** RATEL



Unlike the outgoing traffic, the number of sent text messages showed a decrease. In 2015, the total of 8.7 billion SMS messages were sent, which is a decrease by 15.5% compared with 2014 when 10.29 billion SMS messages were sent. The average number of text messages sent in 2015 per user was 949, or 2.6 SMS messages a day.

**Figure 26.**
**Number of sent text (SMS) messages (billion )**

**Source:** RATEL

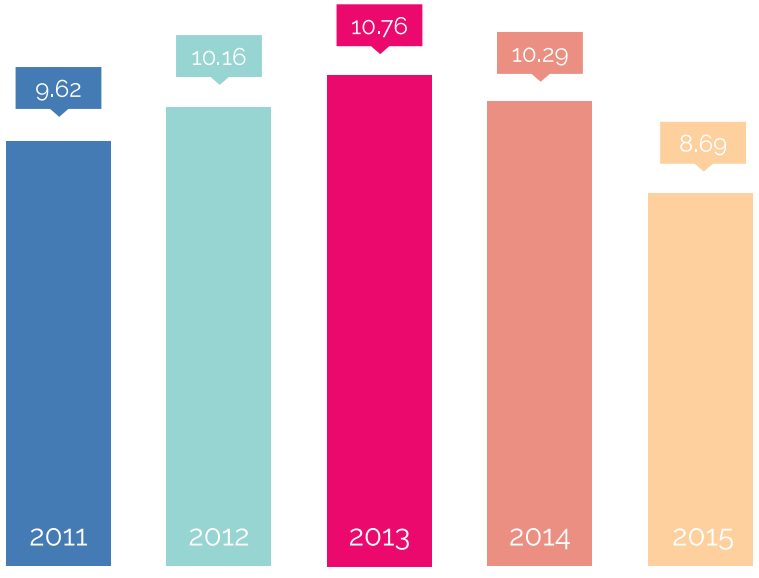
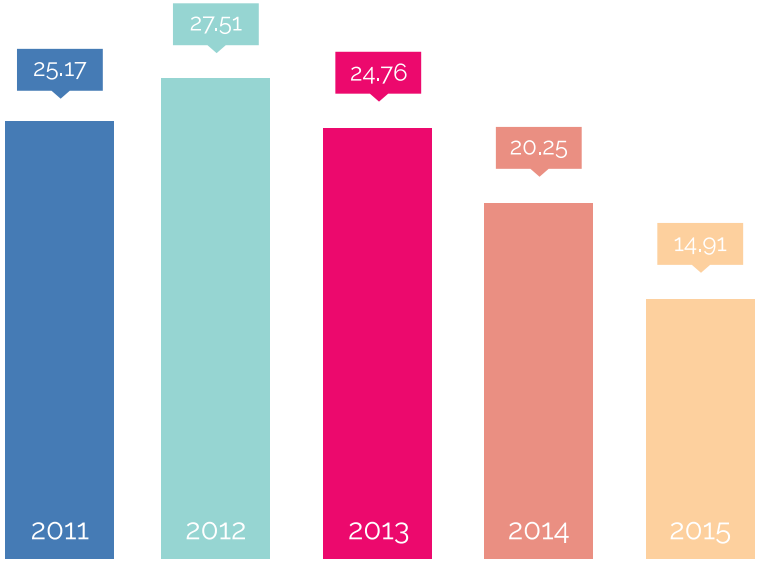



**Figure 27.**
**Number of SMS messages sent (million)**

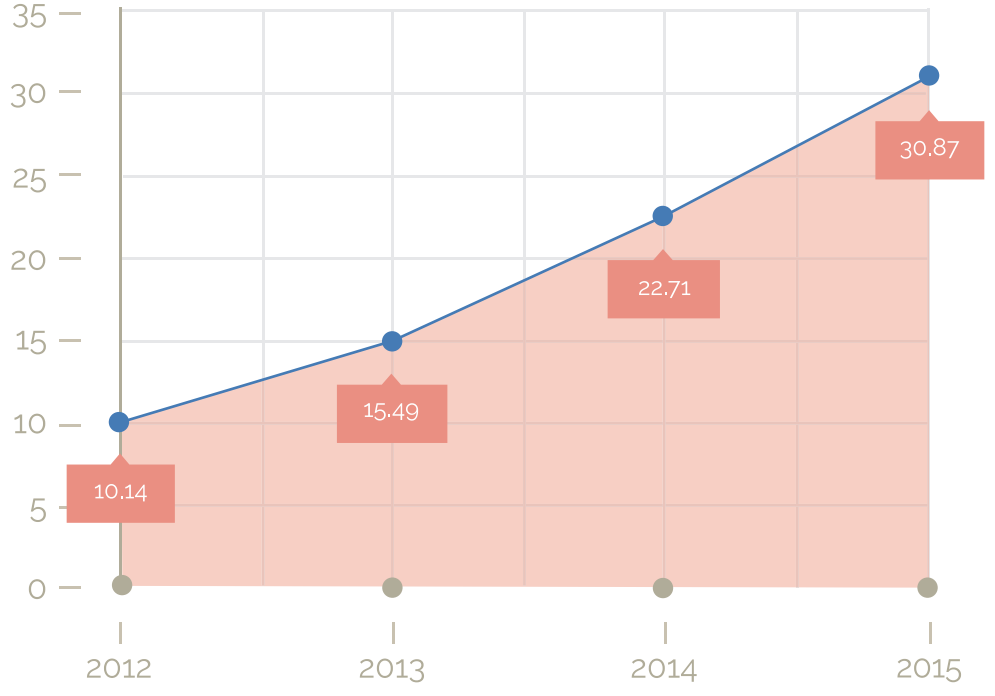
**Source:** RATEL

The number of MMS messages also showed a drop in the last year. In 2015, 14.91 million MMS messages were sent, which is a decrease of 26.4% in respect to 20.25 million sent in 2014.



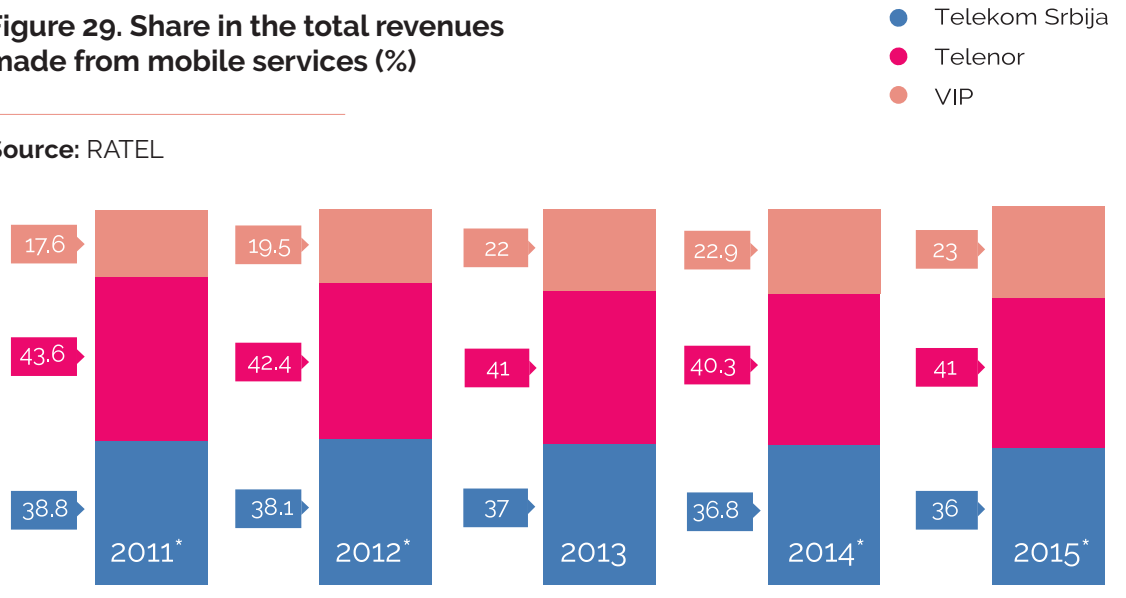
The decrease in the number of sent SMS and MMS messages was expected, considering the growth of the data traffic and OTT services, i.e. usage the Internet for voice and text communication. The data traffic has been constantly growing during the observed period (Figure 28). During the four-year period, the average growth rate of the transmitted data was 45%.

**Figure 28.**
**Data traffic in millions of GB (GPRS+UMTS )**



Figures 29 - 34 show the share of the mobile operators in the total revenues made from mobile services, in terms of number of users, outgoing traffic, number of text and multimedia messages sent and the data traffic made, based on the available data.

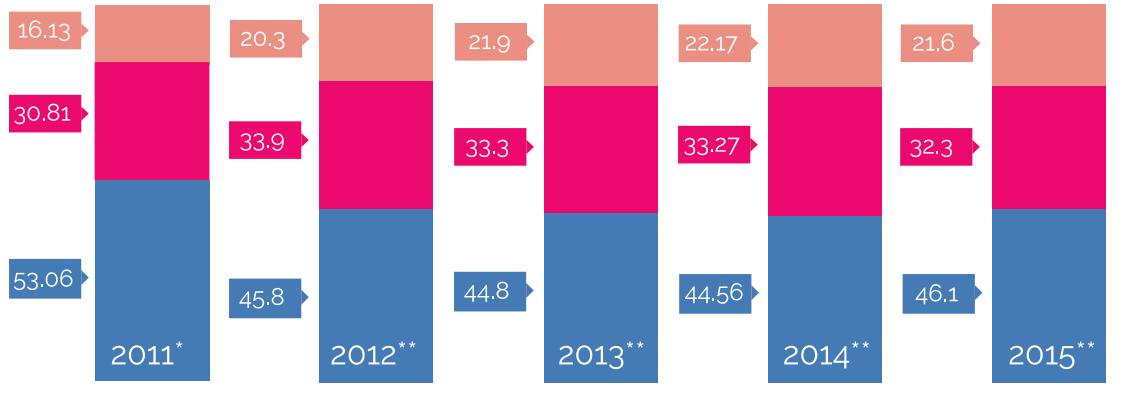
**Figure 29. Share in the total revenues made from mobile services (%)**




**Source:** RATEL

* If the internal accounting between business segments were included, the share of Telekom Srbija in the total mobile market revenues would be 41.35% in 2011, 39.4% in 2012, 37.6% in 2014 and 36.6% in 2015.

**Figure 30. Market share in terms of the number of users (%)**




**Source:** RATEL

* The data for Telekom Srbija comprise the total number of prepaid users

** Market share for all three operators shows prepaid and postpaid users active in the last 3 months of the relevant year

**Figure 31. Share in the total outgoing traffic (%)**

**Source:** RATEL

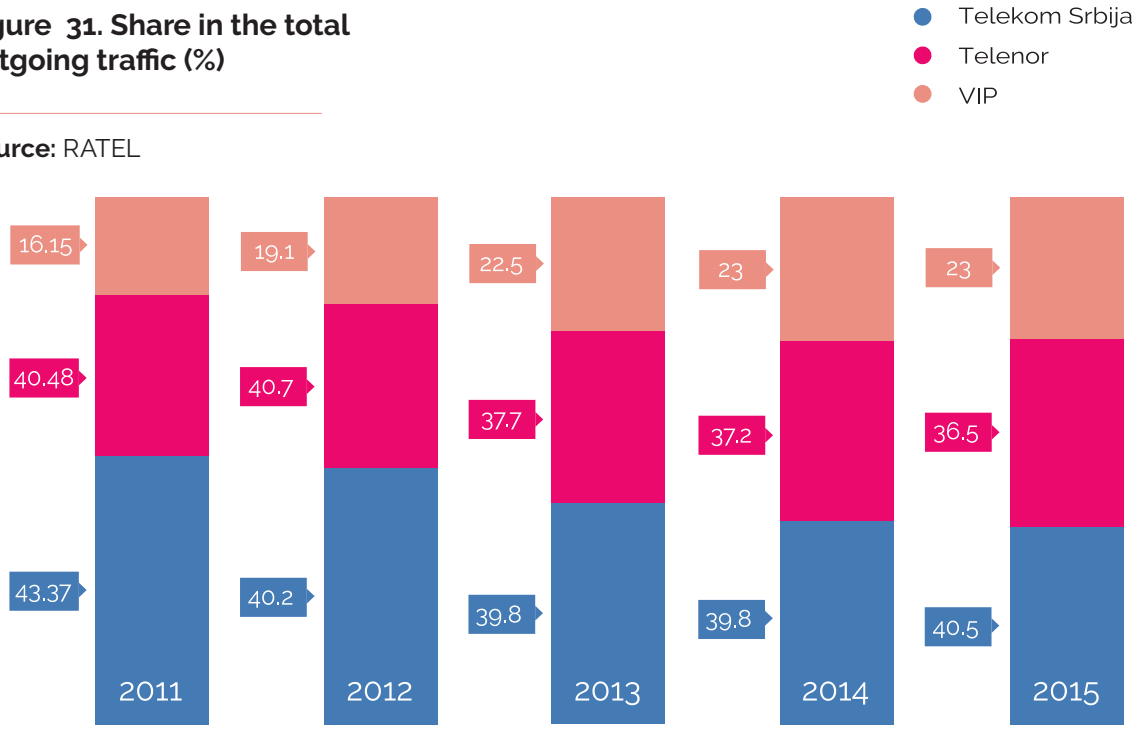



**Figure 32. Share in the total number of sent SMS messages (%)**

**Source:** RATEL

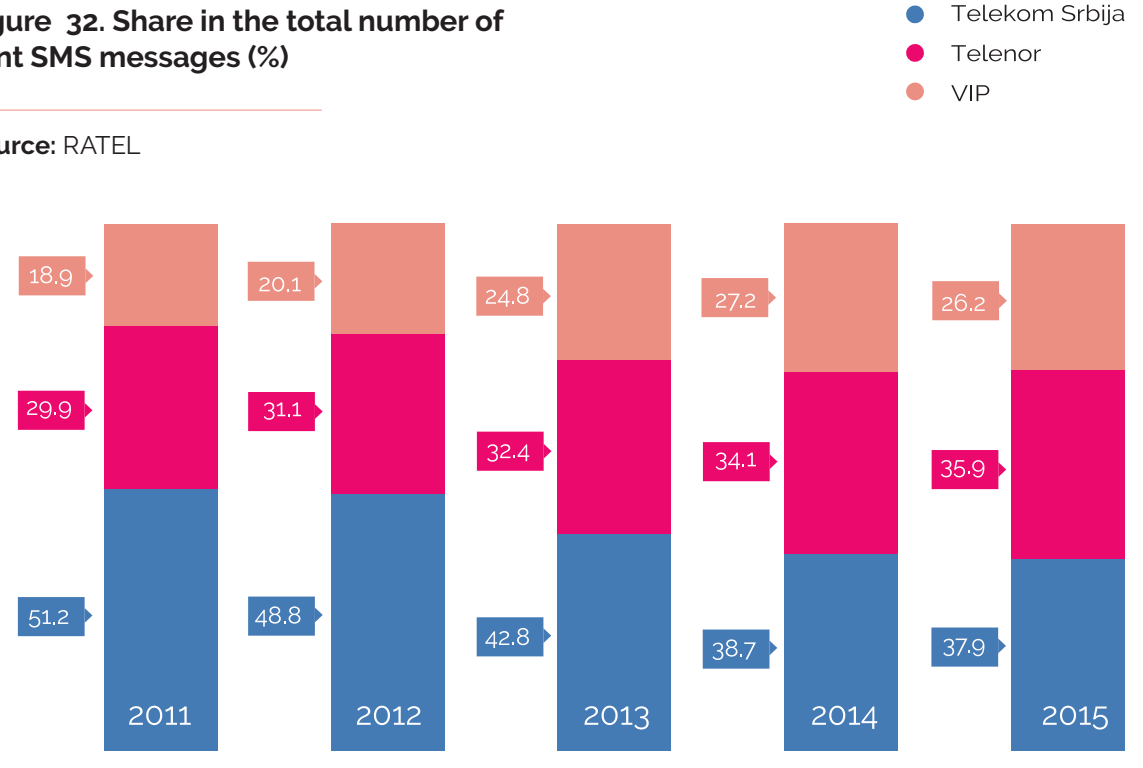


**Figure 33. Share in the total number of sent MMS messages (%)**

**Source:** RATEL

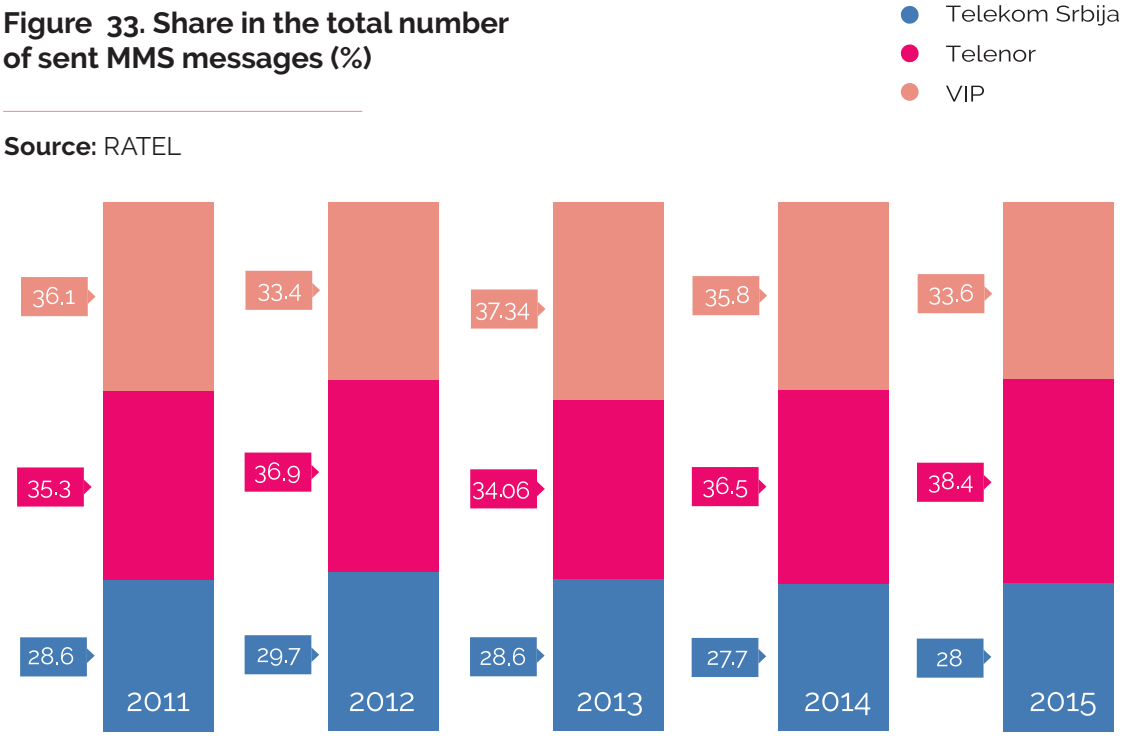
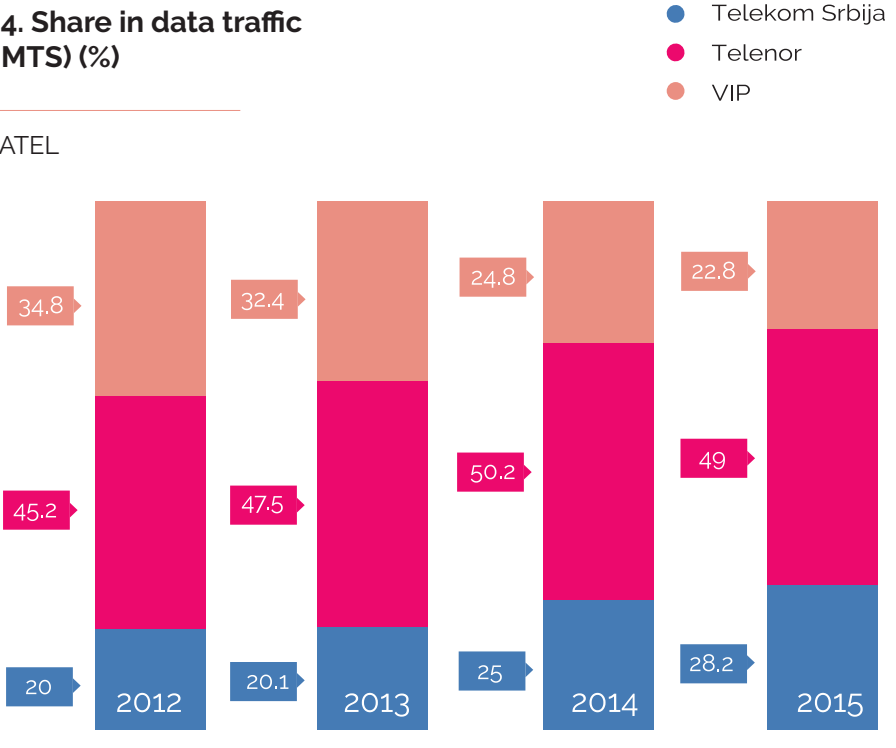



**Figure 34. Share in data traffic (GPRS+UMTS) (%)**

**Source:** RATEL

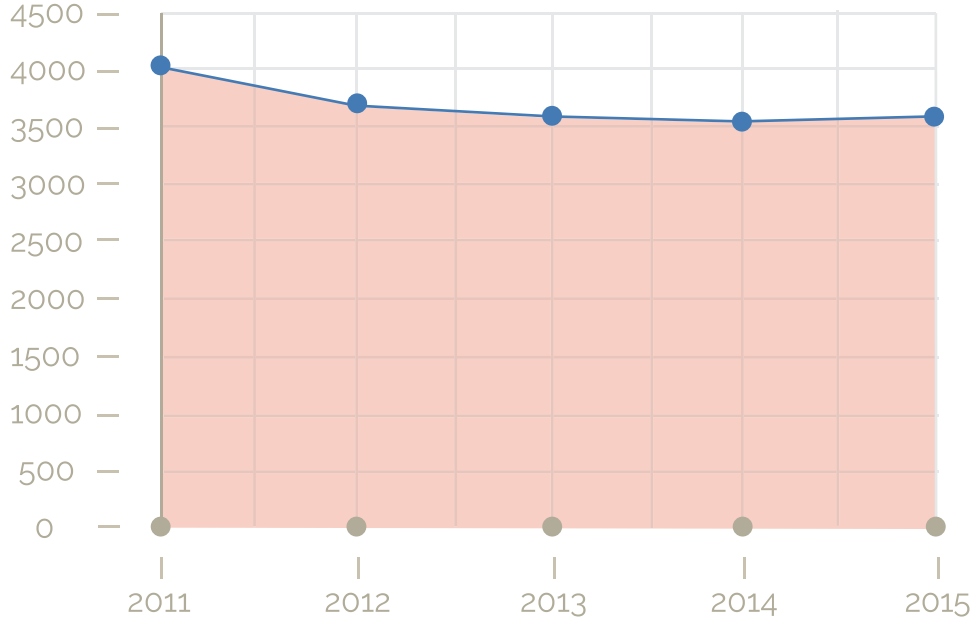


The competition in the mobile market can be estimated using the Herfindahl Hirschman Index (HHI). HHI is an indicator used for determining the degree of concentration of a given market and it is defined as the sum of the squares of the market shares of each individual market share. The market share was identified by the number of users.

**Table 7.**
**HHI values in the period 2011–2015**

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| HHI | 4025 | 3656 | 3596 | 3584 | 3635 |

**Figure 35.**
**HHI values in the period 2011–2015**



The value of HHI was slightly higher compared with the previous year, however still indicating that there is competition between the operators.

During the fifth year since the number portability on mobile networks had been introduced, the number of portings continued to grow, with an average number of portings a month being 9,874 in 2015.

**Figure 36.**
**Average number of portings a month for each year**

**Source:** RATEL

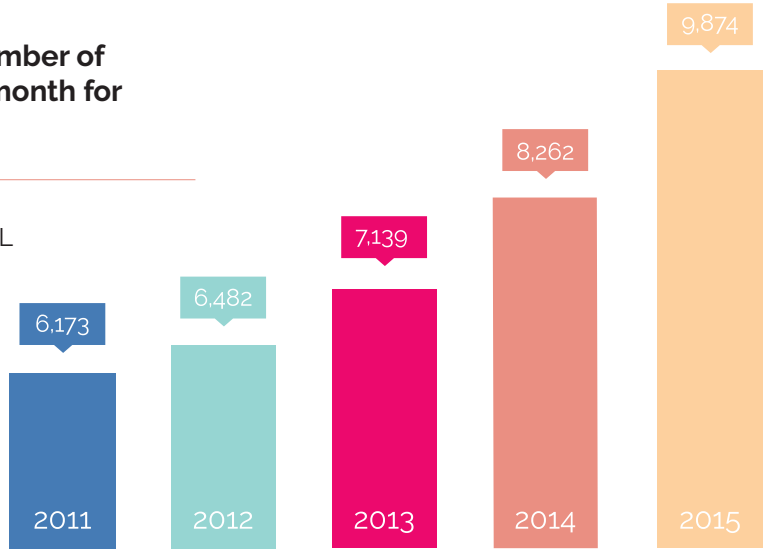
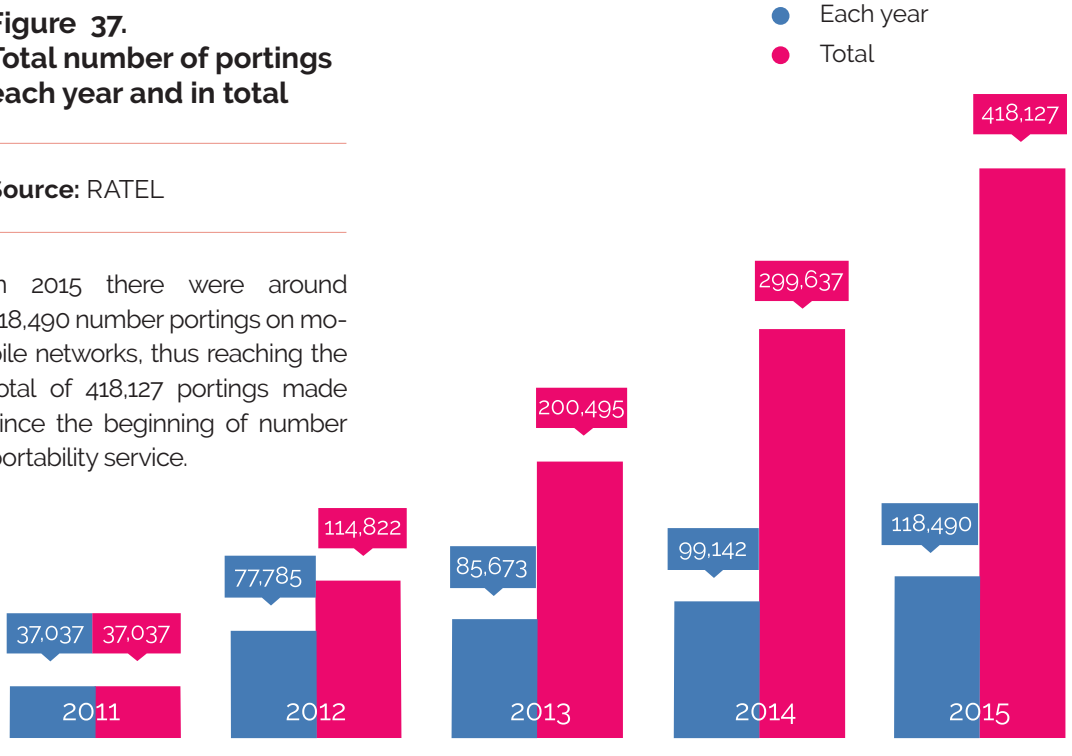



**Figure 37.**
**Total number of portings each year and in total**

**Source:** RATEL

In 2015 there were around 118,490 number portings on mobile networks, thus reaching the total of 418,127 portings made since the beginning of number portability service.



## Regional Roaming

Based on the Agreement on the Reduction in Roaming Fees on Public Mobile Communication Networks, signed between Bosnia and Herzegovina, Montenegro, Republic of Macedonia and Republic of Serbia, the regulated roaming fees began to be applied in the region as of 30 June 2015. The Agreement stipulates a price cap for roaming services in the signatory countries aligned with the prices laid down under 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. In order to implement the Agreement, RATEL passed a decision on gradual reduction in roaming fees (No. 1-03-021-146/14 of 25.12.2014) defining the dates and periods of application of price caps for wholesale and retail fees charged for calls, SMS, data traffic and MMS, in line with the fees under the Roaming Regulation. The price caps applied during the first two years since the implementation of the Agreement are given in Figures 38 and 39.

**Figure 38. Retail roaming price caps (EUR, excluding VAT) applied in the following periods, in the countries that signed the Agreement: 30.6.2015 - 30.6.2016 and 1.7.2016 - 30.6.2017**

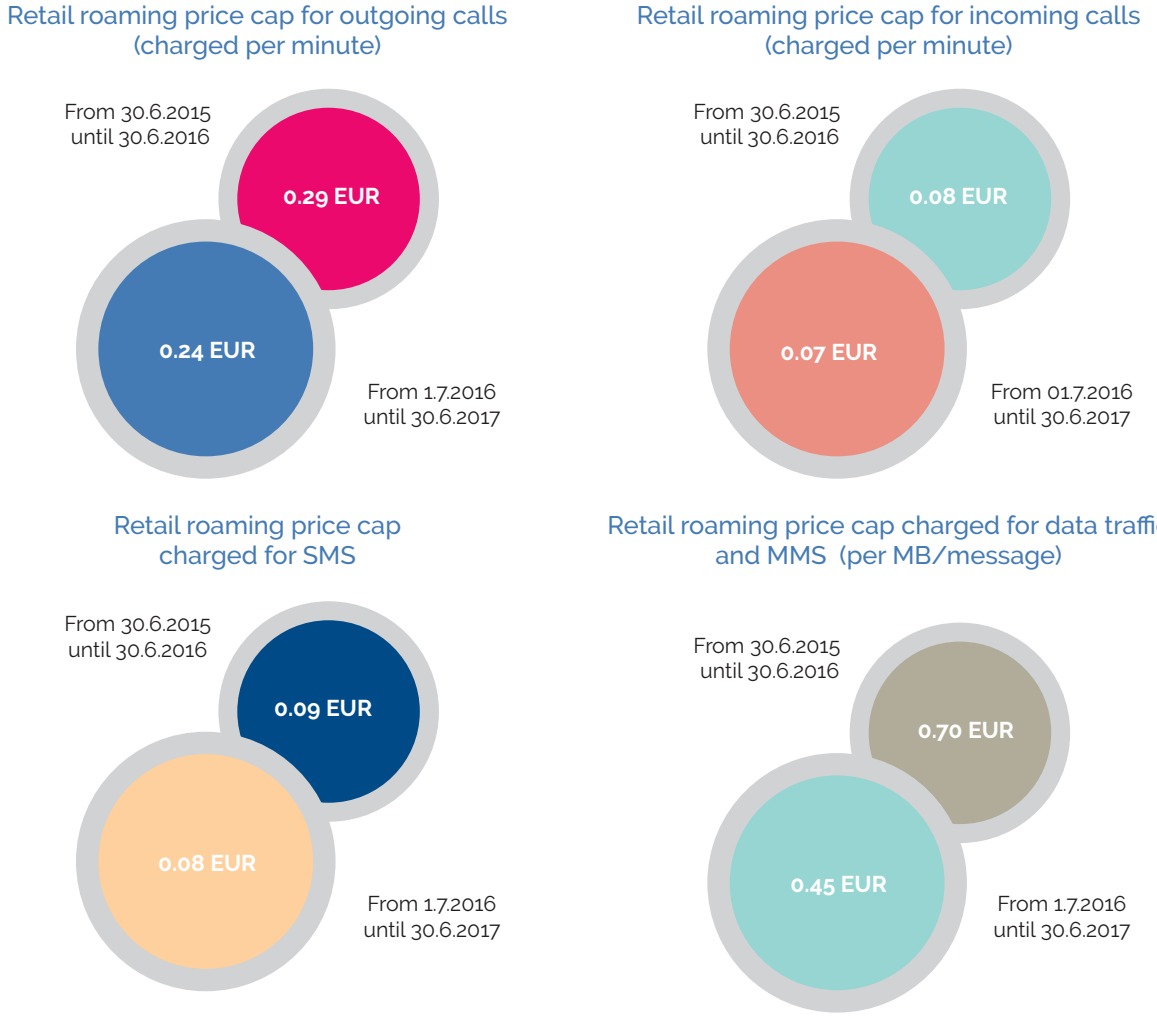
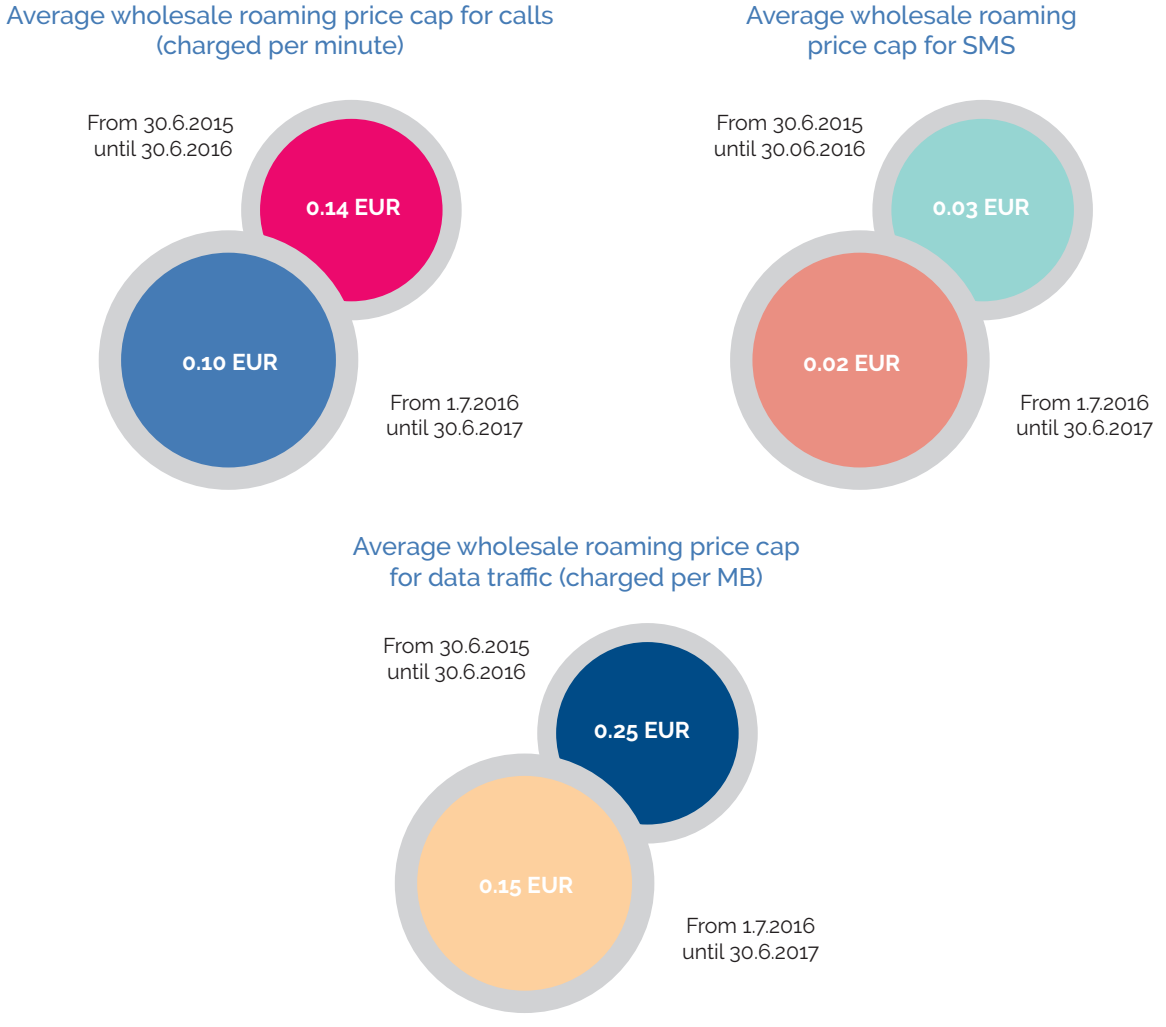


**Figure 39. Wholesale roaming price caps (EUR, excluding VAT) applied in the following periods, in the countries that signed the Agreement: 30.6.2015 - 30.6.2016 and 1.7.2016 - 30.6.2017**



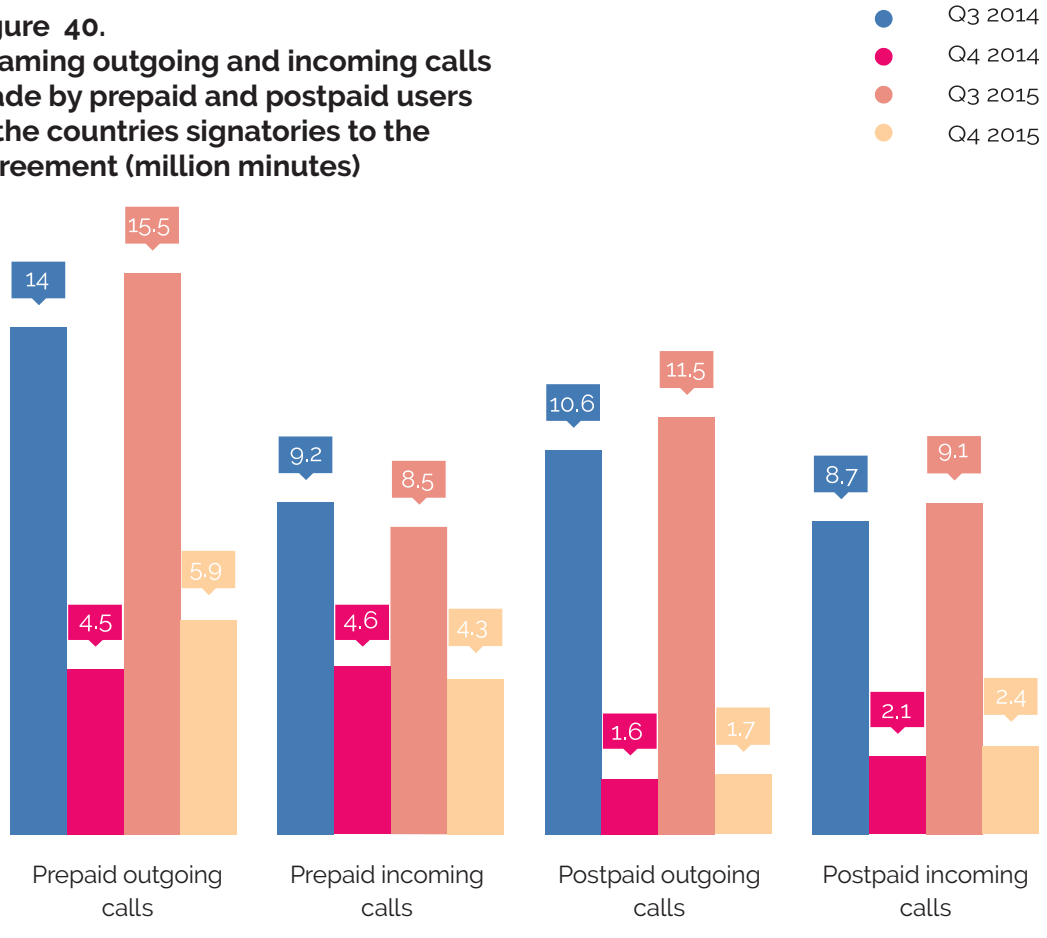

Comparative data for the third and the fourth quarter of 2014 and for the third and the fourth quarter of 2015 are given below, in order to show the first effects of the application of the regulated roaming tariffs. The overview shows the trend followed by the traffic and the revenues made from the regulated retail roaming services provided to the subscribers of the Serbian operators during their stay in other countries signatories to the Agreement.

The data include the entire traffic, i.e. the total of the traffic made without any tariff add-ons and the traffic made using tariff add-ons which are available to the end users.

The comparative data show a growth in the traffic for most roaming voice services. In particular, there was a 10.7% increase in outgoing calls/minutes of the prepaid users in the third quarter of 2014 compared to the third quarter of 2015, and also an increase of 31% in outgoing calls/minutes in the fourth quarter of 2014 compared to the fourth quarter of 2015. On the other hand, there was a 7.6% drop in the incoming calls/minutes in the third quarter of 2015, with the same group of users, compared with the same period a year before, and a 6.5% drop in the incoming calls/minutes in the fourth quarter of 2015 compared with the same quarter of the previous year.

As for postpaid users, there was a growth in both outgoing and incoming calls. The outgoing calls/minutes increased by 8.5% in the third quarter of 2015, compared with the third quarter of 2014, and in the fourth quarter of 2015, the outgoing calls/minutes increased by 6.3% compared with the fourth quarter of 2014. Also, the incoming calls/minutes increased by 4.6% in the third quarter of 2015, compared with the third quarter of the previous year, and in the fourth quarter of 2015, the incoming calls/minutes increased by 14.3% compared with the fourth quarter of 2014 (Figure 40).

**Figure 40.**
**Roaming outgoing and incoming calls made by prepaid and postpaid users in the countries signatories to the Agreement (million minutes)**



The same as in the national traffic, there was also a drop in the number of SMS roaming traffic. In particular, the number of sent messages in the third quarter of 2015 was by 13.4% lower than in the third quarter of 2014, and by 5.9% lower in the fourth quarter of 2015 than in the fourth quarter of 2014. (Figure 41).

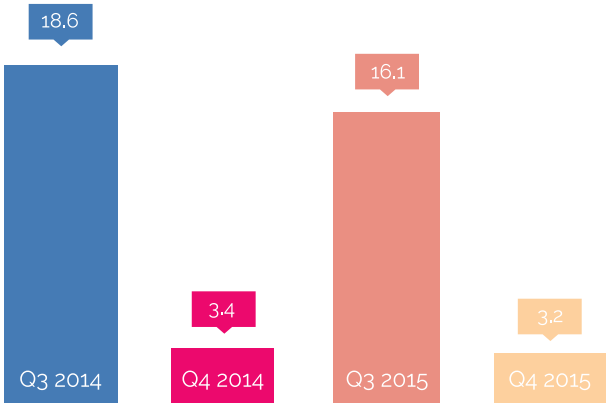
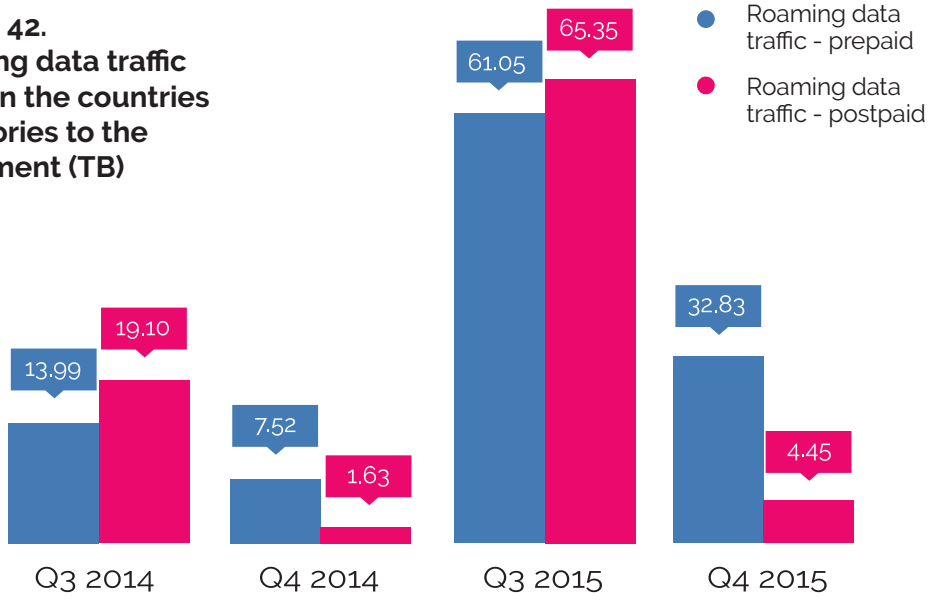



**Figure 41. Number of roaming SMS messages sent in the countries signatories to the Agreement (million)**

Roaming data traffic is a service with the biggest and considerable growth with both groups of users. In particular, with prepaid users this service grew by 336% in the third quarter of 2015, compared with the third quarter of 2014, and by 336% in the fourth quarter of 2015, compared with the same period a year before. As for postpaid users, there was an increase of 242% in the third quarter of 2015, compared with the third quarter of 2014, and by 173% in the fourth quarter of 2015, compared with the same period a year before (Figure 42).

**Figure 42. Roaming data traffic made in the countries signatories to the Agreement (TB)**

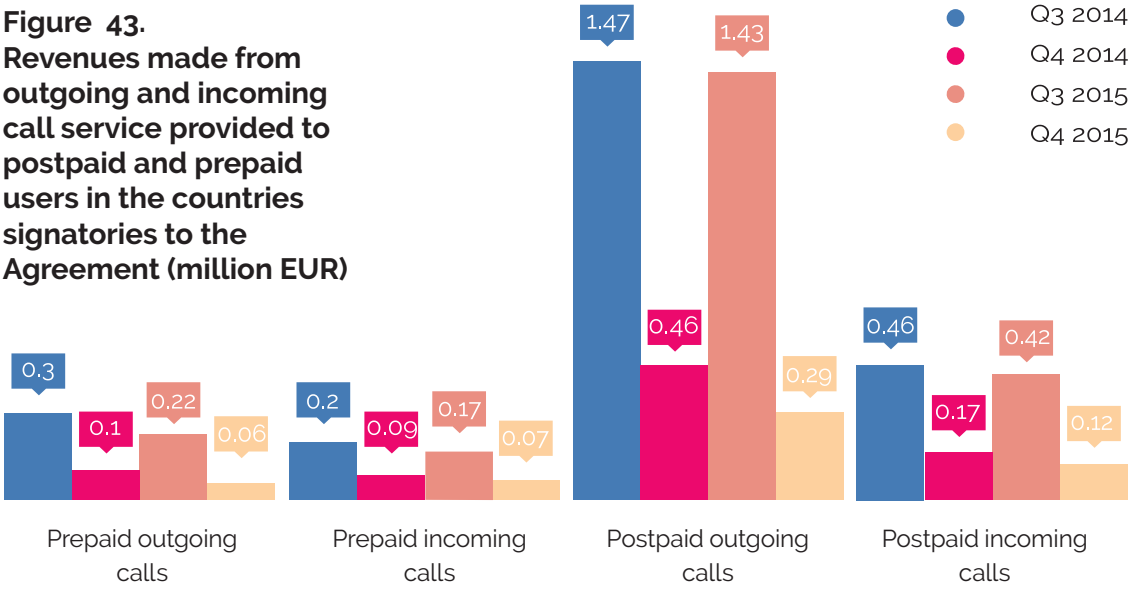



The data illustrating the trend followed by the revenues made from roaming without the revenues made from tariff add-ons are given below.

The revenues made from outgoing call service provided to prepaid users dropped by 26.7% in the third quarter of 2015, compared with the third quarter of 2014, and by 40% in the fourth quarter of 2015, compared with the same period a year before. The revenues made from incoming call service provided to prepaid users dropped by 15% in the third quarter of 2015, compared with the third quarter of 2014, and by 22% in the fourth quarter of 2015, compared with the same period a year before.

The revenues made from outgoing call service provided to postpaid users dropped by 2.7% in the third quarter of 2015, compared with the third quarter of 2014, and by 37% in the fourth quarter of 2015, compared with the same period the year before. The revenues made from incoming call service provided to postpaid users dropped by 8.7% in the third quarter of 2015, compared with the third quarter of 2014, and by 29.4% in the fourth quarter of 2015, compared with the same period the year before (Figure 43).

**Figure 43. Revenues made from outgoing and incoming call service provided to postpaid and prepaid users in the countries signatories to the Agreement (million EUR)**



Revenues made from roaming SMS messages dropped by 11.8% in the third quarter of 2015, compared with the third quarter of 2014, and by 28% in the fourth quarter of 2015, compared with the same period the year before (Figure 44).

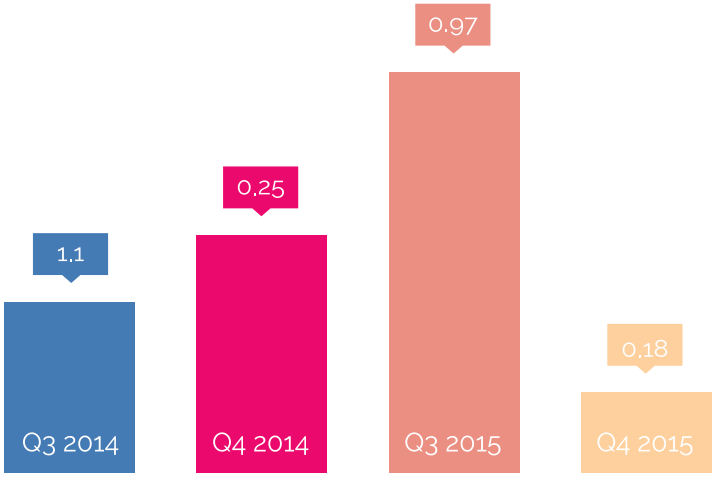
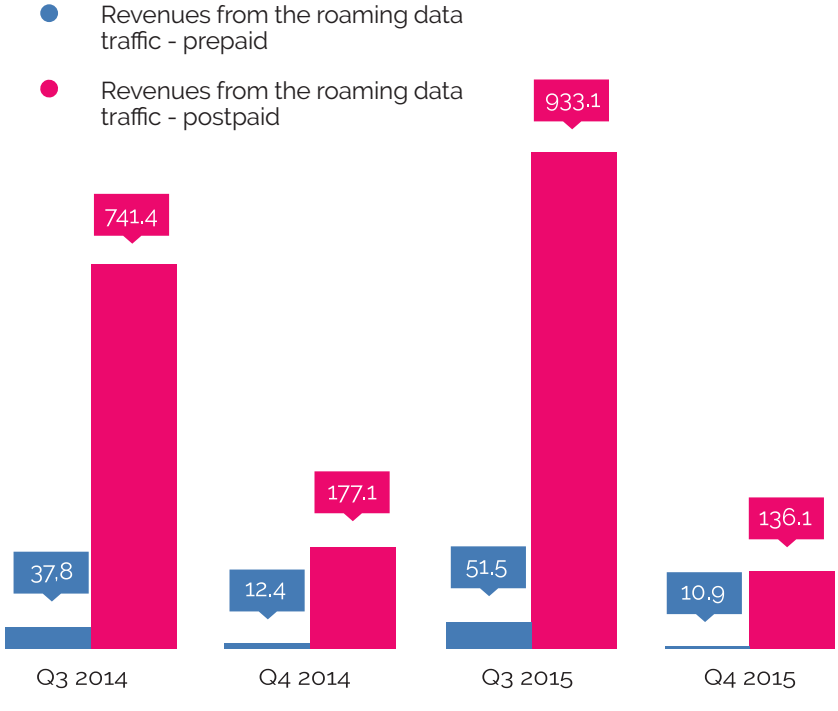



**Figure 44. Revenues made from roaming SMS messages in the countries signatories to the Agreement (million EUR)**

**Figure 45. Revenues made from the roaming data traffic in the countries signatories to the Agreement – prepaid and postpaid (thousand EUR)**




The revenues made from the roaming data traffic increased in the third quarter of 2015, compared with the same period the year before. In particular, the revenues made from the roaming data traffic service provided to prepaid users increased by 36.2% and the revenues made from the roaming data traffic service provided to postpaid users increased by 25.9%. However, the situation in the fourth quarter of 2015 is different from the one in the third quarter of 2015, since the revenues made from the roaming data traffic service provided to prepaid users decreased by 12% and the revenues made from the roaming data traffic service provided to postpaid users decreased by 23.2% (Figure 45).

# 05
# INTERNET SERVICES

*Internet technologies provide the most efficient support for the development of the digital economy, which is a crucial factor of economic growth and progress of a country. In order for the full potential of the services offered by the new technologies to be used, mainly e-health, e-commerce and e-government, an inexpensive and simple access to telecommunications infrastructure and services needs to be made available to all individuals and business entities.*

*The Internet market in the Republic of Serbia has been experiencing expansion for years. This refers in particular to the number and structure of the Internet connections provided to end users. The Serbian Internet market maintained a positive growth trend from the previous years, reaching 1.6 million Internet service subscribers i.e. broadband connections in 2015.*

ADSL access was dominant Internet connection in 2015, with almost 725 thousand connections. accounting for 45% of all broadband connections. In addition to the ADSL, other types of Internet access available are via cable modem, FWA, mobile network, optical cable and directly, via Ethernet.

In December 2015, there were 212 Internet service providers (ISPs) registered in Serbia. Table 8 shows the number of ISPs according to the type of the Internet access provided to end-users.

**Table 8. Number of ISPs according to type of access**

| Access | Number of operators |
|---|---|
| Cable | 37 |
| xDSL | 15 |
| FTTH/B | 20 |
| FTTC/N | 4 |
| Other wired technologies (Ethernet LAN. etc.) | 13 |
| Wireless | 91 |
| Leased lines | 2 |
| Mobile | 3 |

The total number of broadband connections increased by 3% year on year. In terms of the number of subscribers, there was a 1% increase of those using xDSL technology, a 4% increase of wireless access users and a 15% increase in the number of cable Internet subscribers.

The continued expansion of the Internet market is reflected both by the increase in the number of users and by the constant increase in the total revenues from the Internet service provision in the past years. The total revenues in 2015 grew by 8.2% in respect to 2014, amounting to approximately 21.7 billion dinars[3]. If the total revenues from the Internet service provision in 2015 are compared with the total revenues in the previous years, a continuous growth trend of the Internet market in Serbia can be observed.

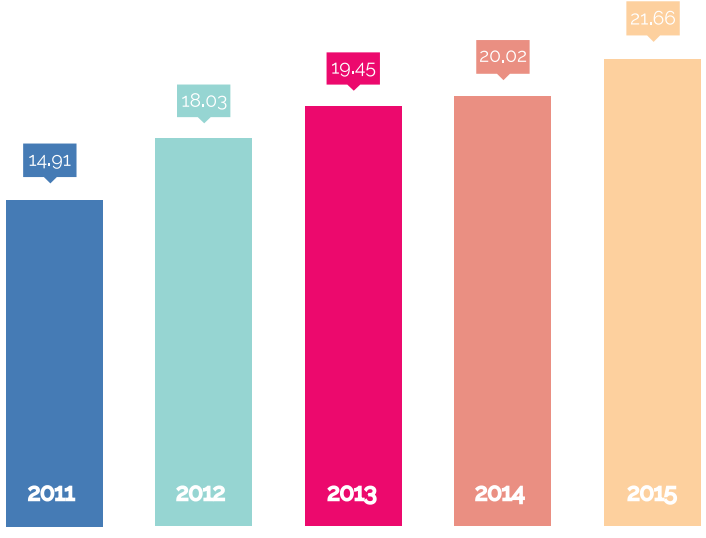



**Figure 46.**
**Internet service revenues (billion RSD)**

**Source:** RATEL

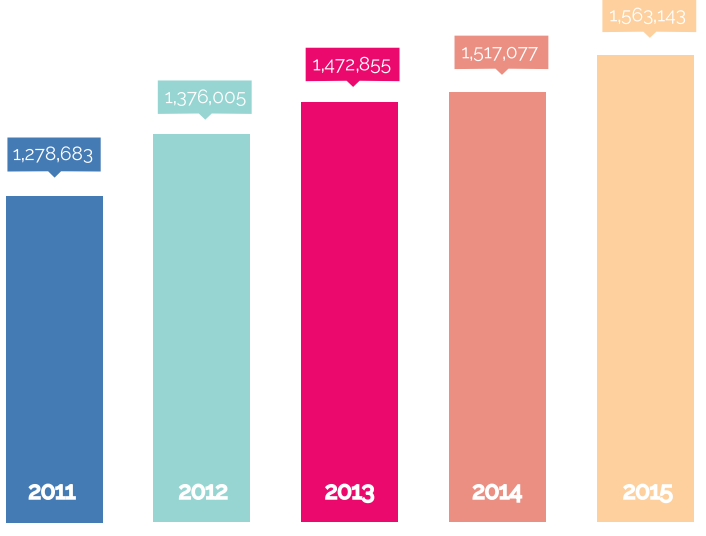



**Figure 47.**
**Total number of the Internet subscribers[4]**

**Source:** RATEL

There was a 16% decrease in the number of broadband subscribers using mobile access modem, with 242 thousand subscribers in 2015.

The number of users that access the Internet using the fiber-optic technology was doubled in 2015, with 30 thousand subscribers of a FTTx network.

3 The total revenues include the revenues from the Internet wholesale.

4 The number of subscribers does not include mobile users that access the Internet via mobile phones.

Telecommunications Company "Telekom Srbija" remains to be the largest operator in the Republic of Serbia in 2015, with a market share of 46% in terms of the number of subscribers. Other ISPs that should be mentioned are: SBB Ltd. Telenor Ltd., I.KOM Ltd., PE "Pošta Srbije", Vip mobile Ltd., Kopernikus technology Ltd., YUNET Ltd. Radijus vektor Ltd., Orion telekom tim Ltd. and Orion telekom Ltd. Together these operators hold 90% of the Serbian ISP market in terms of the number of subscribers.

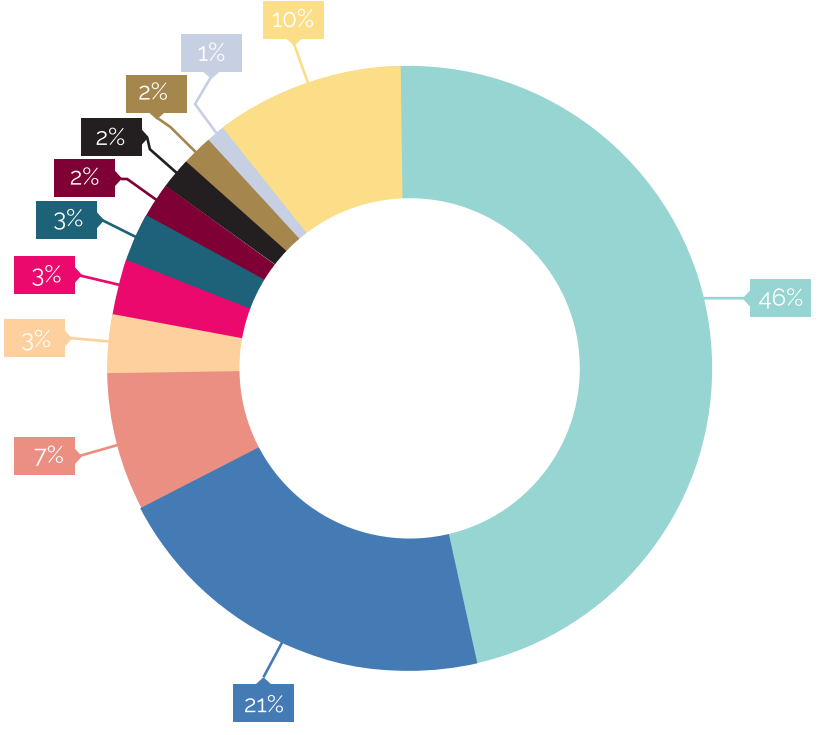
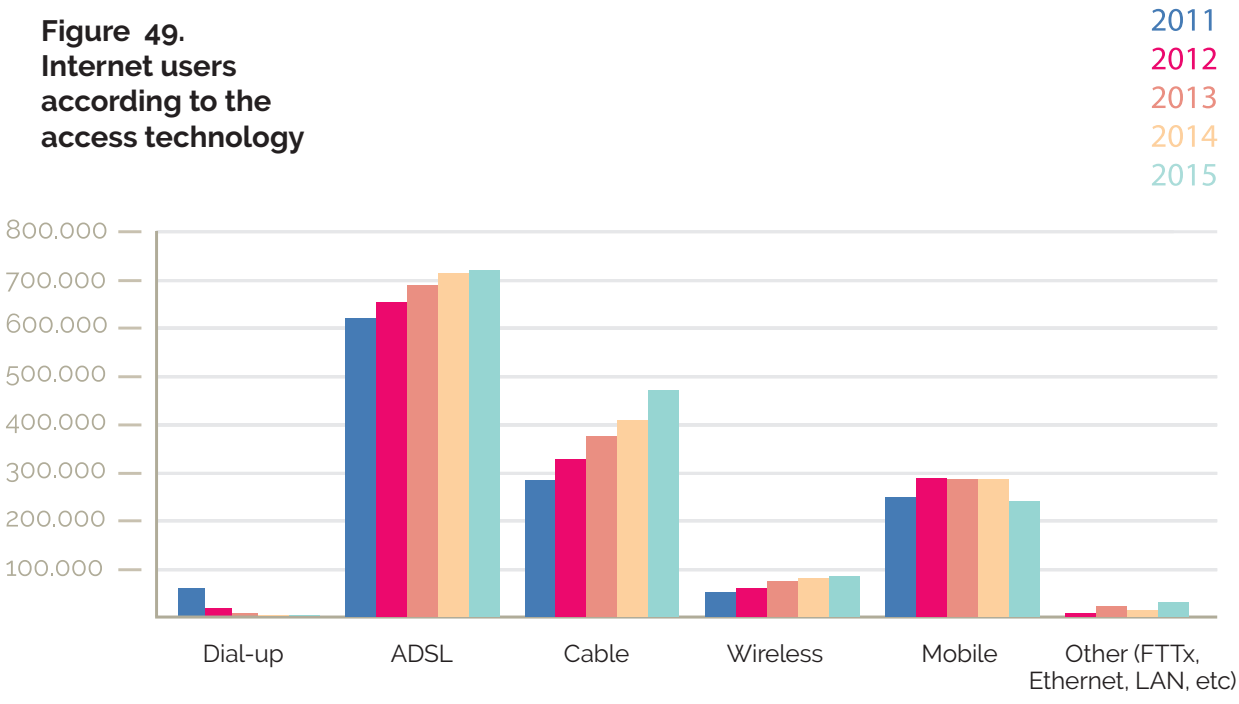



**Figure 48.**
**Market share of the leading ISPs in 2015**

**Source:** RATEL

**Figure 49.**
**Internet users according to the access technology**




| | Dial-up | ADSL | Cable | Wireless | Mobile | Other (FTTx, Ethernet, LAN, etc) |
|---|---|---|---|---|---|---|
| 2011 | 60,694 | 623,611 | 285,413 | 53,754 | 249,542 | 5,669 |
| 2012 | 20,440 | 659,878 | 331,281 | 62,013 | 291,588 | 10,805 |
| 2013 | 10,640 | 693,645 | 375,328 | 79,878 | 288,580 | 24,784 |
| 2014 | 2,539 | 715,845 | 410,821 | 83,643 | 288,348 | 15,881 |
| 2015 | 0 | 724,162 | 475,968 | 87,570 | 242,913 | 32,530 |

**Source:** RATEL

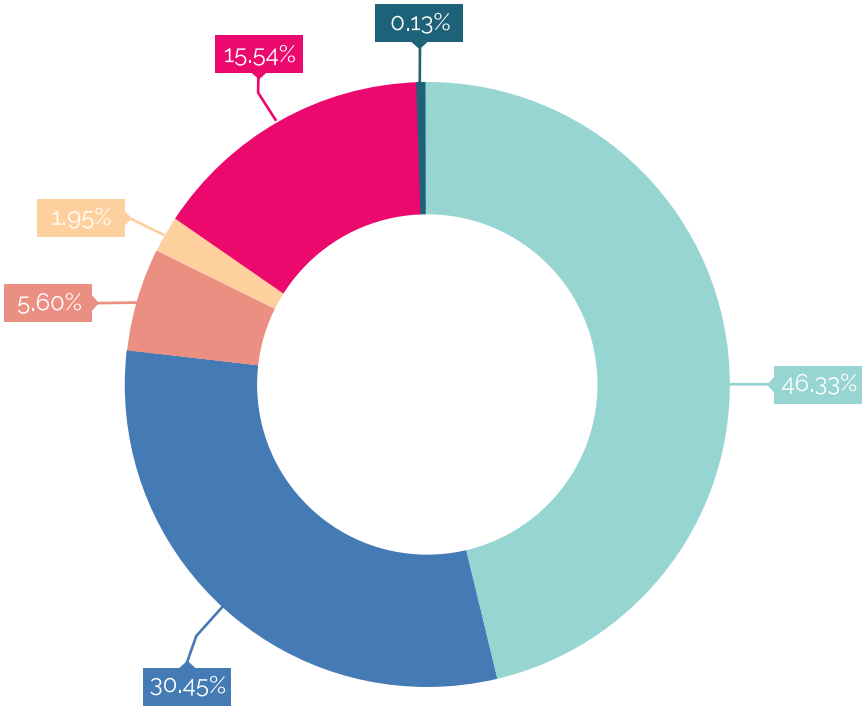



**Figure 50.**
**Share of the Internet connections according to the access technology**

**Source:** RATEL

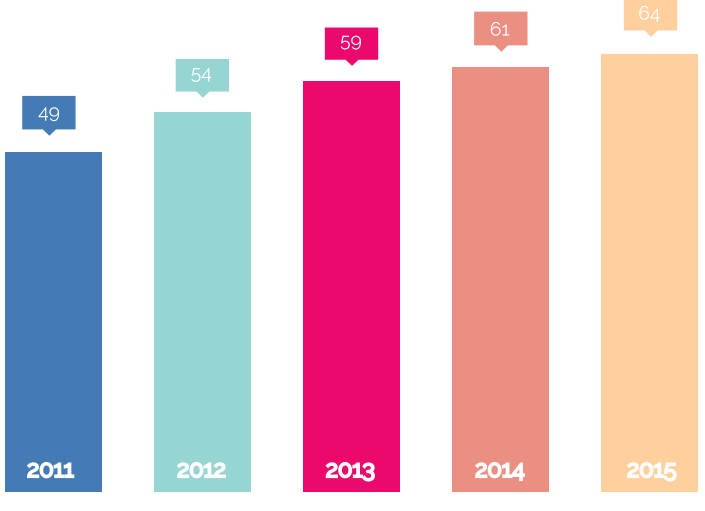



**Figure 51.**
**Internet penetration rate (per 100 households)**

**Source:** RATEL

In 2015 the number of Internet connections per 100 inhabitants was 22 and the number of fixed broadband (ADSL, cable, fiber-optic) connections per 100 inhabitants was over 17.

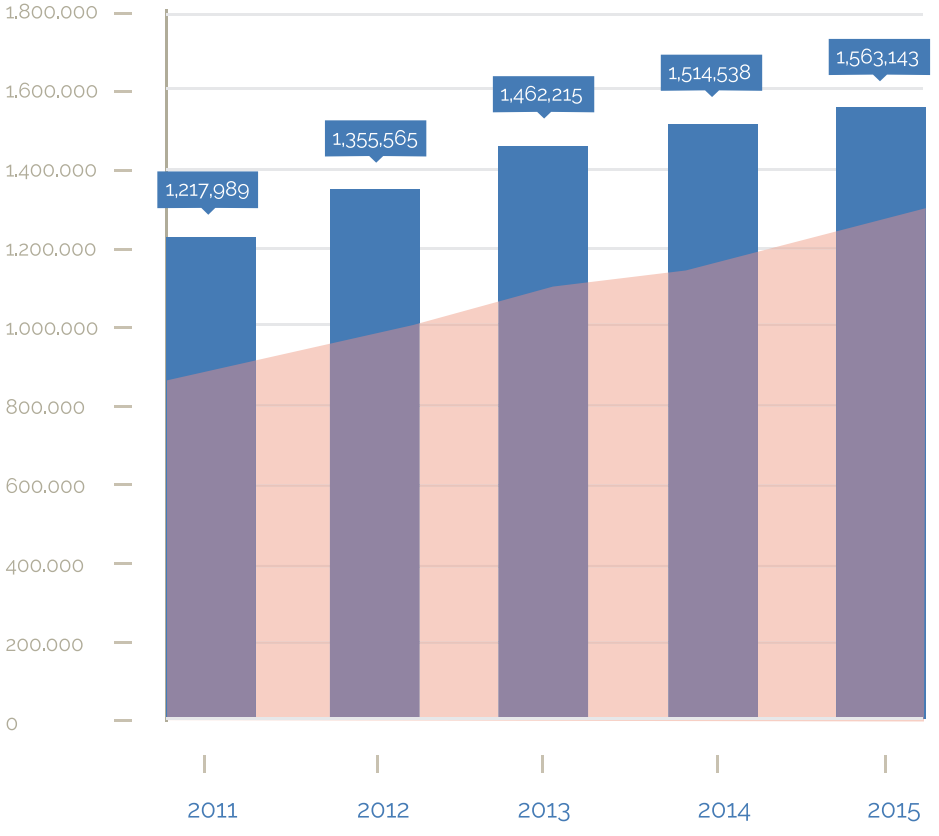



**Figure 52. Total number of Internet connections**

Total number of broadband Internet subscribers

Total number of fixed broadband connections

**Source:** RATEL

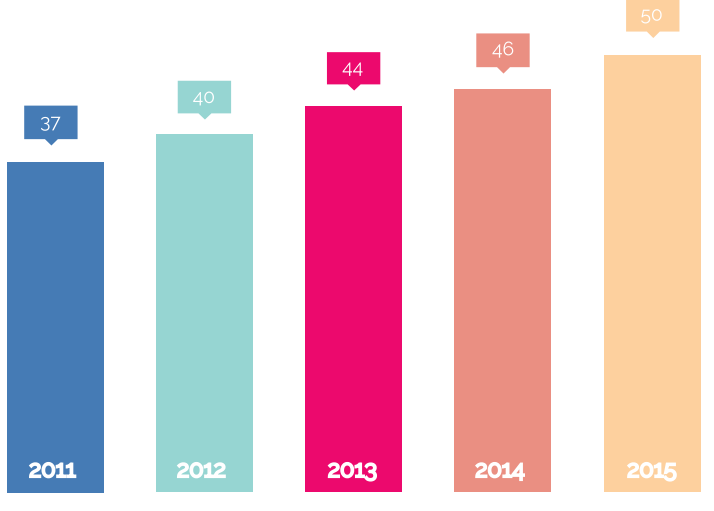



**Figure 53. Fixed broadband penetration rate (per 100 households)**

**Source:** RATEL

The increased competition in the broadband market and the growing user demands led to an improved quality of Internet services, reflected in the constant growth of high bitrate connections. The best sold Internet packages in 2015 were the 10 Mbps ones (14% of subscribers). The average tariff for this package was 1481.83 dinars for private users and 1897.77 dinars for business users.

According to the available data, 82% of the wired broadband users are using the Internet packages at bitrate of 10 Mbit/s or higher, whereas only 18% of the subscribers are using packages that provide less than 10 Mbit/s.

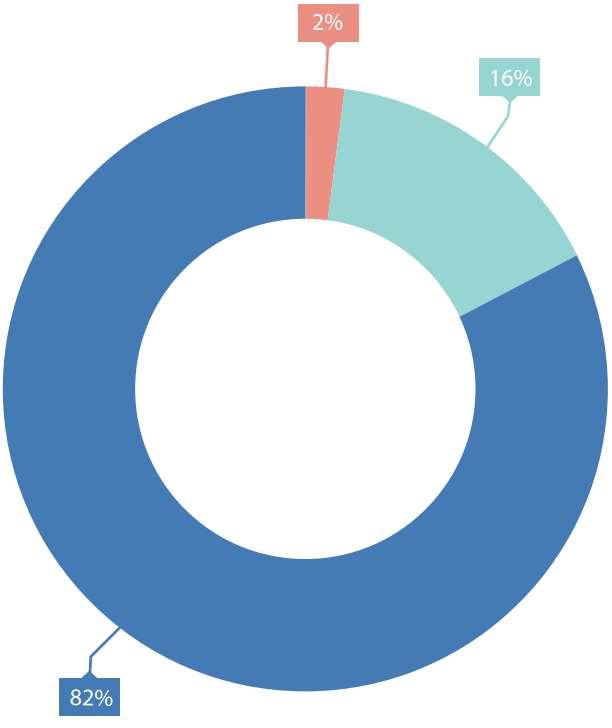



**Figure 54. Distribution of fixed (wired) broadband subscribers according to access rate**

- 10 Mbit/s and over
- 2 Mbit/s - 10 Mbit/s
- 2 Mbit/s or less

**Source:** RATEL

According to the available data, almost 800 thousand subscribers (around 50%) are using broadband Internet bundles, usually combined with media content distribution and/or fixed phone.

In their annual reports submitted to RATEL, the ISPs provided the data on the number of users and access technology in each municipality, as on 31 December 2015. According to the data provided by 142 ISPs, there were nearly 1.6 million subscribers. It should be noted that only prepaid and postpaid users of mobile Internet using a special modem for that purpose were taken into account, and not all subscribers that access the Internet via mobile phone. A majority of subscribers are using some type of cable technology (xDSL, cable modem, fiber/optic network, etc.), followed by those using mobile networks and, finally, the users using Wi-Fi and FWA.

The table below provides the data on service penetration in terms of households and the scope of usage of each technology in different districts.

### Table 9. Penetration by districts

| District | Household penetration (%) | Cable (%) | xDSL (%) | Wired - other technologies (%) | Wireless access (%) | Fiber-optic networks (%) | Mobile Internet (only via special modem %) |
|---|---|---|---|---|---|---|---|
| Belgrade | 91.92 | 42.91 | 32.47 | 0.05 | 4.76 | 2.83 | 16.99 |
| South Bačka | 77.15 | 42.74 | 40.55 | 0.02 | 2.79 | 0.86 | 13.05 |
| Nišava | 61.71 | 28.72 | 44.27 | 0.14 | 13.27 | 3.56 | 10.04 |
| North Bačka | 61.55 | 13.25 | 60.55 | 0 | 9.51 | 1.66 | 15.02 |
| Srem | 58.05 | 16.85 | 61.97 | 0.01 | 7.46 | 0.96 | 12.74 |
| Šumadija | 56.63 | 35.72 | 47.07 | 0.01 | 0.87 | 0.95 | 15.37 |
| Pomoravlje | 55.68 | 25.41 | 53.49 | 0 | 7.3 | 1.03 | 12.77 |
| Central Banat | 54.25 | 34.83 | 40.19 | 0 | 13.43 | 0.19 | 11.35 |
| Morava | 54.20 | 21.18 | 60.47 | 0 | 0.71 | 2.88 | 14.75 |
| South Banat | 51.62 | 15.06 | 56.86 | 0.02 | 13.88 | 1.15 | 13.03 |
| Bor | 51.33 | 6.46 | 64.11 | 0 | 5.75 | 3.46 | 20.21 |
| Podunavlje | 51.20 | 6.95 | 76.39 | 0 | 1.61 | 0.87 | 14.19 |
| Raška | 50.65 | 22.56 | 61.37 | 0 | 2.53 | 2.43 | 11.11 |
| West Bačka | 49.91 | 23.71 | 58.97 | 0 | 1.97 | 0.34 | 15.01 |
| Pčinja | 48.41 | 17.55 | 62.66 | 0 | 5.73 | 1.66 | 12.4 |
| Braničevo | 47.99 | 29.91 | 47.74 | 0.94 | 8.07 | 1 | 12.33 |

| District | Household penetration (%) | Cable (%) | xDSL (%) | Wired - other technologies (%) | Wireless access (%) | Fiber-optic networks (%) | Mobile Internet (only via special modem %) |
|---|---|---|---|---|---|---|---|
| North Banat | 47.99 | 52.83 | 27.32 | 0 | 7.58 | 0.13 | 12.15 |
| Kolubara | 46.25 | 21.51 | 58.21 | 0 | 3.21 | 1.76 | 15.31 |
| Mačva | 44.34 | 17.53 | 56.87 | 0 | 7.89 | 2.59 | 15.12 |
| Zlatibor | 44.28 | 16.24 | 64.5 | 0 | 1.87 | 1.99 | 15.4 |
| Rasina | 42.79 | 28.67 | 52.53 | 0 | 5.08 | 1.06 | 12.65 |
| Zaječar | 41.74 | 7.26 | 70.47 | 0 | 1.91 | 1.19 | 19.16 |
| Pirot | 41.56 | 12.07 | 65.15 | 0 | 5.9 | 4.28 | 12.6 |
| Jablanica | 41.31 | 30.43 | 48.99 | 0 | 7.61 | 0.5 | 12.48 |
| Toplica | 38.31 | 9.51 | 68.51 | 0 | 9.08 | 1.88 | 11.02 |
| Kosovo and Metohija | | 0.00 | 94.85 | 0.00 | 0.59 | 0.00 | 4.55 |

Cable modem is the dominant Internet access technology in North Banat, South Bačka and Belgrade districts, whereas in other districts a xDSL-based technology is commonly used. In Toplica, Podunavlje, Zaječar and Bor the incidence of access via cable modem is under 10%, and the second most used technology, after xDSL, is mobile Internet. Although there are 91 of 142 operators that offer wireless Internet (network access in 2400-2483.5 MHz, 5470-5725 MHz and 5725-5875 MHz frequency bands and CDMA), this technology has the incidence of over 10% only in South Banat, Central Banat and Nišava districts. The highest penetration rate of fiber-optic networks, more than 3%, is registered in Pirot, Nišava and Bor districts.

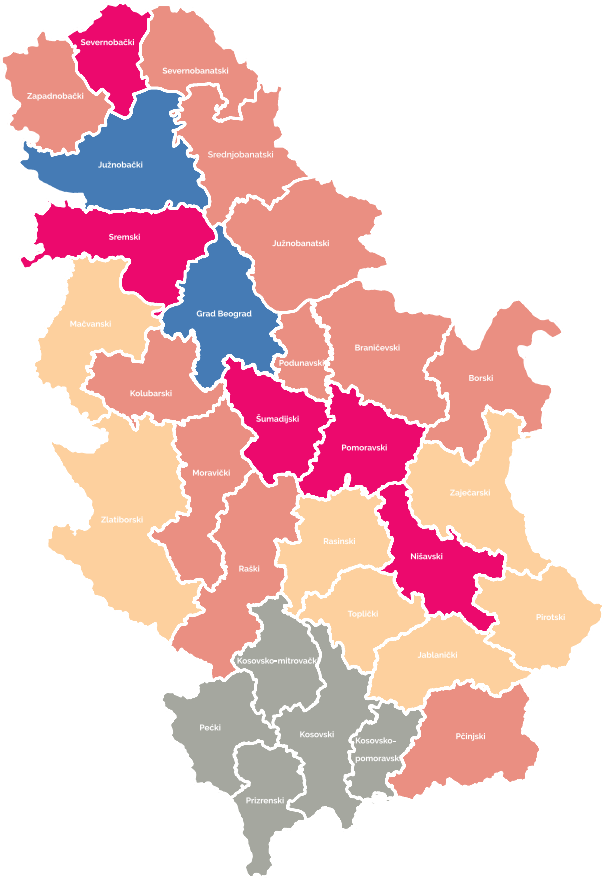



**Figure 55. Internet penetration rates in the Serbian districts**

- Below 45%
- 45%-55%
- 55%-65%
- Above 65%

**Source:** RATEL

**Table 10. 10 cities/municipalities with the highest Internet penetration rate**

| City/Municipality | Total number of subscribers | Number of households | Penetration |
|---|---|---|---|
| Novi Sad | 121007 | 128876 | 93.89 |
| Belgrade | 557409 | 606433 | 91.92 |
| Niš | 67387 | 89903 | 74.96 |
| Temerin | 6444 | 9188 | 70.13 |
| Ćuprija | 6988 | 10489 | 66.62 |
| Veliko Gradište | 3574 | 5488 | 65.12 |
| Vršac | 11555 | 17769 | 65.03 |
| Sremski Karlovci | 1965 | 3024 | 64.98 |
| Subotica | 34980 | 54070 | 64.69 |
| Požarevac | 15977 | 24806 | 64.41 |

**Figure 55 provides an overview of the Internet penetration in the Serbian districts.**

# 06
# MEDIA CONTENT DISTRIBUTION

*In 2015, there were 90 operators registered for media content distribution, providing the service via: cable distribution networks (coaxial, hybrid and optical) – CATV, public fixed telephone network– IPTV, satellite distribution network– DTH (Direct to Home) and wireless network.*

There were 1.6 million users of the media content distribution services in 2015. which is an increase by 6.6% compared to the previous year. According to the available data. approximately 730.000 subscribers are using the service of media content distribution within service package. most often coupled with the service of broadband Internet access and/or fixed telephony.

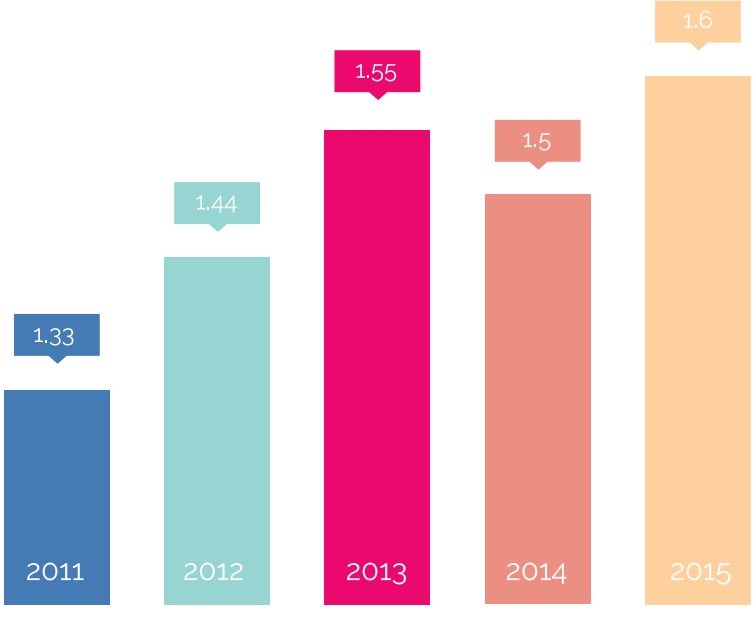
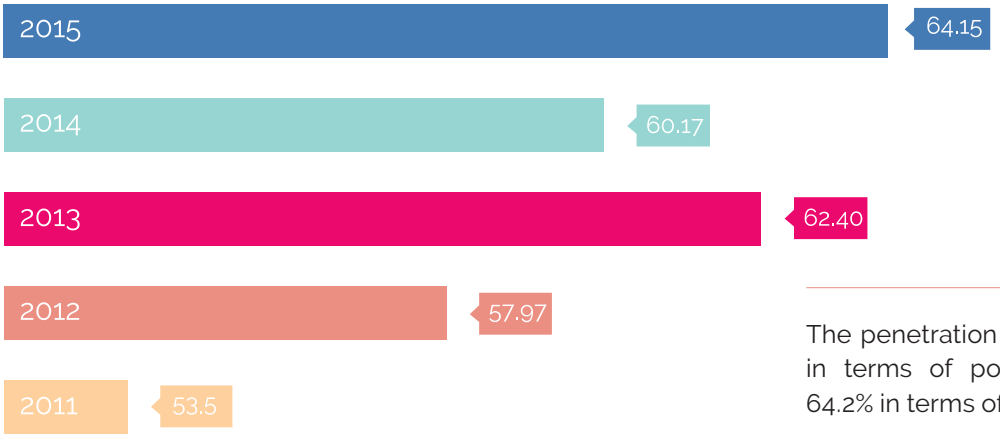



**Figure 56. Total number of subscribers (in million)**

**Source:** RATEL

**Figure 57.**
**Subscribers per 100 households**

**Source:** RATEL




The penetration rate is 22.55% in terms of population. and 64.2% in terms of households.

The largest media content distribution operator in Serbia. during 2015. continued to be Serbia Broadband – Srpske kablovske mreže Ltd. (SBB). with a market share of 47%. in terms of the number of subscribers. Other leading operators are Telekom Srbija Joint Stock Co.. Public Enterprise "Pošta Srbije". Kopernikus tehnology Ltd. I.KOM Ltd. Radijus vektor Ltd. and Sat-Trakt Ltd. In terms of the number of subscribers. the joint market share of these operators in the media content distribution market amounts to almost 90%.

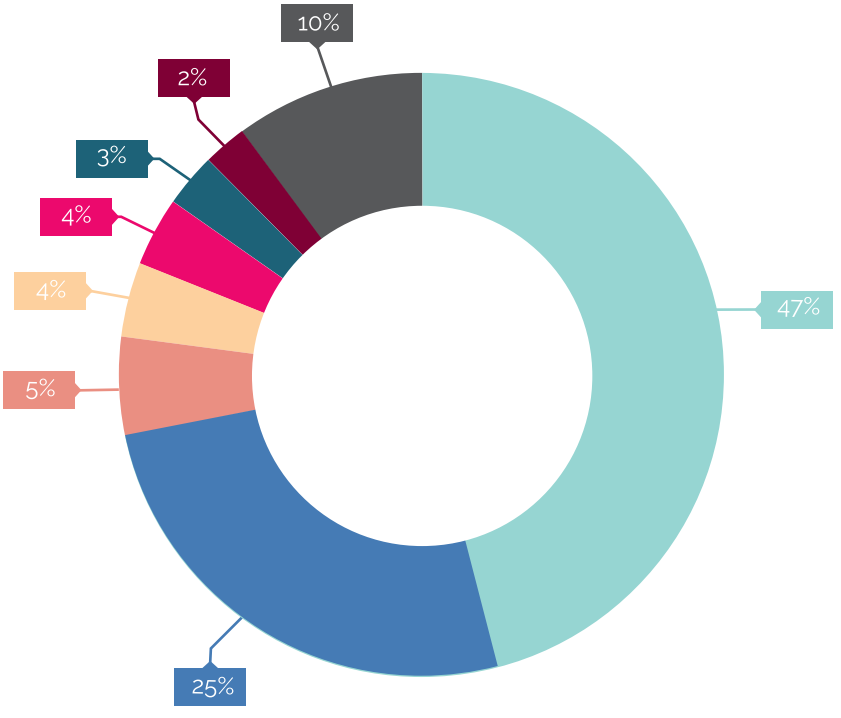
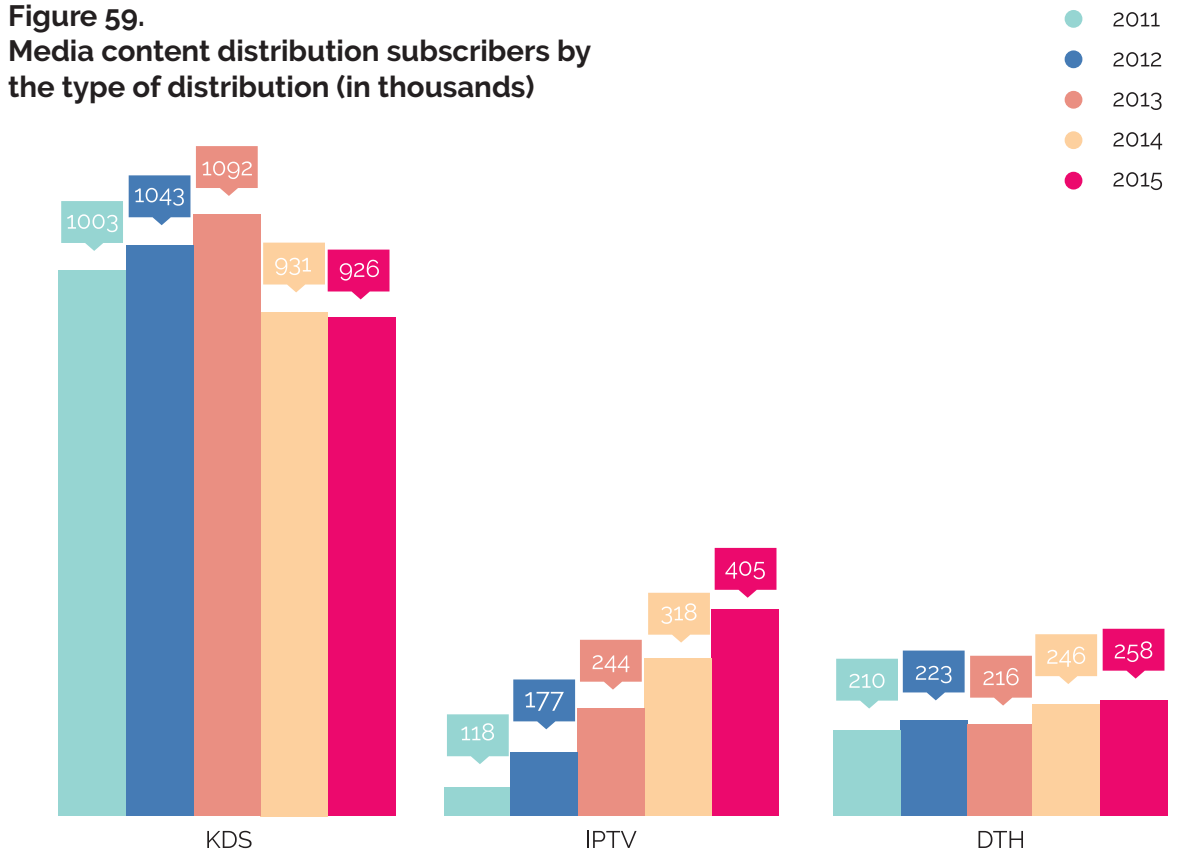



**Figure 58.**
**Market share of the leading operators in 2015**

**Source:** RATEL

Media content distribution via CATV continued to be dominant in 2015, with around 926 thousand subscribers, which is a decrease compared to the previous year. The number of IPTV subscribers, on the other hand, is on the increase, whereas the number of DTH subscribers is approximately on the same level as in the previous years.

**Figure 59.**
**Media content distribution subscribers by the type of distribution (in thousands)**



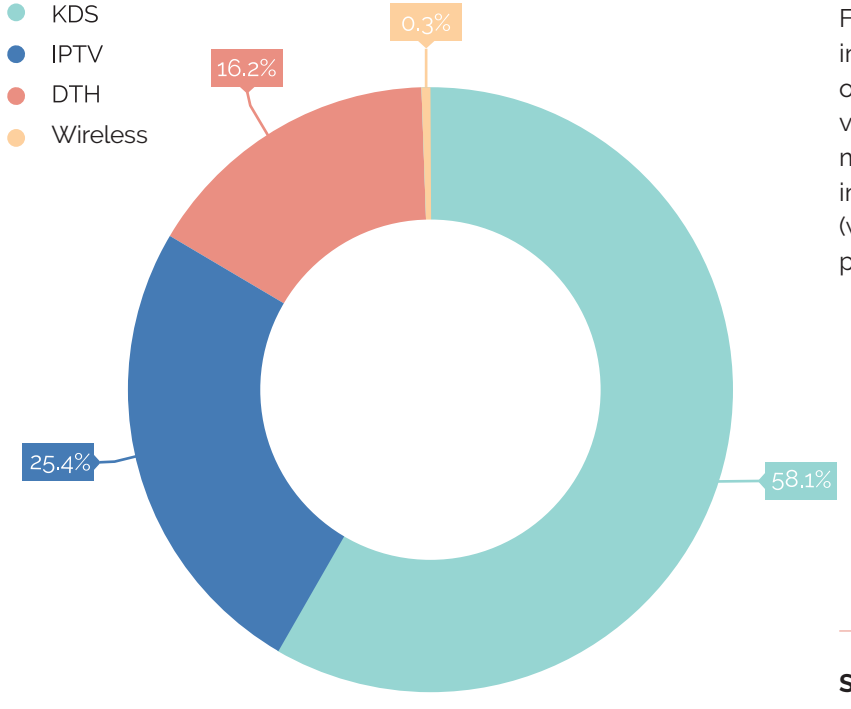
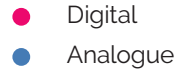



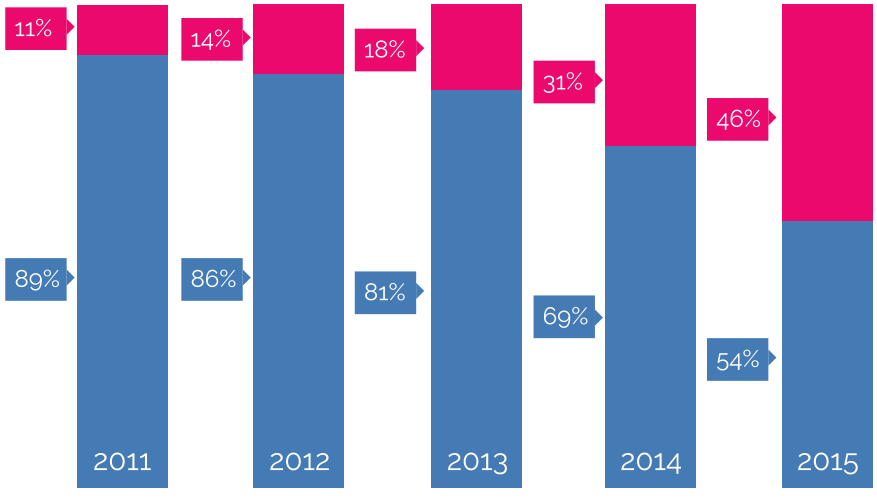

Figure 59, shows an increase in the number of subscribers of digital HD TV which offers various options (video on demand, replay, recording, etc.), in addition to analogue TV (which is the basic package provided by all operators).

**Source:** RATEL

**Figure 60.**
**Cable subscribers**




**Source:** RATEL



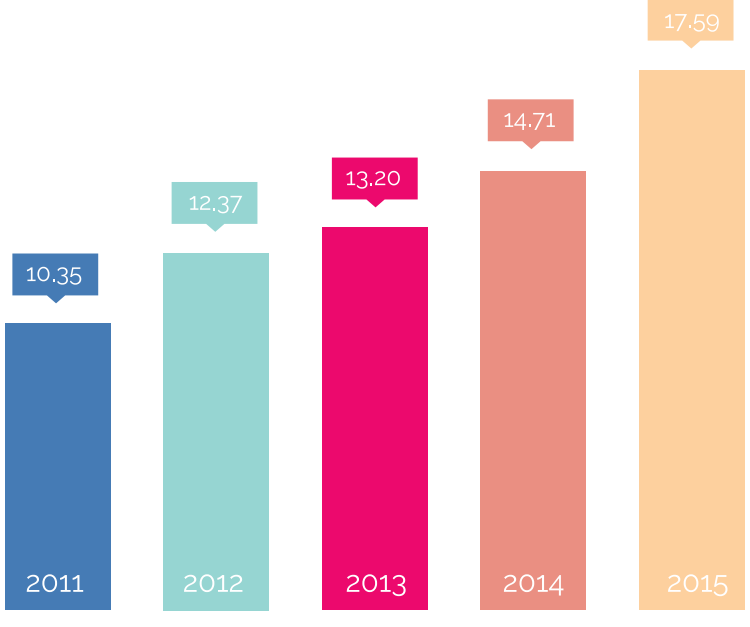




**Figure 61.**
**Revenue trends on the media content distribution market (in billion RSD)**

**Source:** RATEL

The total operators' revenues from media content distribution in 2015 was 17.59 billion dinars, which is a 20% increase compared to the previous year.

CATV accounts for the biggest share in the revenues from the media content distribution (62%), followed by IPTV (21%) and DTH (17%). Compared to the previous year, CATV and DTH revenue shares are in a mild decrease, whereas the IPTV revenue share increased by 4%.

As shown in Figure 62, the revenues from the network maintenance and content distribution account for almost 89% of the total revenues. Network connection charges account for only 0.5% of the total revenues and are decreasing from year to year, since the majority of operators do not charge for this service during promotional offers or 12-month/24-month contractual obligations. Revenues from other services account for around 10% of the total revenues in 2015, and these services are: additional programme packages. video on demand, equipment for digital TV usage on an additional device etc.

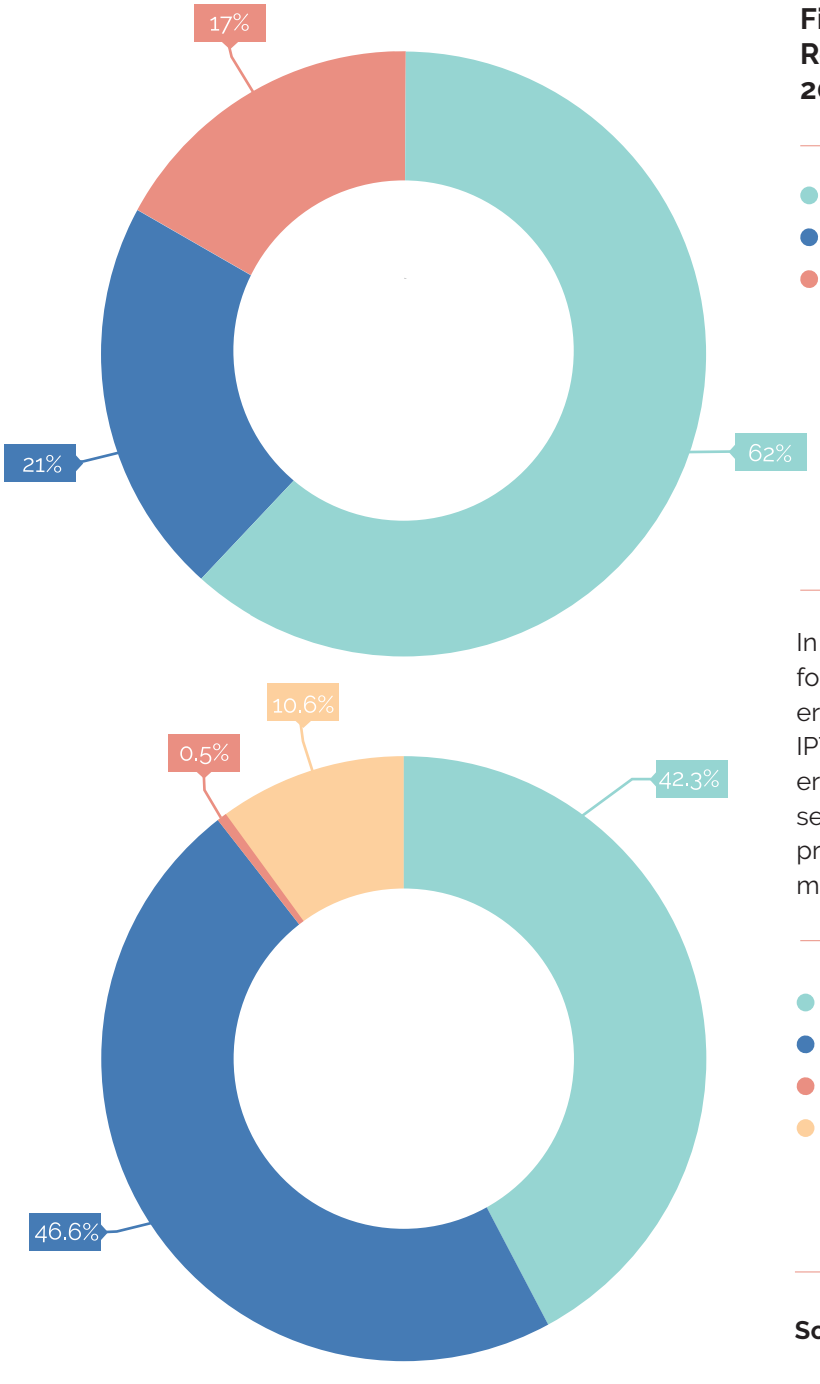



**Figure 62. Revenue structure in 2015**

In 2015, CATV subscribers paid for the basic package on average 979 dinars per month, IPTV subscribers paid on average 1,134 dinars and DTH service subscribers paid approximately 750 dinars on a monthly basis.

**Source:** RATEL

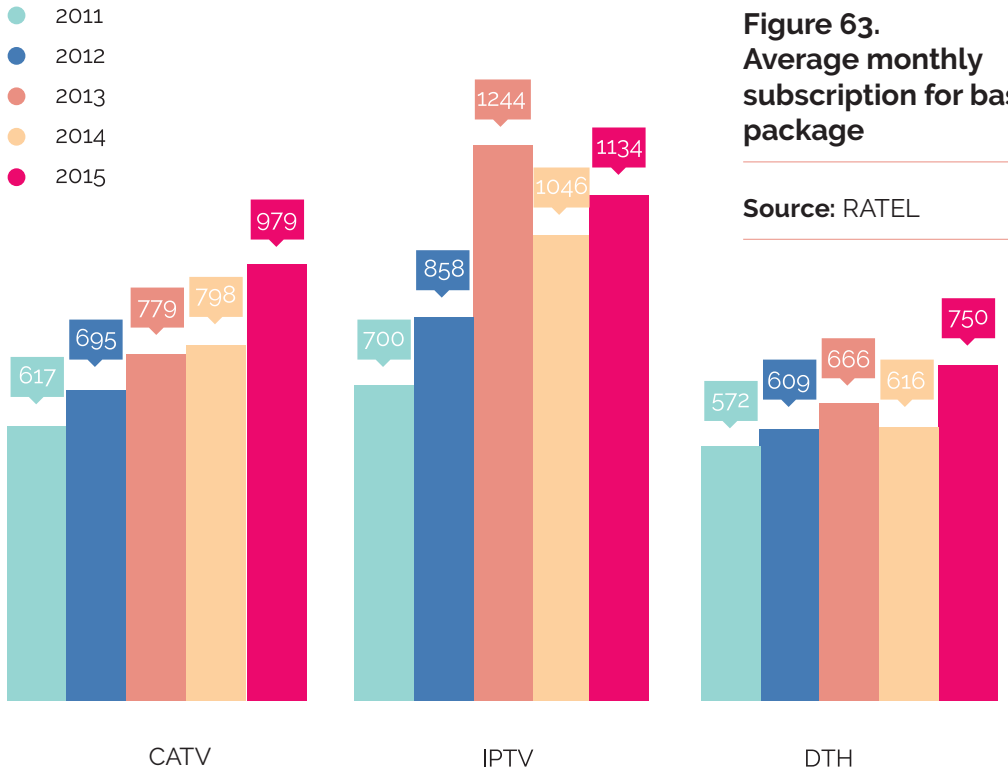



**Figure 63.**
**Average monthly subscription for basic service package**

**Source:** RATEL

Figure 63 shows that, during 2015, CATV subscribers paid on average 1,071 dinars. DTH subscribers paid on average 1,127 dinars and IPTV subscribers paid on average 954 dinars on a monthly basis.

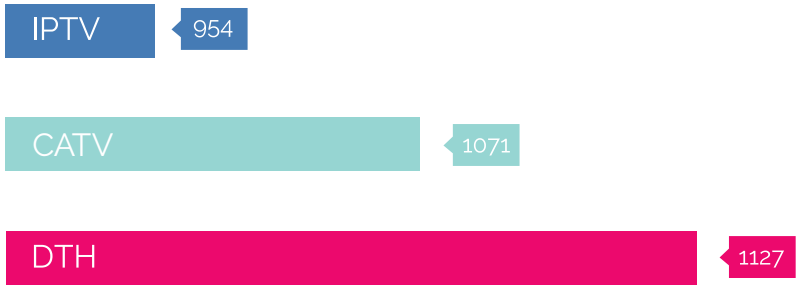
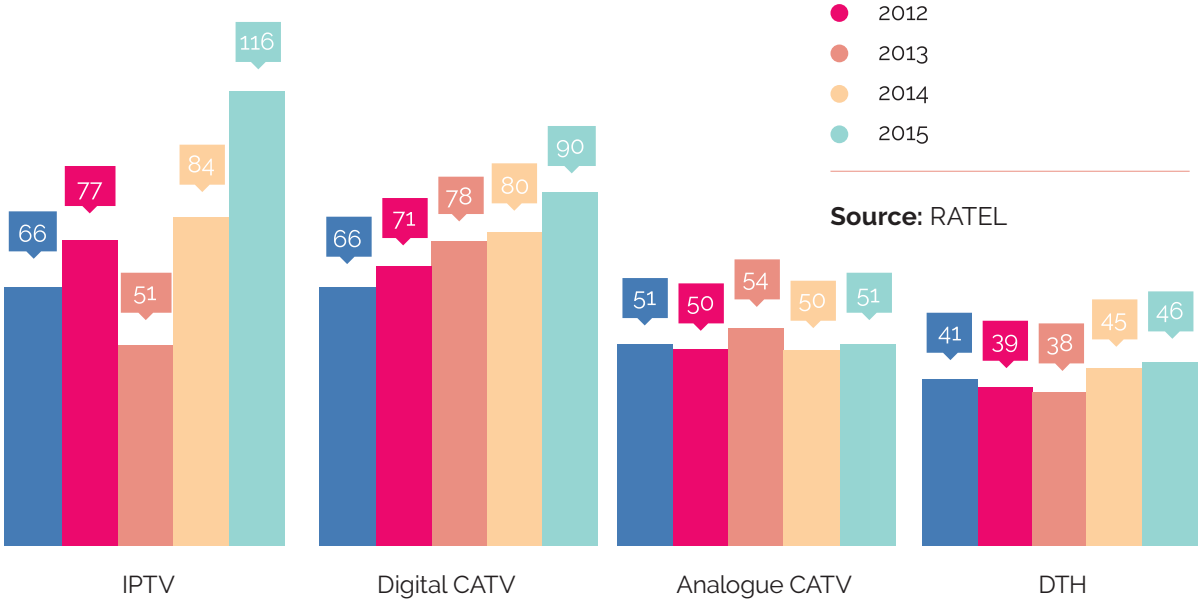



**Figure 64.**
**Average bill per subscriber (in RSD)**

**Source:** RATEL

Figure 65, shows the average number of TV channels in the basic package during 2015, according to different manners of media content distribution. In the previous years, the average number of TV channels in the CATV basic package was considerably higher compared to the average number of TV programmes in the analogue CATV, by which the operators stimulated subscribers to switch to the digital media content distribution. This is also supported by the fact that the number of subscribers of the analogue CATV is decreasing in favour of the digital CATV subscribers (Figure 65).

**Figure 65.**
**Average number of TV channels in the basic package**




**Source:** RATEL

The following table provides the data on the service penetration per household, as well as the incidence of technologies on the district level.

**Table 11. Penetration by districts**

| District | Penetration per household (%) | CATV analogue (%) | CATV digital (%) | IPTV (%) | DTH (%) |
|---|---|---|---|---|---|
| City of Belgrade | 81.76 | 39.52 | 38.06 | 13.35 | 9.07 |
| South Bačka | 80.54 | 37.02 | 34.70 | 20.21 | 8.08 |
| North Bačka | 70.22 | 62.57 | 5.04 | 15.31 | 17.08 |
| Šumadija | 68.08 | 25.56 | 33.24 | 26.69 | 14.51 |
| Central Banat | 67.16 | 26.15 | 29.66 | 24.63 | 19.56 |
| Braničevo | 60.97 | 18.47 | 25.78 | 23.08 | 32.67 |
| Raška | 60.66 | 25.97 | 14.26 | 37.29 | 22.47 |
| North Banat | 58.08 | 50.29 | 23.36 | 11.96 | 14.39 |
| Kolubara | 57.99 | 28.40 | 17.69 | 30.34 | 23.58 |
| Srem | 56.72 | 8.62 | 20.81 | 47.26 | 23.31 |
| Nišava | 56.45 | 38.37 | 23.01 | 27.49 | 11.12 |
| Rasina | 55.73 | 27.18 | 25.37 | 27.72 | 19.73 |
| West Bačka | 54.93 | 24.45 | 18.49 | 39.36 | 17.69 |
| Podunavlje | 54.20 | 24.73 | 14.69 | 38.60 | 21.98 |
| Mačva | 52.81 | 20.77 | 15.62 | 33.62 | 29.99 |
| Morava | 52.01 | 32.83 | 4.39 | 46.09 | 16.69 |
| Zlatibor | 51.52 | 21.41 | 13.39 | 37.37 | 27.83 |
| Pomoravlje | 49.09 | 11.81 | 26.44 | 37.33 | 24.42 |
| South Banat | 48.52 | 15.20 | 12.66 | 46.56 | 25.59 |
| Bor | 46.89 | 8.20 | 15.57 | 46.14 | 30.09 |

| District | Penetration per household (%) | CATV analogue (%) | CATV digital (%) | IPTV (%) | DTH (%) |
|---|---|---|---|---|---|
| Pirot | 46.37 | 23.87 | 10.07 | 49.04 | 17.01 |
| Zaječar | 43.33 | 29.21 | 1.68 | 41.62 | 27.49 |
| Jablanica | 41.40 | 20.72 | 28.21 | 29.41 | 21.66 |
| Pčinja | 40.11 | 26.25 | 17.97 | 34.15 | 21.62 |
| Toplica | 38.61 | 28.90 | 0.00 | 53.27 | 17.83 |

The highest percentage of households subscribed to the digital CATV is in the City of Belgrade and in South Bačka district, which also have the highest incidence of the subscribers of media content distribution. It is notable that, in districts with the highest subscriber penetration, the dominant media content distribution is via CATV, whereas in the majority of districts with the total penetration below 50%, IPTV has the biggest share.

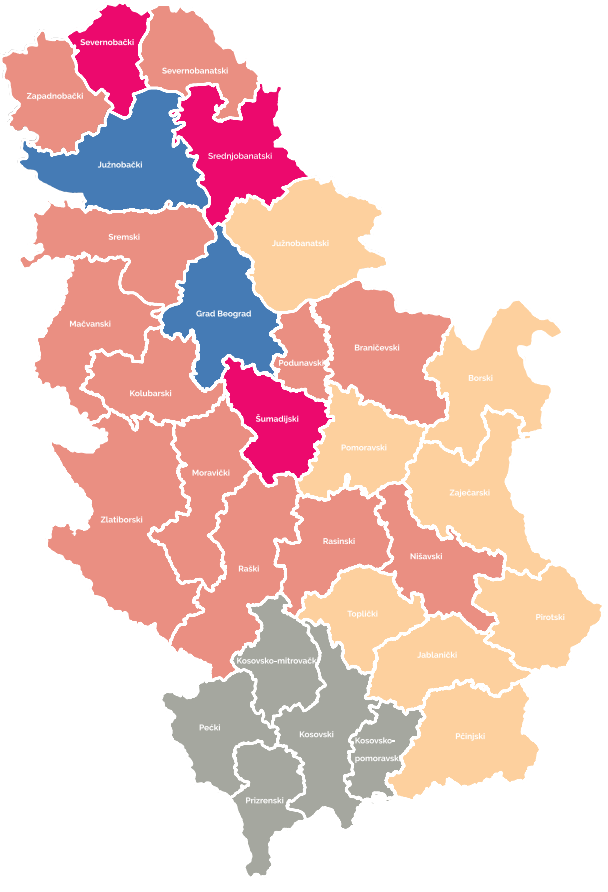



**Figure 66.**
**Media content distribution household penetration rate in the Serbian districts**

**Source:** RATEL

- Below 50%
- 50-65%
- 65-80%
- Above 80%

Figure 66 provides an overview of the media content distribution in the Serbian districts.

**Table 12. Ten cities/ municipalities with the highest subscriber penetration rate regarding media content distribution**

| City/ municipality | Subscribers per 100 households |
|---|---|
| Novi Sad | 82.04 |
| Belgrade | 81.76 |
| Subotica | 70.82 |
| Zrenjanin | 69.49 |
| Požarevac | 67.69 |
| Dimitrovgrad | 66.73 |
| Bečej | 65.77 |
| Vršac | 65.30 |
| Sremski Karlovci | 65.05 |
| Kikinda | 64.66 |

# 07
# MESSAGING AND VALUE ADDED SERVICES

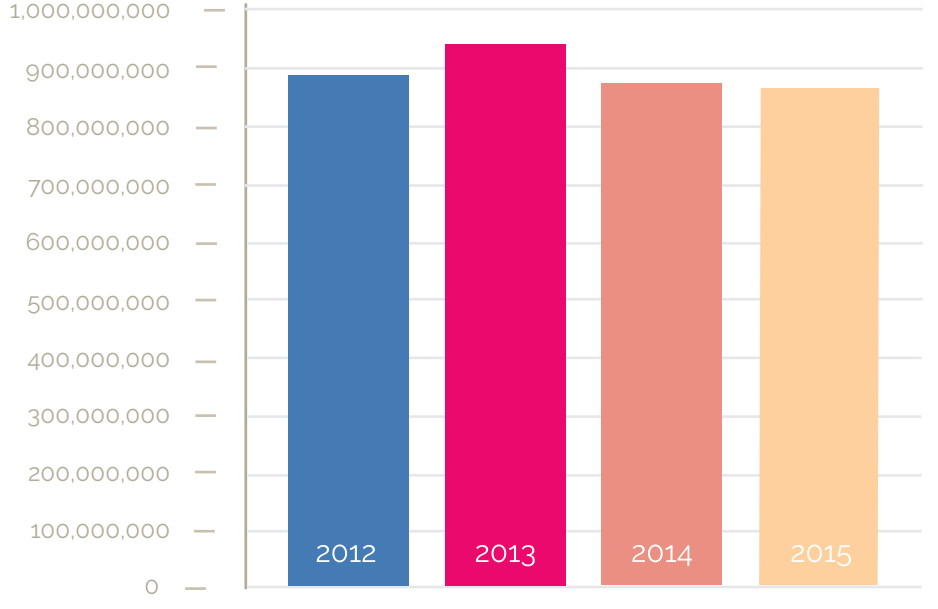
*Law on Electronic Communications and Rules on general terms and conditions for performing electronic communication activities under general authorization regime (Official Gazette of RS, nos. 38/11, 44/11-corr. and 13/14) have created administrative possibility for messaging and value added service (VAS) providers to be registered in the register of operators managed by RATEL, in line with the legal competences.*

*In 2015, there were 58 operators in the register of public communication networks and services registered for value added service provision, most of them being registered for message transmission service, as well. These operators provide services through fixed and mobile network operators, and the users of these networks can access value added services using public numbering (090Xabcdef and 0780abcdef) for value added voice transmission and internal numbering of the mobile operators for value added messaging (SMS, MMS).*

Messaging and value added service provided by operators may be divided, according to purpose, into: televoting, advertising, entertainment, children entertainment, humanitarian aid, adult entertainment, lottery, SMS notification, marketing bulk messages, goods and services payment and other.

Annual revenues from VAS for the 2012-2015 period are given in Figure 65. Service provision accounts for the total revenues in the amount of around 900 million dinars. In 2015, the revenues in this market, according to data collected by RATEL, amounted to somewhat over 880 million dinars, which means the operators' incomes stayed within the last year's levels. Part of the revenues, made from network usage, traffic billing and collecting, go to network operators, based on commercial contracts between network operators and messaging and value added service providers.

**Figure 67.**
**Annual revenues in the priod 2012 – 2015**



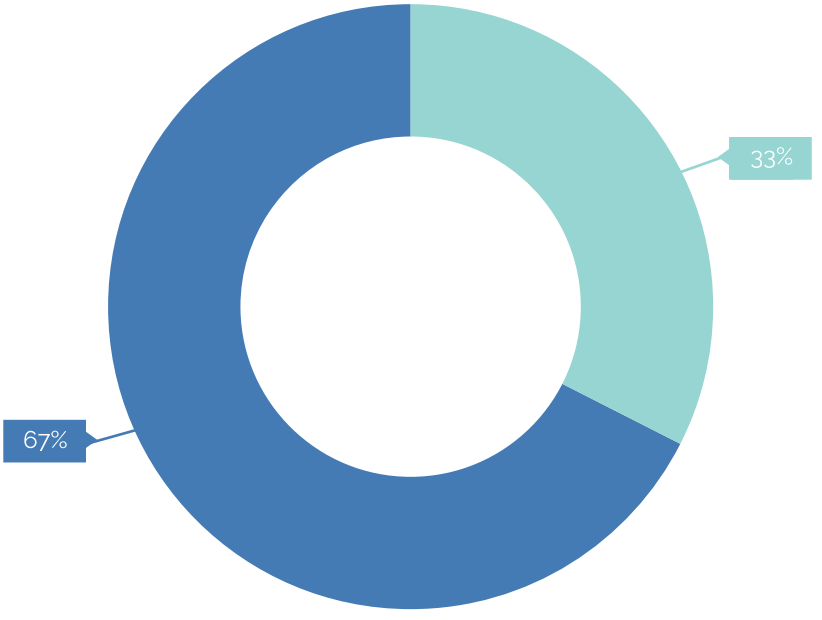



**Figure 68.**
**Revenue share by services in 2015**

- Messaging service
- Value added service

Figure 68 shows the share in revenues held by messaging service provision on the one hand and value added service provision on the other.

According to available data provided to RATEL by the operators, three operators with the largest revenues from messaging and value added service provision in 2015 were: NTH Media, Dimoco Serbia and Golive, with the total of 50.35 % of the value added service market.

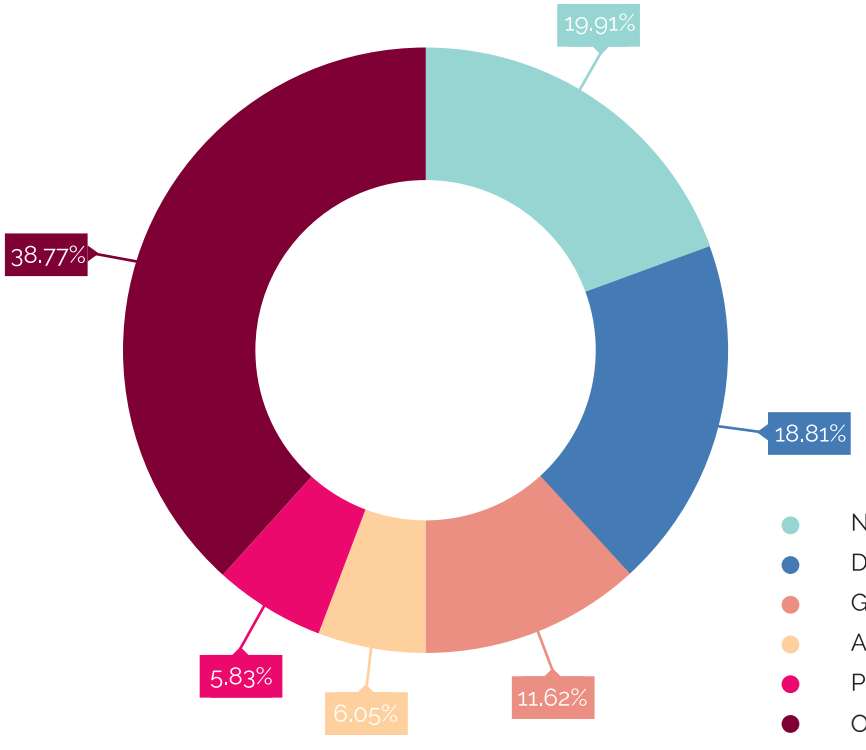



**Figure 69.**
**Market share of messaging and value added service operators according to revenues made from these services**

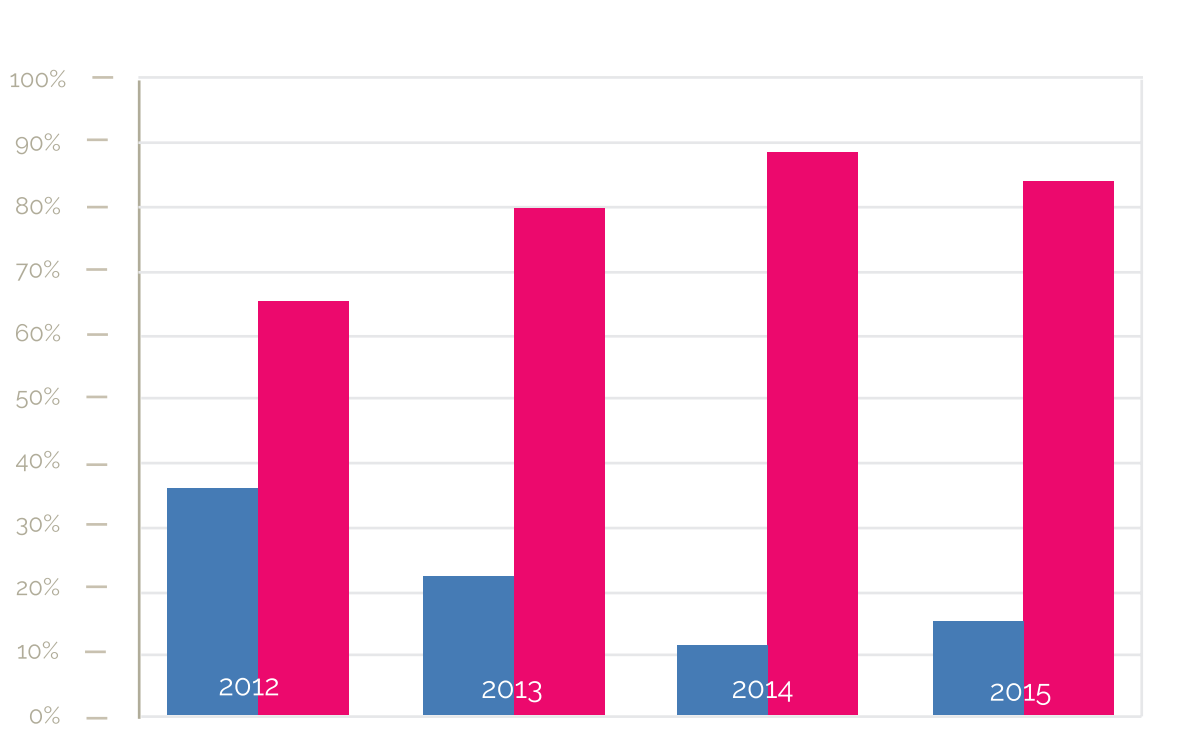
- NTH MEDIA
- DIMOCO SERBIA
- GOLIVE
- ALGOTECH
- PINK INTERNATIONAL COMPANY
- OTHER

In addition, the following operators made significant revenues as well – Algotech and Pink International Company.

Value added service market is fully competitive. Figure 70 shows the share of VAS providers (VASPs) according to revenues made. However, it should be noted that the revenues are divided between VASPs, network operators and content creators.

Around 85% of the total revenues made in 2015 are revenues from messaging service (SMS, MMS) and VAS messaging, and the rest of revenues come from voice VAS. Technology that enables easier and better data processing for SMS and MMS and the expansion of direct electronic marketing have led to a significant increase in the revenues made from messaging and value added services, on the one hand, and a decrease in revenues from voice VAS, on the other. Despite that, in 2015, a mild increase in the share of voice VAS by 2% was noted. However, large-scale usage of smart phone devices lowers the users' interest for VAS realized by voice transmission or SMS messaging, which particularly affects voice VAS.

**Figure 70.**
**Market share by type of VAS, according to revenues made in 2012, 2013, 2014 and 2015**



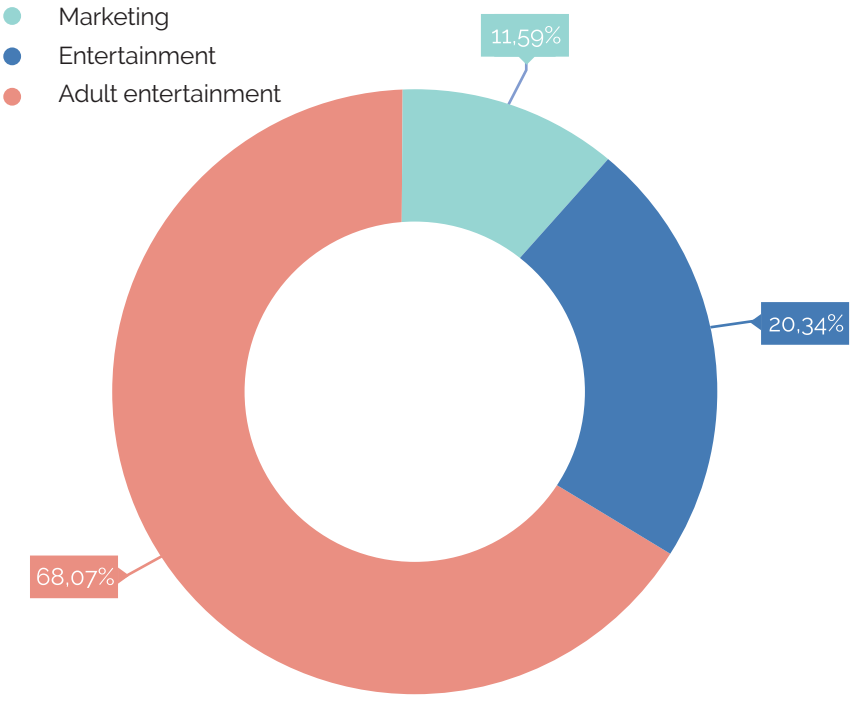



**Figure 71.**
**Share of minutes according type of voice VAS in 2015**

RATEL assigned 620 numbers for voice value added service provision, 30 numbers more than last year.

In 2015, voice value added service provision accounted for over 830,000 minutes of traffic, and the share by type of voice VAS is given in Figure 71.

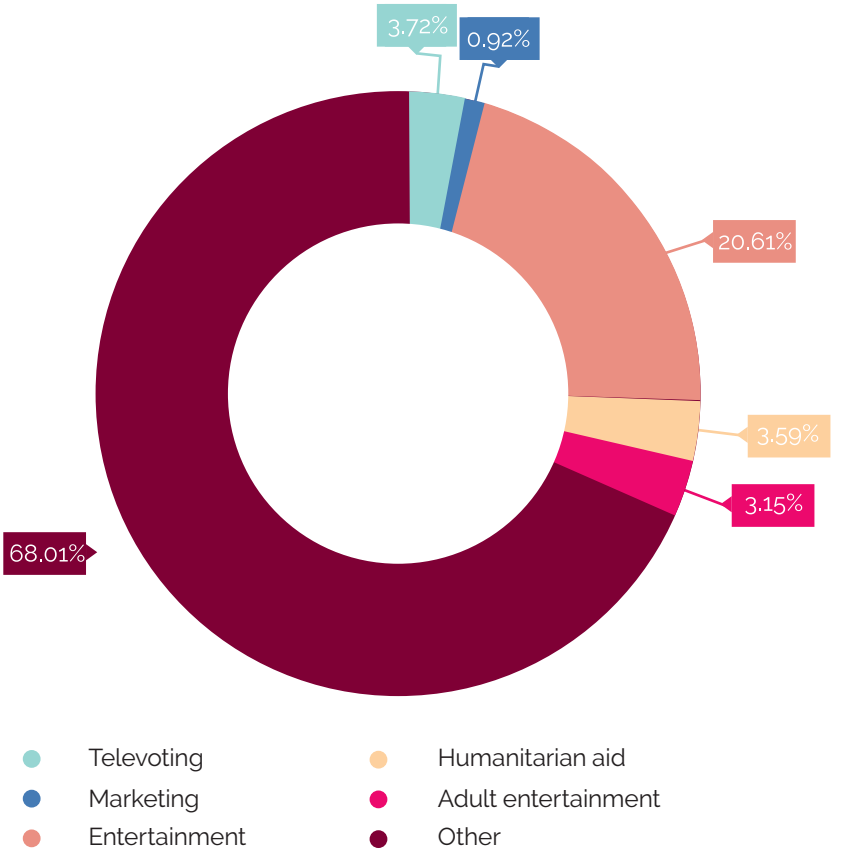



**Figure 72.**
**Share of VAS messages by type in 2015**

Messaging value added services accounted for over 18 million messages and the share by type of VAS is given in Figure 72. Messages labelled as "other" make up 68.01%, since they do not fall into a standard set of VAS, but concern different notifications, taxi orders or queries (on exchange rates etc.) and payment of goods and services.

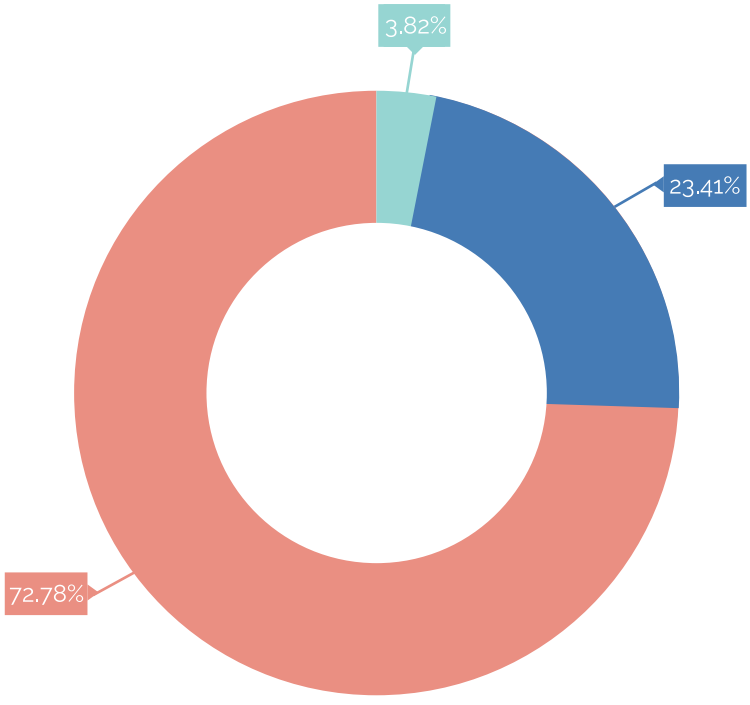



**Figure 73.**
**Share of voice VAS in revenue by type in 2015**

- Marketing
- Entertainment
- Adult entertainment

Revenues from voice VAS amount to over 83 million dinars and the share by type is given in Figure 73.

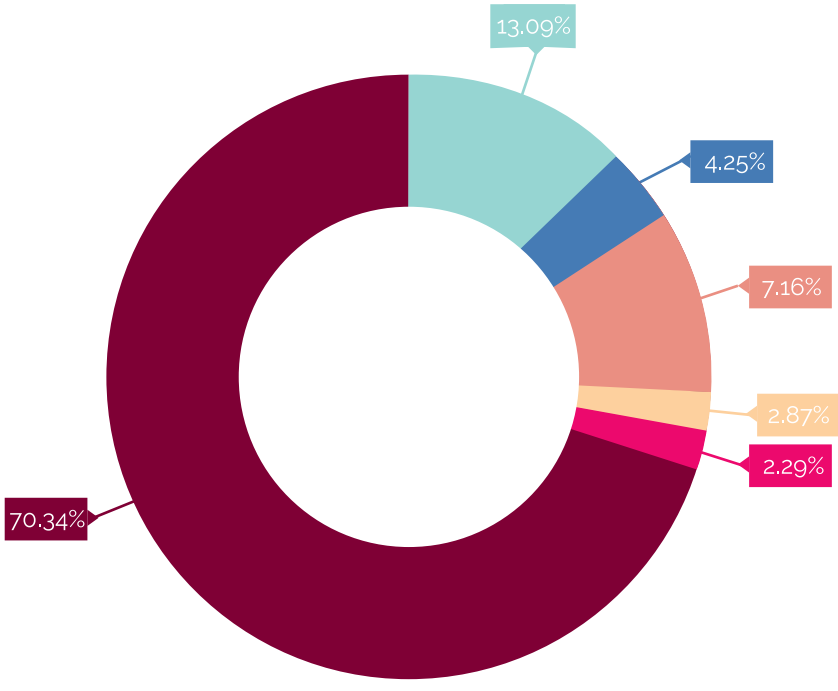



**Figure 74.**
**Share of messaging VAS in revenue by type in 2015**

- Humanitarian aid
- Adult entertainment
- Other
- Televoting
- Marketing
- Entertainment

Revenues from messaging VAS amount to over 500 million dinars and the share by type is given in Figure 74.

According to official data provided by operators, companies registered for VAS provision had around 1000 employees, while more than 140 of them were employed in telecom business.[5]

5 Operators Telenor and Novosti have more than 1300 employees. However, since a small number of them are engaged in VAS-related work, the employees working for these operators have not been taken into account.

# 08
# QUALITY PARAMETERS OF ELECTRONIC COMMUNICATIONS SERVICES AND NETWORKS

*Control of quality parameters for electronic communication services and networks is performed pursuant to the Rulebook on quality parameters for publicly available electronic communication services and monitoring of electronic communication activity ("Official Gazette" of RS, nos. 73/11 and 03/14).*

*The Rulebook stipulates quality parameters for the following electronic communication services:*

1. *public voice service on the public telephone network at a fixed location,*
2. *public services on the public mobile communication network,*
3. *public voice service provided via Internet,*
4. *broadband access,*
5. *media content distribution,*

*and for the following networks:*

1. *public mobile communication networks*
2. *public fixed wireless telecommunications networks (CDMA)*

Electronic communication operators are required to provide on an annual basis, upon RATEL's request, a report on the values of the quality parameters for services and/or networks, on appropriate forms for each service or network. On the other hand, RATEL monitors quality parameters for services and networks, compliance with the technical and other requirements and the performance of the electronic communication activity, pursuant to the Law, the aforementioned Rulebook and other bylaws and national regulations.

The parameters provided in form of a report on an annual basis may be divided in three groups:

1. Parameters that involve different records kept by the operators, such as successful call rate, records on customer complaint, service setup requests, records on faults, etc.
2. Parameters evaluated based on surveys (customer relations, professionalism of call centres)
3. Call centre parameters, based on the Call Manager reports.

The reports on the values of quality parameters for electronic communication services and networks were submitted to RATEL by the operators within the prescribed delay, till March 15, 2016, for the previous year. In 2015, based on its authorization, RATEL performed the verification of the received reports on the quality parameters for 2014 with a number of operators and inspected the submitted quality parameters values for 2015.

In 2015, RATEL performed the verification of the received reports on the quality parameters for publicly available electronic communication services and networks for 2014 with the following operators:

1. Telekom Srbija, for public voice service on the public telephone network at a fixed location, public mobile communication network services, broadband access, media content distribution, as well as for public mobile communication network and public fixed wireless telecommunications network (CDMA);
2. Telenor, for public voice service on the public telephone network at a fixed location, public mobile communication network services, as well as for public mobile communication network;
3. VIP mobile, for public mobile communication network services, as well as for public mobile communication network;
4. SAT-TRAKT Bačka Topola, for public voice service at a fixed location public, broadband access and media content distribution;
5. Serbia broadband – Srpske kablovske mreže, for public voice service on the public telephone network at a fixed location, for public voice service provided via Internet, broadband access and media content distribution;
6. Telemark systems Čačak, for public voice service at a fixed location, broadband access and media content distribution;
7. Kopernikus technology, for broadband access and media content distribution;
8. Targo Telekom, for broadband access and media content distribution;
9. Truf, for public voice service provided via Internet, broadband access and media content distribution;
10. Polaris media Niš, for media content distribution.

RATEL maintains an up-to-date database on the quality of the public communication networks and services. The operators are required, pursuant to Article 106 of the Law, to make the agreement terms and conditions, including the minimum quality of service provision, publicly available in a suitable manner, so as to inform the users on the values of the quality parameters used for measuring the QoS of the electronic communication.

This year, RATEL has collected the data on the 2015 quality parameter values. Verification of the collected data on the quality parameters, for confirmation of data authenticity, is planned during this year.

Based on the received quality parameters for electronic communications services and networks, the results obtained with the average values for some of the submitted parameters for 2013, 2014 and 2015 are given in Table 13.

**Table 13. Average values of the quality parameters for electronic communications services and networks for 2013, 2014 and 2015**

**Values of the quality parameters for public voice service provided by public telephone network at a fixed location**

(Four operators provided the report for 2013, six operators for 2014 and nine operators for 2015)

| Parameter | Parameter definition | Prescribed minimum value | Average value in 2013 | Average value in 2014 | Average value in 2015 |
|---|---|---|---|---|---|
| Supply time for fixed network access | The duration from the instant of a valid service order being received to the instant a working service is made available for use | 10 days for 50% of new connections a year | 5.34 days | 9.72 days | 5.64 days |
| Fault report rate per fixed access lines | The total number of fault reports a year divided by the number of active lines | 15% or 15 per 100 lines | 10.17 | 11.44 | 11.88 |
| Fault repair time for 80% of quickies repairs of access lines a year | The total duration of all faults (from the instant a fault report has been made to the instant when service has been restored) divided by the number of faults | 36 hours | 17.5 hours | 16.65 hours | 17.18 hours |
| Unsuccessful call ratio | Percentage of call attempts to a valid number, which failed due to system failure or no capacities available. The case where the called party (B-Number) is busy or not responding is not regarded as a failed call. The measurement is performed on the biggest possible sample | 1% | 1.315% | 1.7% | 1% |

**Values of quality parameters for public service provided by public mobile communications network**
(Reports for this type of service were provided by three operators: Telenor, Telekom Srbija and VIP Mobile)

| Parameter | Parameter definition | Prescribed minimum value | Average value in 2013 | Average value in 2014 | Average value in 2015 |
|---|---|---|---|---|---|
| Call Setup Success Rate for GSM mobile network | CSSR=(succesful call attempts/all call attempts)*100[%] | > 98% at GSM network level | 99.29% | 98.99% | 99.27% |
| Call Setup Success Rate for UMTS mobile network | CSSR=(succesful call attempts/all call attempts)*100[%] | > 98% at UMTS network level | 99,67% | 99,45% | 99,62% |
| Telephony Setup Time for GSM network | Time between sending of complete address information and receipt of call setup notification | - | 5,31s | 6,13s | 5,32s |
| Telephony Setup Time for UMTS network | Time between sending of complete address information and receipt of call setup notification | - | 4s | 5,19s | 5,12s |
| DL Throughout for Packet Interactive | Average throughput towards user (DL) for packet interactive | >128Kb/s | 4515 Kb/s | 4980 Kb/s | 4940 Kb/s |
| Bill Correctness Complaints | Percentage of bills followed by user complaint (% of complaints that result in bill correction) | ≤1% | 0.21% | 0.19% | 0.14% |
| Response time for operator's contact services | The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user | 20 s in 60% cases | 49 s | 35.5 s | 52.33 s |

| | | | | | |
|---|---|---|---|---|---|
| **Values of quality parameters for public voice service provided over the Internet**<br>(Reports on quality parameter values were submitted by 26 operators for 2013, by 32 operators for 2014 and by 16 operators for 2015) | | | | | |
| Service Supply Time | The average duration from the instant of a valid service order being received to the instant a working service is made available for use for 95% of requests | 8 days for more than 95% of requests | 2.3 days | 5 days | 2.5 days |
| Customer Complaints Resolution Time for 80% of complaints | Resolution time for 80% and 95% of complaints from the moment of complaint submission | 1 day | 1 day | 1.77 days | 0.76 days |
| **Values of the quality parameters for broadband services**<br>(Reports on quality parameters for broadband services were submitted by 138 operators for 2013, by 151 operators for 2014 and by 134 operators for 2015) | | | | | |
| Service Supply Time | Average time between sending of complete address information and receipt of service setup notification for 95% of requests | 8 days for more than 95% of requests | 4 days | 3.25 days | 3.5 days |
| **Quality parameters for media content distribution services**<br>(Reports on quality parameters for media content distribution services were submitted by 62 operators for 2013, by 70 operators for 2014 and by 62 operators for 2015) | | | | | |
| Service Supply Time | Average repair time refers to period between malfunction being reported and being repaired for 95% of requests | 8 days for 95% of requests | 3 days | 3.3 days | 3.2 days |
| QoS Complaints | Number of complaints in proportion to total number of users (%) | - | 3.8% | 4.7% | 6.25% |
| Fault Repair Time | Average repair time refers to the period between malfunction being reported and being repairedq | 48 hours | 24 hours | 14.8 hours | 17.33 hours |

**Values of quality parameters for public mobile communications network**

(Reports on quality parameters for public mobile communications network were submitted by three operators: Telekom Srbija, Telenor and VIP Mobile. Values for years 2013, 2014 and 2015 were included.

| Parameter | Parameter definition | Prescribed minimum value | Average value in 2013 | Average value in 2014 | Average value in 2015 |
|---|---|---|---|---|---|
| GSM coverage | The percentage of the entire territory of the country covered, measured simultaneously in all relevant frequency bands for RxLev > -95 dBm | - | 85.5% | 86.15% | 87.1% |
| UMTS coverage | The percentage of the entire territory of the country covered, measured simultaneously in all relevant frequency bands for CPICH RSCP > -105 dBm | - | 55.86% | 63.89% | 74.4% |
| Peak Hour Handover Success Rate Applicable to GSM network | Percentage of successful handovers in GSM network in peak hour | ≥95% | 97.74% | 97.40% | 97.54% |
| Network load for GSM network voice traffic | Erlang/TRX, mean value | - | 2.34 Erlang/ TRX | 2.1 Erlang/ TRX | 1.92 Erlang/ TRX |
| Network load for UMTS network voice traffic | Erlang/TRX , mean value | - | 2.34 Erlang/ TRX | 2.93 Erlang/ TRX | 1.51 Erlang/ TRX |

**Values of the quality parameters for public fixed wireless telecommunication networks (CDMA):** The report on the CDMA network quality consists of the overview of the coverage in 5 districts in Srbija: Pčinja District, Jablanica District, Raška District, Pirot District and Zlatibor District. The reports on the CDMA network coverage by district have been provided by Telekom Srbija and Orion telekom. The operators fulfilled the criteria for the network coverage set under the licence for public fixed wireless telecommunications network (FWA) in the frequency band 411.875-418.125/421.875-428.125 MHz and voice

service, data transmission, and simultaneous voice and data transmission. The lowest coverage of the localities in districts needs to be 40% for the transmission signal power above -94 dBm. Over the years, the CDMA coverage has not increased, since the demand for this service has been decreasing.

The operators generally fulfil the set minimum value, with some exceptions. The parameter-related irregularities found during control were indicated. The parameter values are reliable even though they are still below the minimum values set. However, with the innovated monitoring, management and surveillance systems the values were improved. In 2013, a number of operators was preparing for the provision of public voice service at a fixed location, as a new service offered. Such operators have submitted the reports on the values of quality parameters for public telephone network at a fixed location for 2014 and 2015, and now have enough users in order to monitor the statistics.

There are fewer operators with a small number of users providing reports on quality parameters, compared to the operators with a large number of users. The operators with a small number of users are often unaware of the set quality parameters that they are required to monitor and the values of which to provide to RATEL, very often they do not keep appropriate records, have small number of employees and also, the values they provide are often unreliable. On the other hand, the operators with a large number of users have professional software for quality parameter monitoring, as described in the reports on verification of the data on quality parameters for electronic communication services and networks, and are constantly investing in CRM software tools due to complexity of the monitored process. In addition, these operators apply special software tools for monitoring of call statistics in contact centres, unlike the operators with smaller number of users that do not have contact centers but only direct operator's centre telephone numbers, where call statistics in time is not monitored.

In the aim of improving the quality of electronic communications services, as of May 9, 2016, RATEL enabled the users of Internet access services and Internet services in public fixed and public mobile communications networks, to measure the QoS of the broadband Internet access. Internet users in public fixed communications networks can test the quality of access via an application at RATEL NetTest link, found on RATEL's website, whereas Internet users in public mobile communications networks can test the quality of access via an appropriate application downloaded from Google Play Store or Apple App Store, depending on the software platform of the mobile device they are using.

# 09
# ELECTRONIC COMMUNICATIONS INFRASTRUCTURE INTENDED FOR SHARED USE

*Operators of public electronic communications networks are entitled to request shared usage of another operator's or third person's electronic communications infrastructure, when necessary, for the purpose of a competitive, economic and efficient performance of the electronic communications activities.*

*In Serbia, the process of creation of the database containing detailed geographic and structural data on cable ducts of electronic communications networks and antenna masts that may be the object of the request for common use is underway.*

The shared use of infrastructure in the Republic of Serbia is defined in the following acts and by-laws:

1. Law on Electronic Communications ("Official Gazette of RS", nos. 44/10, 60/13 – US and 62/14, hereinafter: Law);
2. Rulebook on the manner of collection and publication of the data on type, availability and geographic location of the electronic communications network's capacities ("Official Gazette of RS", no. 66/15, hereinafter: Rulebook).

Pursuant to Article 52 od the Law, the Agency shall keep an updated database on the type, availability and geographic location of capacities which may be subject of shared use (hereinafter: Database).

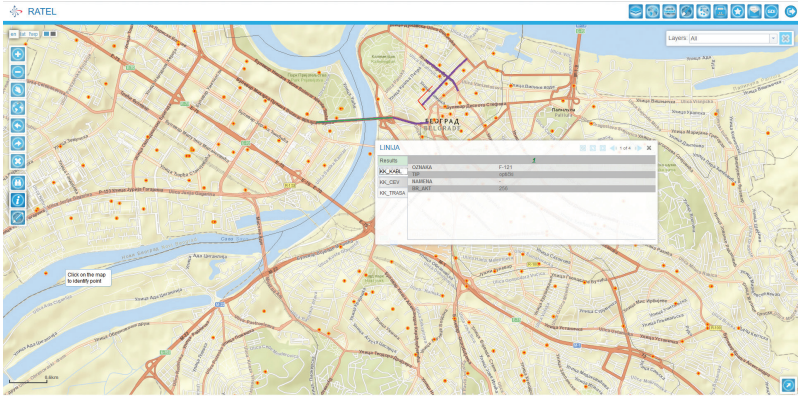
Based on the Law, the Rulebook was adopted in July 2015. It prescribes creation of the records of the electronic communications network capacities which may be subject of shared use, in the form of an aggregated Database.

Pursuant to Article 8 of the Rulebook, the Agency shall be responsible for the creation and regulation of the Database access within 12 months from the coming into force of the Rulebook. The Agency shall also be responsible for the financing, maintenance and management of the Database.

Operators interested for the lease of infrastructure are obliged to submit the required data within 6 months from the creation of the Database. In case a newly built infrastructure is the subject of lease, the required data must be submitted within 15 days from the beginning of the use of infrastructure. The operators are obliged to update their data at least once in 3 months.

The Database will be available to all interested operators and other parties, in the form of a Web – GIS application, according to the requirements prescribed by the Agency. The Web – GIS application was developed on Esri GIS software solution, Figure 75.

**Figure 75.**
**Spacial representation of the infrastructure**



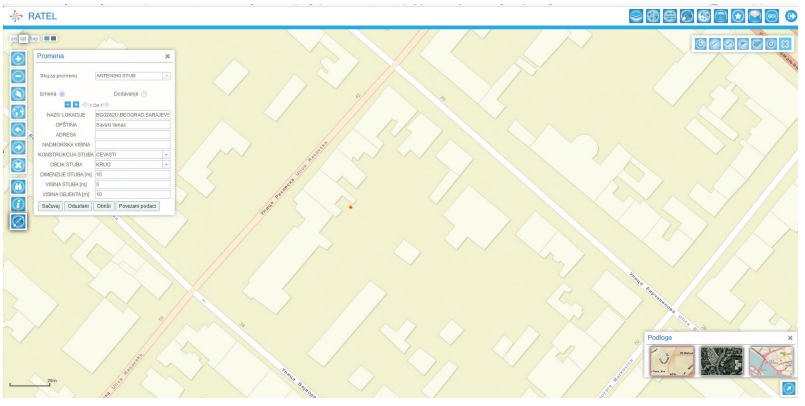



**Figure 76.**
**Entering data into the Database**

The manner of entering data into the Database will be enabled by Web access or systems for automatic data exchange with operators, Figure 76.

The Web – GIS application will include standard tools for map operation, such as (Figure 77):

- Switching on/ switching off of layers;
- Zooming;
- Measurement of distance/ surface;
- Definition of coordinates in different coordinate systems;
- Selection of data using spatial inquiries/ selection of areas by hand;
- Selection of a number of data through free ArcGIS online service (satellite footages, topographic maps, street networks etc.)

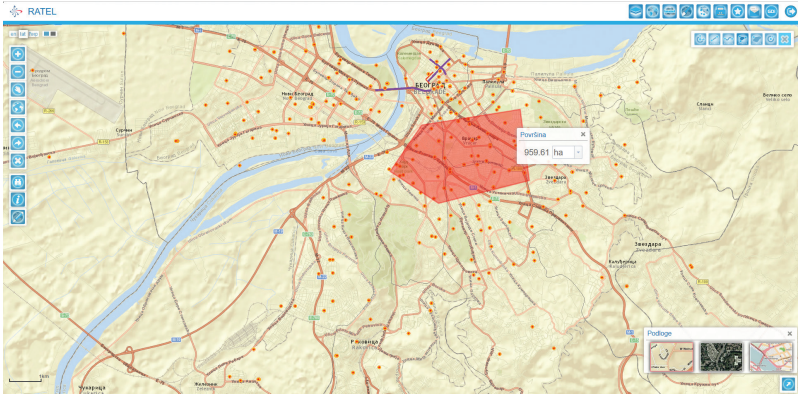



**Figure 77.**
**Use of standard tools**

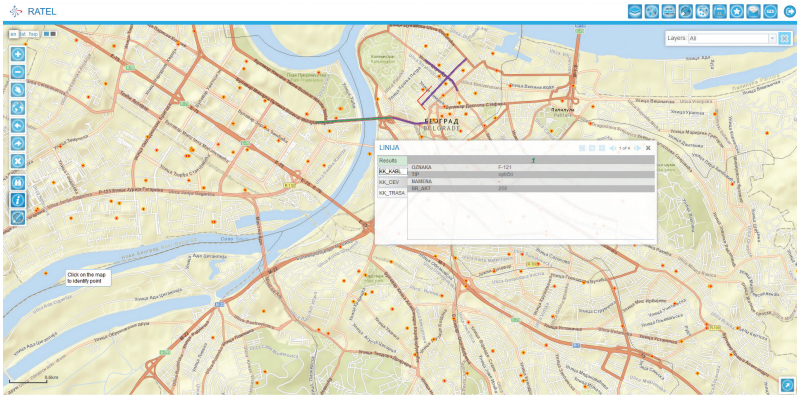
The Database will contain data on cable ducts of electronic communications networks and antenna masts.

## Cable ducts of electronic communications networks subject of lease

Based on Annex 1, EKMI1 Form of the Rulebook, the data on cable ducts to be collected are the following (Figure 78):

- Name of operator (owner)/ locations/ routes;
- WGS84 coordinates of important positions (start/ end, node);
- Route length/ geodetic footage;
- Cable type;
- Information on cable canalization (type of pipes/ number of pipes on the route/ type of cable shaft/ number of shafts on the route);
- Type of data transmitting equipment (optional);
- Capacity for lease/ unused capacity;
- Data on cable instalments (optional);
- Cable ending in the facility (optional).

**Figure 78. Spacial representation of the infrastructure**




## Antenna masts and equipment

Based on Annex 2, EKMI2 Form of the Rulebook, the data on antenna masts and equipment to be collected are the following (Figure 79):

- Name of operator (owner);
- Location of antenna mast;
- Mast construction;
- Shape of the mast base/ dimensions of the mast base (m);
- Mast height (m);
- Facility height in meters (if the antenna mast is mounted on a facility);
- Information regarding free space on the mast (length of the free segment/ azimuth range available for mounting);
- Mounted equipment (type/ free capacity) – if subject of lease.

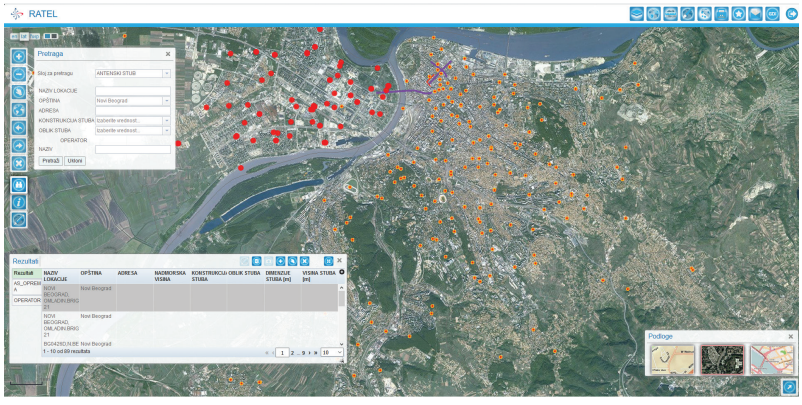



**Figure 79.**
**Use of different types of maps and representation of antenna masts**

# 10 USAGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN SERBIA

*Like in the previous period, this year also, a survey on the use of information and communication technologies by individuals, households and companies in Serbia was conducted by the Statistical Office of the Republic of Serbia.[6] The survey was carried out according to the Eurostat methodology in the territory of the Republic of Serbia (excluding AP Kosovo and Metohija).*

*In 2015, the survey was conducted on the sample of 2400 households and 2400 individuals. The sample was allocated to the areas of Central Serbia (without Belgrade), AP Vojvodina and the City of Belgrade, according to the respective number of households. Sample volume regarding companies was 1361. Response rate was 98% for households and individuals and 93% for companies.*

6 Data used in the following text were imported from the publication „Usage of ICTs in the Republic of Serbia", Statistical Office of the Republic of Serbia, 2015.

The number of households with a computer rose in 2015 in a slower rate than during previous years, reaching the value of 64.4% (Figure 78). Most of the households have one computer (84.5%), while only 11.3% of households have two computers. The incidence of computers in households varies depending on different territorial areas: Belgrade 73.9% (70.6% in 2014), Vojvodina 67% (66.3% in 2014) and Central Serbia 58% (57.5% in 2014).

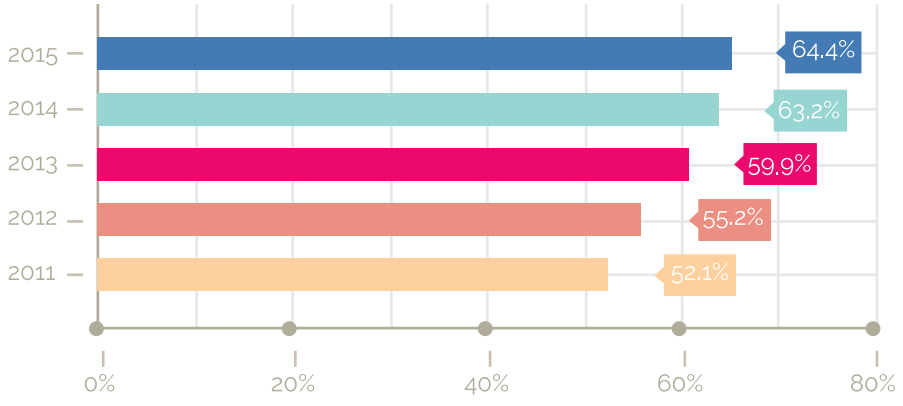



**Figure 80. Percentage of households with a computer**

**Source:** Statistical Office of the Republic of Serbia

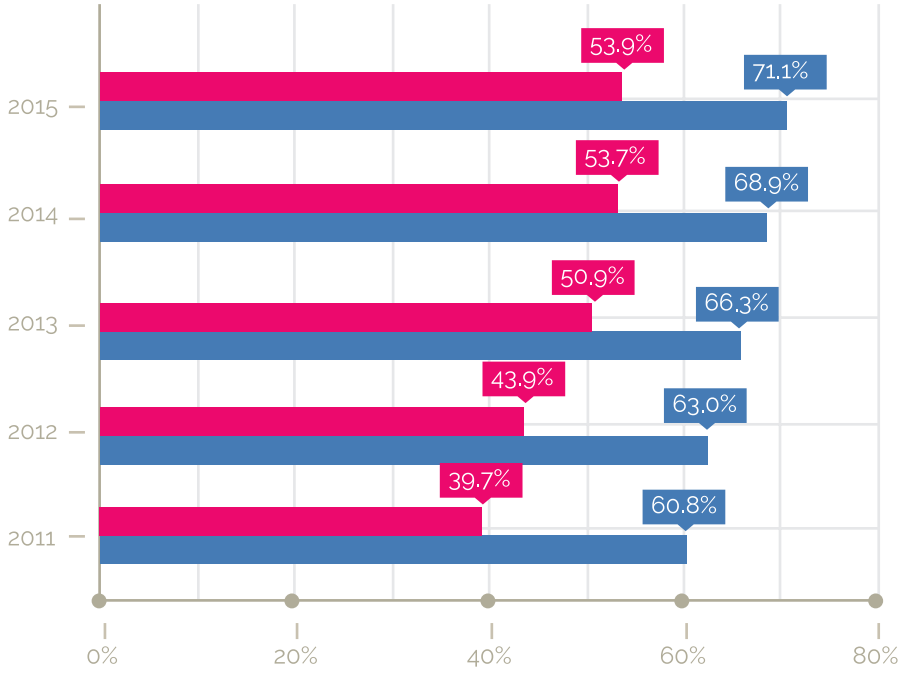



**Figure 81. Percentage of households with a computer according to the type of populated area**

- Rural areas
- Urban areas

**Source:** Statistical Office of the Republic of Serbia

The incidence of computers in households also varies between urban areas (71.1%) and rural areas (53.9%) in Serbia. A faster increase of computer incidence in urban areas was observed in 2015, which contributed to the deepening of the gap between these two types of populated areas (Figure 81).

The research also showed that, in 2015, the number of computer users had increased by 1% compared to the previous year. Out of the total number of respondents, 65.8% used computer within 3 previous months, 2.2% used computer more than 3 months earlier and 3.3% more than a year earlier. Share of the respondents that have never used the computer is, like in previous years, on a considerably high level (28.7%). Figure 82 shows different groups according to the incidence of computer usage in Serbia, from 2011 to 2015..

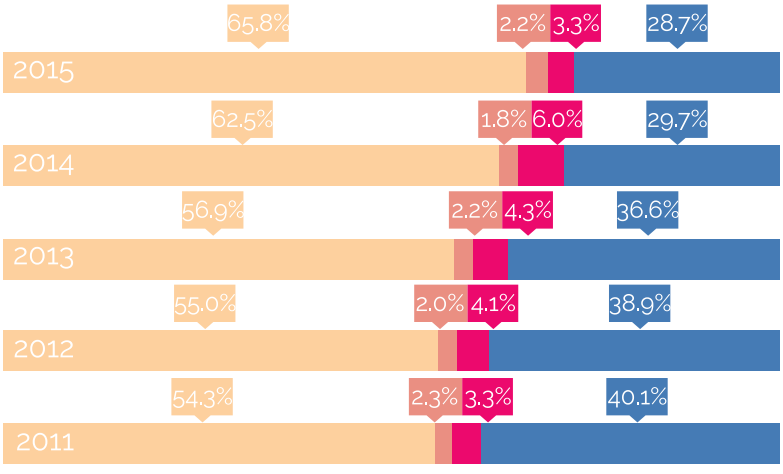



**Figure 82. Computer usage by individuals**

- within last 3 months
- more than 3 months ago
- more than a year ago
- never

**Source:** Statistical Office of the Republic of Serbia

In 2015, there were 63.8% of households in the Republic of Serbia with Internet connection, which is a slight increase compared to the previous year (Figure 81). Once again, significant discrepancies may be observed in different territorial regions. The incidence rate is highest in Belgrade, 71.6% (70% in 2014). In Vojvodina, it is 67.9% (65.9% in 2014) and in Central Serbia, 57.3% (56.6% in 2014). Considerable discrepancies can also be noted if we compare the number of households with Internet connection in urban and rural areas of Serbia. While in urban areas the number of households with Internet connection amounted to 70.1%, in rural areas this percentage was 53.2%. It should be noted that the growth rate of Internet connections in respect to 2014 was seen in both urban (3.4%) and rural (4.1%) areas.

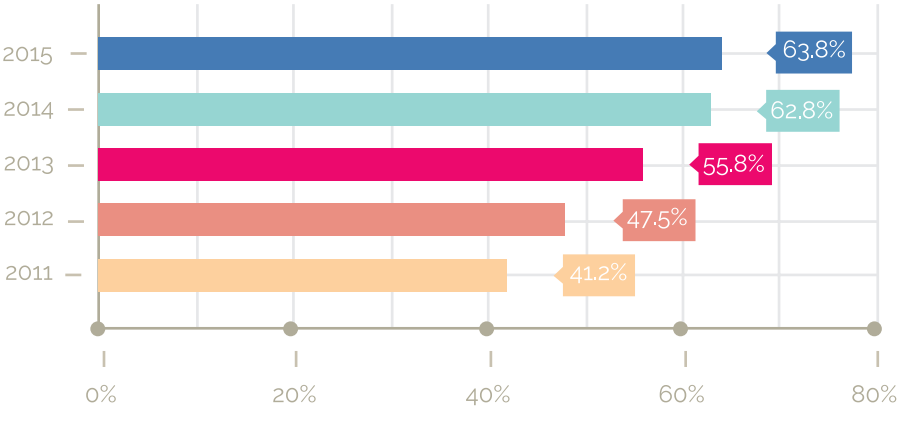



**Figure 83. Percentage of households with Internet connection**

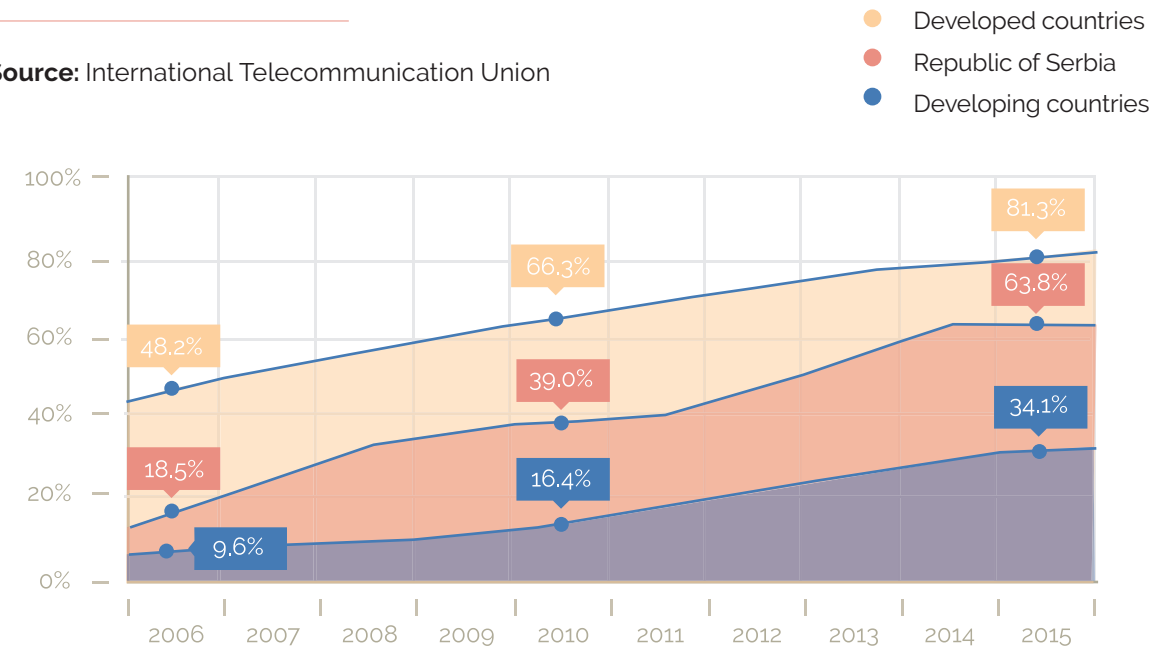
**Source:** Statistical Office of the Republic of Serbia

It should be noted that the Internet connection incidence is very much related to the household income, as Internet connection is mainly used by the households with the monthly income of over 600 euros (87.7%), while only 46.4% of the households with an income of up to 300 euros have Internet connection.

By analysing the changes in the number of households with Internet connection in the developed and developing countries during a ten-year period (Figure 84), it can be concluded that there is a stable growth trend in both groups of countries. According to the evaluation of the International Telecommunications Union[7], during 2015, 81.3% of the developed countries' households had Internet connection, while in the developing countries this percentage was 34.1%. As already mentioned, the share of the households with Internet connection in Serbia has a growing trend, with the values ranging between those measured in these two categories of countries.

**Figure 84. Comparison of the share of the households with Internet connection in the Republic of Serbia to that in the developed and developing countries**

**Source:** International Telecommunication Union

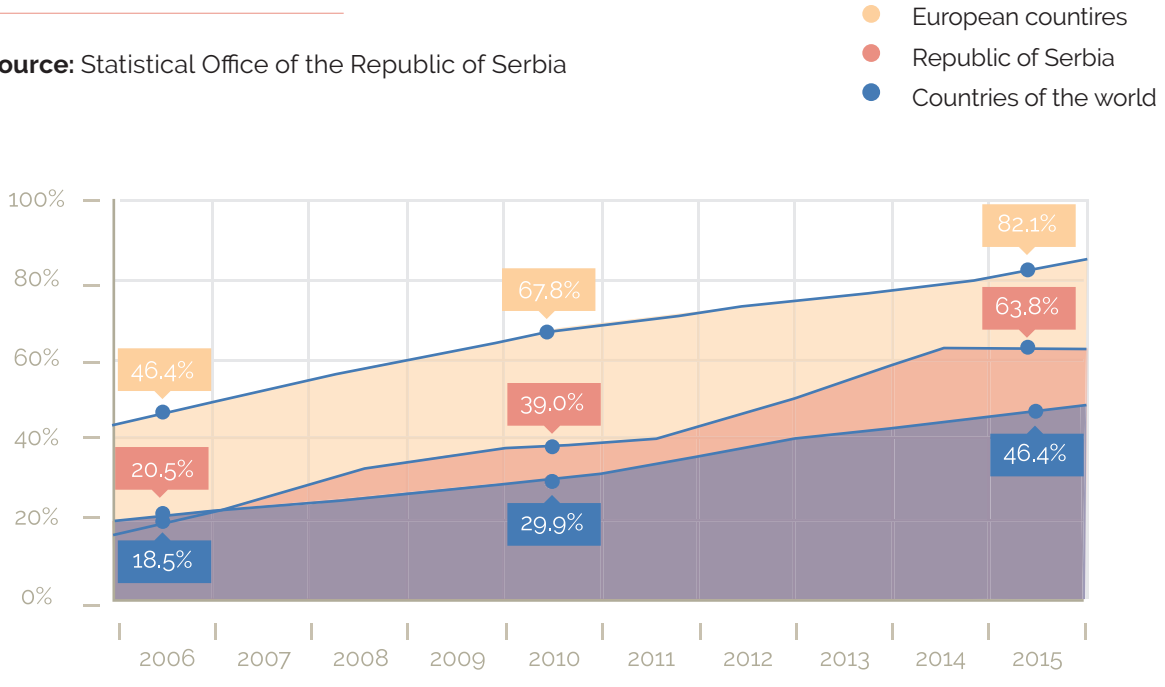



7 International Telecommunication Union – ITU data used in the following text, can be found here: http://www.itu.int/ict/statistics

In comparison with the countries in Europe and worldwide (Figure 85), it is evident that, during a ten-year period, the share of households with Internet connection in the Republic of Serbia was under the EU average but above the world average.

**Figure 85. Comparison of the share of households with Internet connection in the Republic of Serbia to that in the countries of Europe and the world**

**Source:** Statistical Office of the Republic of Serbia



The survey has shown that the Internet is used by nearly the same percentage of respondents using the computer (65.3%) and that this number is in constant growth. In the three-year period preceeding the survey, the Internet was not used by 1% of individuals, whereas 3.1% of the respondents stated that they had used the Internet more than a year before. The share of individuals that have never used Internet is high and amounts to 30.6%, but this is also a declining value. The Internet usage in the Republic of Serbia during past five years is shown in Figure 86.

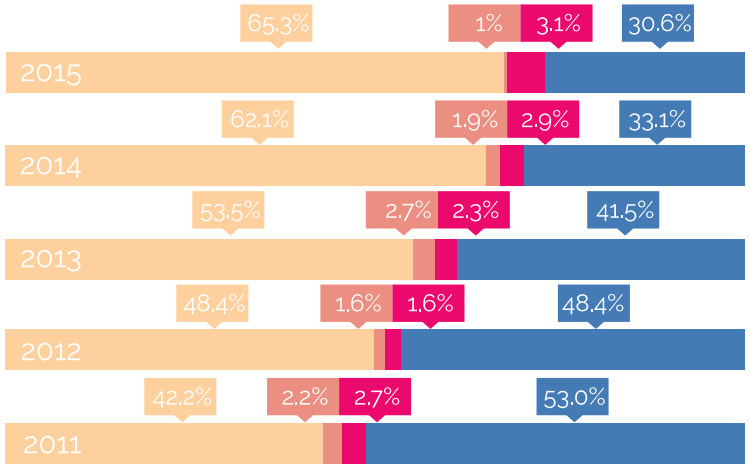



**Figure 86. Internet usage by individuals**

- during last 3 months
- more than 3 months ago
- more than a year ago
- never

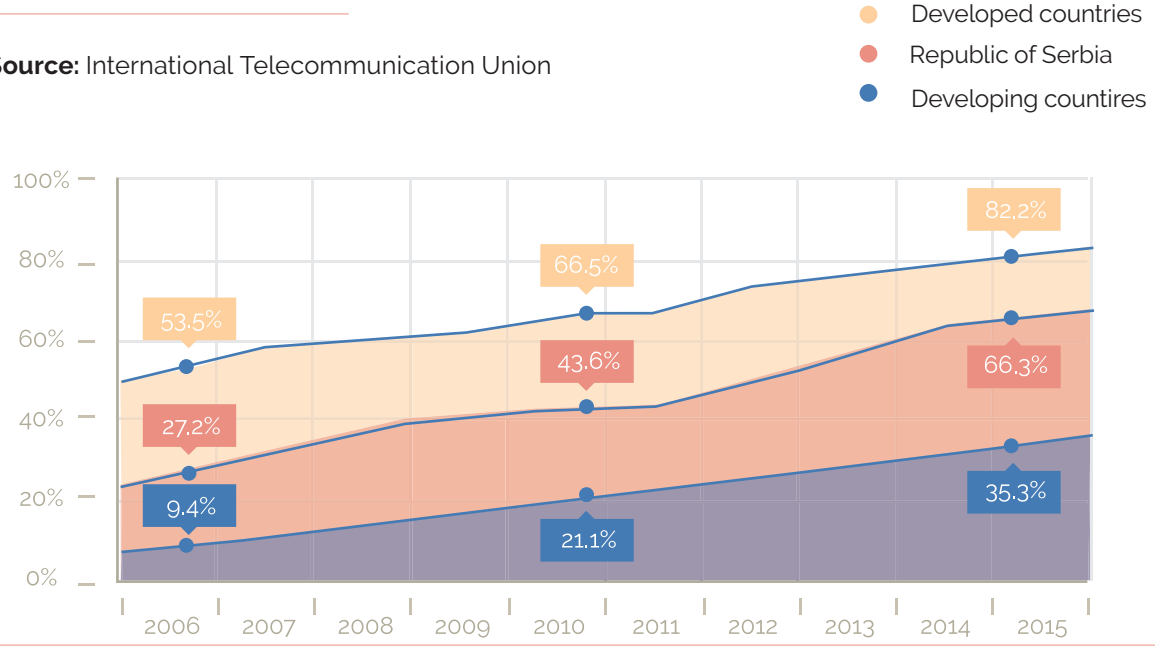
**Source:** Statistical Office of the Republic of Serbia

The survey has also revealed that, in the three-month period preceeding the reaserch, a high percentage of Internet users were using this service every day or almost every day (83.6%). Among Internet users, there is a small percentage of individuals stating that they use Internet at least once a week (11.5%), or at least once a month (4.0%), whereas less than 1% use Internet less than once a month.

In the context of the analysis of the Internet usage incidence, in addition to taking into account the several-year trend, it is also important to envisage the situation of Serbia compared to other countries. According to the assessment of the International Telecommunication Union, the percentage of population using Internet in the developed countries in 2015 was 82.2% and in the developing countries 35.3%. As shown in Figure 85, the share of Internet users in Serbia, during the observed ten-year long period (2006-2015), ranged between these values, approaching the values of the developed countries, during the last several years.

**Figure 87. Comparison of the range in the number of Internet users in the Republic of Serbia to that in the developed and developing countries**

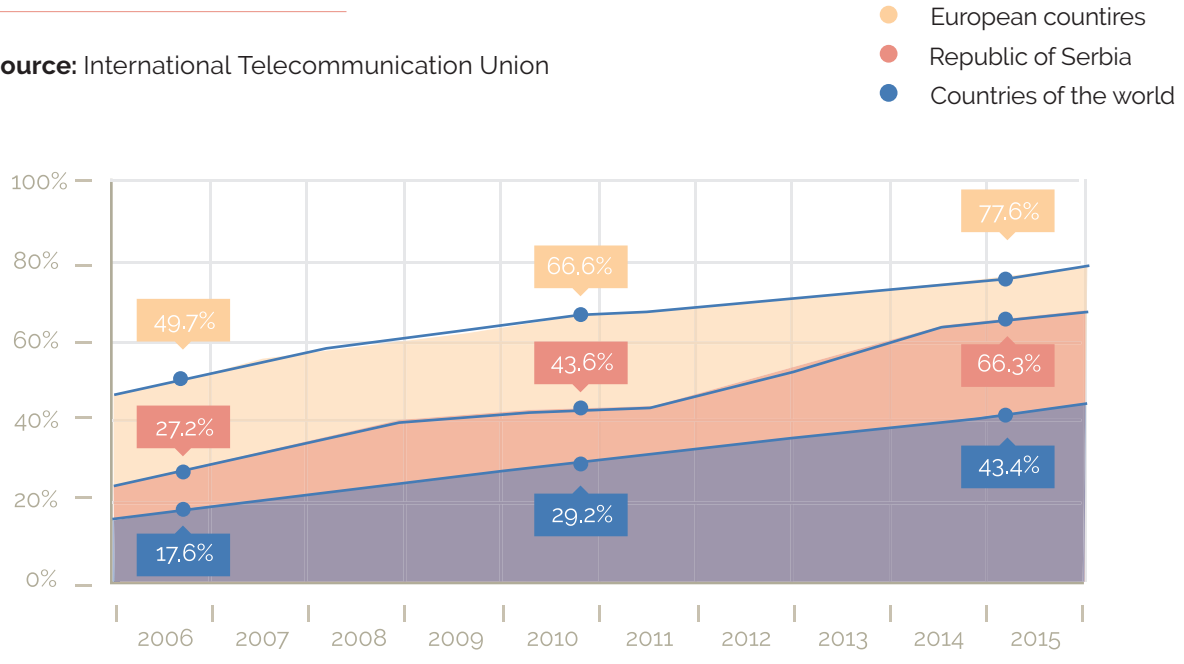
**Source:** International Telecommunication Union



The comparison can also be made to the countries of the world and European countries (Figure 86). The Republic of Serbia, with 66.3% of its population using Internet, once again found itself between these values, since according to the estimate of the International Telecommunication Union, 43.4% of the world population and 77.6% of European population used Internet in 2015.

**Figure 88. Comparison of the range in the number of Internet users in the Republic of Serbia to that in the countries of the world and Europe**

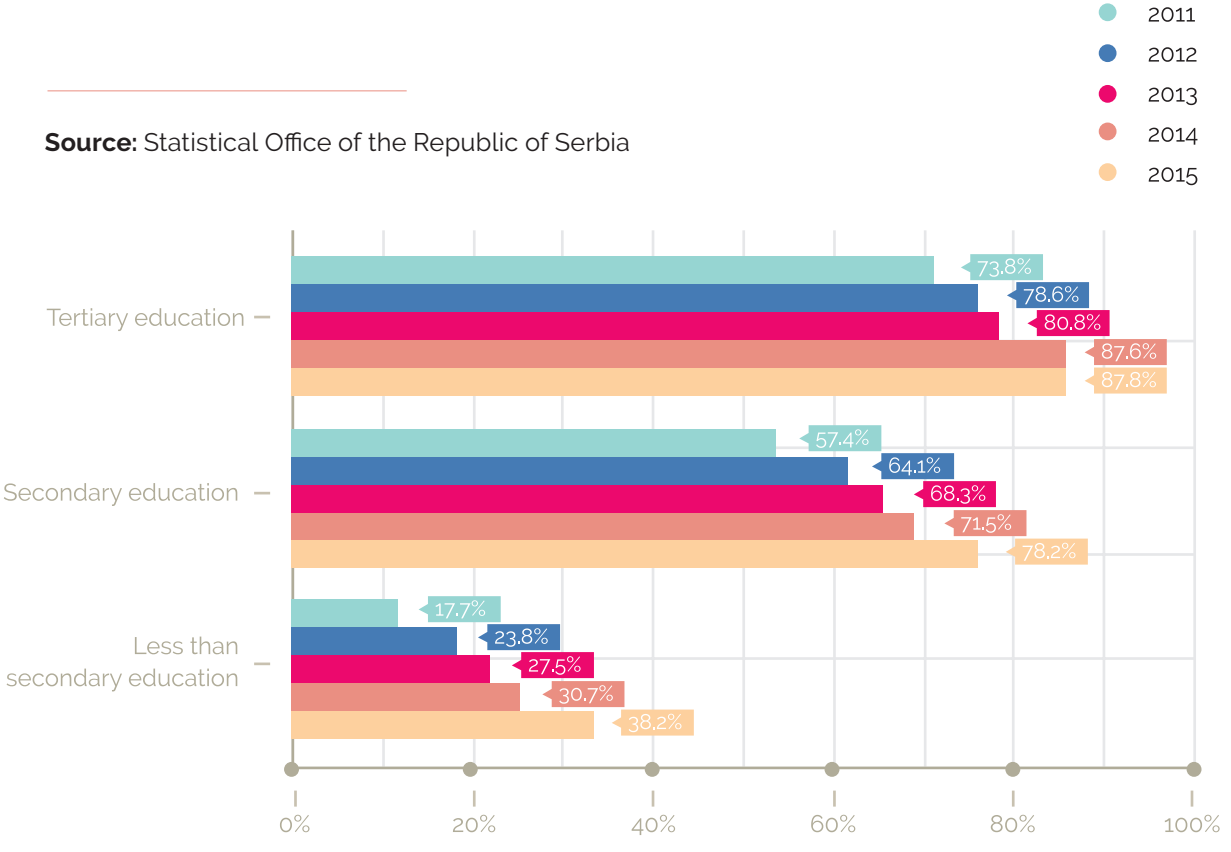
**Source:** International Telecommunication Union



By separately observing the categories of respondents with tertiary and secondary education and less, it can be confirmed that there are discrepancies regarding their respective Internet usage as well, which is shown in Figure 89. A steady growth in the usage of Internet has, however, been noted in all of these categories.

**Figure 89. Internet users by level of education**

**Source:** Statistical Office of the Republic of Serbia



By observing the share of Internet users according to employment status, the conclusion can be drawn that Internet is used mostly by students (99.5%) and employed individuals (91%), their percentage being in a constant growth. The number of Internet users has also increased in the category of unemployed and other individuals. The percentage range by these categories for a five-year period can be seen in Figure 90.

**Figure 90. Internet users by employment status**

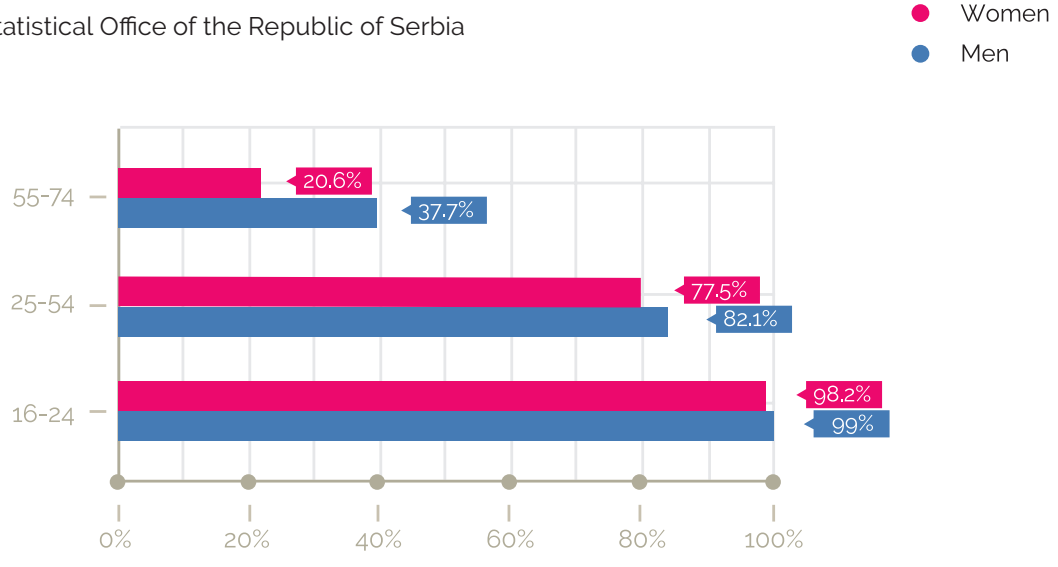
**Source:** Statistical Office of the Republic of Serbia

Figure 91 shows the usage of Internet by gender and age, based on the answers of the respondents regarding the three-month period immediately before the survey. As shown in the Figure 91, the Internet is used most by the youngest population (16 – 24 years). In this user group there is practically no difference between genders as far as Internet usage is concerned. The interesting detail is that, within this age group, as many as 97.4% of respondents have account on the social networks such as Facebook and Twitter.

The group of older respondents (25 – 54 years) has a smaller share of Internet users. In addition, there is a gap between the percentage of men and women using Internet (difference of 4.6%). The smallest share of Internet users is in the oldest group, including individuals between the age of 55 and 74 years. This group also displays the greatest discrepancy between genders regarding the usage of Internet (over 17 %).

**Figure 91. Internet users by gender and age**

**Source:** Statistical Office of the Republic of Serbia

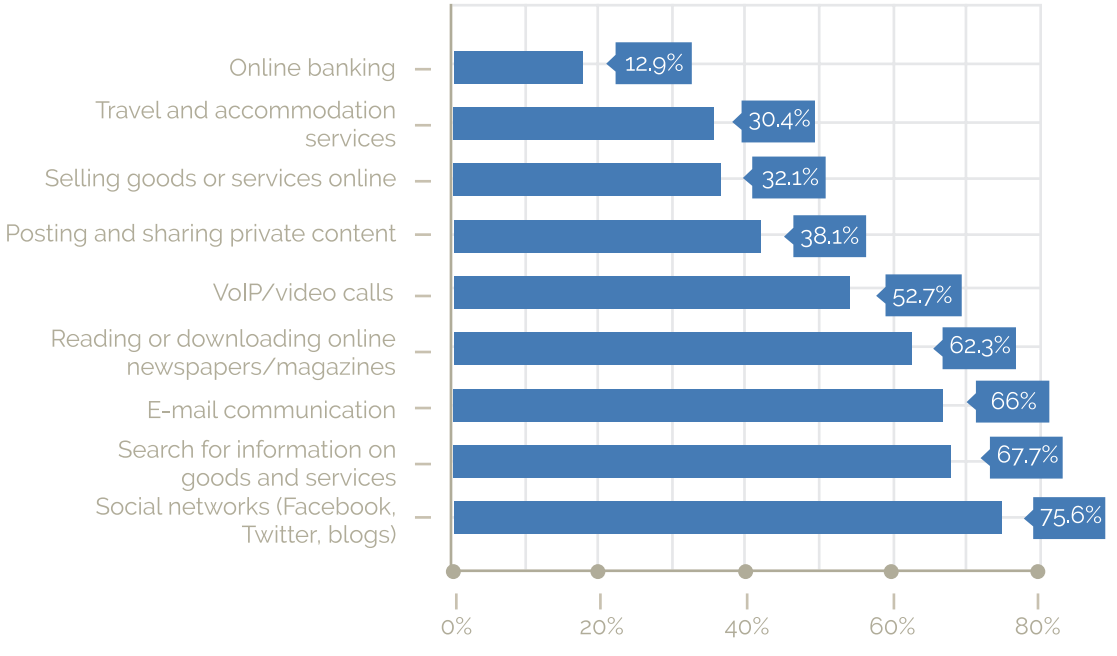


In 2015, the Internet was mostly used for participation in the social networks activities (75.6%), searching the information on goods and services (67.7%), e-mail exchange (66%), followed by reading online newspapers/magazines (62.3%). These activities were the reason for the usage of Internet during previous years too, but it is only in 2015 that participation in the social networks found itself on the top of the list. Having in mind the ever growing popularity of social networks[8], this detail is not surprising, but additionally supported by the fact of the previously mentioned, extremely high participation of the youngest population (16 – 24 years) in the social networks activities. Figure 92 shows the list of the most frequent reasons for the Internet usage, based on a three-month period.

For Internet access outside home or work, during the analysed period in 2015, similar as in the previous year, mobile phones and mobile computers (laptops or tablets) were used.

**Figure 92. Types of Internet usage for private purposes**

**Source:** Statistical Office of the Republic of Serbia




8 According to the research of the British company Brandwatch, which monitors social networks, in 2015 there were around 2.3 billion active users of social networks, whereas only Facebook had 1.66 billion users. Facebook acquires half a million users every day, i.e. 6 new profiles per second. For more, visit: https://www.brandwatch.com/2016/03/96-amazing-social-media-statistics-and-facts-for-2016/

Purchase of goods and services online is on the rise, however still underdeveloped. During past 3 months, only 22.7% respondents ordered goods or services online, whereas 57.7% individuals never used Internet for this purpose. Changes in the habits of individuals regarding online purchases during last 5 years can be seen in Figure 93.

Individuals opting for online purchases, most often order clothes, sports products and computer and electronic equipment.

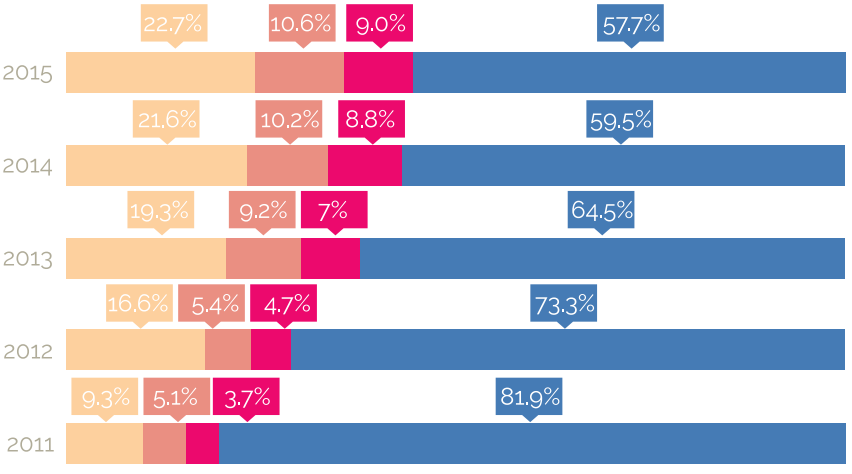



**Figure 93. Ordering/ buying goods and services online**

**Source:** Statistical Office of the Republic of Serbia

The research on the ICT usage in companies during 2015 has revealed that 100% of companies in Serbia use computer for their business operations and that 99.1% have Internet connection. Out of the total number of companies with Internet connection, 98% have broadband access.

Figure 94 shows the Internet connection bitrate in the companies, defined by the contract with Internet provider. Like in previous years, around half of the companies have the bitrate of 2-10 Mbit/s. Somewhat slower Internet connection of at least 30, but less than 100 Mbit/s is used by 32% of the companies, and 9.5% of the companies use the bitrate of at least 10, but less than 30 Mbit/s.

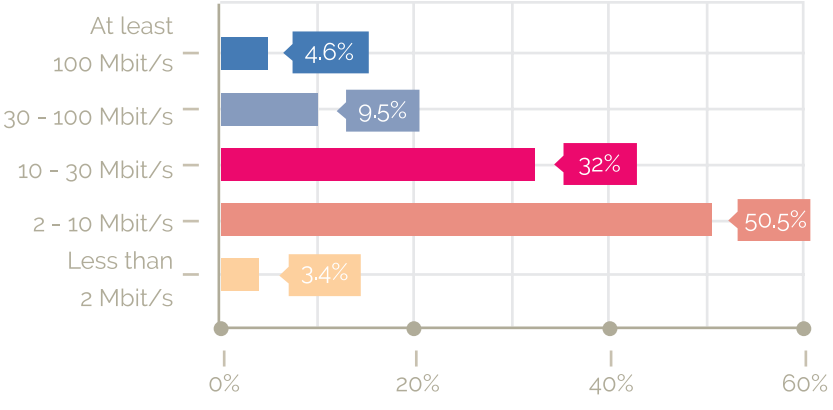



**Figure 94. Internet bitrate in companies**

**Source:** Statistical Office of the Republic of Serbia

Companies on the territory of the Republic of Serbia increasingly use public administration electronic services, predominnatly for the purpose of information gathering, collection of forms and returning of the filled-in documents. In 2015, these services were used by 94.5% of companies. The expansion of public administration electronic services is shown in Figure 95.

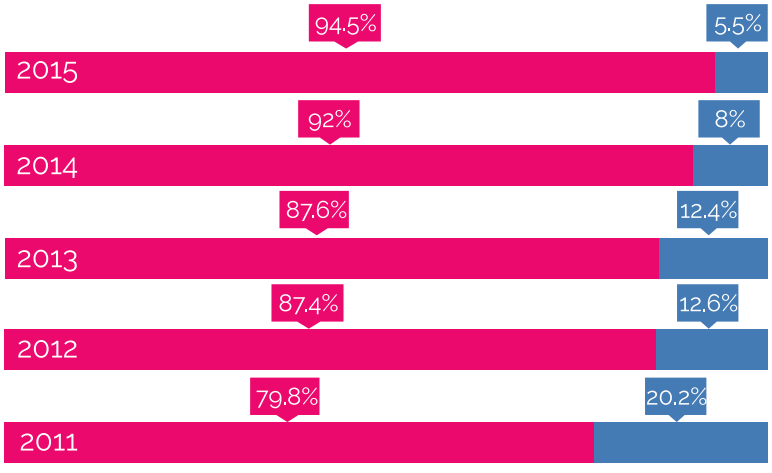



**Figure 95. Usage of online public administration services by companies**

Yes
No

**Source:** Statistical Office of the Republic of Serbia

Out of the total number of companies with Internet connection, 75.2% have their own website, the purpose of which is mainly description of goods or services and price lists (95.1%), availability of product information (83.6%) and possibility to view contents in customized mode (78.9%).

Social networks are becoming increasingly important for the company business. For their business operations during 2015, nearly 28.6% of the companies used one of the social networks, such as Facebook or LinkedIn.

The number of companies paying for cloud service is also on the mild rise. Cloud services are acceded via Internet for the purpose of software usage, data storage etc. On the territory of the Republic of Serbia, during 2014, 3.8% of the companies were subscribed to the cloud service, and in 2015, this percentage amounted to 9.2%.

# 11 ANALYSIS OF THE POSTAL SERVICE MARKET

## *Volume of postal services*

*In the Republic of Serbia, there were 36 postal operators providing postal services in 2015. Only the Public Postal Operator is both licensed for the provision of universal postal service and authorized for the provision of commercial services, whereas other operators have permits only for the provision of commercial services. The analysis of the supplied annual reports data has shown that those operators perform exclusively express and courier services.*

Approximately 315 million services were realized on the postal market of the Republic of Serbia in 2015, which is by 2% less compared to the previous year, following the trend of the 2% decline in the volume of services, which started two years ago. Up to 2012, postal services were showing growth, quite the opposite from the EU trend.

Out of 315 million services, almost 93% (around 291 million) account for universal postal service (UPS). The volume of UPS has been in decline third year in a row now, 2015 being the year of the sharpest drop so far. Commercial services continue their growth trend. During the five-year period, since 2011 onwards, there has been a growth of these services by over 84%.

**Table 14. Volume of postal services from 2011 to 2015**

| Type of service | Volume (in thousands) | | | | | Growth in %/decrease in volume | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| Universal postal services | 304,537 | 314,865 | 308,923 | 301,542 | 291,399 | 3 | -2 | -2 | -3 |
| Commercial services | 12,632 | 15,613 | 18,104 | 20,350 | 23,228 | 24 | 16 | 12 | 14 |
| TOTAL | 317,169 | 330,478 | 327,026 | 321,892 | 314,627 | 4 | -1 | -2 | -2 |

Commercial services are on the rise in other European countries as well. Their growth is influenced by multiple factors: sophisticated customers' demands, comfort needs, e-commerce, parcel distribution service within supermarket chains...

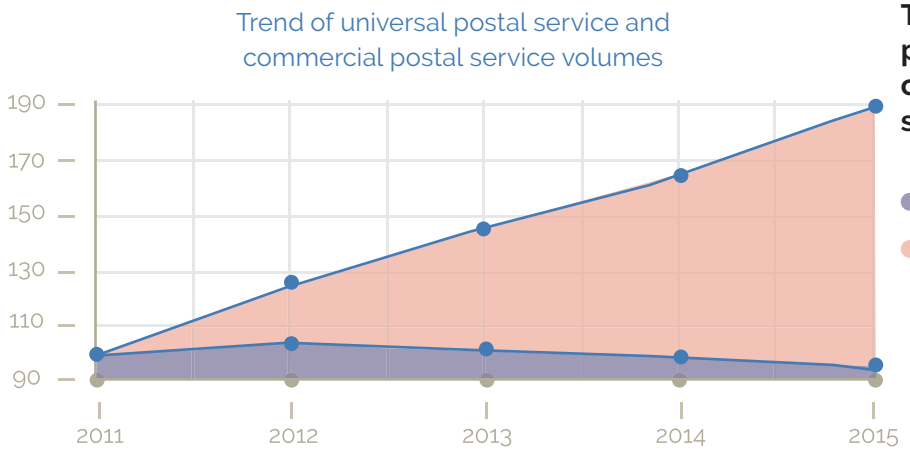



**Figure 96. Trend of universal postal service and commercial postal service volumes**

The Public Postal Operator (PPO) realized over 298 million postal services (95% out of the total volume), which is by 3% less compared to year 2014. This is the direct result of the drop in the volume of universal postal service, accounted at the PPO's for almost 98%.

Private operators performed over 16 million services (5% out of the total volume), which is by 14% more, compared to the previous year.

**Table 15. Volume structure by operators from 2011 to 2015**

| Operators | Volume (in thousands) | | | | | Growth in %/decrease in volume | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| PPO | 308,776 | 320,079 | 314,605 | 307,422 | 298,132 | 4 | -2 | -2 | -3 |
| Private operators | 8,393 | 10,399 | 12,421 | 14,470 | 16,495 | 24 | 19 | 16 | 14 |
| TOTAL | 317,169 | 330,478 | 327,026 | 321,892 | 314,627 | 4 | -1 | -2 | -2 |

The PPO's service structure has stayed almost unchanged in the analyzed period. Universal service is the most dominant, with the share of 97.74%. The share of the reserved services within the UPS is very high (over 97%), while that of the parcels is extremely low (less than 0.1%). Among the reserved services, the most numerous are letters up to 20 grams (over 92%).

Since the beginning of the observed period, there has been constant drop in the volume of parcels, over 31%. Compared to the previous year, the volume of express items has increased by 14.7% and that of money orders by over 10%.

The PPO's commercial services are still VAT exempt, therefore an objective analysis of these services on the postal market is not possible.

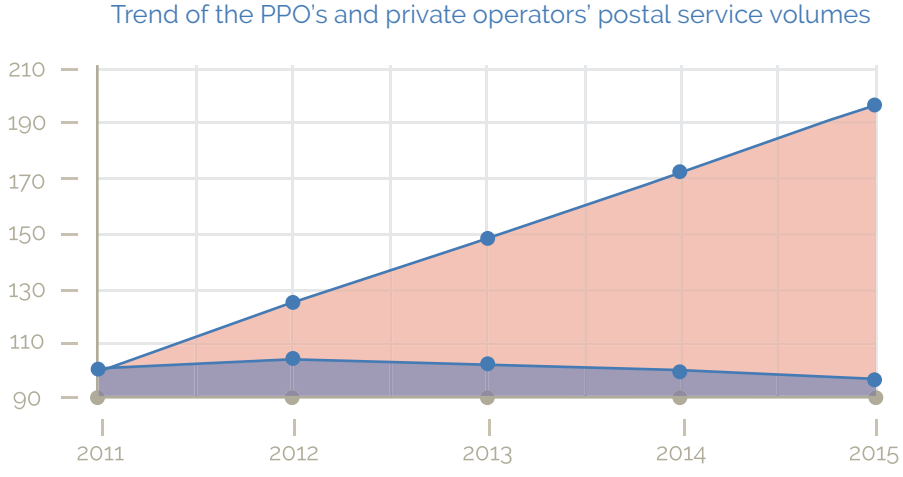



**Figure 97. Trend of the PPO's and private operators' postal service volumes**

PPO

Private operators

Within the private operators' service volume growth (14%), the highest growth rate pertains to domestic express services (14%). A growth in the international traffic by 8% was recorded, while courier services account for a decline by 2%.
In 2014, a drastic drop in the volume of courier services was recorded, due to the fact that a number of operators ceased their business activities (5 + 2 authorizations were revoked). Despite the entrance of 5 new operators in the courier market during 2015, difficult economic situation is causing a drop in the volume of courier services.

**Table 16. Private operators' volume of services 2011 - 2015**

| Operator's services | Volume (in thousands) | | | | | Growth in %/decrease in volume | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| Domestic express services | 7,747 | 9,758 | 11,764 | 13,837 | 15,831 | 26 | 21 | 18 | 14 |
| International express services | 391 | 404 | 417 | 440 | 475 | 3 | 3 | 6 | 8 |
| Courier services | 255 | 237 | 241 | 193 | 189 | -7 | 2 | -20 | -2 |
| TOTAL | 8,393 | 10,399 | 12,421 | 14,470 | 16,495 | 24 | 19 | 16 | 14 |

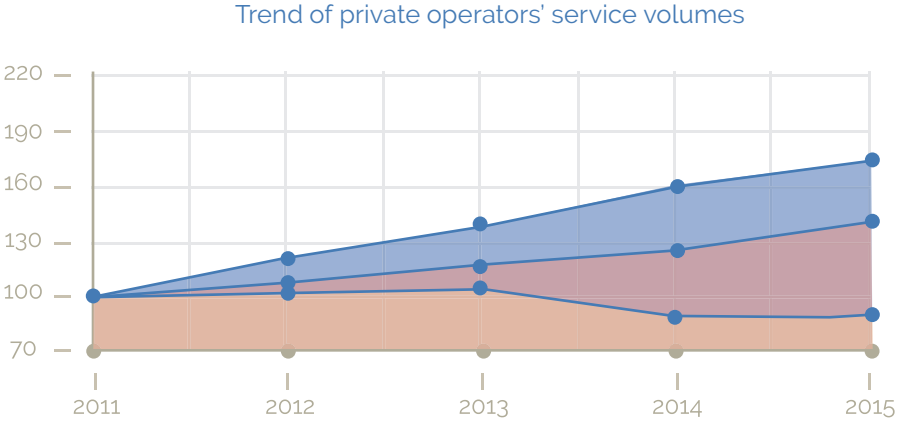



**Figure 98. Trend of private operators' service volumes**

## Income from postal services

The income stemming from postal services in 2015 amounted to over 16 billion dinars, representing approximately 0.4% of the projected GDP (~3,973 billion dinars). Even though a drop in the volume of services was recorded, the generated income surpassed that from the previous year by 7%.

The UPS income has increased by 5% and the commercial services income by 10%. Commercial services growth trend has continued, but by smaller rates (from 20% in 2011 to 10% in 2015).

**Table 17. Structure of income from UPS and commercial services from 2011 to 2015**

| Type of service | Income (in million RSD) | | | | | Growth in %/decrease in income | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| Universal postal services | 7,057 | 7,119 | 7,245 | 7,871 | 8,264 | 1 | 2 | 9 | 5 |
| Commercial services | 4,777 | 5,573 | 6,396 | 7,099 | 7,809 | 17 | 15 | 11 | 10 |
| TOTAL | 11,835 | 12,692 | 13,641 | 14,970 | 16,073 | 7 | 7 | 10 | 7 |

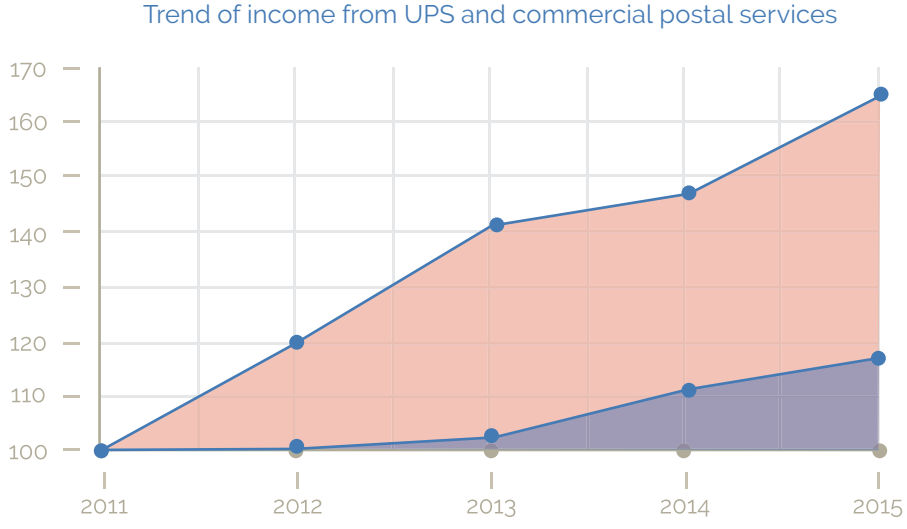



**Figure 99. Trend of income from UPS and commercial postal services**

UPS

Commercial services

In the PPO's postal service income, the income from the reserved area participates with approximately 75.7% (letter post items with 68.9%, postal money orders with 6.8%). The declining trend of the reserved area share in the total income has continued. In the total income of 16 billion dinars, the PPO is accounted for 64%, whereas private operators realized more than 1/3 of the income on the total market of the Republic of Serbia. Growth trend rate of the private operators' share in the total income has continued in 2015 as well (in 2011 it was 30 %, in 2012 33%, in 2013 34.6 %, in 2014 35.4%, and in 2015 36%).

The PPO realized an income of almost 10.3 billion dinars, representing an increase by 6% compared to the previous year. In the PPO's postal service income, the income from the reserved area participates with 74.8% (letter post items with 67.6% and postal money orders with 7.2%). The declining trend of the reserved area share in the total income has continued.

Private operators generated an income of almost 5.8 billion dinars, which represents a growth by 9%. Since 2011, this has been the lowest income growth rate generated by private operators.

**Table 18. Structure of operators' income from 2011 to 2015**

| Operators | Income (in million RSD) | | | | | Growth in %/decrease in income | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| PPO | 8,288 | 8,563 | 8,920 | 9,671 | 10,293 | 3 | 4 | 8 | 6 |
| Private operators | 3,546 | 4,129 | 4,721 | 5,299 | 5,780 | 16 | 14 | 12 | 9 |
| TOTAL | 11,835 | 12,692 | 13,641 | 14,970 | 16,073 | 7 | 7 | 10 | 7 |

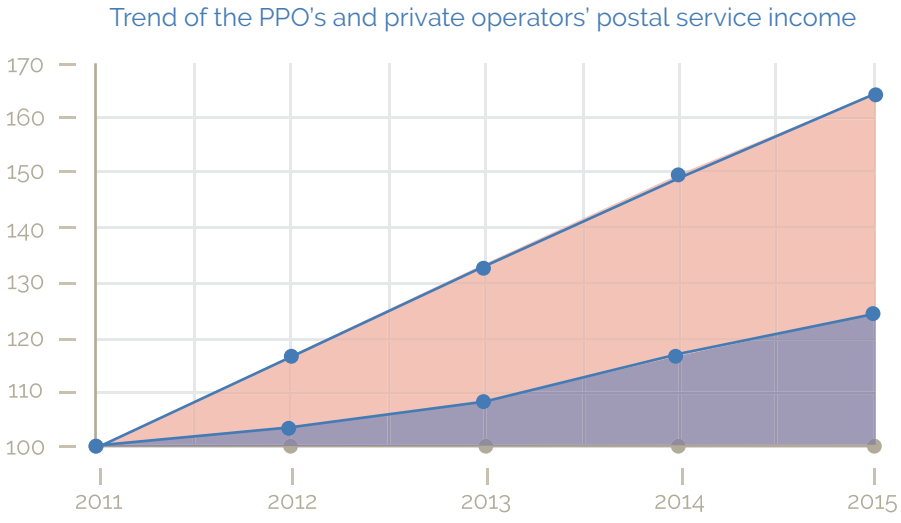



**Figure 100. Trend of the PPO's and private operators' postal service income**

PPO

Private operators

At private operators', a growth in the income from express services by 9% was recorded. As the volume grew by 14% and average price per service was reduced by 4%, a conclusion can be made that the conditions and prices on the market are governed by the competition. Regarding courier services, there is no change in income compared to 2014, despite the decline in volume by 2%.

**Table 19. Private operators' income from 2011 to 2015**

| Private operators' services | Income (in million RSD) | | | | | Growth in %/decrease in income | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| Unutrašnje ekspres usluge | 2,541 | 3,049 | 3,547 | 4,063 | 4,391 | 20 | 16 | 15 | 8 |
| Međunarodne ekspres usluge | 942 | 1,015 | 1,107 | 1,179 | 1,332 | 8 | 9 | 6 | 13 |
| Kurirske usluge | 63 | 65 | 67 | 57 | 57 | 2 | 3 | -14 | 0 |
| UKUPNO | 3,546 | 4,129 | 4,721 | 5,299 | 5,780 | 16 | 14 | 12 | 9 |

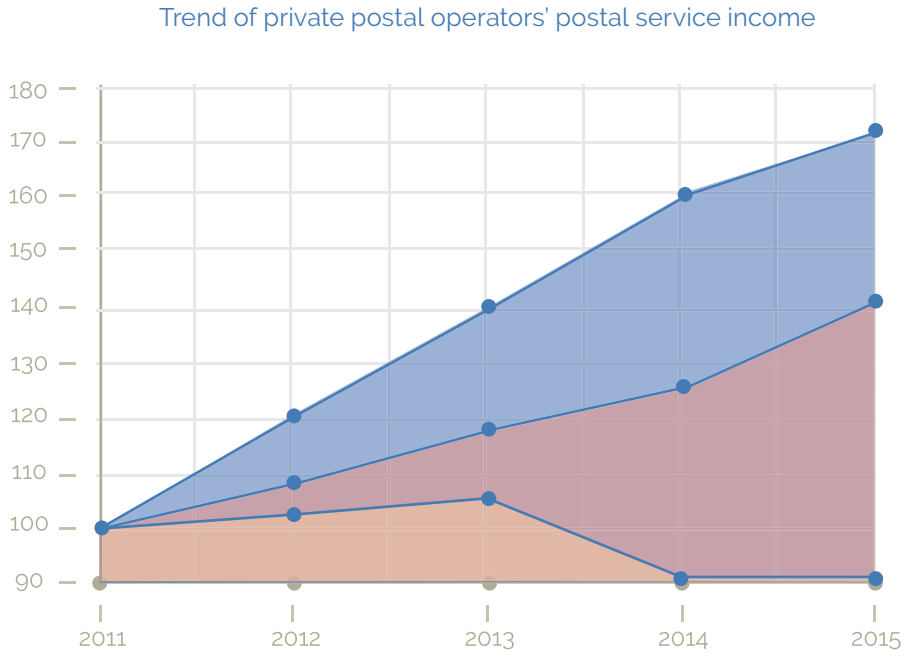



**Figure 101. Trend of private postal operators' postal service income**

## Postal service market in 2015

Since the regulator's analysis of the postal service market was put in place, the shares of the UPS volume and income in the totality of postal services have marked a steady decline (approximately 4% in volume and almost 12% in income, during the observed period).

Even though their participation in the total postal service volumes is slightly over 7% on the market of the Republic of Serbia, the commercial services income has been almost identical to that of UPS.

**Table 20. Postal service market in 2015**

| Type of service | Volume (in thousands) | Income (in thousand RSD) | Volume | Income |
|---|---|---|---|---|
| | 2015 | 2015 | % | % |
| Universal postal service | 291,399 | 8,264,077 | 92.6 | 51.4 |
| Commercial services | 23,228 | 7,808,901 | 7.4 | 48.6 |
| TOTAL | 314,627 | 16,072,978 | 100 | 100 |

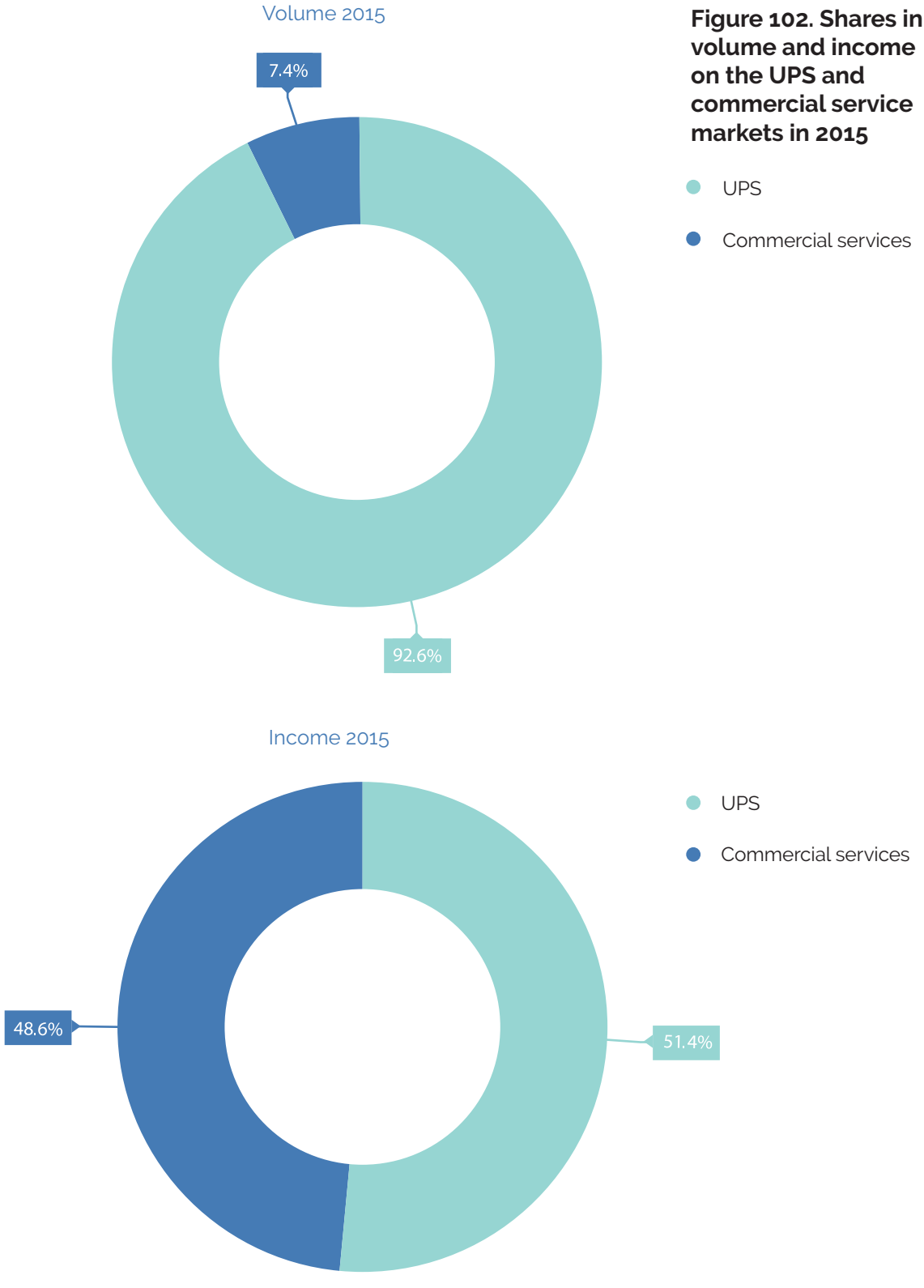



**Figure 102. Shares in volume and income on the UPS and commercial service markets in 2015**

Private operators, as providers of exclusively commercial services on the postal market, participate with 5.2% in volume and with 36% in income.

**Table 21. Shares of postal operators in the market in 2015**

| Operators | Volume (in thousands) | Income (in thousand RSD) | Volume % | Income % |
|---|---|---|---|---|
| PPO | 298,132 | 10,292,663 | 94.8 | 64.0 |
| Private operators | 16,495 | 5,780,315 | 5.2 | 36.0 |
| TOTAL | 314,627 | 16,072,978 | 100 | 100 |

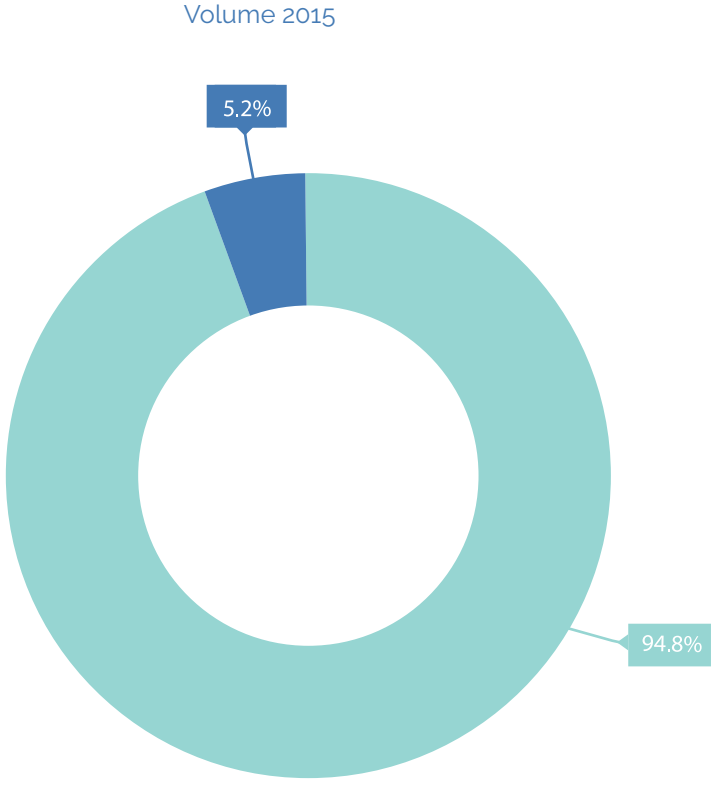



**Figure 103. Shares in the PPO's and private operators' volume and income in 2015**

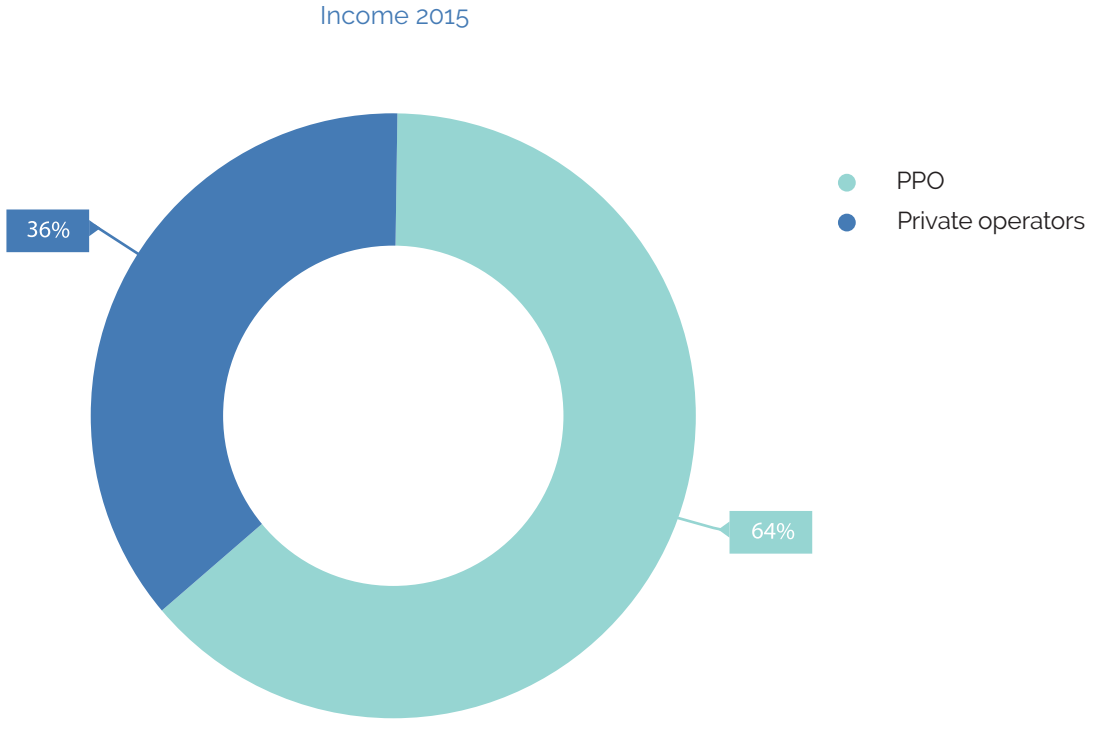



**Table 22. Structure of private operators' services in 2015**

| Private operators' services | Volume (in thousands) | Income (in thousand RSD) | Volume % | Income % |
|---|---|---|---|---|
| Domestic express services | 15,831 | 4,390,602 | 95.97 | 75.96 |
| International express services | 475 | 1,332,493 | 2.88 | 23.05 |
| Courier services | 189 | 57,219 | 1.14 | 0.99 |
| TOTAL | 16,495 | 5,780,315 | 100 | 100 |

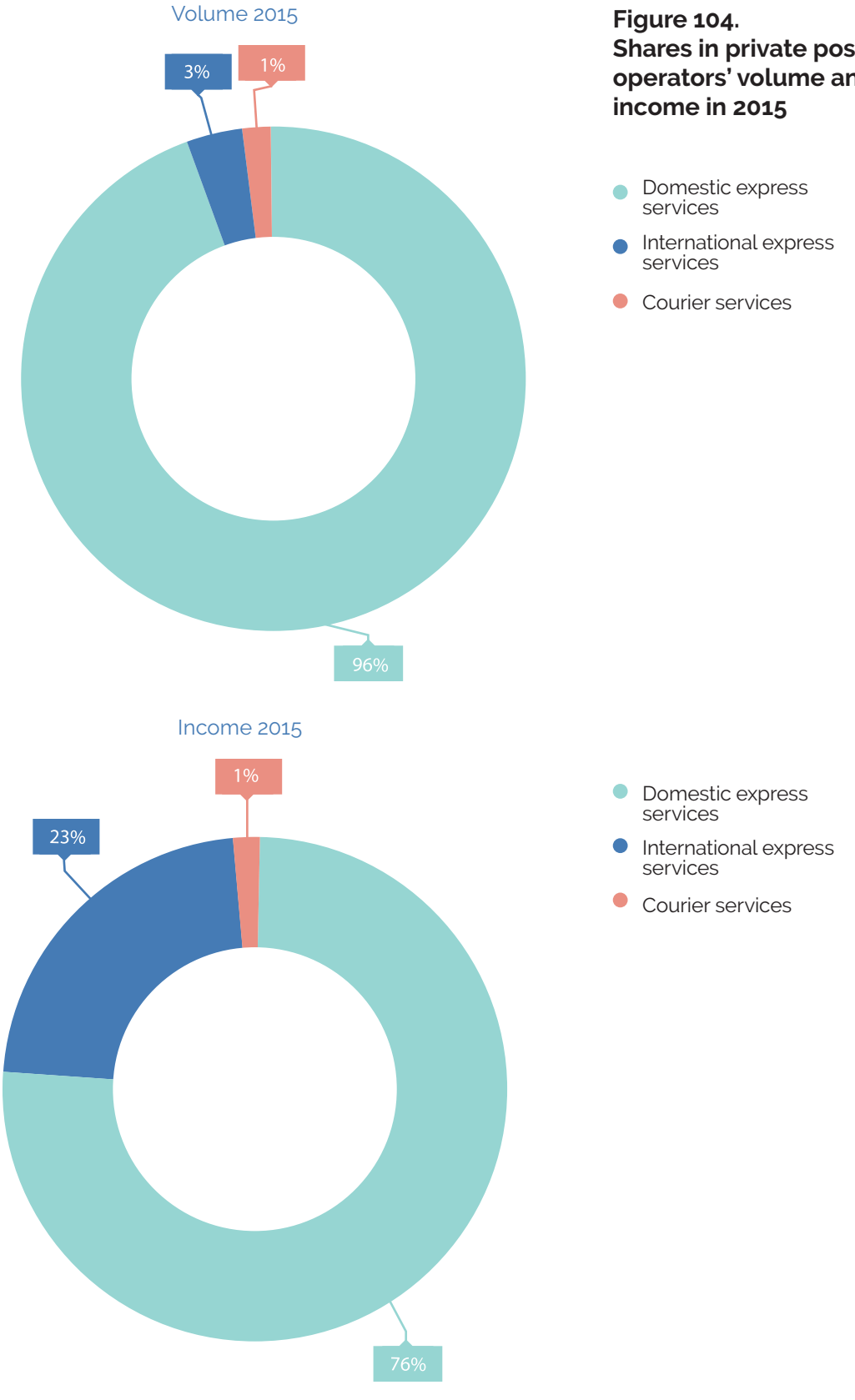



**Figure 104.**
**Shares in private postal operators' volume and income in 2015**

In the structure of postal services provided by the PPO, the most dominant is universal postal service, the share of which declined by merely 0.9% in the volume, whereas the share in the income dropped by almost 5% during the last five years. At the same time, the share of commercial services, above all Post Express, has marked an increase by nearly 4%.

**Table 23. Percentage of the PPO's UPS and commercial services share**

| Type of service | Vol. | Inco. | Vol. | Inco. | Vol. | Inco. | Vol. | Inco. | Vol. | Inco. |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | |
| UPS | 98.63 | 85.15 | 98.41 | 83.13 | 98.19 | 81.22 | 98.09 | 81.38 | 97.74 | 80.29 |
| Post Express | 1.31 | 11.53 | 1.51 | 13.40 | 1.75 | 15.15 | 1.85 | 14.50 | 2.19 | 15.34 |
| Other commercial | 0.06 | 3.32 | 0.08 | 3.46 | 0.06 | 3.63 | 0.06 | 4.12 | 0.07 | 4.37 |

**Table 24. Employees in postal sector**

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| PPO | 14,939 | 15,068 | 15,115 | 15,015 | 14,965 |
| Other postal operators | 2,048 | 2,618 | 2,464 | 2,615 | 2,751 |
| TOTAL | 16,987 | 17,686 | 17,579 | 17,630 | 17,716 |

During 2015, 17,716 workers were employed in this industry segment, making approximately 1% of the total number of the employees in the Republic of Serbia (1,882,825 employees).

Like in previous years, this year either the employees (drivers) in the road transport companies (Niš ekspres and Autoprevoz Kikinda) were not included in the total number of employees.

During the last five years, there were no significant changes in the number of employees, however a slight increase by 0.5% has been observed. At the PPO's, the number of employees has dropped by 0.33% (50 employees), whereas at the private operators', an increase in the number of employees by over 5% has been recorded.

Even though the UPS share in the totality of postal services remains extremely high (nearly 93%), postal market in 2015 has seen an evident drop in the volume of services from the UPS scope, for the third year in a row. This trend has been present in the EU countries for several years now. Continuous decrease in the volume of services entails an increase in unit service costs, which, coupled with the existing challenges on the market, represents a great burden for the universal service provider (USP). This compromises the concept of the UPS sustainability and calls for a thorough re-engineering in this domain, after reaching a national consensus regarding the most important issues.

In this sense, during 2015, RATEL initiated a set of steps, such as: research and elaboration of the study on UPS, organization of meetings with the objective of reaching the national consensus, development of the re-engineering methodology of the UPS concept, as well as the model for the support to the decision-making process regarding these issues, such as the ERGP guidelines. All these activities were concluded by testing of the model for the support to the decision-making regarding the definition of the optimum UPS scope, with participation of all relevant state entities responsible for postal services and expert representatives.

# 12 QUALITY OF THE PROVISION OF POSTAL SERVICES

*In order for the quality of the postal service provision to be comparable to the European practice, the Regulatory Agency for Electronic Communications and Postal Services adopted on December 30, 2014 its Rulebook on quality parameters for the provision of postal services and on the minimum quality standards for the provision of universal postal service (Official Gazette of RS, no. 146/14). This Rulebook prescribes implementation of the most important and most applied quality standards for the provision of postal services. Until the Public Postal Operator (PPO) adapts the existing procedures of quality measurement to those set in the standards, performance of the universal postal service provision is measured based on the internal act of the Public Enterprise of "Pošta Srbije" – Methodology of the postal traffic quality monitoring (hereinafter: Methodology) and is established based on the following parameters:*

- *availability of postal services,*
- *speed and reliability of the transmission and delivery of items,*
- *security of items,*
- *efficiency of complaint handling,*
- *service users' satisfaction and availability of information, etc.*

## Availability of universal postal service

The availability of postal services is assessed based on the territorial accessibility of post offices, postal letter boxes, working hours of post offices, availability of postal office counters and delivery of items.

**Table 25. Availability of post offices and letter boxes**

| | Year | | | | | Trend (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 12/11 | 13/12 | 14/13 | 15/14 |
| No. of post offices | 1507 | 1499 | 1489 | 1478 | 1491 | -0.53 | -0.67 | -0.74 | 0.88 |
| No. of letter boxes | 2062 | 2087 | 2072 | 2052 | 2000 | 1.21 | -0.72 | -0.97 | -2.53 |

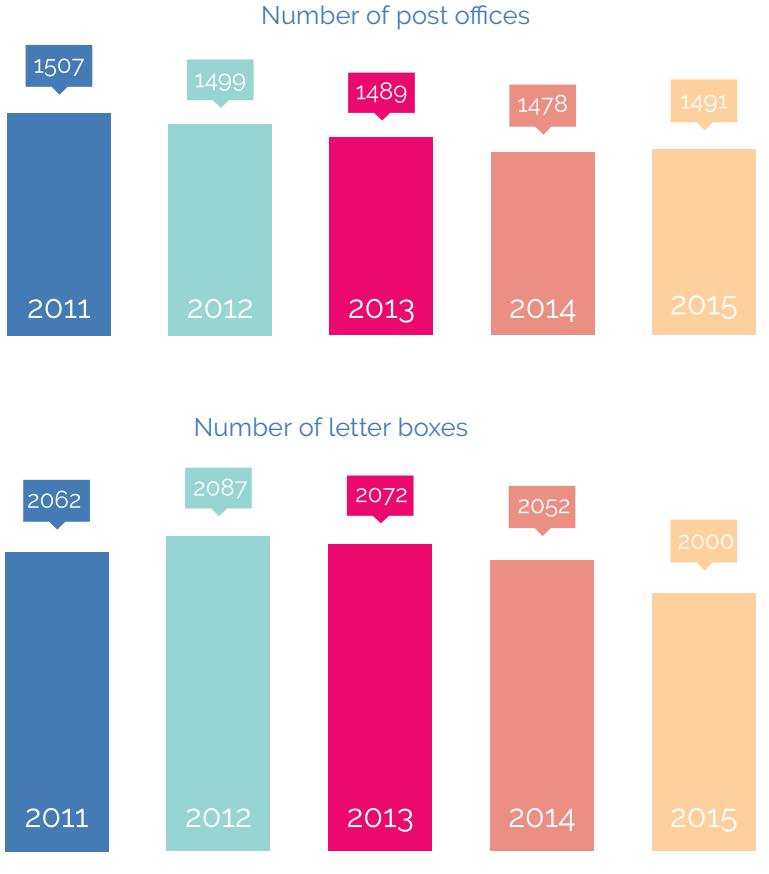



**Figure 105. Trend in the number of post offices and postal letter boxes**

In comparison with the year 2014, in 2015 the total number of post offices was increased from 1478 to 1491 (13 post offices), i.e. by 0.9%. After a five-year period, the declining trend of the number of post offices was interrupted, resulting in almost 1% better accessibility of post offices to the customers. Compared to 2011, in 2015 we saw a reduction of the number of post offices by 16, i.e. by 1.1%.

The average number of inhabitants per post office is 5000, which is by approximately 10% more than the EU average (4500 inhabitants per post office).

The number of postal letter boxes in 2015 was reduced from 2052 to 2000, i.e. by 2.5% compared to 2014, and by 3% compared to 2011. The decreasing trend in the number of letter boxes was started in 2013, resulting in the number of letter boxes in 2015 to be lower by almost 4.2% compared to 2012. There are, on average, three postal letter boxes per ten thousand inhabitants in the Republic of Serbia, which is by far below the EU average, i.e. 15 letter boxes.

## Post offices' working hours

Out of 1491 post offices, 969 (65%) belong to rural and 522 (35%) to urban areas. The analysis of these post offices' working hours has shown the following:

- out of 969 post offices in rural areas, 904 post offices (93.3%) work with customers up to 7 hours a day, 58 post offices (6%) work from 7 to 12 hours a day, 1 post office (0.1%) serves customers more than 12 hours a day and 6 post offices (0.6%) at border crossings work around the clock. Taking into account that all mentioned post offices are situated in populated areas with less than 10000 inhabitants, a rather high percentage of post offices (93.3%) serving customers up to 7 hours a day can be observed, in accordance with the PPO's Methodology;
- out of 522 post offices in urban areas, 182 post offices (34.9%) work with customers up to 7 hours a day, 323 post offices (61.9%) work from 7 to 12 hours a day, whereas 17 post offices (3.2%) serve customers more than 12 hours a day. Taking into account that the PPO has post offices in 176 Serbian municipalities, and that as many as 48 municipalities (27.3%) have less than 10000 inhabitants in their urban area, it can be observed that the percentage of post offices serving customers from 7 to 12 hours a day (61.9%) is in accordance with the Methodology.

## Availability of postal counters

The availability of postal counters to customers regarding the provision of universal postal service is determined by measuring the waiting time of customers in line.

During 2015, the screening of average waiting time in front of the counter for letter post collection indicated that the average waiting time of customers in line of 4 minutes and 33 seconds was considerably below the limit value of 10 minutes, as prescribed by the Methodology. This proves that the criterion of the availability of postal counters is satisfactory.

## Availability of the delivery of postal items

The availability of the postal item delivery is not possible to be captured, due to the lack of data on the volumes in the local, larger and the largest delivery area. In lieu of these data, only the shares of PACs (postal address codes) respectively on the local, larger and the largest delivery area levels are provided by the PE "Pošta Srbije". Unfortunately, these data are not relevant for the analysis, nor is it possible to determine the availability of the delivery of postal items based on those data.

## Speed and reliability of the transmission and delivery of postal items

Speed and reliability of the transmission and delivery of postal items are measured by the trans-

mission and delivery times of domestic non-recorded letter post items and international priority and air letter post items. Delivery standards for the domestic traffic are prescribed by the regulator (Table 26).

In the international postal traffic, delivery standards are prescribed by the Universal Postal Union (D+5 from 85%) or by the Association of European Public Postal Operators (PostEurop), which are D+3 of at least 85% (speed indicator) and D+5 of at least 97% (reliability indicator).

## Table 26. Transmission and delivery times

| | Domestic traffic | | | | | standard EN 13850 | | International traffic | | | | | Prescribed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Independent screening – internally PPO | | | | | up to 2015 | for 2016 | PostEurope | | | | | standard |
| | 2011 | 2012 | 2013 | 2014 | 2015 | | | 2011 | 2012 | 2013 | 2014 | 2015 | |
| D+1 | 78.18% | 79.93% | 82.27% | 71.81% | / | / | 80.00% | | | | | | |
| D+2 | 96.05% | 96.46% | 95.86% | 93.63% | / | 90.00% | 85.00% | | | | | | |
| D+3 | 98.57% | 98.84% | 98.74% | 99.14% | / | 98.50% | 90.00% | 60.25% | 63.70% | 66.50% | 67.95% | 56.20% | 85.00% |
| D+5 | 99.85% | 99.87% | 100.00% | 100.00% | / | 99.50% | | 87.60% | 90.25% | 92.50% | 87.50% | 83.35% | 97.00% |

**Figure 106. Domestic postal traffic – transmission and delivery times**

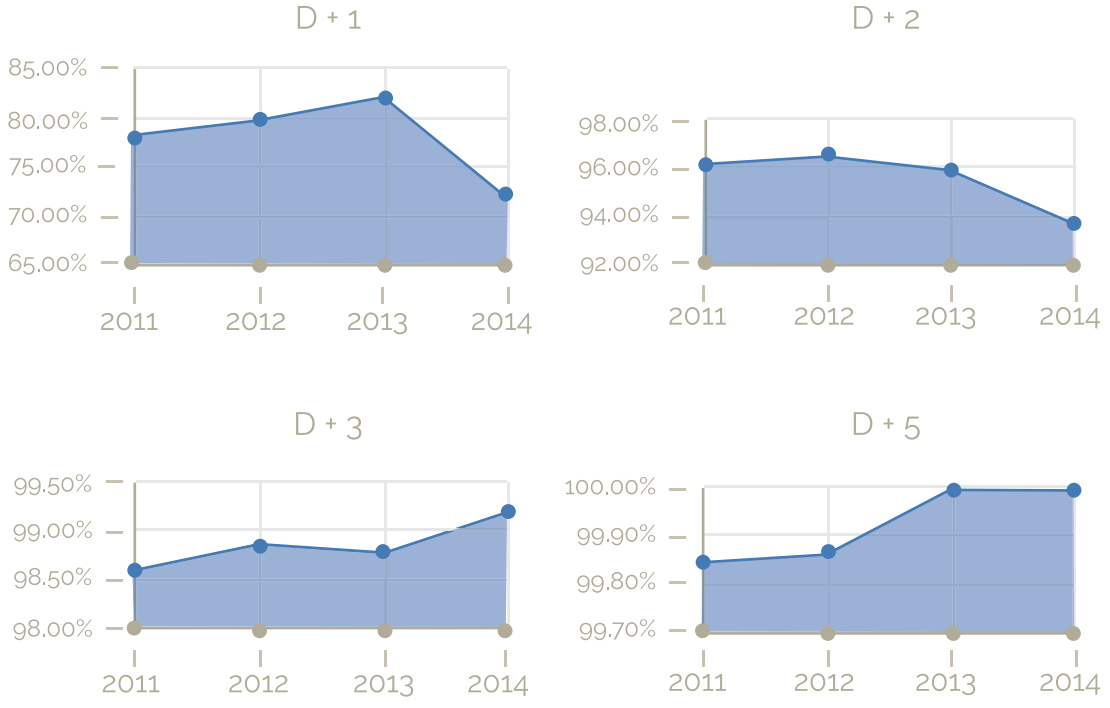
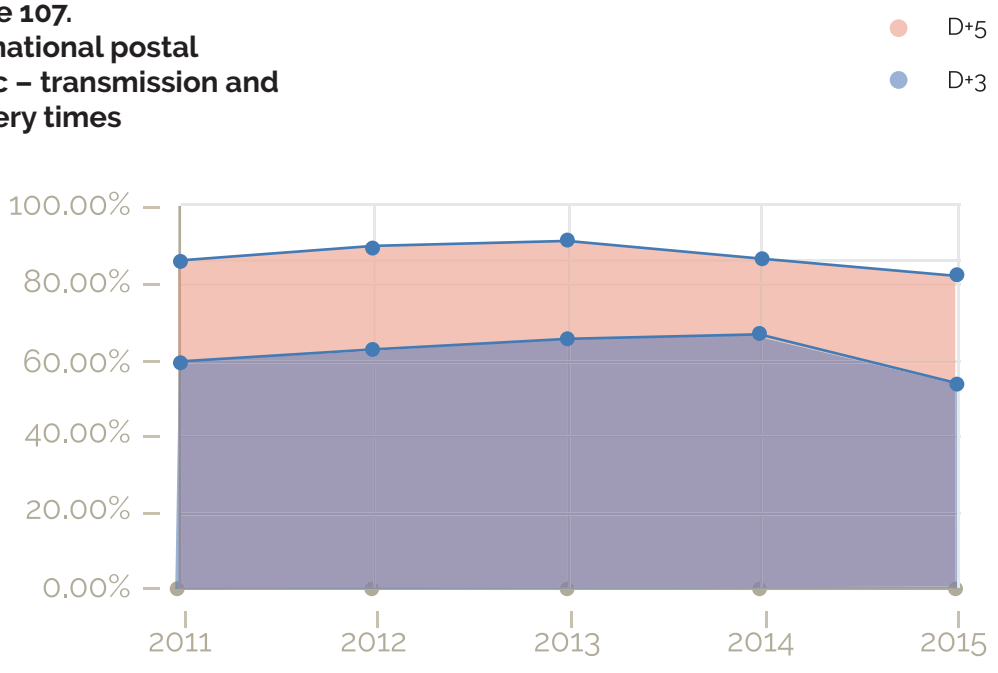



**Figure 107. International postal traffic – transmission and delivery times**



The provided data regarding international postal items show that, during 2015, following a continuous four-year growth, there was a decrease in the percentage of the items delivered within the prescribed transmission and delivery times, i.e. in the quality of the transmission and delivery times in international traffic.

Likewise, regarding the transmission and delivery times in domestic postal traffic, a continuous growth trend between 2011 and 2014 can be observed. If the analogy from the international traffic would be applied to the domestic traffic, it could be assumed with the great probability that domestic items too saw a decrease in quality of the transmission and delivery times.

## Security of items

An overview of the volume of lost, rifled and damaged items is shown in Table 27. For the sake of data comparability, the number of items was recorded per 100000 collected items, in accordance with the PPO's Methodology. The analysis showed decrease in the number of lost registered items during 2015 (in 2015, 7 out of 100000 items were lost, against 8 items in 2014). Registered items being the most numerous recorded postal items, the drop in the number of lost registered items was automatically reflected on the increase of the level of security of all items (0.006% i.e. 6 lost, rifled and damaged items per 100000 collected items), representing a quality leap compared to 2014, when 0.007% of these items were recorded.

**Table 27. Lost, rifled or damaged items**

| OF POSTAL ITEM | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| **REGISTERED LETTERS** | | | | | |
| - lost per 100000 items | 8 | 10 | 10 | 8 | 7 |
| - rifled or damaged per 100000 items | 0 | 0 | 0 | 0 | 0 |
| **INSURED LETTERS** | | | | | |
| - lost per 100000 items | 0 | 0 | 0 | 1 | 0 |
| - rifled or damaged per 100000 items | 0 | 0 | 0 | 0 | 0 |
| **PARCELS** | | | | | |
| - lost per 100000 parcels | 1 | 1 | 1 | 0 | 0 |
| - rifled or damaged per 100000 parcels | 4 | 3 | 2 | 1 | 0 |
| **MONEY ORDERS** | | | | | |
| - lost per 100000 items | 0 | 0 | 0 | 0 | 0 |
| **SECURITY LEVEL OF ITEMS** | 0,007 | 0,009 | 0,009 | 0,007 | 0,006 |

An overview of the paid indemnities, according to the types of recorded postal items for the period 2011 – 2015 is shown Table 28 below.

**Table 28. Paid indemnities by the types of postal items**

| Domestic postal traffic | Year 2011 | | Year 2012 | | Year 2013 | | Year 2014 | | Year 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | kom, | dinara | kom, | dinara | kom, | dinara | kom, | dinara | kom, | dinara |
| Registered items | 1,156 | 772,009.56 | 1,041 | 639,381.88 | 1,061 | 665,728.86 | 591 | 415,066.00 | 452 | 349,982.00 |
| Insured letters | 4 | 3,780.00 | 8 | 10,552.52 | 6 | 9,978.00 | 18 | 31,036.00 | 5 | 10,262.00 |
| Parcels | 24 | 37,060.00 | 14 | 23,178.00 | 9 | 23,334.51 | 8 | 9,451.50 | 3 | 28,592.00 |
| Money orders | 0 | 0 | 0 | 0 | 1 | 900 | 0 | 0 | 3 | 6,140.00 |
| TOTAL | 1,184 | 812,849.56 | 1,063 | 673,112.40 | 1,077 | 699,941.37 | 617 | 455,553.50 | 463 | 394,976.00 |

Based on the Table data, a trend of increase of the postal items' security level can be observed, especially regarding insured items. Compared to 2014, in 2015, a decrease in the number of indemnity requests for lost, rifled and damaged items (25%) was recorded, which also resulted in a lower amount of the paid indemnities (13%).

In international postal traffic, following the decrease of the security level of items in 2014, when the indemnity for 27 items was paid (in 2013 – for 11 items, in 2012 – for 14 items, in 2011 – for 20 items), in 2015 the indemnity for 17 items was paid, which represents the average of the observed five-year long period. Generally, a considerable increase of the security level of items was recorded in 2015, compared to the previous year, from the aspect of the number of paid indemnities, where a decrease by 40% occured, which respectively resulted in the drop of the amount of paid indemnities in the same percentage during 2015, compared to 2014.

## Efficiency of complaint handling

In 2015, customer complaints in domestic traffic usually got resolved in 4 days on average, whereas the indemnity claims were paid out in 7 days, identically as in 2014. These delays are harmonized not only with the Law on Postal Services, but also with the Law on Consumer Protection, which is even stricter in this segment of regulation (8 days). The delays for the international postal items are considerably longer, taking into account the fact that complaint procedures need to be carried out in at least two countries.

**Table 29. Average time for complaint resolution, realization and payment of indemnities**

| | Resolution of complaint procedure | Realization of indemnity | Payment of indemnity | Total for realization and payment of indemnity |
|---|---|---|---|---|
| | (days) | (days) | (days) | (days) |
| | 1 | 2 | 3 | 4=2+3 |
| Year 2014 | 4 | 7 | 5 | 12 |
| Year 2015 | 4 | 7 | 6 | 13 |

## Service users' satisfaction and availability of information

In its annual report on the quality of service, the PPO has regularly informed RATEL about the level of service users' satisfaction and the availability of information on products and services. The research on the level of service users' satisfaction and the availability of information is carried out by means of an internal survey on customers' opinions, whether they be natural or legal persons. The measured parameters such as: reliability, speed, assortment, price and manner of service provision were commonly highly rated. Similar conclusion can be drawn indirectly, based on the market survey conducted by RATEL.

Based on the analysis of the provided data, it can be concluded that, according to the Methodology of the postal traffic quality monitoring, a satisfactory quality level in the provision of universal postal service has been reached.