

2018

ANNUAL ACTIVITY REPORT



CROATIAN
REGULATORY AUTHORITY
FOR NETWORK
INDUSTRIES

ZAGREB, JULY 2019



The Croatian Regulatory Authority for Network Industries (HAKOM), pursuant to the Electronic Communications Act, hereby submits to the Croatian Parliament and the Government of the Republic of Croatia its Annual Activity Report for the year 2018. The financial and final statement are integral parts of this Report.



TABLE OF CONTENTS

A word from the President of the Council and the Director	4
Summary	5
Electronic Communications	9
Postal services	33
Rail services	40
RF Spectrum Management	48
Consumer Protection	57
Inspection	65
HAKOM	68
Financial statement	77
Annexes	83



A WORD FROM THE PRESIDENT OF THE COUNCIL

The Council of HAKOM has acted in this composition since the end of April 2018. Considering the discontinuity in the Authority's management, there has been a delay in making regulatory decisions, as well as in the public procurement process. For this reason, the 2018 financial plan was not realized in the planned percentage. Therefore, the surplus funds shall be used in the current and following years.

In the regulatory sense, the previous year was primarily marked by the introduction of a new European regulatory framework in the field of electronic communications which must be transferred to the Croatian legislation by the end of 2020. The new framework encourages the development of networks of very high capacities, as a foundation for the development of digital economy and socio-economic welfare. Among other activities I would like to highlight the increasingly intensive work on building the foundations for the introduction of 5G technology in the Republic of Croatia and the activities related to the analysis of relevant markets.

On the postal market, the amount of letter items has been constantly decreasing, but operators' incomes have been increasing at the same time, due to an increase in the amount of delivered parcels. In the long term, however, a structural change is needed in the postal system and new legislative solutions are required at the European Union level.

The rail market has slowly been liberalizing, and HAKOM is facing new challenges because of the Railway Act, adopted this year in the Croatian Parliament.

HAKOM's main role remains the development of market competition on the markets it regulates, creation of incentives for investments, protection of users of services and contribution to the development of the European Union internal market.

Tonko Obuljen, Council President



A WORD FROM THE DIRECTOR

The year 2018 was special for HAKOM. The Croatian Parliament appointed a new Council after the termination of the previous Council's five-year term, and I was entrusted with leading HAKOM's administrative service for the next four years. Despite the changes in the management system, brought by the new Council and the Director, our main task was to maintain the stability of business operations and fulfil the goals set for 2018. We were successful in this, thanks to our professionalism, competence and responsibility of the administrative service employees.

HAKOM's operations span across different areas of activity. I would like to stress our role in resolving disputes between end-users and operators, that is, the providers of postal and rail services. This administrative procedure enables users fast and safe protection. We thus have an insight into the users' current problems and this is the basis for the actions we perform in order to prevent bad practices. I would especially like to emphasize the importance of the work of HAKOM's inspectors who, through market surveillance, ensure that regulations are complied with. HAKOM has been entrusted with the important task of managing and controlling the use of the RF spectrum – a valuable, but limited resource. Topics surrounding the introduction of 5G networks have been the most prominent in our work over the past year, and will become even more significant in the future. A quality 5G network will represent the strategic advantage of countries for the introduction of Industry 4.0, and the Republic of Croatia currently has excellent 4G (LTE) networks.

We determine infrastructure operators and the right of way on real properties, we manage address and numbering space, we issue licences for the use of the RF spectrum, building conditions and certificates of compliance for main projects and we enable public access to the information we have, in particular the information with spatial determinants available through our GIS portals which are continually upgraded.

Our wish is to be fast and reliable in the procedures we perform, and for the majority of procedures we have enabled our users to submit their requests online. We wish to fully digitalize our procedures and be the first state authority that will operate entirely digitally. I believe we are on the right track, but we still have many steps to reach our goal.

Miran Gosta, Director

01

SUMMARY

In 2018, HAKOM continued its regulatory activities in all areas of its competence, with an emphasis on creating the conditions for investment, protecting users and passengers and creating the pre-conditions for the introduction of 5G networks.

FINANCIAL STATEMENT

HAKOM had non-profit organizations accounting until the end of 2017, and on January 1 2018, it was included in the State Budget of the Republic of Croatia as a budget beneficiary, and switched from non-profit organizations accounting to budget accounting. In 2018, HAKOM generated assigned revenue, own revenue and reimbursements from EU institutions, which were sufficient to cover all expenditures for carrying out and developing HAKOM's activities. At the end of 2018, a surplus of revenue was generated, which is planned to be used in the coming period to ensure the liquidity and financial stability of the business and for investments. Total revenues amounted to HRK 99.1 million and expenditures HRK 73.5 million.

ELECTRONIC COMMUNICATIONS

The electronic communications market in the Republic of Croatia has been marked by a further increase in data traffic by almost 50 percent in a year, as well as an increase in revenues and investments in broadband infrastructure. Revenue from the electronic communications market exceeded HRK 11.5 billion, a 73 million increase compared with the previous year. Growth in revenues from broadband Internet service was about five percent, and for pay-TV it was about seven percent. Operators continued to invest in infrastructure development, new technology and services. A total of over HRK 2.5 billion was invested in the market, which is a three percent decrease compared to 2017, but the

investment in the network and network equipment grew to HRK 1.4 billion. Direct investment in the network is evident in the increase in the availability of NGA broadband Internet access, placing the Republic of Croatia on EU average. The number of users of telephone services in the fixed network continues to decline, while the number of users of all other services is increasing.

The largest share in total revenue, around 40 percent of total revenue, is generated from broadband Internet access. Internet access through fixed networks generated revenue of around HRK 2 billion, and through mobile networks over HRK 2.5 billion. Accessibility is almost 100 percent, and NGA access coverage with speeds over 30 Mbit/s has reached EU average and amounts to 83 percent. The RoC is behind with ultra-fast access availability (more than 100 Mbit/s), and for faster increase of availability, resources from EU development funds should be used. At the end of the year, mobile networks provided access to 4G signal for more than 94 percent of the population. Data traffic has been growing exponentially, particularly in mobile networks. An increased use of services based on the application layer of Internet protocol (OTT services), like Viber, WhatsApp and others, has led to a stagnation in revenue from telephone services in mobile networks. 44 percent of households has not contracted any form of paid television. Telephone services in the fixed network, in addition to a decrease in the number of users, have been decreasing even more in terms of revenue, which is expected. The universal service is available to all citizens of the RoC. Machine-to-machine communication services, M2M, have increased by 40 percent.

In the RoC the principles of neutrality and openness of the Internet have consistently been applied. As for the quality of Internet, HAKOMetar measurements have shown that only two percent of measurements are completed with measured speeds below the lowest contracted speed. The quality of mobile networks has been increased by increasing the transfer capacity of base stations and network upgrades.

Security of networks and services has become increasingly important in HAKOM's work. A few interruptions in service provision in Croatian communication networks point to the fact that the most common reason of interruption is human error, and less frequently system error.

In order to facilitate the construction of ultra-fast networks, access to and joint use of the infrastructure has been additionally regulated in the sector, and alternative operators have shown higher activity in the construction of fibre distribution networks in Croatia. Information on Internet availability is regularly updated and used as a basis for creating technical documentation for the financing of projects from EU development funds. Requests for the regulation of property-law relations were also settled and an infrastructure operator was defined in 136 cases, and more than 800 certificates on the right of way were issued. For interventions into space almost 20,000 special conditions were issued, along with almost 500 documents which define the guidelines and requests for designing physical plans.

As the Holder of the Framework Programme, HAKOM continued to fulfil its tasks within the Framework National Programme for the Development of Broadband Infrastructure in Areas Lacking Sufficient Commercial Interest for Investments. By the end of 2018, 69 drafts for the Plans for the Broadband Infrastructure Development (PBID) were received. The project holders and public local and regional self-government units received all necessary support during the whole year, and meetings and workshops were regularly held in order to cover topics in the preparation and application phases of projects.

Regulatory activities revolving around market analysis resulted in the implementation of a new round of market analyses from the EC Recommendation. The goal was to prevent the negative impact of HT managing with Optima, reduce the costs of interconnection, establish rules for call termination prices according to the cost model and encourage wider usage of broadband access with speeds above 30 Mbit/s. A decision on interconnecting was also adopted, which will help establish and develop Trans-European networks.

POSTAL SERVICES

The postal services market of the RoC has been fully liberalized and has been part of the single EU market. The trends present on our market are the same as in the rest of the EU. The number of postal services dropped again by 2.6 percent, amounting to 309 million, but this drop is somewhat smaller than the year before. The number of parcels grew expectedly due to an increase in e-trade related services. Market revenue increased and this trend that has been present for the last couple of years continues, even though the total number of services has been decreasing. The revenue amounted to a total of HRK 1.65 billion, which is about 108 billion more than the previous year or a growth of about 7 percent annually. There were 32 million pieces of printed matter, 257 million letters, and 21 million parcels. The number of postal offices in the RoC has not changed and it remains 1016.

92 percent of postal services was realized in domestic traffic, but a further growth in international traffic is expected, especially because the Regulation on Cross-Border Parcel Delivery Services came into force in 2018. The universal service had a 60 percent share in total services, and a large part was accounted for by letter items. There were almost 40 million interchangeable postal services. Other postal services, which are also part of postal services, mostly basic postal services (letters and parcels) with some added value, that is, express parcels and printed matter and direct mail, amounted to more than HRK 85 million. This is around four percent more than in the year before, whilst income grew by 12 percent to HRK 710 million. In this segment of the market the competition is the highest, and given that the services in question have been increasingly popular, with the biggest potential

for growth and development, the trend is expected to continue.

During the year HAKOM carried out an independent audit procedure of the regulatory financial statement and cost model of the universal service provider Hrvatska pošta (HP). In October 2018, HAKOM adopted a Compliance Statement confirming that the form, content and methodology used in HP's financial statement meet the stipulated requirements.

The net cost of the universal service providers and an assessment of unfair financial burden were conducted pursuant to HP's application for the compensation of the costs of the universal service. HP claimed compensation of costs in the amount of HRK 92 million, but HAKOM found only 80 million to be justified.

Quality measurements of the performance of postal services were met in domestic traffic, but not in international.

RAIL SERVICES

The only railway infrastructure manager in the rail services market in the RoC is HŽ Infrastruktura d.o.o., who is also the largest operator of service facilities. Rail services are also provided by railway operators. There used to be seven operators until a new, eighth freight carrier obtained a licence to perform railway freight transportation services, but did not perform transportation.

In accordance with the law, HŽI published a Draft Network Report and the Report itself within the stipulated time period. HŽI manages a 2605 km long network of railway lines and maintains 545 railway stations and stops, 1511 road and railway crossings, 109 tunnels and 544 bridges, 3877 culverts and 4263 switches. The electric traction system has not been changed since 2015, and neither has the overall length of the electrification, whereby only 980 kilometres, 30 percent, of the railway lines are electrified. The European average in terms of electrified railway lines in 2018 was over 52%.

In 2018 a little over 12 km of railway lines were built and 20.56 km were renewed and upgraded. An efficient absorption and utilization of EU funds, the exchange of information, and cooperation among all interested parties in railway traffic are key to maximizing the use of available resources from EU development funds and to a faster modernization of an outdated railway infrastructure. The most important indicator of transport quality is the commercial speed of trains which has been decreasing for two years. Irregular maintenance and insufficient investment into the railway infrastructure have caused reduced capacity in recent years, but also speed limitations, increased breakdowns, unforeseen events causing the trains to be delayed and directly affecting the transport quality. Current investments into the railway infrastructure should fix the situation.

The upward trend in railway infrastructure use continued in 2018. The number of realized tkm was 21.3 million in 2018, which is a 1.4 increase compared to 2017. The growth was generated by an increase in freight traffic. In the period from January to December, a total of 118.3 million tons of freight was transported in Croatia, and railway traffic recorded the largest growth here, 10.4 percent.

When new railway freight carriers entered into the liberalized market, the historical rail operator reduced its share in the total net ton kilometres by nearly 35 percent in the period from 2014 to 2018, while the new rail carriers secured their market position and increased shares in the total net ton kilometres and other performance indicators. Rail passenger transport recorded a 2.1 percent increase in the number of transported passengers in 2018, compared to the year before. More than 20 million passengers were transported.

In terms of important regulatory activities, the claim from HŽ putnički prijevoz in relation to the Access to Railway Infrastructure Contract was settled, and HAKOM defined, ex officio, a reasonable time limit within which the operator of the service facility must respond to a request by a rail operator to access the service facility and provide services in the service facility.

RF SPECTRUM MANAGEMENT

5G and everything related to a successful introduction of the new technology in the RoC was in the focus of radiofrequency spectrum management. As a precondition, many frequency areas need to be prepared, and in some of them their current use must be terminated, and this meant re-planning national frequency plans. The National Action Plan for frequency band was drafted and it is currently used by television (470-780 MHz). It was submitted to the Government of the RoC for public discussion. The RoC is going to use a more efficient DVB-T2 system with the h.265 HEVC coding standard for terrestrial television, and in this way ensure digital dividend for mobile communications development. At the same time, further development of television channels will be enabled, along with emission of all content in HD quality.

Mobile communications networks have been developing and the frequency capacities they need are constantly increasing, as is the number of base stations. At the end of the year a public auction was conducted for the radiofrequency band 1920-1980/2110-2170 MHz which reached a final price of HRK 106.4 million. Two operators started testing the 5G technology and put it into trial operation, and the goal is to initiate commercial operation in 2020.

The controlling and monitoring of the spectrum included, apart from protection from interferences, protection from high levels of electromagnetic fields. EM field level measurement in the base stations recorded no exceeding values in relation to the ones stipulated in the ordinance issued by

the Ministry of Health, and complete reports on individual measurements were made public. The conclusion is that the designers and operators comply with norms. Interferences from Italy are still present, and FM frequencies are in more danger than DVB-T frequencies, which was found in the yearly measuring campaign and resulted in over 650 reports of interferences to the Italian administration.

CONSUMER PROTECTION

Protection of users and passengers is one of the pillars of HAKOM's work, and the most challenging market for consumers is the electronic communications market. On all the three markets within its competence, HAKOM is the third instance in case of user complaints and dispute initiation, and dispute analyses and immediate consultation of the market are used for improving consumer policy.

In the electronic communications, 1,497 requests for the resolution of disputes were resolved, of which 1,115 were concluded by means of a decision. The reasons why users had initiated disputes were mostly early termination of contracts, billing and consumption and realized traffic. Disputes initiated before HAKOM were used as the basis for the analysis of the level of user protection and for proposing amendments to the sector regulations with the aim of a clearer and more transparent market. Users can still transfer their number to another operator with no difficulties, and there were more than 2017 transferred numbers.

The number of requests for dispute resolution on the postal services market has been growing continuously, but it is around ten times smaller than the number of disputes in electronic communications. The largest number of complaints concern damaging or loss of contents of a postal item, then unfulfilled contractual obligations, non-compliance with deadlines for delivery, and loss of the postal item.

Rail passenger transport recorded the least disputes. In 2018 seven decisions were adopted, with many requirements relating to the payment of additional HRK 500 due to travelling without a ticket.

Special attention was paid to vulnerable groups of consumers, such as the elderly and children. The "Do Not Call" Register had almost 40,000 numbers by the end of the year, and the educational programme for children and parents about conduct on the Internet was continued. In order to improve the position of persons with disabilities, efforts were directed at achieving dialogue between operators, HAKOM and civil society, as well as creating a prototype accessible website.

INSPECTION

Inspection supervisions included all three markets with special emphasis on compliance with regulatory obligations, protection of users and passengers, quality of access networks, conformity of R&TT equipment, unwanted communication, timely payment of fees to the users and roaming and network neutrality. The largest number of procedures were performed in electronic communications, 78 inspection supervisions (108 inspections and on-site evaluations), and in the area of postal services 13 inspection supervisions (36 inspections and on-site evaluations). Inspection supervisions on the rail services market dealt with protection of passengers before and during travel, and protection of persons with disabilities and persons with reduced mobility.

HAKOM

HAKOM continued to cooperate with and participate in the work of numerous international expert bodies or working groups, and the cooperation with the EU and BEREC, ITU, CEPT and international regulatory organizations for all three markets needs to be especially mentioned. As part of its work at the Broadband Competence Offices Network at EU level, HAKOM regularly informed the public and potential project holders of the "WIFI4EU" initiative. In 2018, the EC realized the first round of funding for this initiative, and the maximum number of Croatian municipalities/cities received grants.

A significant part of HAKOM's business is based on the e-Agency programme; the goal is to provide citizens, business entities, state administration and public services with the highest possible quality of electronic service, and with the least possible amount of paperwork. The organization encourages employees to engage in lifelong education and adapt to the dynamics of technological changes on the regulated markets. At the end of 2018, there were 177 employees, 29 percent being electrical engineers, 26 percent economists, 16 percent traffic engineers, 15 percent lawyers and 14 percent others.



02

ELECTRONIC COMMUNICATIONS

MARKET OVERVIEW	11
BROADBAND INTERNET ACCESS	12
TELEPHONE SERVICES IN THE MOBILE NETWORK	14
TELEVISION AND PAID TELEVISION SERVICES	15
TELEPHONE SERVICES IN THE FIXED NETWORK	16
UNIVERSAL SERVICES	17
INTERNET NEUTRALITY, OPENNESS AND QUALITY	17
M2M and IoT	18
NETWORK AND SERVICES SAFETY	19
ACCESS TO AND USE OF THE ELECTRONIC COMMUNICATIONS INFRASTRUCTURE	19
CONSTRUCTION OF THE ELECTRONIC COMMUNICATIONS INFRASTRUCTURE	20
DEVELOPMENT PROGRAMMES	22
REGULATORY MEASURES OVERVIEW	25
DESI	28

In today’s digital society, only companies that are prepared for all challenges of digital communication have a chance of success. The electronic communications market, that is, increasing availability and speed of broadband Internet access service, is considered to be one of the drivers of digital society development. It is important to not only provide broadband Internet access service, but to bring advancements in the overall broadband ecosystem: digitalization of business operations in Croatia, development of e-trade and general e-services, and development of adequate skills for information and communication technologies (ICT) for all citizens of Croatia.

HAKOM operations in 2018 were aimed at enhancing the regulatory framework for stimulating investments into new generation access networks and at introducing new services, all the while protecting users and sustainable market competition.

The electronic communications market in the RoC was in 2018 marked by further growth in data traffic, nearly 50 percent in one year, and the increase in revenue and investments, especially into broadband infrastructure. After 2017, which was marked by a higher number of market acquisitions, 2018 was less intensive in this sense. At the end of the year it was announced that Hrvatski Telekom d.d. (HT) would take over the company HP Produkcija d.o.o. The transaction was finalized at the end of February 2019, after HAKOM adopted a decision on conditionally approved concentration.



Figure 1.1. Republic of Croatia, basic data on the RoC and the electronic communications market

Basic indicators

Official language	Croatian
Surface	56,542 km2
Population	4,284,889
Population (density)	75.8/km2
Number of households	1,520,026
GDP	HRK 343 bill
GDP per capita	HRK 82,289
Currency	Kuna (HRK)
DESI position	20
DESI “Connectivity” position	27
Number of mobile connections	4,388,476
Density per capita	102.4 %
Number of fixed Internet connections	1,120,360
Density per capita	74.28 %
Accessibility to households	>99.5 %
Accessibility of NGA connections	83 %
Accessibility of ultrafast connections	39 %
Number of mobile Internet connections	3,514,032
Data traffic	1,263 PB
Number of M2M tariffs	211,667
4G coverage of population	>94 %
Converged services (4D bundled services)	211,762
Households with 4D services	13.9 %
Households with pay-TV	TV 56 %
Total market revenue	HRK 11.52 bill
Total market expenditure	HRK 2.587 bill

MARKET OVERVIEW

REVENUES

Electronic communications market revenues exceeded HRK 11.5 billion, an increase of HRK 73 million compared to the previous year, and mobile and fixed communications networks are equally important in market development.

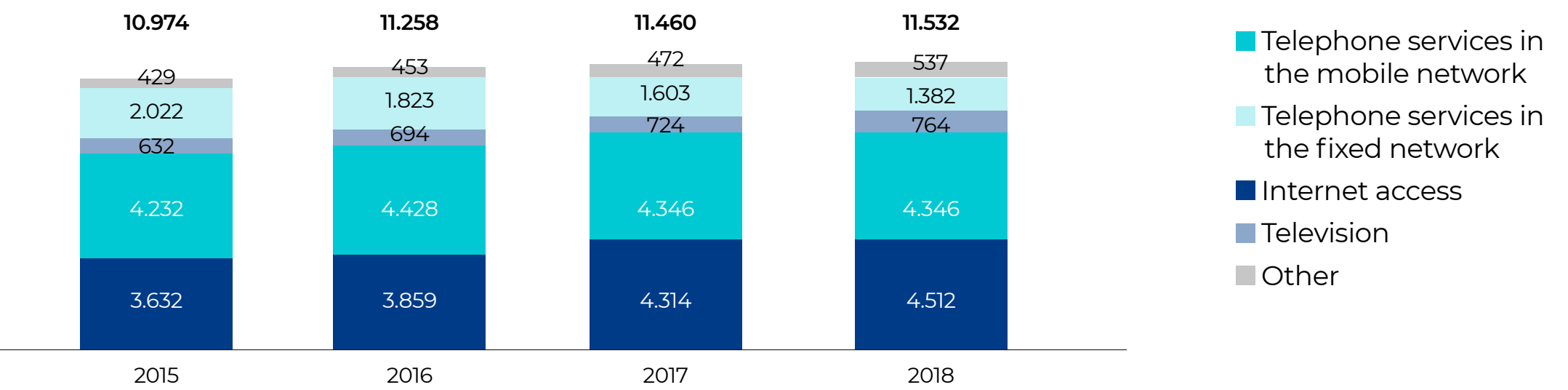


Figure 1.2. Total revenue in the electronic communications market (in HRK million)

Compared to 2017, in 2018 broadband Internet revenue grew by almost five percent, while pay-TV service recorded an increase in revenue by almost seven percent.

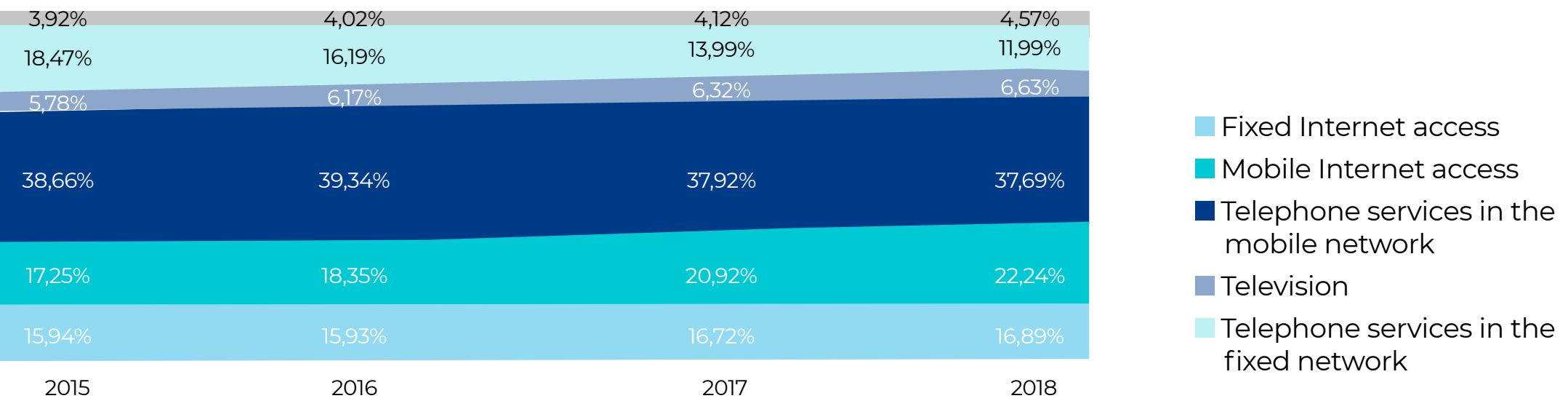


Figure 1.3. Shares of services in total revenue in the electronic communications market

Given that the basis for the development of the electronic communications market is broadband Internet access service, the largest share of the revenue – almost 40 percent of total revenue – is from this service. In 2018, for the first time, broadband Internet access accounted for a larger share of total revenue than telephone services in the fixed network which used to generate the largest revenue.

INVESTMENTS

Operators continued to invest in infrastructure development, advanced technology and innovative services in mobile and fixed communications network throughout 2018. More than HRK 2.5 billion was invested in the market, which represents a slight, three percent decrease compared to 2017. The growth in investment in mobile networks has not offset the decline in investment in fixed networks. Nevertheless, total investments have amounted to at least HRK 2.5 billion for the past four years.

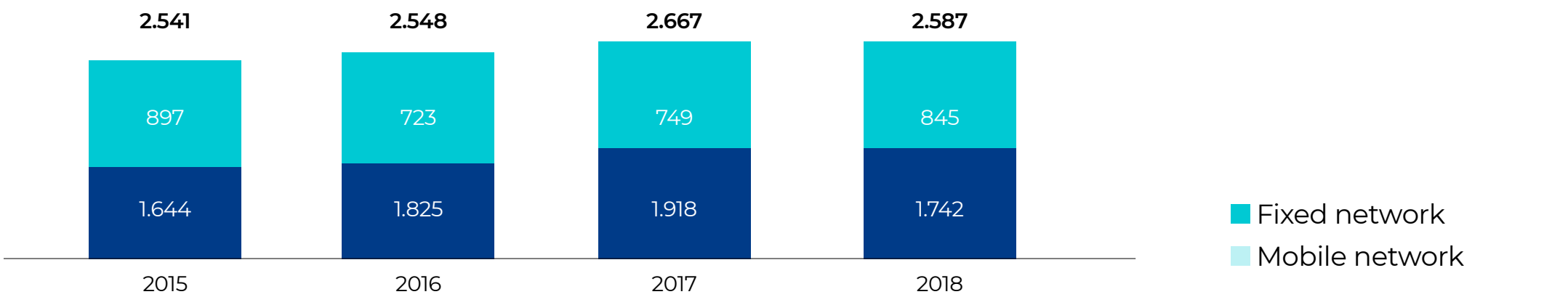


Figure 1.4. Total investments of electronic communications operators in the Republic of Croatia (in HRK million)

Investments in the network and network equipment amounted to almost HRK1.4 billion, an increase over the previous year. Direct investment in the network is seen in, for example, a sharp increase in the availability of NGA broadband Internet access which has reached the EU average in the Republic of Croatia, or an increase in the share of households using broadband Internet access.

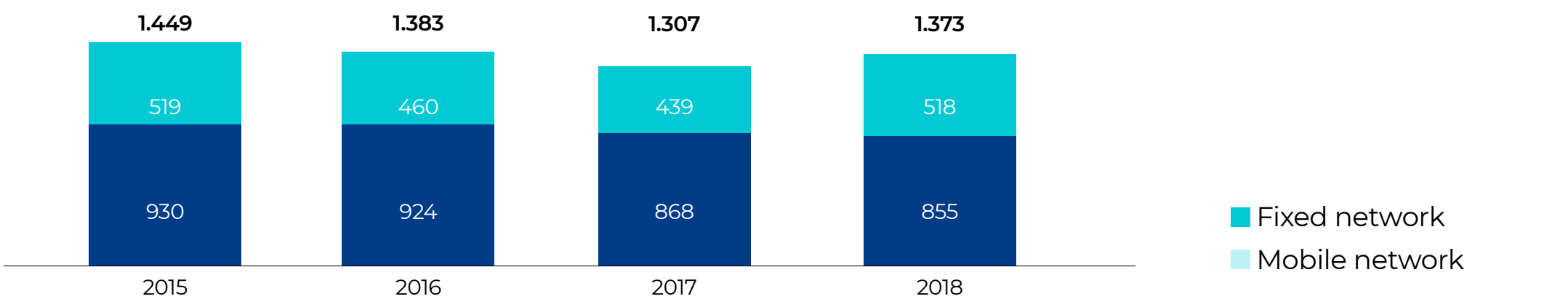


Figure 1.5. Investments in the network and network equipment (in HRK million)

Investments in the RF spectrum represent investments in the radio frequency capacities for the provision of mobile services. This creates the basis for future investments in a network that will use these new radio frequencies. Operators have been increasing the capacities year after year, they receive new licences for the previously unused RF spectrum and thus constantly invest in mobile networks. Finding the right balance between the price of the new spectrum and subsequent investments in the network is one of the key challenges.

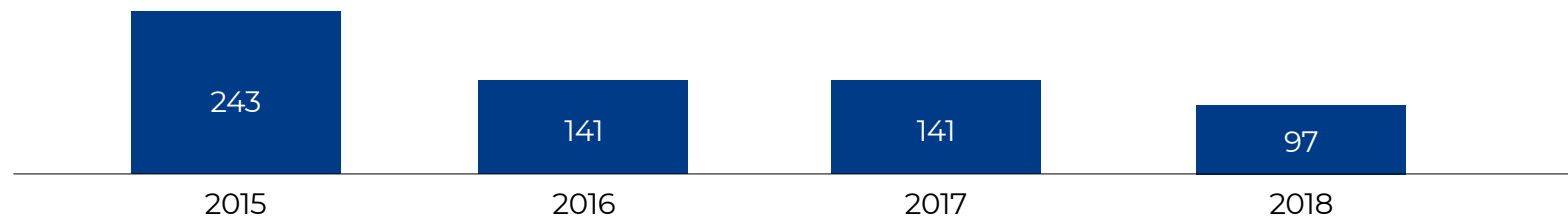


Figure 1.6. Operator investments in the RF spectrum (in HRK million)

USERS

In 2018 there was a decline in the number of users of telephone services in the fixed network, and an increase in the number of users of telephone services in the mobile network, the number of pay-TV connections, and the number of users of broadband Internet access over the fixed and mobile networks. The growth in the number of broadband Internet users is in line with European trends. The high growth in the number of pay-TV connections can be linked to the fact that more (exclusive) content can be viewed only through TV channels on such platforms.

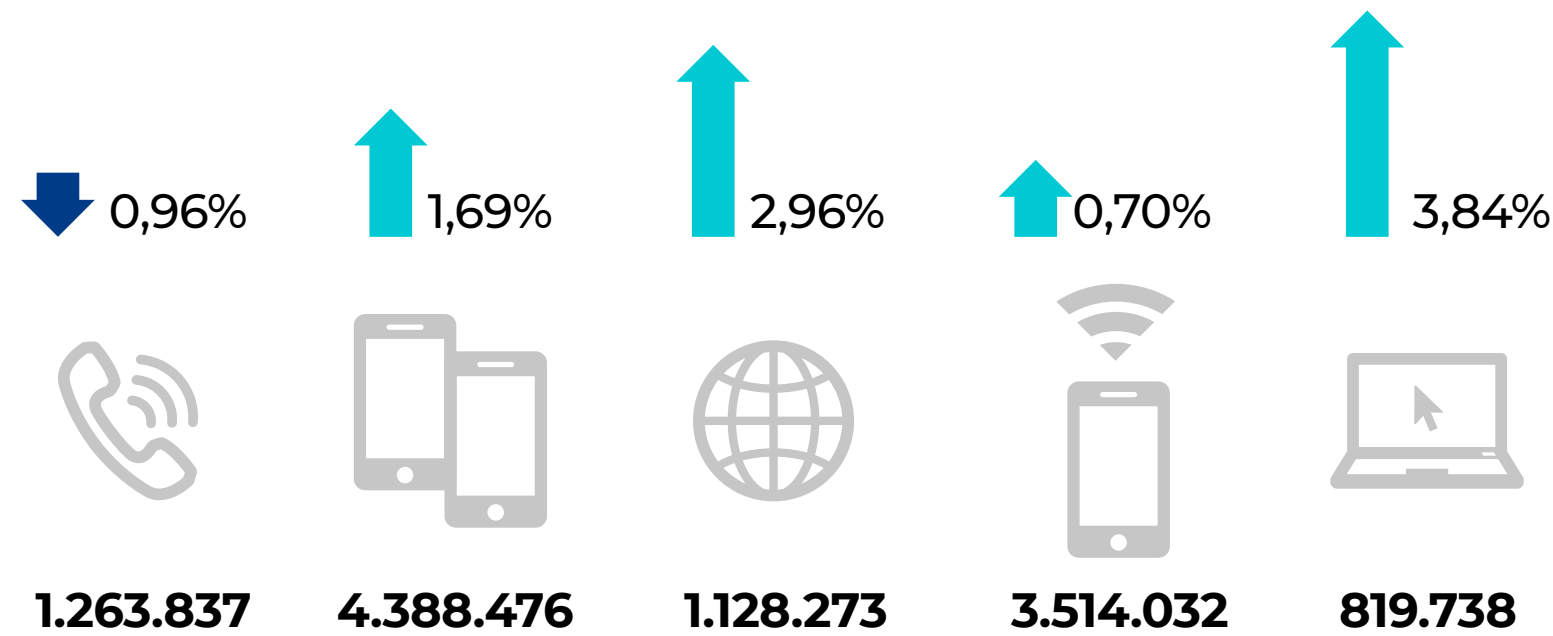


Figure 1.7. Electronic communications market, number of subscribers: fixed phones, mobile phones, fixed Internet, mobile Internet, pay-TV

BROADBAND INTERNET ACCESS

The basis of advancement in the digital society is broadband Internet access available through fixed and mobile communications networks. Total revenue from this service has been steadily increasing since 2015 and at the end of 2018 it became the largest in the entire market for the first time. Broadband Internet access service over the fixed network generated revenue of almost HRK 2 billion, and for the first time it exceeded revenue of HRK 2.5 billion in the mobile networks.

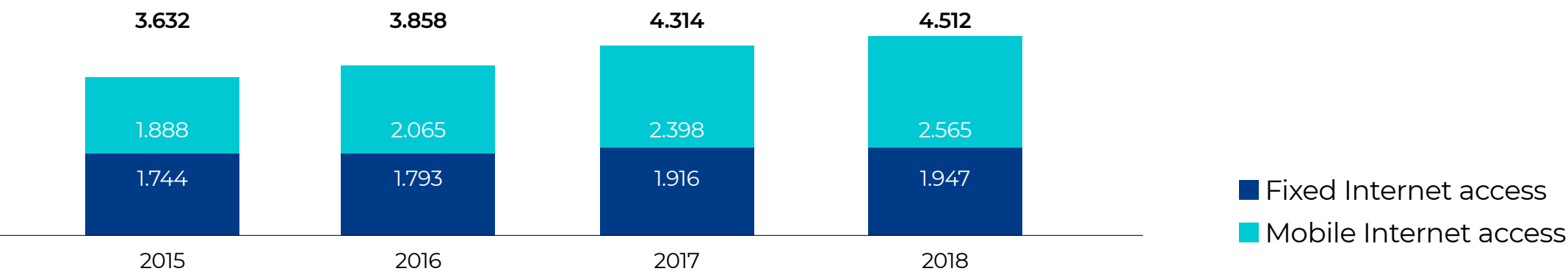


Figure 1.8. Total broadband Internet access service revenue (in HRK million)

Users in the Republic of Croatia are happy to use bundled services, so the use of bundled services has been growing continuously for years. At the end of 2018, there were a million users using some of the bundled services combinations for the first time. The largest number, about half a million users, use 2D bundled services, of which almost 85 percent include broadband Internet access. The pronounced increase in the number of users of 4D bundled services shows that users increasingly want to use both fixed and mobile services from the same operator with one monthly bill.

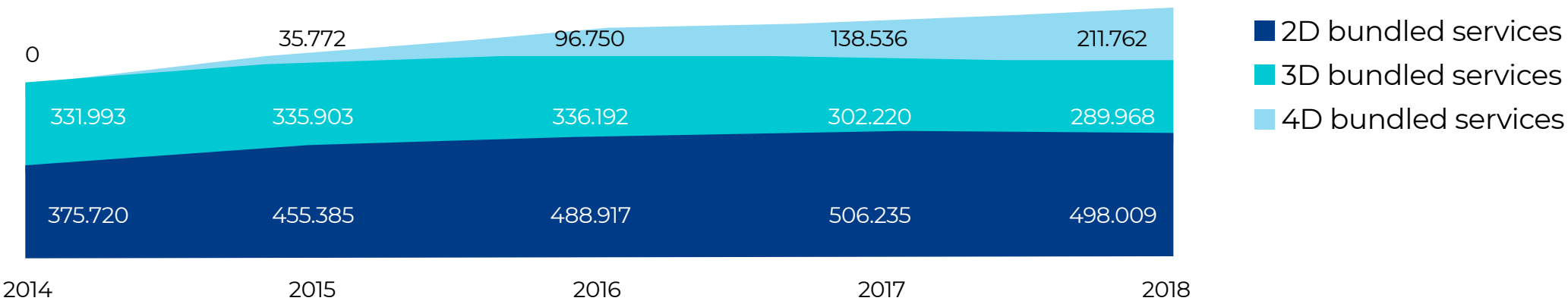


Figure 1.9. Number of users with different bundled services

The availability of broadband Internet access over the fixed network in the Republic of Croatia is more than 99.5 percent, while at the same time the average of other EU countries for availability is about 97 percent.

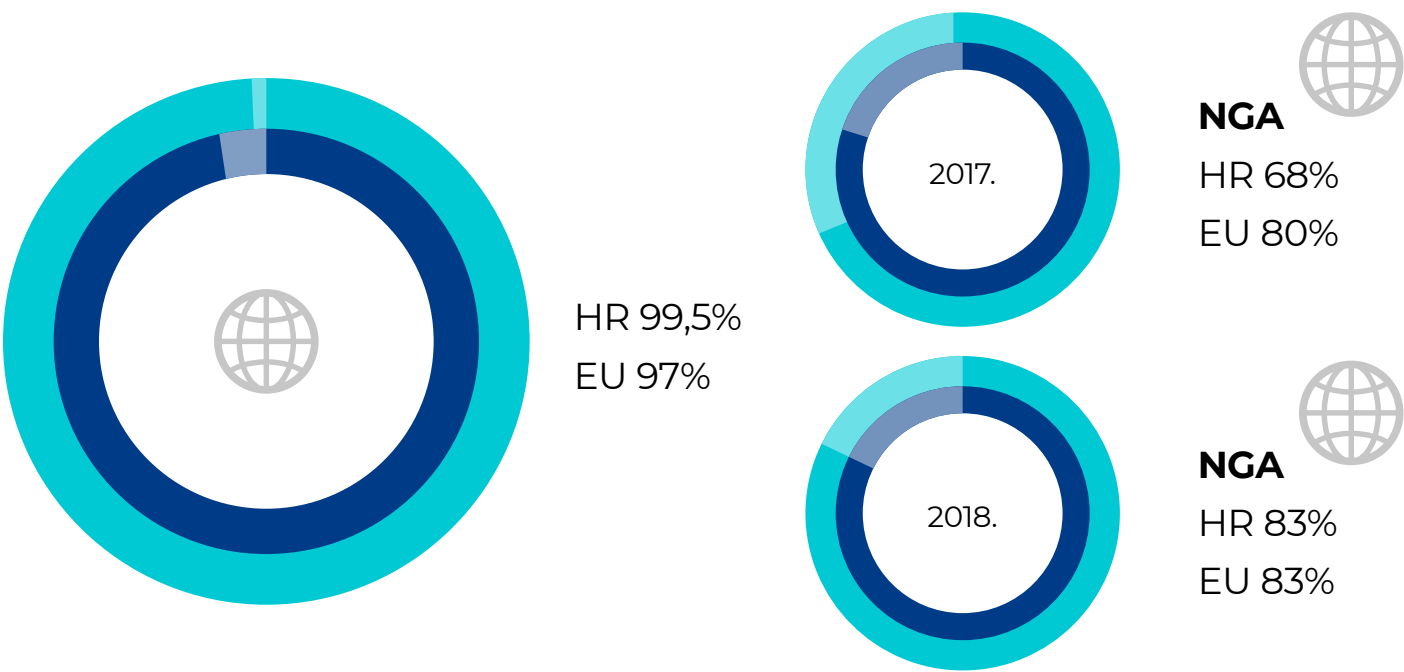


Figure 1.10. Fixed broadband Internet access availability. All landline and NGA networks.

The Republic of Croatia has made a significant step forward in the availability of NGA broadband Internet access in the last year, where the average has risen from 68 to 83 percent, bringing the Republic of Croatia to the EU average. NGA broadband Internet access implies a speed of at least 30 Mbit/s, but a shift has also been made in the availability of ultra-fast broadband Internet access at speeds above 100 Mbit/s. In this category, the Republic of Croatia remained below the EU average. Due to a significant increase in construction announcements by different stakeholders on the market during 2018, Croatia can be expected to approach the EU average in this category as well in the years to come, especially if EU funds are utilized.

In addition to increasing the availability of broadband Internet access and NGA availability, the share of households using fixed broadband Internet access is increasing. At the end of 2018, almost 75 percent of households were using broadband Internet access, while that share was around 65 percent three years ago.

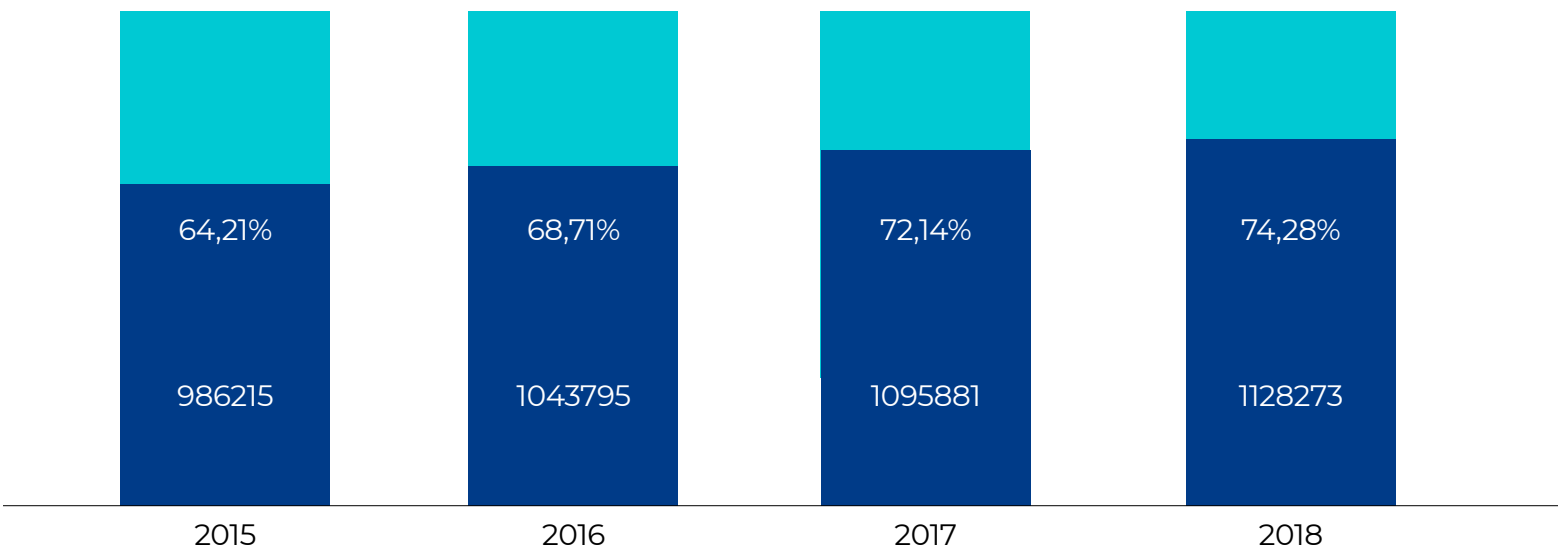


Figure 1.11. Share and number of households using broadband Internet access over fixed communications networks

When making regulatory decisions about broadband Internet access, particular attention is paid to maximizing the presence of NGA speeds, which include all speeds of at least 30 Mbit/s. At the end of 2018, about 825,000 users used broadband Internet access at speeds exceeding 10 Mbit/s, representing an increase of more than 100,000 users in that category in a year. The highest growth was recorded in the number of users of NGA speeds, that is, more than 300,000 users have speeds above 30 Mbit/s.

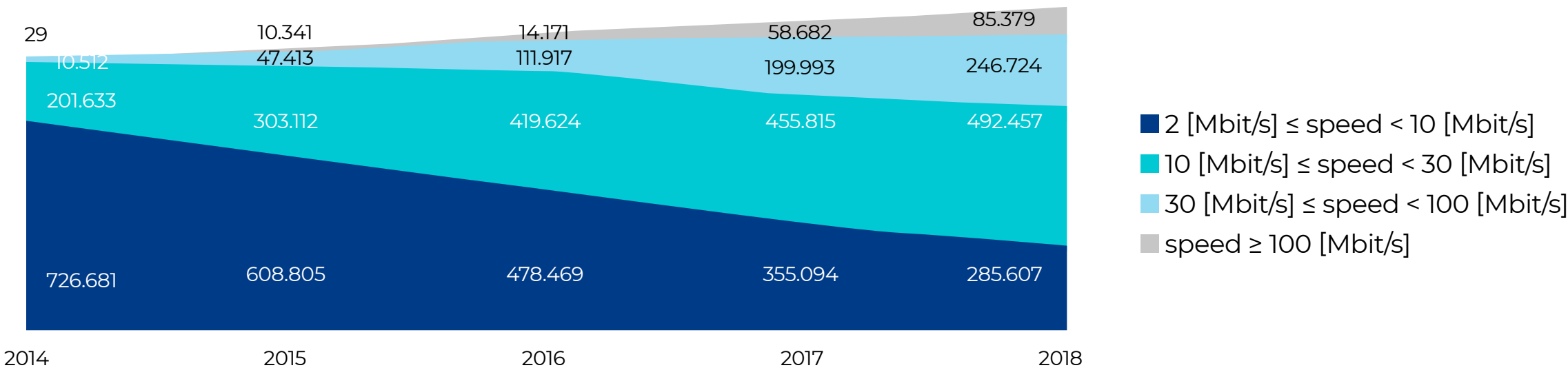


Figure 1.12. Number of broadband connections by speed

In the DESI “Connectivity” category, fast (≥ 30 Mbit/s) and ultrafast (≥ 100 Mbit/s) broadband Internet access play an important role. The significant increase in the use of high-speed broadband Internet access has contributed to the Republic of Croatia achieving a significantly better result in this category compared to the previous year. HAKOM’s regulatory decisions have also contributed to the increase in the use of high-speed broadband Internet access.

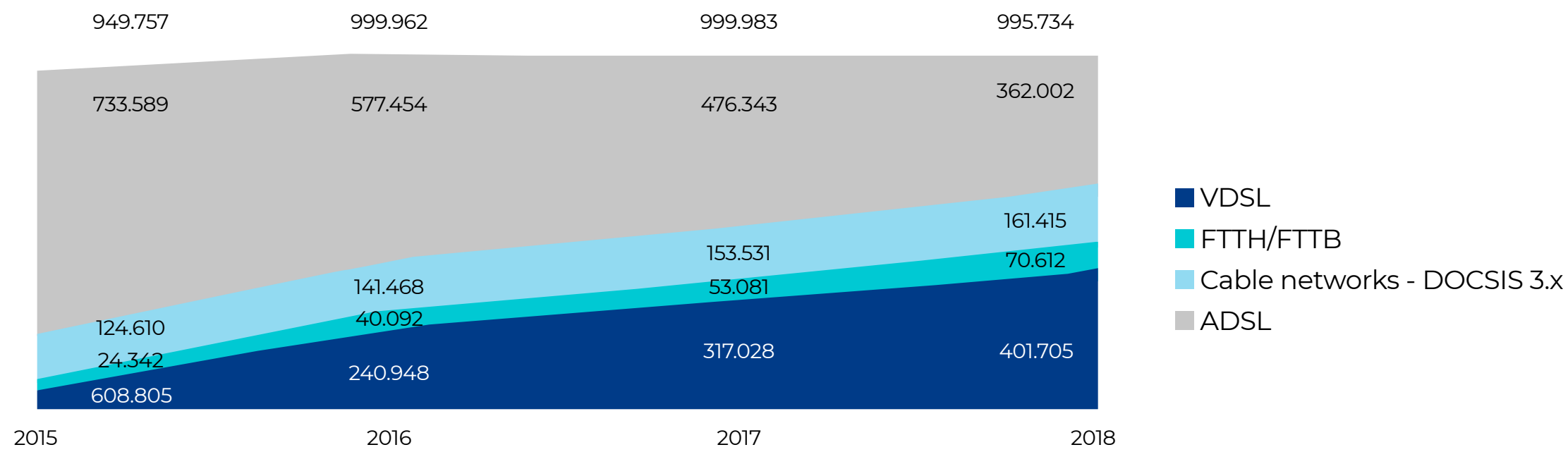


Figure 1.13. Number of fixed broadband connections by technology

HAKOM as the regulatory body takes care of what technologies can support higher access speeds. The growth of VDSL technology, which is also the most represented technology for NGA speeds, is significant. Growth is also evident in the fibre optic FTTH access infrastructure and cable infrastructure on the DOCSIS 3.X standard. ADSL technology does not allow NGA speeds, so a fall in the number of ports through this technology and a replacement with VDSL, cable or fibre optics is understandable. This decline should be even more pronounced in the coming years.

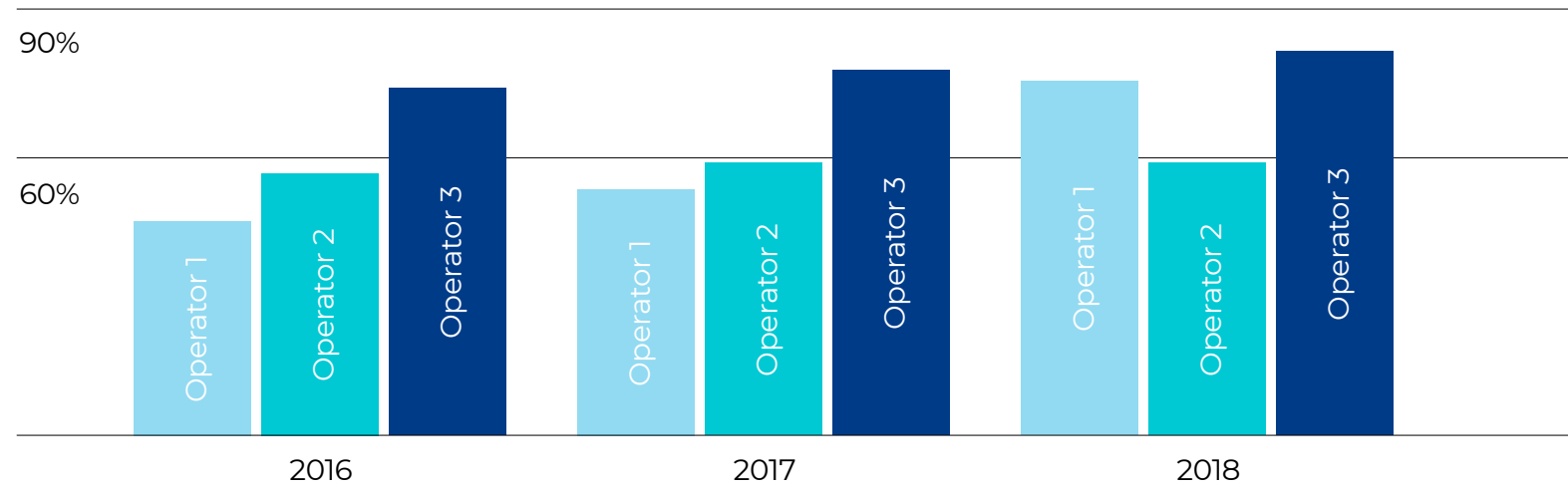


Figure 1.14. Geographical coverage with 4G signal

An increased use of broadband Internet access has also been achieved through mobile communications networks, and wireless access also plays an important role in the use of high-speed broadband Internet access. Additional investments in the RF spectrum have contributed to the increased geographical coverage of 4G by all three mobile operators.

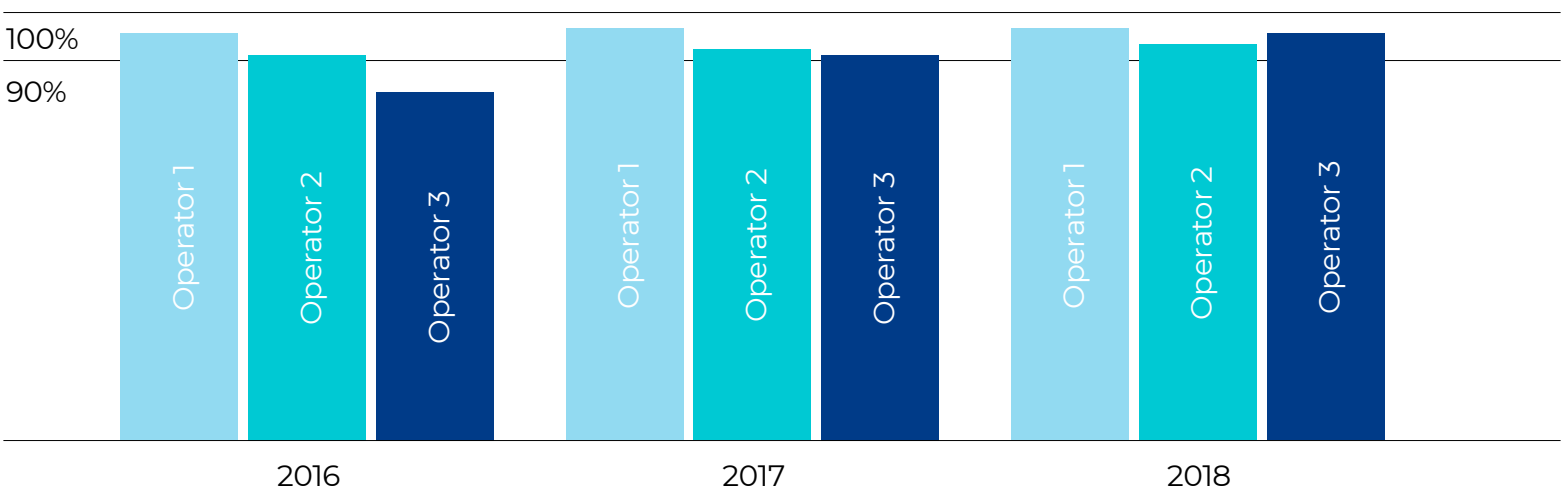


Figure 1.15. Population coverage by 4G signal

More important than geographical coverage is population coverage. As is expected, population coverage is greater than geographical coverage in all operators. In order to develop competition as well as new services, it is important for 4G population coverage to grow and be comparable across operators. 4G signal coverage provides users with high-quality broadband Internet access comparable to the service over fixed communications networks.

DATA TRAFFIC

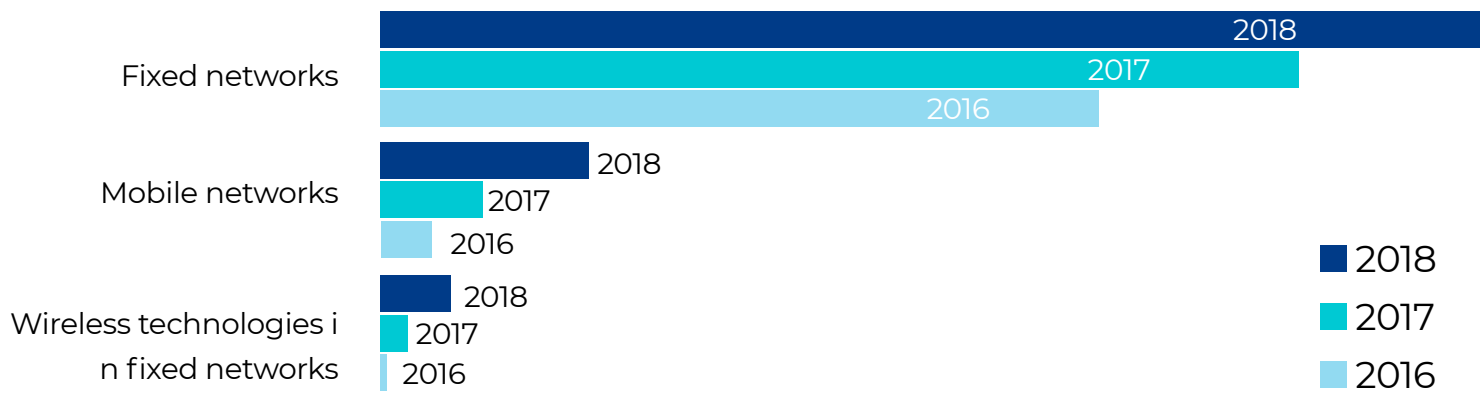


Figure 1.16. Data traffic growth

The evolution of the digital society can be monitored using the increase in data traffic. Looking at the period of the last three years, we can see a significant growth of data traffic in the fixed and especially in the mobile networks. Moreover, in 2016 data traffic over wireless technologies in the fixed network has emerged. Fixed network data traffic in 2018 increased by 150,000 TB and was around one million TB. Data traffic in mobile network tariffs doubled compared to last year and it has been growing at these rates since 2016 and the advent of unlimited tariffs.

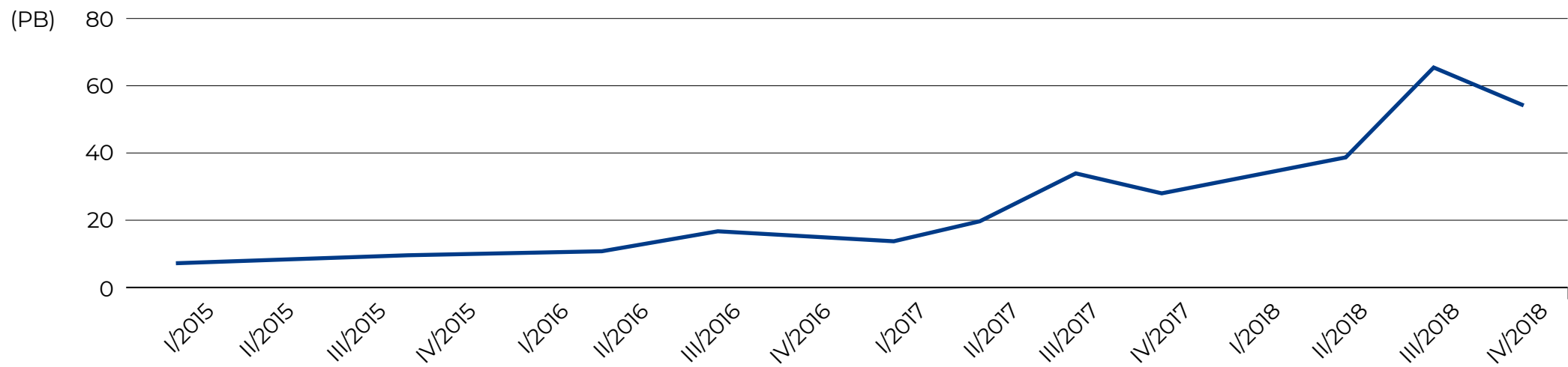


Figure 1.17. Data traffic in mobile networks by quarter (in PB)

Data traffic in Croatian mobile networks must be viewed in the context of the seasonal tourist impact as the Republic of Croatia is a highly tourism-oriented country. There was a strong increase in traffic during the third quarter of the year, and especially since the third quarter of 2017 because on 15 June 2017 the Roam Like At Home (RLAH) rule came into force, and tourists from EU countries are the most frequent guests in our country.

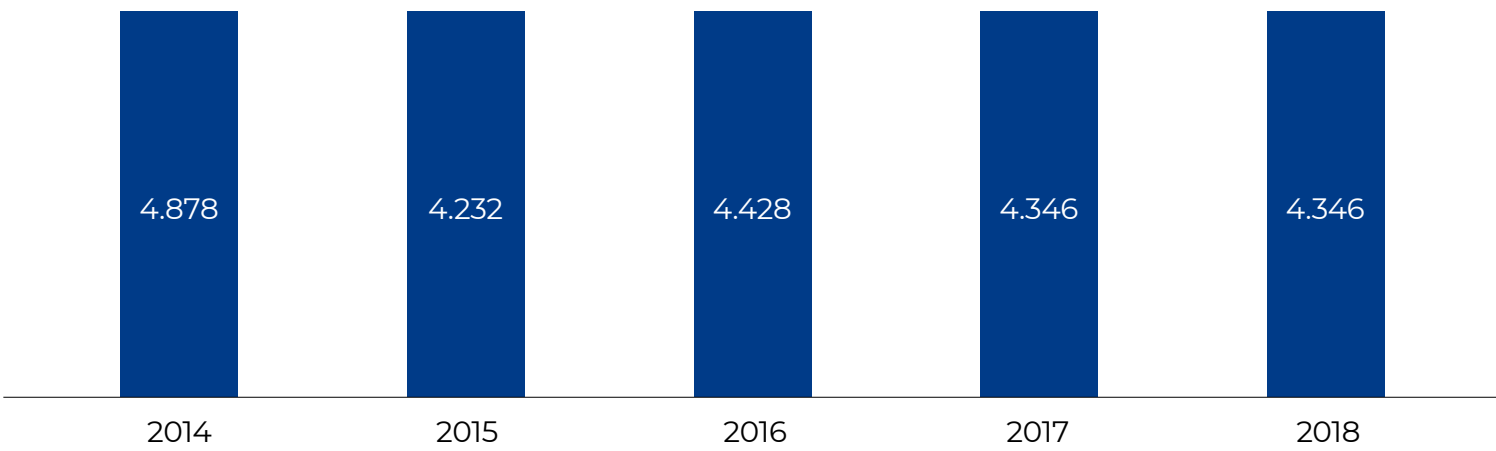


Figure 1.18. Revenue from telephone services in the fixed network (in HRK million)

TELEPHONE SERVICES IN THE MOBILE NETWORK

In the market of telephone services in the mobile network, revenue has been stabilized at HRK 4.35 billion in the last two years. With the development of broadband Internet access, an increasing number of users are making calls through OTT services such as Viber, WhatsApp, Skype, iMessa-

ge, especially when it comes to calls abroad. Roaming revenue, driven by stronger demand due to lower regulated prices introduced in 2017, has become stable. In the coming years, revenue from the telephone service is expected to decline slightly in mobile networks.

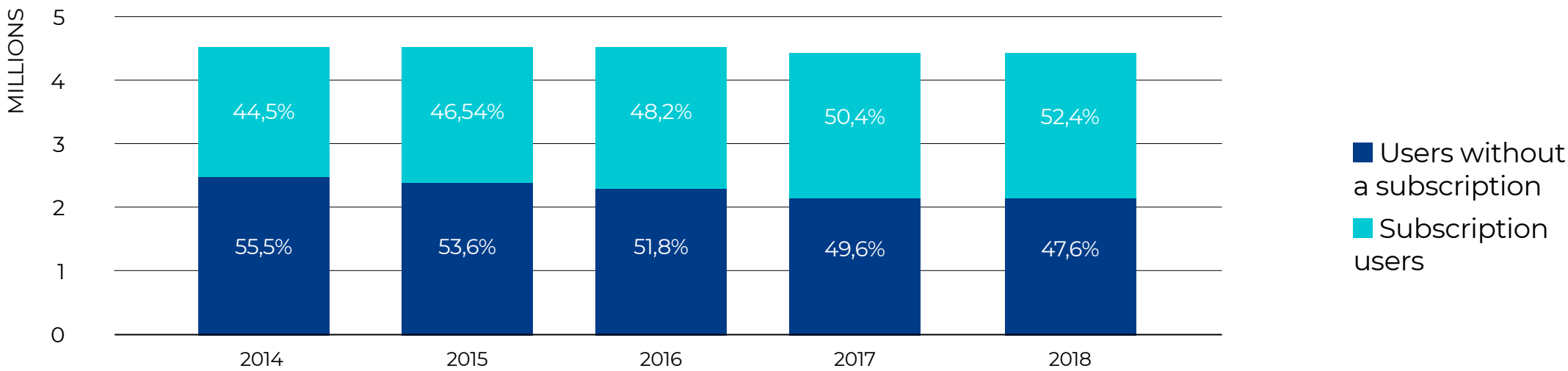


Figure 1.19. Distribution of the number of prepaid and postpaid telephone service users in the public mobile communications network in the RoC - all users

Users can use the services so that they have a subscription with the operator (postpaid) or no subscription with the operator (prepaid). Over the last five years, there has been a trend of an increase in the number of subscribers, and at the end of 2018 there were about 52 percent of such users. The data includes all users, that is, it also includes business users who do not use tariffs and packages without a subscription.

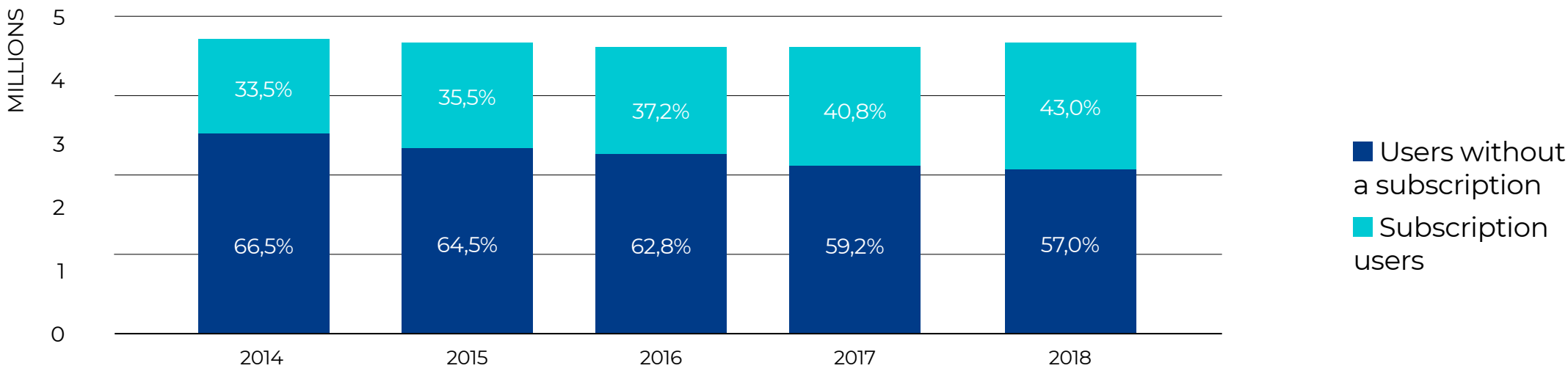


Figure 1.20. Distribution of prepaid and postpaid telephone service users in the public mobile communications network in the RoC - private users (consumers)

When looking exclusively at private users, that is, users who use both subscription and non-subscription tariffs in practice, there is a trend of an increased number of subscribers, although there are currently more consumers using prepaid tariffs. The increase in the number of subscribers also shows that operators have been increasingly “organizing” tariff packages so that users enter into a subscription contract with an operator with a contractual obligation for a period of usually two years.

HAKOM continued to monitor the implementation of the obligations arising from the Roaming Regulation. Since 15 June 2017, the RLAH Regulation has been in force, determining roaming prices on the basis of national prices. For calls beginning and ending in the EU/EEA, operators apply prices from the national tariff, the one agreed to by the user with their operator for domestic traffic.

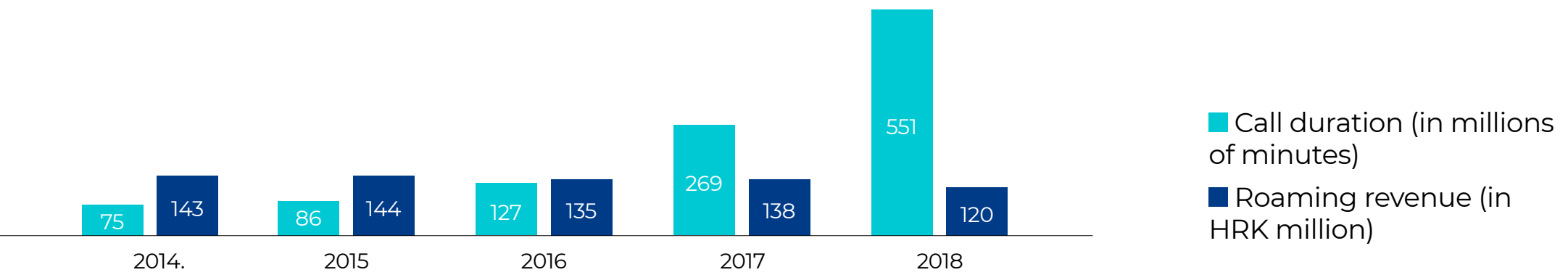


Figure 1.21. Revenue and duration of roaming calls made by domestic users in international networks

Considering the constant increase in the number of foreign tourists in the RoC, an even greater increase in roaming traffic was recorded in 2018 compared to the previous year. It was realized both by Croats abroad and by foreign visitors to the RoC. Roaming revenues from Croatian users abroad and foreigners in the Republic of Croatia were at the same level as in the year before, around HRK 120 million.

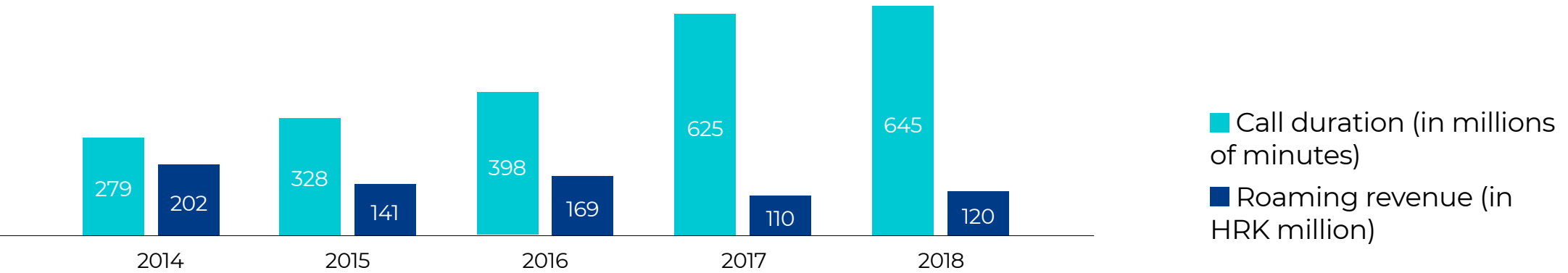


Figure 1.22. Revenue and duration of roaming calls made by foreigners in national networks

TELEVISION AND PAID TELEVISION SERVICES

Users can gain access to the television distribution service through the so-called Free-to-air TV and through various forms of pay-TV. Most households watch and follow television programmes via digital terrestrial television signal, that is, they watch television programs via the DVB-T transmitter system. However, as exclusive content that can be viewed exclusively through some forms of pay-TV is expanding, the share of pay-TV in the total number of households has increased from 49 to 56 percent. Further growth can be expected in the share of pay-TV, primarily with exclusive sports and/or film content.

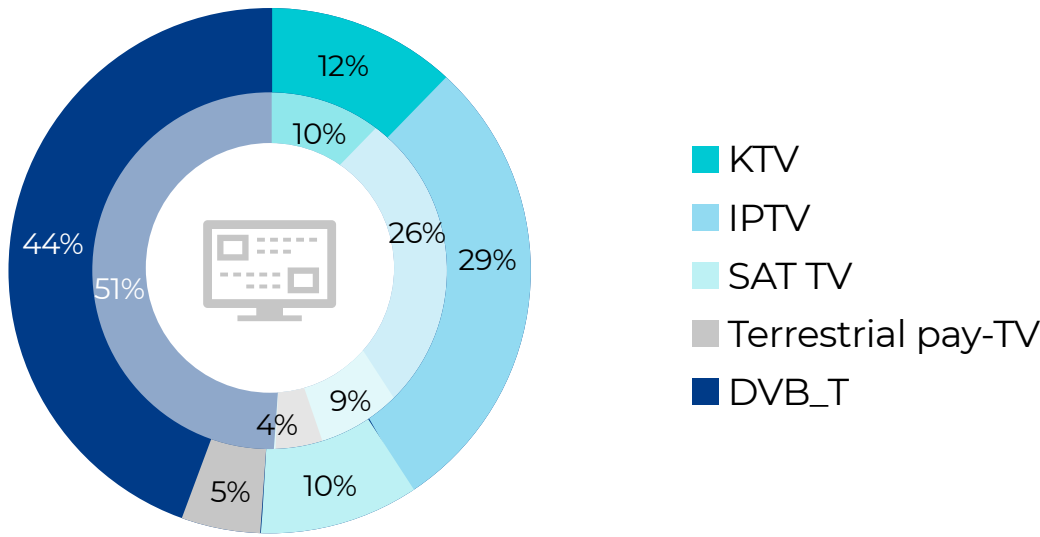


Figure 1.23. Shares of TV distribution services in the RoC in 2015 and 2018

Although broadband Internet access is a key electronic communications service, with an increase in the number of users using the pay-TV bundled service, the quality of the content offered by an operator as part of the pay-TV service will be an important parameter for selecting an operator.

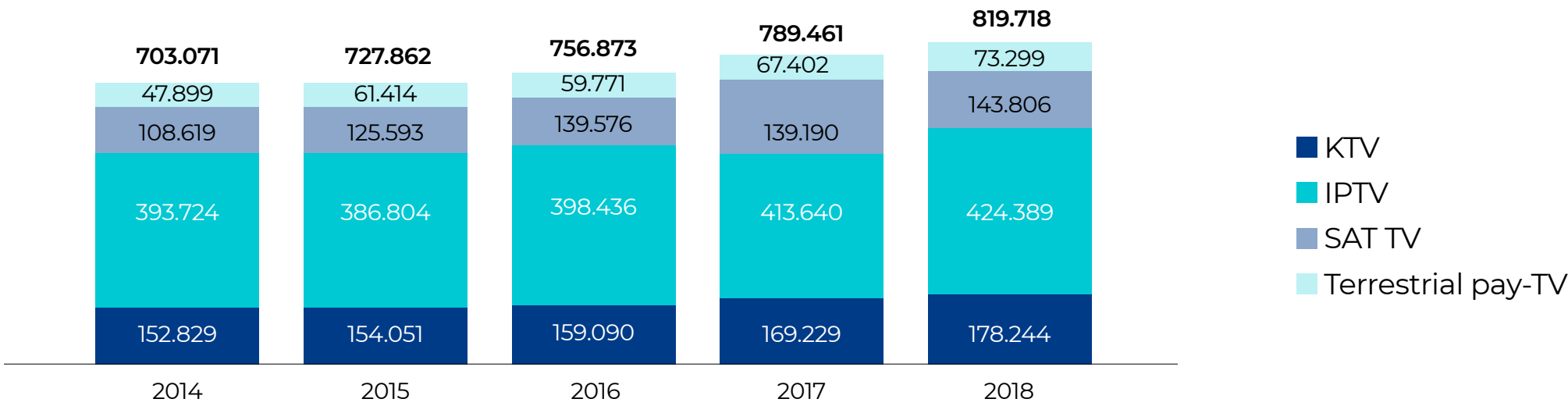


Figure 1.24. Number of pay-TV users in the RoC by technology

Given the growth of pay-TV services by technology, the dominant number of connections is based on the Internet Protocol (IPTV). Considering the investments made so far, IPTV technology will remain dominant for pay-TV provision in the future. Some changes in the share of terrestrial pay-TV connections can be expected as HT has been allowed to acquire ownership of EVO TV.

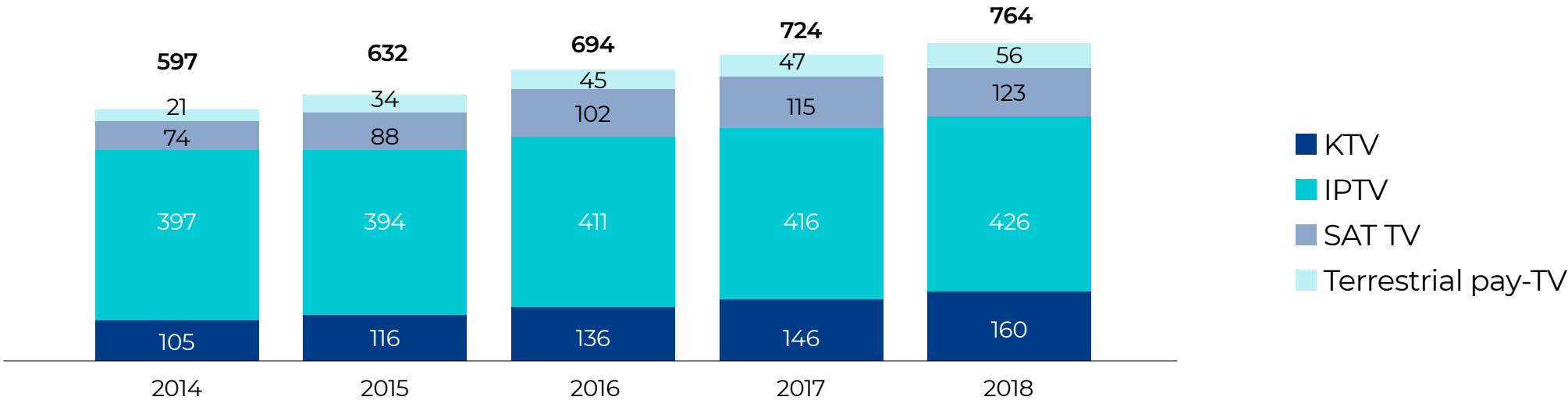


Figure 1.25. Total revenue from pay-TV by technology (in HRK million)

More and more (exclusive) content can be viewed exclusively through the various pay-TV service platforms, so the continuous growth of revenue from this service is understandable. Pay-TV revenue increased by almost HRK 170 million in five years, and by about HRK 40 million in the last year alone.

The largest share of total revenues is generated by IPTV service, which has been stable over the last three years and ranges from 55 to 60 percent. No major changes in the ratios or proportions of total revenues should be expected in the coming years.

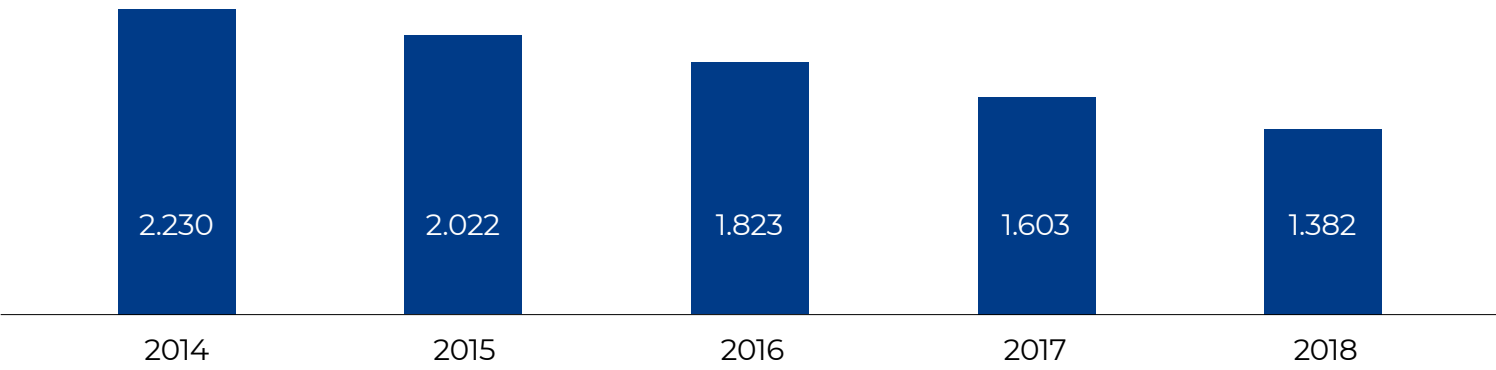


Figure 1.26. Total revenue from telephone services in the fixed network (in HRK million)

TELEPHONE SERVICES IN THE FIXED NETWORK

At the end of 2013, for the first time, broadband Internet access had a greater share of total revenues than telephone services in the fixed network, and at the end of 2018 the share of telephone services in the fixed network can be regarded as almost negligible in relation to the revenues from telephone services in the mobile network or broadband Internet access service.

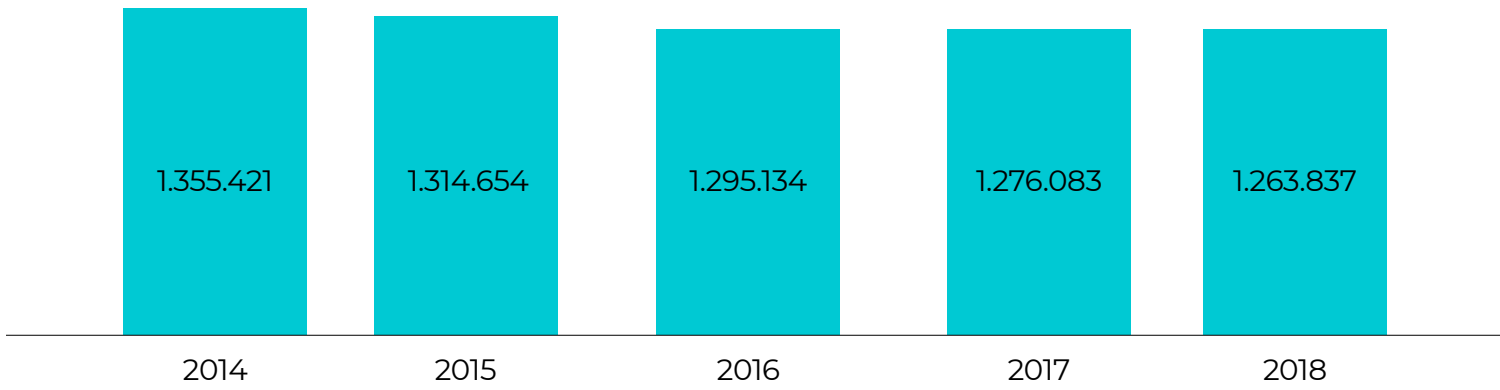


Figure 1.27. Number of users of telephone services in the fixed public communications network

Over the last five years, total revenue from this service has been continuously declining and at the end of 2018 it amounted to just under HRK 1.4 billion, while in 2017 it amounted to around HRK 1.6 billion, and in 2014 even above HRK 2.2 billion. Given the decreasing importance of this service and the significant development of other advanced services, an even more pronounced decline in revenue is expected in the coming years.

Unlike revenue from telephone services in the fixed network, which recorded a significant decline, the number of users of telephone services in the fixed network has decreased to a lesser extent. This shows that, despite the existence of fixed-mobile interchangeability, the fixed network still has users who opt for this type of service.

Operators cannot expect revenue growth from this service in the future, and the number of users will also be influenced by the operators' decision whether to offer bundled services without this service or this service will remain part of the service bundle, but without a significant price difference if part of the bundle.

UNIVERSAL SERVICES

Ensuring access to universal services for all users of electronic communications services is one of the main principles and objectives of the regulatory body, as they represent the smallest range of services of a specified minimum quality that must be available to all citizens at an affordable price throughout the territory of the Republic of Croatia, regardless of their geographical location, with as little distortion of competition as possible.

The Council of HAKOM adopted back in 2015 decisions on the designation of universal service operators in the territory of the Republic of Croatia for a period of four years. Imenik d.o.o was designated as the universal service provider of access to a comprehensive directory of all subscribers of publicly available telephone services to end-users, and HT was designated as the universal service provider of access services to end-users, including users of public payphones, notification (information) services about subscriber numbers and special pricing systems adapted to the needs of socially vulnerable groups of end-users of services.

The fulfilment of universal service obligations and the quality of provided universal services are regularly published on HAKOM's official website at <https://www.hakom.hr/default.aspx?id=323>.

INTERNET NEUTRALITY, OPENNESS AND QUALITY

Regulatory goals such as maintaining the openness of the Internet, promoting the freedom of end-users to access the Internet, distribute their own content and run applications of their choice, along with promoting innovation represent key challenges for the development of the Internet. These goals are most readily achievable if the Internet is governed by the principle of network neutrality.

National regulatory authorities play an essential role in securing end-users' ability to effectively exercise their rights and adhere to the rules of protection of open Internet access and to promote the continuous availability of non-discriminatory Internet access services at quality levels reflecting technological advancements. To that end, national regulatory authorities may impose requirements relating to technical characteristics, minimum service quality requirements and/or other appropriate and necessary measures for one or more public electronic communications service providers, including Internet access providers.

In 2018 HAKOM continued its activities regarding the implementation of [Regulation \(EU\) 2015/2120](#) of the European Parliament and the Council establishing measures for access to the open Internet and the amending of Directive 2002/22/EC on the universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No. 531/2012 on Roaming in the Public Mobile

Communications Networks in the Union. The purpose of the Regulation is to establish common rules for the protection of equal and non-discriminatory treatment of Internet traffic and the rights of end-users. Internet access service providers should treat all traffic equally, without discrimination, restriction or interference, regardless of its sender or receiver, content, application or service, or terminal equipment. Reasonable traffic management measures applied by providers of Internet access services should be transparent, non-discriminatory and proportionate, and should not be based on commercial considerations. The requirement for traffic management measures to be non-discriminatory does not preclude providers of Internet access services from implementing, in order to optimise the overall transfer quality, traffic management measures which differentiate between objectively different categories of traffic.

Two procedures have been carried out for assessing possible violation of Article 3, paragraph 3 of the Regulation for Potential Technical Discrimination Against Data Traffic, in the part related to bandwidth for video streaming of the "zero rated" option. It was HT's "StreamOn" tariff option and AI's "GO Video streaming" tariff whereby the bandwidth for video streaming of content was reduced without user consent, which represented unequal treatment of data traffic. Following HAKOM's intervention, operators aligned their offers with the Regulation, without the need for a binding decision.

In addition to the principle of neutrality and openness, proper quality is equally important, which is nowadays reflected most in the available speeds. In order to better monitor the contractual conditions for the quality (speed) of broadband Internet access service, which is stipulated at EU level by the Regulation, HAKOM has been providing free use of the certified tool for measuring access speed in the fixed network since 2012 - HAKOMetar. The test results are acceptable evidence in the end-user complaint resolution process. When implementing the measurement methodology, it is ensured that the measurement results are credible and valid, and in the measurement process, the circumstances that are not the responsibility of the operator but result from the user environment are largely excluded. According to EU rules, any significant difference which occurs continually or on a regular basis, and which is established by the monitoring mechanism certified by the national regulatory authority, between the actual performance of the service and performance specified in the contract should be considered as non-compliance of the performance for the purposes of determining the legal remedies available to the user in accordance with national law. According to the above, and if the results show that the operator has not provided the minimum rate of broadband access to the end-user, the user may change the bundled service that is more appropriate to the delivered broadband speed or terminate the contract with no charge, according to the user's choice. According to the Ordinance on the Manner and Conditions for the Performance of Electronic Communications Networks and Services, operators must indicate in the contracts and advertisements the minimum and maximum speed, and the minimum speed must not be less than 70 percent of the maximum speed.

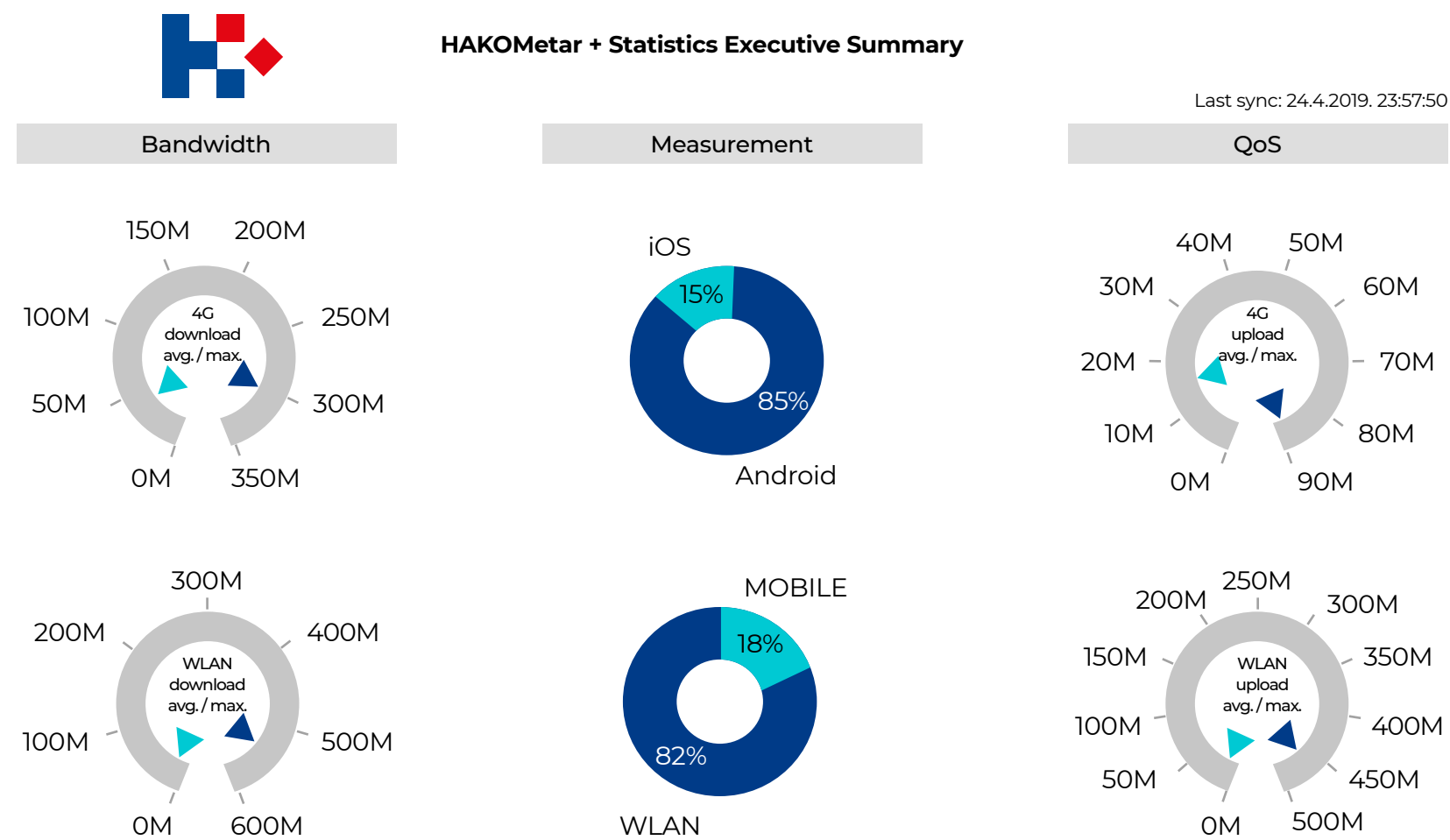


Figure 1.28. Statistical report available in HAKOMetar Plus

In 2018, more than 10,320 individual measurements were performed, or more than 7,170 measurements cycles were started, with 146 completed user measurement cycles eligible for end-user complaint to the operator (two percent of all measurements). These data show that the vast majority of operators provide Internet access speeds as stipulated in subscription contracts.

In April 2017, to measure the quality of Internet wireless networks, HAKOM launched the free [HAKO-Metar Plus](#) application, which provides information on the current quality of mobile Internet or WLAN network connection services, including speed and response. The test results (more than 384,000 measurements since putting into operation) are informative and do not constitute evidence in end-user claim processes. However, the results summarized in aggregate values for different categories and geographically represented on the maps can be used to compare Internet access market offerings, as well as to consider the availability of different Internet access offers or offer ranges provided by ISPs and their penetration among end-users. Likewise, HAKOM uses these results to verify whether the published information (coverage maps and available speeds maps in mobile networks) is consistent with the results of independent user measurements.

In 2018, HAKOM received no complaints from users regarding the difficulty of using the Internet access service in the part related to blocking or slowing down the use of certain applications and services or to the price discrimination. In general, HAKOM concludes that there is no public concern about access to open Internet in Croatia. However, HAKOM has identified some areas that need to be improved by ISPs in order to fully comply with the Regulation. HAKOM continues to monitor the market to ensure that obligations from the Regulation are met and, in case of non-compliance, to use appropriate measures to ensure compliance with the prescribed provisions.

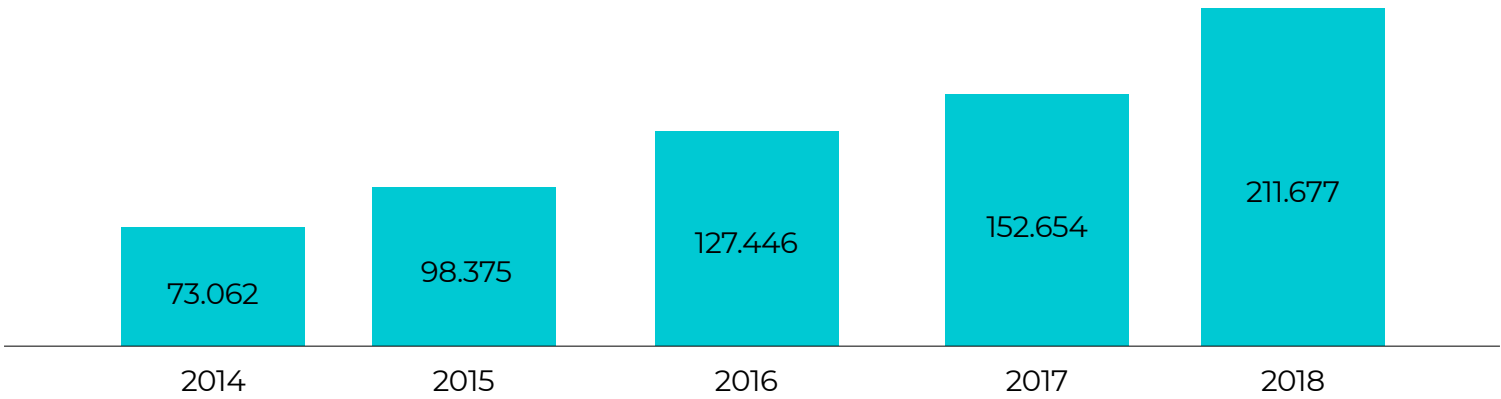


Figure 1.29. Number of M2M tariffs

M2M/IoT

Communication between machines (machine-to-machine, M2M), as part of the Internet of Things (IoT), is an area in the initial phase of significant growth in the field of electronic communications. It is estimated that in 2020 it will cover more than ten billion different devices. With the introduction of 5G, increased growth is expected as the new network will be the communication basis for Industry 4.0. Therefore, HAKOM amended the Numbering Plan to determine the appropriate numbering for services based on M2M/IoT applications (such as networked cars). With current growth estimates for IoT services, there will be a demand for an increased amount of uniquely identifiable devices, that is, numbering requests because it is assigned to each device.

On the other hand, in order not to disrupt market competition, HAKOM must monitor and in a timely manner, in cooperation with the operators, provide a technical solution for the transfer of number resources between different Over The Air networks (OTA) networks, that is, a solution that allows the reprogramming of communication equipment identifiers without physical access to devices. Likewise, with the growth of M2M services, HAKOM's significant focus has been on privacy and data security issues.

NETWORK AND SERVICE SECURITY

The security of electronic communications networks and services is becoming an increasingly important issue, and security incidents are being used as a basis for system improvement. HAKOM is therefore obliged to notify the EU Network and Information Security Agency – ENISA – and the competent national regulatory authorities of other EU Member States of breaches of security or loss of integrity of Croatian communications networks. HAKOM also submits to the European Commission and ENISA an annual report on the security incidents it received during the previous calendar year and the action taken on these notices. HAKOM submitted an annual report to ENISA with eight significant security incidents it received in 2018 from operators, two of which were related to the disabling of mobile Internet access, where human error or system error was reported as the cause. Two incidents involved disabled voice service and disabled Internet access service in the fixed network due to human error, two incidents involved disabled voice service in the fixed network due to a system error, one involved disabled Internet access service in the fixed network due to system error and was disabled voice service and Internet access service in the mobile and fixed networks due to natural phenomenon.

Part of the activities carried out was related to the implementation of measures from the National Cyber Security Strategy, where HAKOM is responsible, alone or in cooperation with other public authorities, for the fulfilment of the set objectives. HAKOM participated in the implementation of Objective A.1 related to the supervision of technical and organizational measures taken by operators to ensure the security of their networks and services, as well as to direct operators of public communications networks and/or services in order to ensure a high level of security and availability of public communications networks and services. In addition, measure G.1.3 was actively implemented, by reporting to stakeholders within the electronic communications sector about computer security incidents, and cyber security awareness was increased using measure I.2.1 (celebrating Safer Internet Day, issuing brochures on Internet safety, developing applications to better inform users, and continuing guest visits by policy makers in schools).

MANAGEMENT OF ADDRESS AND NUMBER SPACE

One of HAKOM's tasks is to ensure efficient use of addresses and numbers. This is primarily done by modifying the Addressing Plan and Numbering Plan in line with market requirements and assigning addresses and numbers to operators. In addition to these activities, HAKOM also monitors the legitimate use of numbers and addresses, the process of number porting, the operation of the Central Administrative Base of Portability (CABP) and takes care of its maintenance, development, testing, upgrades and any necessary changes to make it functional and in accordance with market needs.

ACCESS AND COMMON USE OF THE ELECTRONIC COMMUNICATIONS INFRASTRUCTURE

The construction of electronic communications networks for broadband access has been recognized as an important indicator of the development of the electronic communications market, in particular the construction of fibre optic networks necessary for the future 5G network, the Internet of Things, new digital services and applications requiring high bandwidth and minimal delay (low latency). For this reason, HAKOM has decided to amend [the Reference offer](#) on the manner and conditions of access and sharing of electronic telecommunications infrastructure and other related equipment (cable ducts) of Hrvatski Telekom d.d. Modifying the reference offer operators-users are encouraged to make more efficient use of the existing infrastructure while reducing the cost of building new networks. The amendments speed up procedures related to access to cable ducts so that communication is digitized and automated and that all parties are obliged to actively participate in the process and respect the set deadlines. This directly contributes to the faster and more efficient construction of NGA networks. Particular attention was paid to preventing possible discrimination in terms of construction speed in FNP areas. Specifically, the networks will be built in much larger areas than in the past, which will require greater involvement of operators-users and HT in meeting the deadlines. The goal is to ensure a balanced development of urban and rural areas of the Republic of Croatia.

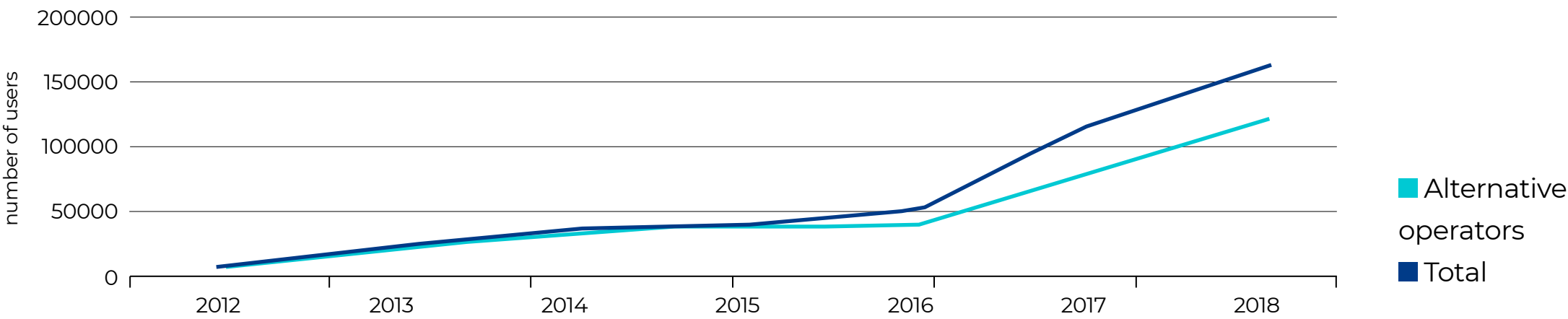


Figure 1.30. Notices of Intent to build Fiber Optic Distribution Network

CONSTRUCTION OF ELECTRONIC COMMUNICATIONS NETWORKS

[Ordinance On Fibre Optic Distribution Networks](#) (ODN) prescribes the method of construction (setting up) of the ODN as an open network that enables access and joint **REGULATION OF PROPERTY-LAW RELATIONS BETWEEN INFRASTRUCTURE OPERATORS AND MANAGERS OF COMMON GOOD AND REAL ESTATE OWNERS**

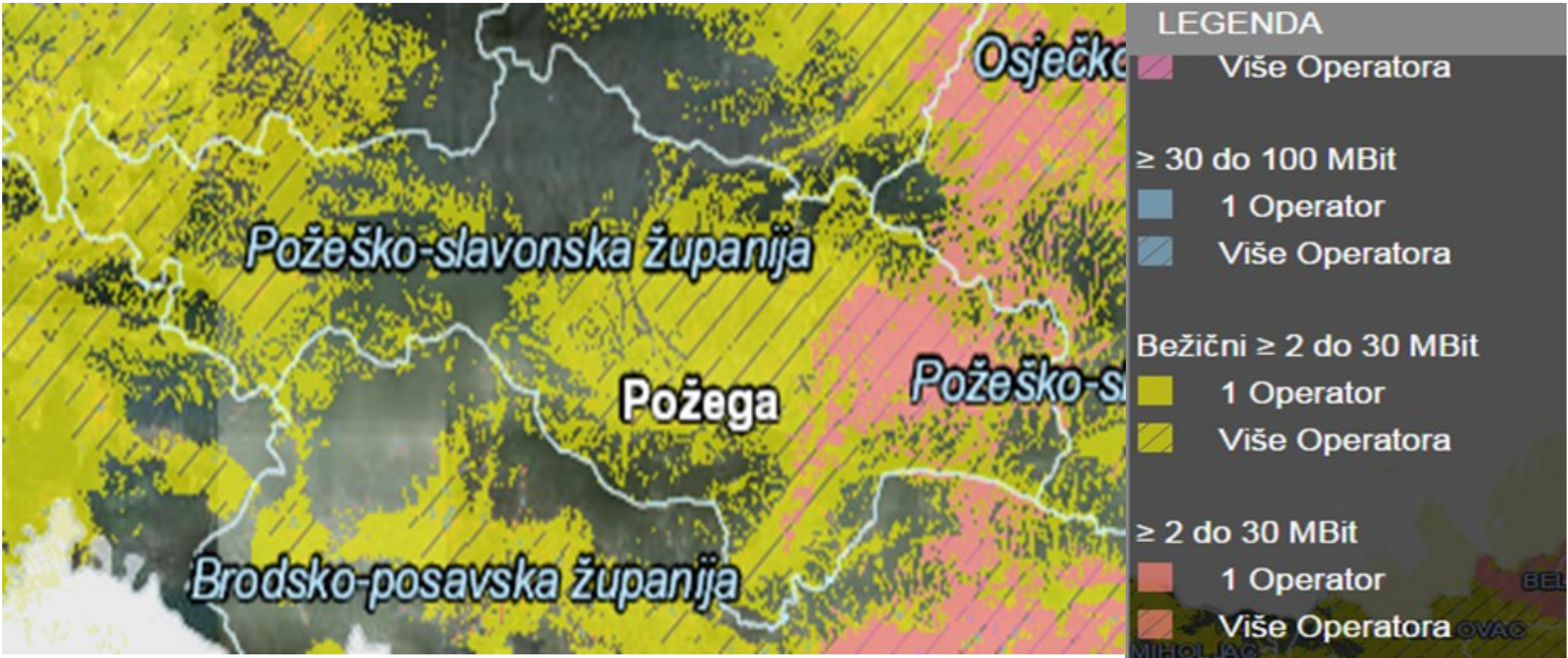


Figure 1.31. Example of display of Availability of BBI in Požega-Slavonia County

During 2018, HAKOM received a total of 93 new requests for the regulation of property-law relations between local self-government units (LSU) and the infrastructure operator from the following LSUs, the cities: Mali Lošinj, Velika Gorica, Karlovac, Vukovar, Imotski, Dubrovnik, Glin, Hrvatska Kostajnica, Petrinja, Vodice, Čazma, Ogulin, Slatina, Križevci, Split, Nin, Novigrad, Buzet, Trilj, Đakovo, Vinkovci, Metković, Ludbreg and Trogir; the municipalities: Nova Bukovica, Dobrinj, Trpanj, Sveti Juraj na Bregu, Smokvica, Mljet, Svetvinčenat, Zagorska Sela, Brtonigla, Gračiče, Novi Golubovec, Gundinci, Žakanje, Lasinja, Kaptol, Netretić, Breznica, Plaški, Vrbnik, Janjina, Ston, Donja Motičina, Cetingrad, Strizivojna, Perušić, Gradec, Cestica, Erdut, Kloštar Ivanić, Slivno, Donja Kukuruzari, Sunja, Brdovec, Koprivnički Bregi, Ljubeščica, Sveti Križ Začretje, Starigrad, Križ, Gornja Stubica, Gorjani, Maruševac, Žminj, Peteranec, Hrvace, Domašinec, Darda, Župa Dubrovačka, Orebić, Gornji Mihaljevec, Zdenci, Vinica, Podstrana, Novo Virje, Otok, Dubravica, Tkon, Žumberak, Gornja Vrba and Tisno and the county roads administrations: Zadar County, Virovitica-Podravina County, Istria County, Split-Dalmatia County, Karlovac County, Zagreb County, Požega-Slavonia County, Međimurje County and Vukovar-Srijem County.

A total of 136 LSU requests have been resolved, that is, an infrastructure operator was identified in the LSU areas. Among these, 45 were received in 2018, and 91 were from the previous period. HAKOM's request processing is conditioned by the accuracy of the documentation, so it is possible to have several solutions (partial, final and supplementary). This is how the LSUs regulate property-law relationships with infrastructure operators who have illegally set up their ECI on LSU-owned real estate. The goal of regulating relations is to achieve monetary compensation for the use of their real estate.

	2014	2015	2016	2017	2018
Number of municipalities and cities	14	175	140	49	93

Table 1.1. Movement of the number of LSU requests for the regulation of property-law relations

THE RIGHT OF WAY

The certificate of the right of way is issued by HAKOM pursuant to the ECA and the Ordinance on the Right of Way Certificate and Fee, based on requests submitted by infrastructure operators, common good managers and real estate owners. In the course of 2018, natural persons filed 764 requests for issuing a certificate of the right of way and 809 right-of-way certificates were issued. The total length of the route for which the right of way certificate was issued is 79,199.42 m.

	2014	2015	2016	2017	2018.
Certificate	1.050	276	163	602	809
Route (m)	77.480	155.365	909.210	1.750.120	79.199

Table 1.2. Certificates of the right of way and length of the route through the years

REMOVAL OF ELECTRONICS COMMUNICATION INFRASTRUCTURE AND OTHER ASSOCIATED FACILITIES

In 2018, a total of 78 requests for the removal of the ECI were submitted to HAKOM on the basis of which procedures were conducted for designating the infrastructure operator, the type and size of the ECI, for checking the reasoning and credibility of requests and priority of submitted requests. The requests were submitted to the infrastructure operator for resolution, and the resolution dynamics was monitored. A total of 70 removal requests were resolved, 58 out of which were received

during 2018, while the remaining 12 cases had been received in previous years but were resolved in 2018. The procedures conducted according to a submitted request for the removal are long-lasting procedures that encounter numerous obstacles and restrictions out of HAKOM’s control, (unresolved land registration issues, unresolved ownership relations, procedures related to the obtaining of various consents and approvals, prohibition of construction works during the tourist season in some LSUs, development of technical solutions, problems related to the coordination of infrastructure operators, contractors and subcontractors, etc)

PRELIMINARY OPINIONS ON PHYSICAL PLANNING DOCUMENTS

In accordance with the legal obligations pursuant to the Physical Planning Act, HAKOM participates as a public sector authority in the area of the ECI and other associated facilities in the adoption of physical plans at all levels. In 2018, HAKOM issued 486 documents defining guidelines and requirements to be complied with during the development of physical plans of all levels, and 201 opinions during public consultations concerning proposals for physical plans of all levels. 1459 documents were also issued laying down the guidelines, requirements to be followed in drawing up physical plans and opinions during public consultations on proposals for physical plans at all levels.

SPECIAL BUILDING CONDITIONS AND APPROVAL OF MAIN PROJECTS

For interventions into space, within the ECI zone and other associated facilities, as well as in the safety zone and the radio corridor of certain radio stations, HAKOM establishes and publishes special conditions for and approvals of main projects in compliance with the Physical Planning Act and the Building Act. In 2018, special conditions were issued in 19,846 cases, and 44,848 acts were issued in connection with main project certificates.

	2014	2015	2016.	2017.	2018
Special conditions	5.832	5.930	7.593	8.737	19.846
Main projects	2.304	4.991	6.895	8.660	44.848

Table 1.3. Special conditions for construction and certification of main projects through the years



DEVELOPMENT PROGRAMMES

By the Decision of the Government of the Republic of Croatia, of 13 July 2016 the [Framework National Programme for the Development of Broadband Infrastructure in Areas Lacking Sufficient Commercial Interest for Investments](#) (FNP) was adopted. HAKOM was appointed as the FNP holder (FNPH) under the same Decision. The FNP is an implementation programme aimed at the achievement of national strategic objectives specified by the [Strategy for Broadband Development in the Republic of Croatia for 2016–2020](#), and the Digital Agenda for Europe for the period up to 2020, particularly in the field of ensuring the availability of fast and ultra-fast broadband access on the entire territory of the Republic of Croatia. The Framework Programme is the national framework scheme, that is, a state aid programme, followed by a large number of individual projects in the narrow local area. The basic roles of HAKOM as the FNPH are the coordination of FNP implementation on the national level and the compliance verification of each Plan for the Broadband Infrastructure Development (PBID) with the FNP, a consulting role regarding Project Holders, and the approval of PBIDs and other activities prescribed by the FNP. Implementation holders for each FNP project are public authorities on the local and/or regional levels (municipalities, cities and counties).

COMPLIANCE VERIFICATION OF EACH PBID WITH FNP

In 2018, HAKOM, as the FNPH, received 23 PBID drafts from project holders. Together with the 46 drafts received in 2016 and 2017, the PBID drafts encompassed a total of 444 local and regional self-government units in the area with more than 2.7 million inhabitants of the Republic of Croatia. The City of Krk withdrew its PBID draft submitted in 2016, but in 2018 it submitted a new PBID draft for the Island of Krk area. In 2018, 27 PBID drafts were preliminarily analysed and evaluated, thus verifying the compliance of the PBID drafts with FNP structural rules, and 24 public consultations on PBID drafts were conducted during the year.

The figure shows local/regional self-government units submitting drafts for preliminary evaluation.

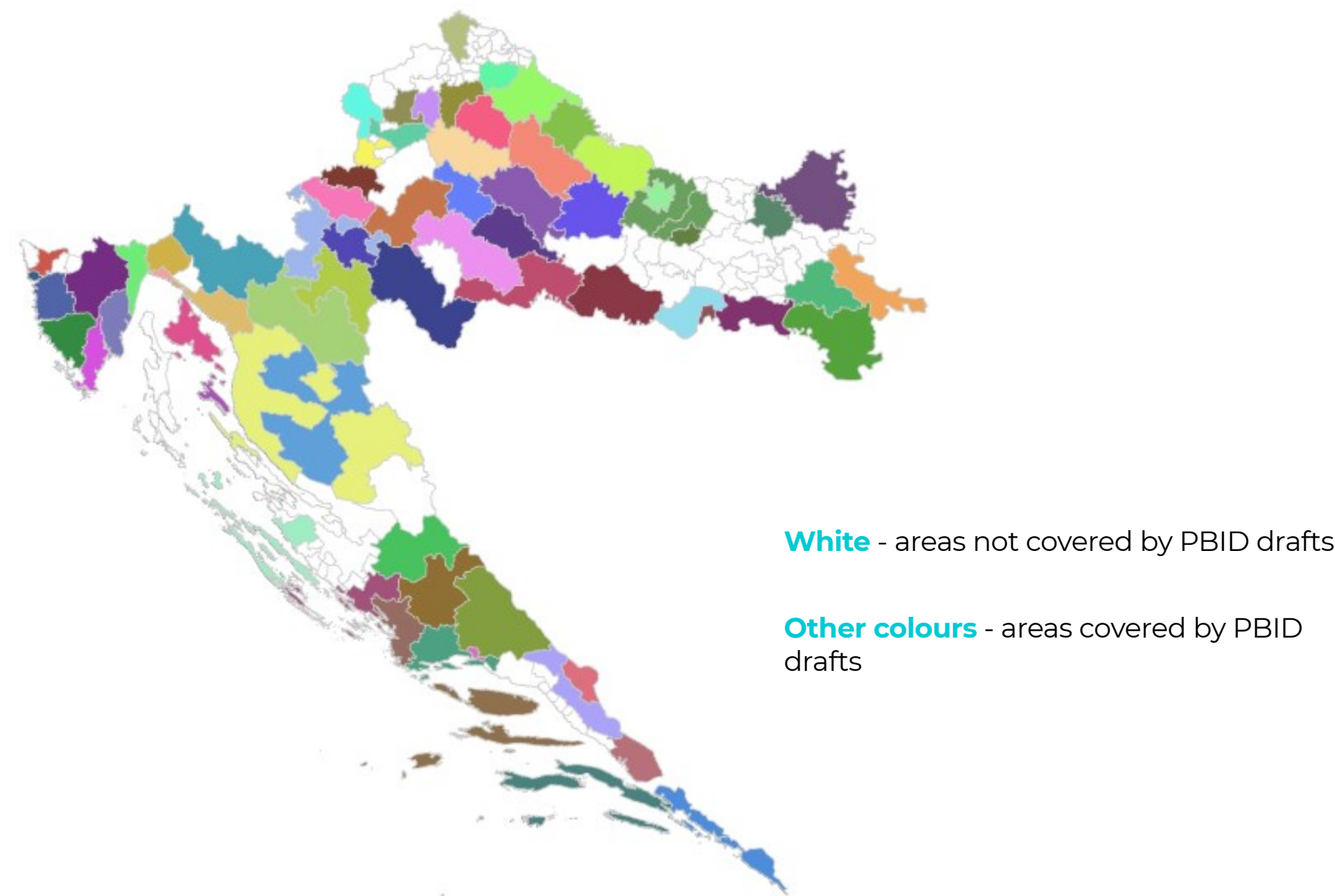


Figure 1.32. Received PBID drafts by local/regional self-government units by the end of 2018

All received PBID drafts by the end of 2018 by project holders and LSUs involved are listed in the table.

PBID001	Project Holder	Coverage
PBID001	Poreč City	Poreč City and Municipalities Funtana, Kaštelir-Labinci, Sveti Lovreč, Tar-Vabriga, Višnjan, Vižinada, Vrsar and Tinjan
PBID002	Orahovica City	Orahovica City
PBID003	Buzet City	Cities Buzet and Pazin and Municipalities Cerovlje, Gračišće, Karojba, Lanišće, Lupoglav, Motovun and Sveti Petar u Šumi
PBID004	Jastrebarsko City	Jastrebarsko City and Municipalities Klinča Sela, Krašić and Žumberak
PBID005	Novigrad City	Novigrad-Cittanova City
PBID006	Beli Manastir City	Beli Manastir City and Municipalities Bilje, Čeminac, Darda, Draž, Jagodnjak, Kneževi Vinogradi, Petlovac, Popovac
PBID007	Zadar County	Zadar City, Municipalities Bibinje, Kali, Kukljica, Pašman, Poličnik, Preko, Sali, Sukošan, Tkon, Zemunik Donji
PBID008	Rovinj City	Cities Rovinj-Rovigno and Vodnjan-Dignano and Municipalities Bale-Valle, Kanfanar, Svetvinčenat and Žmin
PBID009	Kaštela City	Cities Kaštela, Split and Trogir and Municipalities Lećevica, Marina, Okrug, Prgomet, Primorski Dolac and Seget
PBID010	Zaprešić City	Zaprešić City and Municipalities Brdovec, Dubravica, Jakovlje, Marija Gorica, Pušća
PBID011	Koprivnica-Križevci County	Koprivnica City, Municipalities Drnja, Đelekovec, Gola, Hlebine, Koprivnički Bregi, Koprivnički Ivanec, Legrad, Novigrad Podravski, Peteranec, Rasinja, Sokolovac
PBID012	Valpovo City	Cities Valpovo and Belišće and Municipalities Bizovac and Petrijevci
PBID013	Velika Gorica City	Velika Gorica City, Municipalities Kravarsko, Orle, Pisarovina, Pokupsko, Rugvica
PBID014	Medulin Municipality	Municipalities Medulin, Barban, Ližnjan-Lisignano, Marčana
PBID015	Nerežišća Municipality	Cities Hvar, Komiža, Stari Grad, Supetar, Vis and Municipalities Bol, Jelsa, Milna, Nerežišće, Postira, Pučišća, Selca, Sućuraj, Sutivan and Šolta

PBID001	Project Holder	Coverage
PBID016	Đurđevac City	Đurđevac City and Municipalities Ferdinandovac, Kalinovac, Kloštar Podravski, Molve, Novo Virje, Podravske Sesvete and Virje
PBID017	Ivanić-Grad City	Cities Ivanić-Grad and Dugo Selo and Municipalities Brckovljani, Kloštar Ivanić and Križ
PBID018	Virovitica City	Virovitica City and Municipalities Gradina, Lukač, Pitomača, Suhopolje and Špišić Bukovica
PBID019	Vrbovec City	Cities Vrbovec, Sveti Ivan Zelina, Municipalities Bedenica, Dubrava, Farkaševac, Gradec, Preseka, Rakovec
PBID020	Bjelovar-Bilogora County	Bjelovar City, Municipalities Velika Pisanica, Nova Rača, Kapela, Veliko Trojstvo, Zrinski Topolovac, Rovišće, Šandrovac, Severin
PBID021	Nova Gradiška City	Nova Gradiška City, Municipalities Cernik, Davor, Dragalić, Gornji Bogičevci, Nova Kapela, Okučani, Rešetari, Stara Gradiška, Staro Petrovo Selo, Vrbje
PBID022	Dubrovnik-Neretva County 1	Dubrovnik City, Municipalities Dubrovačko Primorje, Konavle and Župa Dubrovačka
PBID023	Dubrovnik-Neretva County 2	Cities Metković, Opuzen and Ploče, Municipalities Kula Norinska, Pojezerje, Slivno, Zažablje
PBID024	Krk City	<i>Krk City</i>
PBID025	Korčula City	Korčula City, Municipalities Lumbarda, Smokvica, Vela Luka, Blato, Lastovo, Mljet, Orebić, Trpanj, Janjina and Ston
PBID026	Slatina City	Slatina City, Municipalities Čađavica, Mikleuš, Nova Bukovica, Sopje and Voćin
PBID027	Labin City	Labin City, Municipalities Pićan, Sveta Nedjelja, Kršan, Raša
PBID028	Međimurje County	Mursko Središće City and Municipalities Gornji Mihaljevec, Nedelišće, Selnica, Strahoninec, Sveti Juraj na Bregu, Sveti Martin na Muri, Šenkovec and Štrigova
PBID029	Križevci City	Križevci City, Municipalities Gornja Rijeka, Kalnik, Sveti Ivan Žabno and Sveti Petar Orehovec
PBID030	Delnice City	Cities Delnice, Vrbovsko and Čabar and Municipalities Fužine, Lokve, Skrad, Mrkopalj, Ravna Gora and Brod Moravice
PBID031	Rab City	Rab City and Lopar Municipality

PBID001	Project Holder	Coverage
PBID032	Novi Vinodolski City	Cities Novi Vindolski, Crikvenica and Kraljevica and Vinodolska Municipality
PBID033	Kastav City	Kastav City and Municipalities Čavle, Jelenje, Klana, Kostrena and Viškovo
PBID034	Opatija City	Opatija City and Municipalities Matulji, Lovran and Mošćenička Draga
PBID035	Vukovar City	Cities Vukovar and Ilok, Municipalities Bogdanovci, Borovo, Lovas, Negoslavci, Nuštar, Tompojevci, Tovarnik, Trpinja
PBID036	Pregrada City	Cities Pregrada and Klanjec, Municipalities Desinić, Hum na Sutli, Kraljevec na Sutli, Krapinske Toplice, Kumrovec, Tuhelj and Zagorje villages
PBID037	Buje City	Buje City and Brtonigla Municipality
PBID038	Rijeka City	Rijeka City
PBID039	Sveta Nedjelja City	Cities Samobor and Sveta Nedelja, Stupnik Municipality
PBID040	Karlovac City	Karlovac City
PBID041	Zmijavci Municipality	Cities Imotski and Vrgorac, Municipalities Zmijavci, Cista Provo, Lokvičići, Lovreč, Podbablje, Proložac, Runovići and Zagvozd
PBID042	Trilj City	Cities Trilj, Sinj and Vrljika, Municipalities Dicmo, Dugopolje, Otok, Hrvace, Klis, Muć
PBID043	Karlovac County 1	Cities Duga Resa and Ozalj and Municipalities Barilović, Bosiljevo, Draganić, Generalski Stol, Kamanje, Krnjak, Lasinja, Netretić, Ribnik, Vojnić and Žakanje
PBID044	Karlovac County 2	Cities Ogulin and Slunj and Municipalities Cetingrad, Josipdol, Plaški, Rakovica, Saborsko and Tounj
PBID045	Donja Stubica City	Cities Donja Stubica and Oroslavje, Municipalities Gornja Stubica, Marija Bistrica, Stubičke Toplice, Veliko Trgovišće
PBID046	Daruvar City	Cities Daruvar and Grubišno Polje, Municipalities Dežanovac, Đulovac, Končanica and Sirač
PBID047	Zlatar City	Zlatar City, Municipalities Budinščina, Hrašćina and Konjščina

PBID001	Project Holder	Coverage
PBID048	Novi Marof City	Gradovi Novi Marof and Varaždinske Toplice, Municipalities Breznica, Breznički Hum, Ljubešćica and Visoko
PBID049	Ludbreg City	Ludbreg City, Municipalities Mali Bukovec, Martijanec, Sveti Đurđ and Veliki Bukovec
PBID050	Solin City	Solin City
PBID051	Varaždin County 1	Cities Ivanec and Lepoglava, Municipalities Bednja and Klenovnik
PBID052	Varaždin County 2	Varaždin City, Municipalities Beretinec, Gornji Kneginec, Jalžabet, Sračinec, Sveti Ilija, Trnovec Bartolovečki and Vidovec
PBID053	Šibenik-Knin County 1	Cities Šibenik and Drniš, Municipalities Bilice, Biskupija, Cijljane, Kijevo, Primošten, Rogoznica, Ružić and Unešić
PBID054	Šibenik-Knin County 2	Cities Knin, Skradin and Vodice, Municipalities Ervenik, Kistanje, Mirter, Pirovac, Tisno and Tribunj, Promina
PBID055	Bedekovčina Municipality	Municipalities Bedekovčina, Lobor, Mače, Mihovljan, Novi Golubovec, Sveti Križ Začretje and Zlatar Bistrica
PBID056	Sisak City	Sisak City, Municipalities Lekenik, Martinska Ves and Sunja
PBID057	Gospić City	Cities Gospić and Otočac, Plitvička Jezera Municipality
PBID058	Lika-Senj County	Cities Novalja and Senj, Municipalities Brinje, Donji Lapac, Karlobag, Lovinac, Perušić, Udbina and Vrhovine
PBID059	Brod-Posavina County A	Municipalities Bebrina, Brodski Stupnik, Bukovlje, Oriovac, Podcrkavlje and Sibinj
PBID060	Brod-Posavina County B	Municipalities Donji Andrijevc, Garčin, Gornja Vrba, Gundinci, Klakar, Oprisavci, Sikirevci, Slavonski Šamac, Velika Kopanica, Vrpolje
PBID061	Slavonski Brod City	Slavonski Brod City
PBID062	Vinkovci City	Vinkovci City, Municipalities Andrijaševci, Ivankovo, Jarmina, Markušica, Stari Mikanovci, Vođinci, Privlaka, Stari Jankovci and Tordinci
PBID063	Županja City	Cities Županja and Otok, Municipalities Babina Greda, Bošnjaci, Cerna, Drenovci, Cityišta, Gunja, Nijemci, Štitar and Vrbanja

PBID001	Project Holder	Coverage
PBID064	Čazma City	Cities Čazma and Garešnica, Municipalities Berek, Hercegovac, Ivanska, Štefanje and Velika Trnovitica
PBID065	Novska City	Cities Novska and Hrvatska Kostajnica, Municipalities Donji Kukuruzari, Hrvatska Dubica, Jasenovac, Lipovljani and Majur
PBID066	Kutina City	Cities Kutina and Popovača, Velika Ludina Municipality
PBID067	Krk City	Krk City, Municipalities Baška, Dobrinj, Malinska-Dubašnica, Omišalj, Punat and Vrbnik
PBID068	Virovitica-Podravina County	Municipalities Crnac, Čačinci, Čađavica, Mikleuš, Nova Bukovica, Sopje, Voćin and Zdenci
PBID069	Glina City	Glina City, Municipalities Dvor, Gvozd and Topusko

Table 1.4. PBID drafts received by the end of 2018

CONSULTATIVE ROLE OF THE FNPH REGARDING PROJECT HOLDERS

In 2018, HAKOM, as the FNPH, held regular meetings with project holders and their consultants in view of providing the holders with all necessary information and instructions in all stages of the project (compliance verification of each PBID with the FNP, initiating public consultation, during and after the public consultation). Also, in 2018, FNPH received a large number of inquiries by the project holders, operators and other interested subjects, to which it provided written replies within its consultative role. Particular attention was paid to verifying the credibility of the operators' commercial interests expressed in public consultations. In May 2018, two full-day workshops were organized for all project holders to prepare them in a timely manner for the preparation of the final versions of the PBIDs and to answer any open questions. At the workshops, the FNPH gathered representatives of other bodies involved in the implementation of the FNP - [MRDEF](#), [CFCA](#), [OIV](#) and [AIC](#), to cover all topics relevant for the preparation of projects and the application for public co-financing.

To inform project holders and the public, the FNPH produced a brochure outlining the opportunities and benefits of developing fast and ultra-fast access networks and 5G. All relevant information about the on-going projects and other information were regularly published on its central website <https://nop.hakom.hr>.

OVERVIEW OF REGULATORY MEASURES

HAKOM conducted a new round of market analyses in markets that are an integral part of the EC Recommendation on relevant markets and concluded that in order to further develop effective competition it is necessary to maintain regulation in all these markets. In addition, an analysis of the market of public communications network access at a fixed location for private and business users was also conducted, and this market is not an integral part of the EC Recommendation on the relevant markets. Following the additional steps to be taken in markets that are not an integral part of the EC Recommendation on the relevant markets, it was concluded that regulation should also be maintained in that market.

Market analyses

In the [access market](#) analysis, the emerging circumstances of the CCA decision from June 2017 were taken into account. This decision extended HT's management rights over Optima, and another decision, also from June 2017, determined the merger of H1 Telekom and Optima as a conditionally approved concentration of undertakings. HAKOM has abandoned regulation in this market, but in such a way that the price control obligation, unlike in the previous analysis of this market, is determined solely when the wholesale line rental service (WLR service) is used to provide a standalone publicly available telephone service, or when not used in combination with any other wholesale service. In the Republic of Croatia, a significant number of users still use a standalone publicly available telephone service, so regulation of the WLR service in the Croatian market is still important. In case the WLR service is used in combination with some other wholesale services, the HT may offer the price of the WLR to the operators on a commercial basis.

The analysis of [call origination market](#) is closely linked to the access market analysis, so a segmented regulation of call origination was applied, which means that HT is obliged to apply the origination price only when used alone or in combination with a standalone WLR service. In addition, and in line with market trends, since HAKOM had already imposed upon HT an obligation on IP interconnection with other operators in the market, this analysis defined that HT no longer has an obligation of parallel TDM interconnection, that is, the connection method that is nowadays no longer used. This reduces the cost of interconnection.

Analyses of [the market of wholesale termination of voice calls in own mobile network and analysis of the market of wholesale termination of voice calls in own public telephone network](#) are different from all other analyses because in these markets all operators are subject to regulatory obligations. Considering the connection to the call origination market, IP interconnection is also an obligation only with other operators in this market. In the previous round of analyses, HAKOM was among the

first EU regulators to introduce regulated call termination rates only if the A number belongs to the EEA operator, in order to strengthen the position of Croatian operators towards operators outside the EEA area when negotiating wholesale prices. The measure proved to be very good for the business of Croatian operators in practice and was retained in the same form in this analysis.

The existing rates for voice call termination in own mobile and own public telephone network are based on the cost model developed by HAKOM. As the cost model is not updated in a period shorter than three years, due to the business predictability of operators, and the existing rates for the termination of voice calls in the Republic of Croatia came into force on 1 July 2017, it is considered ineffective to carry out the process of updating the existing cost model, given that in the short period after 1 July 2020 the highest termination rate for voice calls, determined by an implementing act of the European Commission, is coming into force. In other words, it is considered justifiable to stipulate that the existing rates for termination of voice calls in both own mobile and own public telephone network remain in force until the highest level of termination rates for voice calls is applicable, directly determined by the EC. HAKOM representatives are working with the EC to develop a cost model based on which the highest price of voice call termination will be calculated.

Given the importance of broadband Internet access service in today's digital society, the analysis of the [wholesale local access market](#) and the analysis of the [wholesale central access market](#) is of utmost importance. These are the markets that determine the regulation of broadband Internet access. In the past, the need to encourage the use of high-speed broadband Internet service (NGA speeds of 30 Mbit/s higher) was evident, so HAKOM continued to determine prices based on its own model by analysing the wholesale central access market, but for the first time HAKOM decided to encourage the use of high-speed Internet access in such a way that the model-specific prices represent the highest price level. Thus, without additional procedures and in the shortest possible time, HT can reduce the cost of broadband Internet access for end-users and enable other market operators to offer lower prices to their users. The key was to find a solution that would enable operators to offer low-price, high-speed broadband Internet access to their users as soon as possible, without compromising effective competition.

A new hybrid access service has been included in the wholesale central access market, which means that HT is obliged to make wholesale access to that service and to other operators upon request. This protected the further development of effective competition. More about this service can be read below under "Regulatory Affairs Not Scheduled for 2018".

In the wholesale local access market, regulation continued, as determined by the latest analysis of this market. Additionally, in the wholesale local and wholesale central access market, all prices will continue to be determined based on HAKOM's cost model, whose update is scheduled to begin during 2019.

In relation to the analysis of the market of wholesale high-quality access provided at a fixed location and the analysis of the market of wholesale leased lines transmission segments, in 2018, questionnaires were prepared and a data analysis was conducted of the operators in these markets.

These analyses continue onto the analyses of the wholesale local and the wholesale central access, which were completed in the first half of 2019 due to the complexity in determining the mode of regulation. The activity flow of these analyses was also influenced by the filing of a joint concentration of HT and HP in the form of a 100%-share acquisition in the share capital of HP Produkcija d.o.o by HT. The analysis, as well as the final decisions in the market of wholesale high quality access provided at a fixed location and in the market of wholesale leased lines transmission segments are expected in the second half of 2019.

Regulatory affairs not scheduled for 2018

On 27 November 2018 HT and HP filed a joint concentration application in the form of a 100%-share acquisition in the share capital of HP Produkcija d.o.o. The concentration application did not contain all the necessary information for decision making and additional data and information were collected from the concentration stakeholders, as well as relevant regulatory bodies in the Republic of Croatia. On 4 January 2019, HAKOM issued a provisional decision assessing that the concentration in question could have a significant impact on competition in the relevant market and prohibiting the further implementation of the concentration until a final decision is taken. In the period from 15 to 30 January 2019, a public invitation was issued to comment on the concentration.

Following an analysis of the received comments, as well as a detailed analysis of the possible effects on competition, on 27 February 2019, HAKOM adopted the final decision determining the concentration of HT's acquiring of a 100% stake in the share capital of HP Produkcija d.o.o. as conditionally approved.

A conditionally approved concentration means that certain measures are adopted which the parties to the concentration are required to comply with in order to eliminate the adverse effects on competition. Without the adoption of additional measures, the concentration would have a negative impact on further development of effective competition.

Hybrid access service enables users to access high-speed Internet at a specific (fixed) location through mobile network access. At the request of HT, HAKOM enabled the use of the new hybrid broadband service for a trial period of six months. The service was enabled twice; first in August 2017 and then in February 2018. After a detailed analysis and monitoring of the trends in the service during the second half of 2017 and throughout 2018, the service was included in the wholesale central access market. This service should contribute to greater and faster use of high-speed broadband Internet access.

Operator retail tariff analysis - highlights

With regard to regulatory obligations, HAKOM pays special attention to the margin squeeze test imposed on the HT group within the regulatory obligation to control prices. Conducting the test allows other operators to compete with their packages against the HT group, since the previous HAKOM verification ensures that the packages on the market have sufficient margin to cover their wholesale and retail costs.

In the last period, there was a trend that HT group retail packages contain different combinations of benefits and gifts, including packages consisting of different combinations of regulated and unregulated services, and the conduct of margin squeeze tests should ensure that such components of packages are appropriately taken into consideration. HAKOM's activities in this area, both before and after the packages were introduced, were significant.

Thus, [in the process of inspection supervision, initiated ex officio over HT, a decision was made prohibiting the advertising, offering and contracting of the Najbolja L tariff](#) with the benefit of a monthly fee for the tariff in question of 1 HRK, within the Magenta 1 offer. A violation of the regulatory obligation to control prices was found insofar as HT is obliged to provide evidence for services in the fixed network that the margin squeeze test has been met.

Likewise, continuing with the analysis, argumentation and attitudes that were considered when introducing Iskon.Mobile tariffs on the market, in 2018, HAKOM amended *the regulatory treatment of Iskon packages combined with Iskon.Mobile tariff*. In order to properly assess whether there is a subsidy, in the first half of 2019, the margin squeeze test of Iskon packages was conducted again in combination with the Iskon.Mobile tariff.

In addition, all operators have an obligation to pre-announce their packages in price lists, so HAKOM verified whether all operators' packages were duly reported to HAKOM. In the 2018 verifications no irregularities were identified, that is, there was no offering of tariff packages to end-users that were not an integral part of the public price lists.

Other regulatory activities

In relation to international roaming, in 2018 continued to follow the implementation of obligations arising from the [Roaming Regulation](#), which allows all users to make roaming calls within the EU/EEA area at home prices from 15 July 2017. No problems were observed in the implementation of the Regulation, primarily due to HAKOM's proactiveness and constant contact with operators. An important

role that HAKOM has within BEREC helped operators respond to all queries and implementation-related uncertainties that were ongoing throughout the year in a timely manner. In addition, in the last quarter of 2018, HAKOM started preparing operators for lower international prices of international calls to EU/EEA countries, which come into force on May 15, 2019, so the priced are limited to the maximum amounts prescribed by the Regulation.

Following the workshops held with mobile network operators in February 2018, a [Decision on the conditions of IP interconnection](#) was adopted which, except for the previously prescribed method of IP interconnection between the fixed communications networks, further specifies the IP interconnection method within the mobile communications network. The document is the result of an agreement reached between network operators of mobile communications at the workshops. The Decision contributes to the development of the internal market in the European Union by encouraging the establishment and development of trans-European networks and the interoperability of pan-European services and the connectivity between end-users of services. It is neither economically nor technologically justifiable for each operator to implement its IP-IP interconnection protocols separately, since in this case interoperability between services and end-user connectivity of services of different operators on the market would not be ensured.

In February, HT's [Reference Offer for Wholesale Broadband Access Service](#) was amended, whereby HAKOM introduced and regulated prices and all the necessary conditions for a new FTDP technical solution. In addition to the existing FTTH and FTTB solutions, the definition of the prices and conditions of the new technical solution additionally encourages greater use of the new generation networks.

DESI

One of the indicators of the development of the digital society is the DESI Index, that is, the Digital Economy and Society Index. DESI is a complex index developed by the European Commission (DG CONNECT) for monitoring Member States' digital progress using measurable indicators. Croatia is currently ranked 20th in the DESI 2019.

The DESI index consists of five dimensions, with the highest weighting, 25 percent each, belonging to the dimensions **“Connectivity”** and **“Human Capital”**. **“Use of Internet Services”**, **“Integration of Digital Technology”** and **“Digital Public Services”** hare the rest at 15:20:15 percent.

In terms of the electronic communications market, the most important dimension is “Connectivity”. The Republic of Croatia has been in the penultimate place in this dimension for years. The reasons for such a poor placement should be sought primarily in those subdimensions in which the Republic of Croatia is positioned very low, such as availability of ultra-fast Internet, demand for NGA or ultra-fast

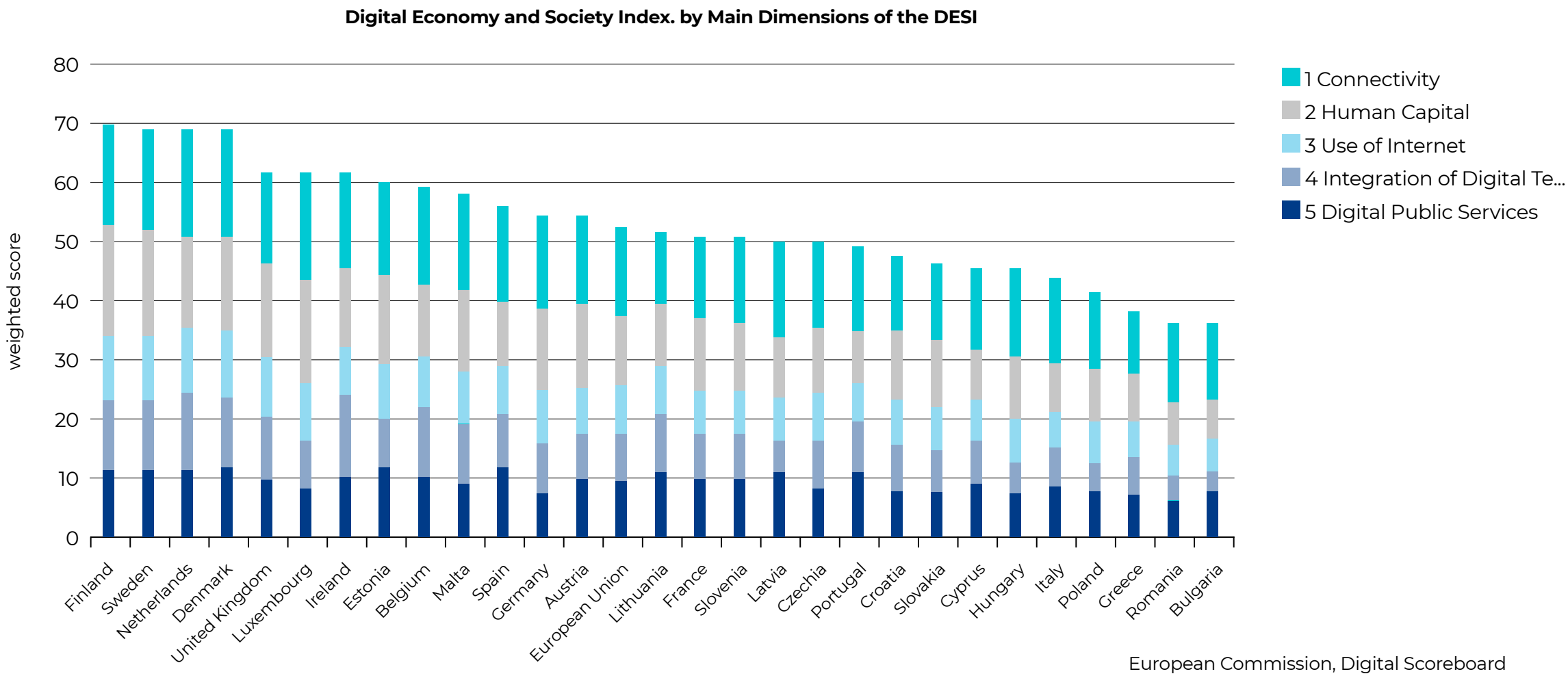


Figure 1.33. DESI (Source: <https://ec.europa.eu/digital-single-market/en/desi>)

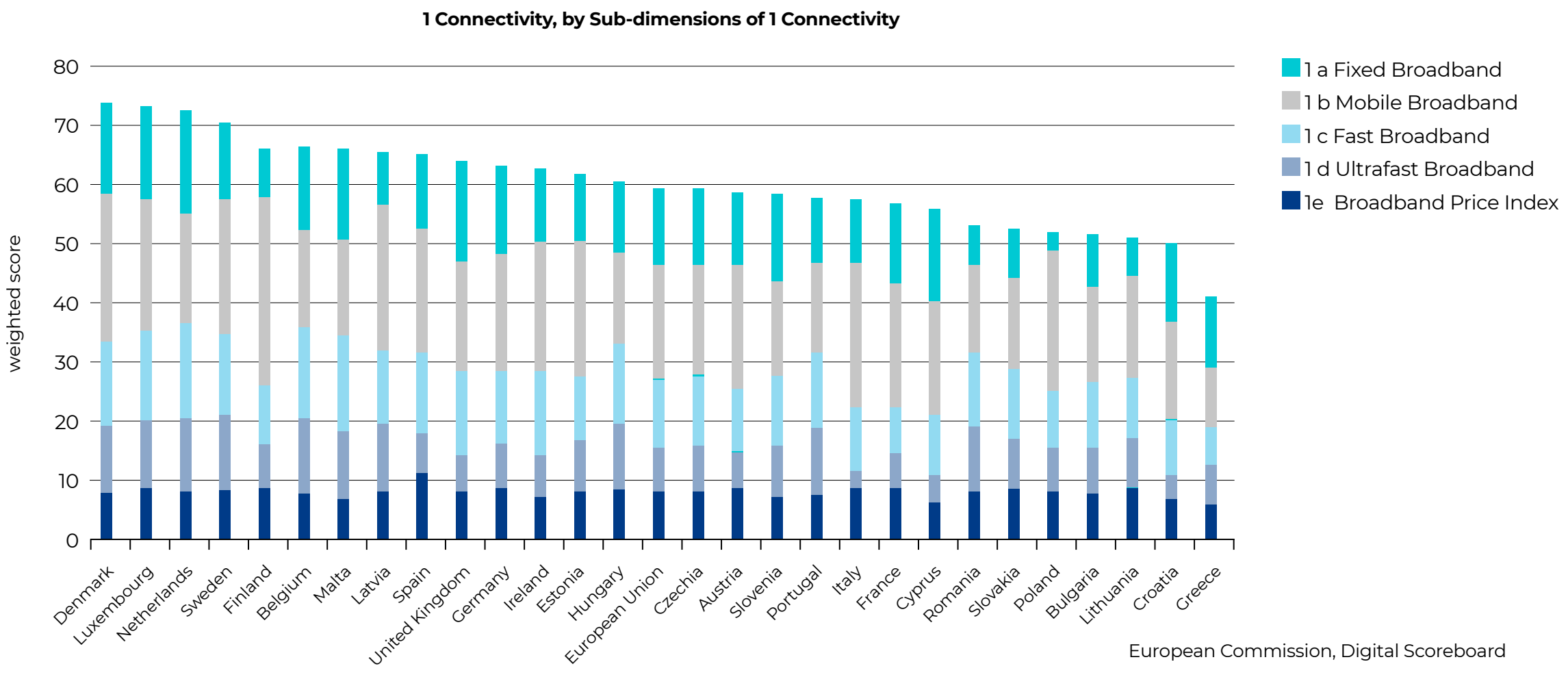


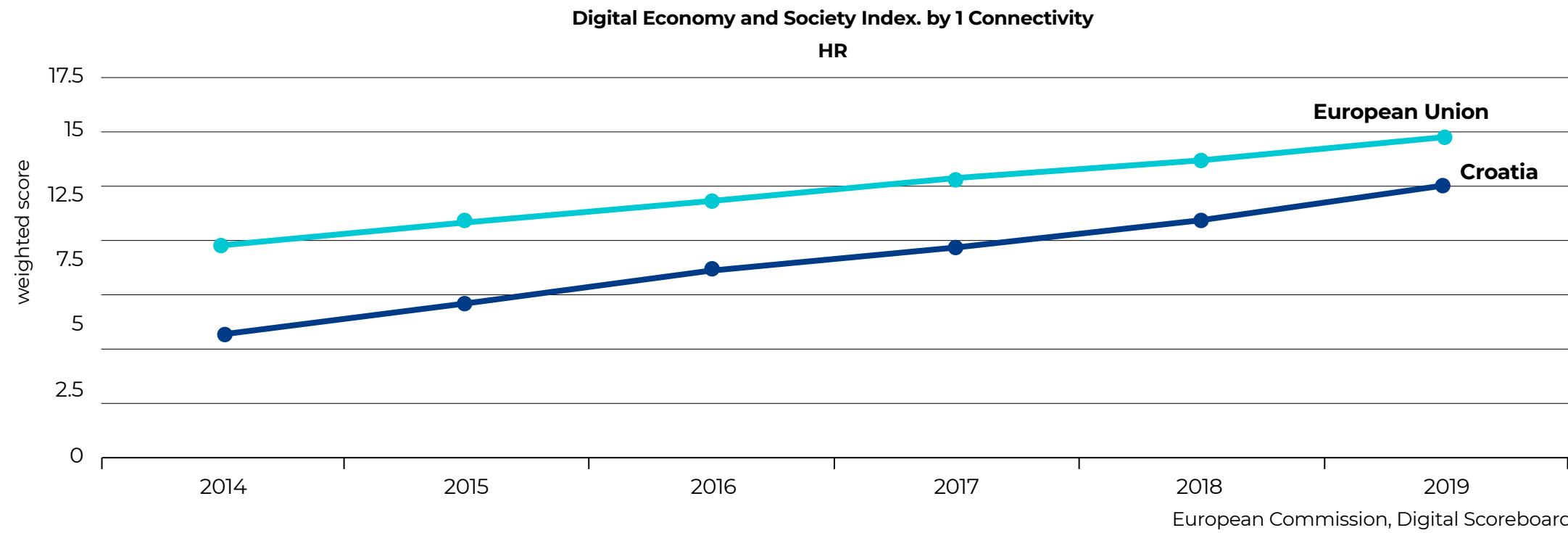
Figure 1.34. DESI Connectivity (Source: <https://ec.europa.eu/digital-single-market/en/desi>)

t is interesting that the Republic of Croatia has no lower ranking than 26 in any dimension, but it still has a low overall score. Each year, the Republic of Croatia gets closer to the EU average, but the pace is not enough to succeed in improving the overall position. In 2019, a new dimension was introduced which measures 5G readiness. Some encouraging indicators, such as the increase in the availability of NGA ports and the fall in the fixed Internet price index point that in the next period, the Republic of Croatia could outperform some Member States, especially if it builds rural networks from European development funds.

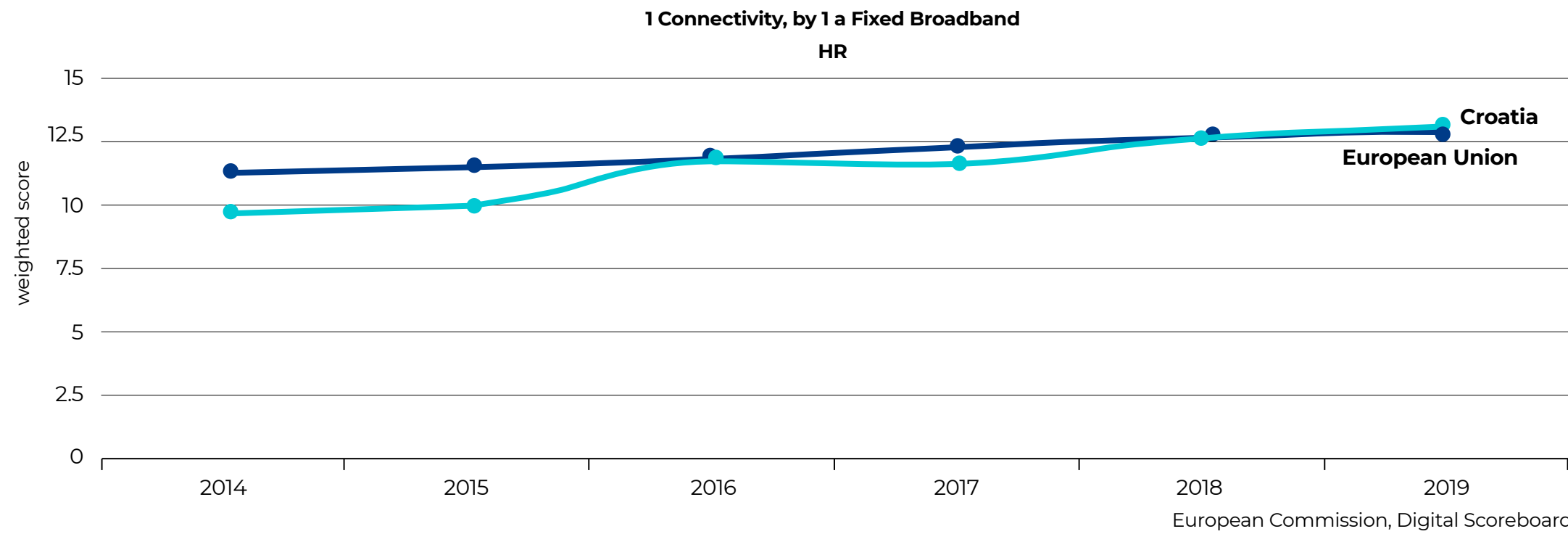
	CROATIA				EU
	DESI 2017 value	DESI 2018 value	DESI 2019. value	rank	DESI 2019 value
1.a.1. Fixed broadband coverage	97%	99%	>99,5%	8.	97%
% households	2016	2017	2018		2018
1.a.2 Fixed broadband take-up	70%	70%	72%	19.	77%
% households	2016	2017	2018		2018
1.b.1 4G coverage	67%	73%	94%	19.	94%
% households (average of operators)	2016	2017	2018		2018
1.b.2 Mobile broadband take-up	78	82	84	21.	96
Subscriptions per 100 people	2016	2017	2018		2018
1.b.3. 5G readiness	NA	NA	0%	13.	14%
Assigned spectrum as a % of total harmonised 5G spectrum			2018		2018
1.c.1. Fast broadband (NGA) coverage	60%	68%	83%	20.	83%
% households	2016	2017	2018		2018
1.c.2. Fast broadband take-up	7%	14%	19%	26.	41%
% households	2016	2017	2018		2018
1.d.1.. Ultrafast broadband coverage	NA	35%	39%	26.	60%
% households		2017	2018		2018
1.d.2. Ultrafast broadband take-up	0%	1%	5%	26.	20%
% kućanstava	2016	2017	2018		2017
1.e.1. Broadband price index	56	63	72	26.	87
Score (0 to 100)	2016	2017	2018		2017

Figure 1.35. DESI Connectivity for Croatia (Source: <https://ec.europa.eu/digital-single-market/en/node/66894>)

Overall, in the **Connectivity** category, the Republic of Croatia has been reducing the gap behind the EU average. While in 2014 the weighted gap was almost five points, today it is less, about 2.5 points.



The **availability of fixed access** in the Republic of Croatia is almost 100 percent and we are above average. At the same time, only 72 percent of households have a contracted tariff with fixed Internet access. Despite the fact that in the Republic of Croatia there is a higher percentage of people who do not use the Internet than the EU average, 100% demand is impossible because some households have replaced fixed access with quality mobile services. The situation is similar in Finland or Italy, for example.



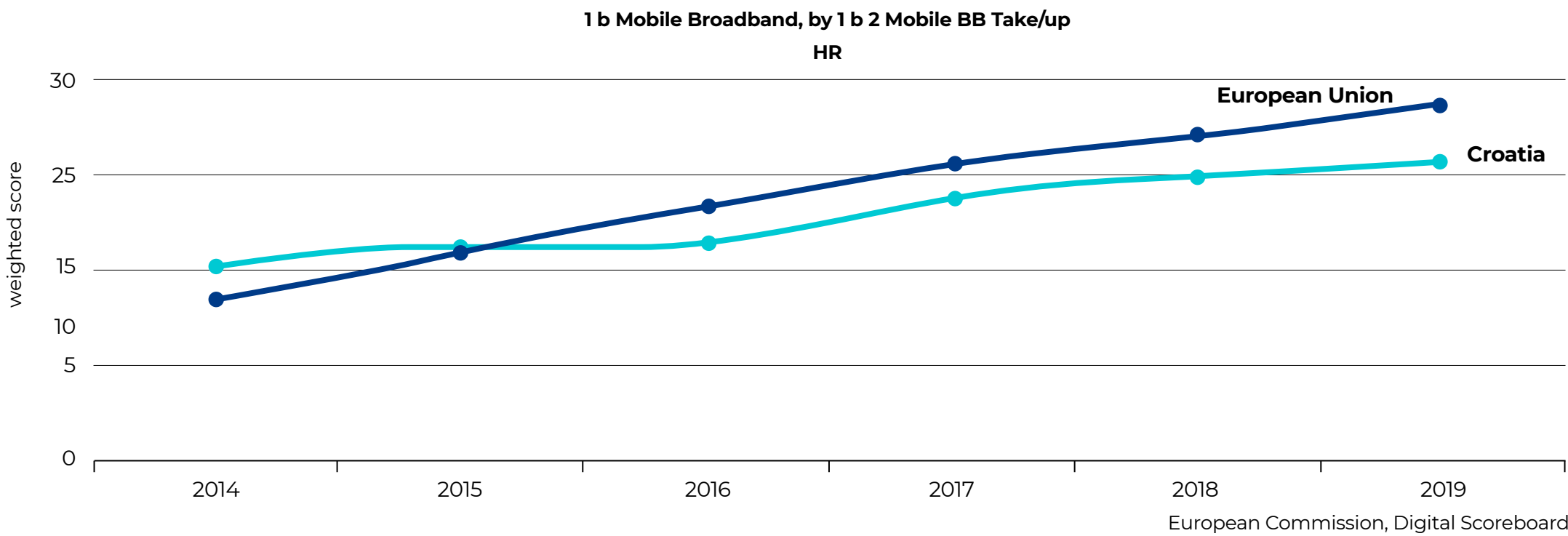
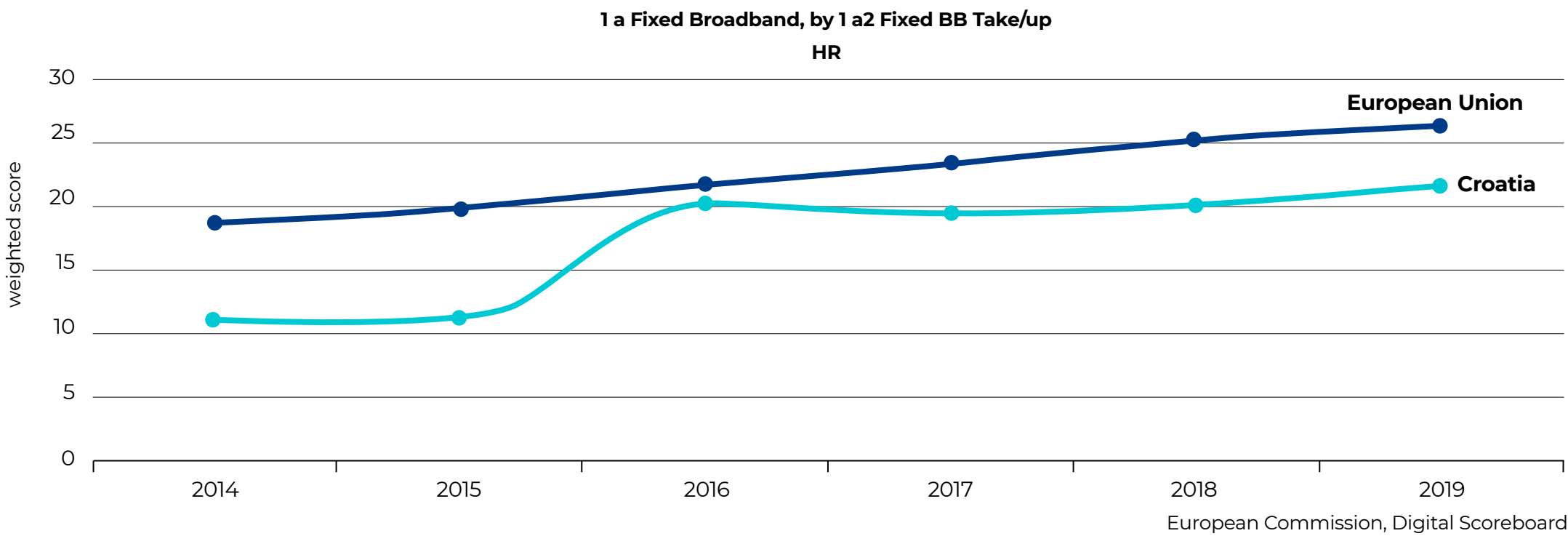
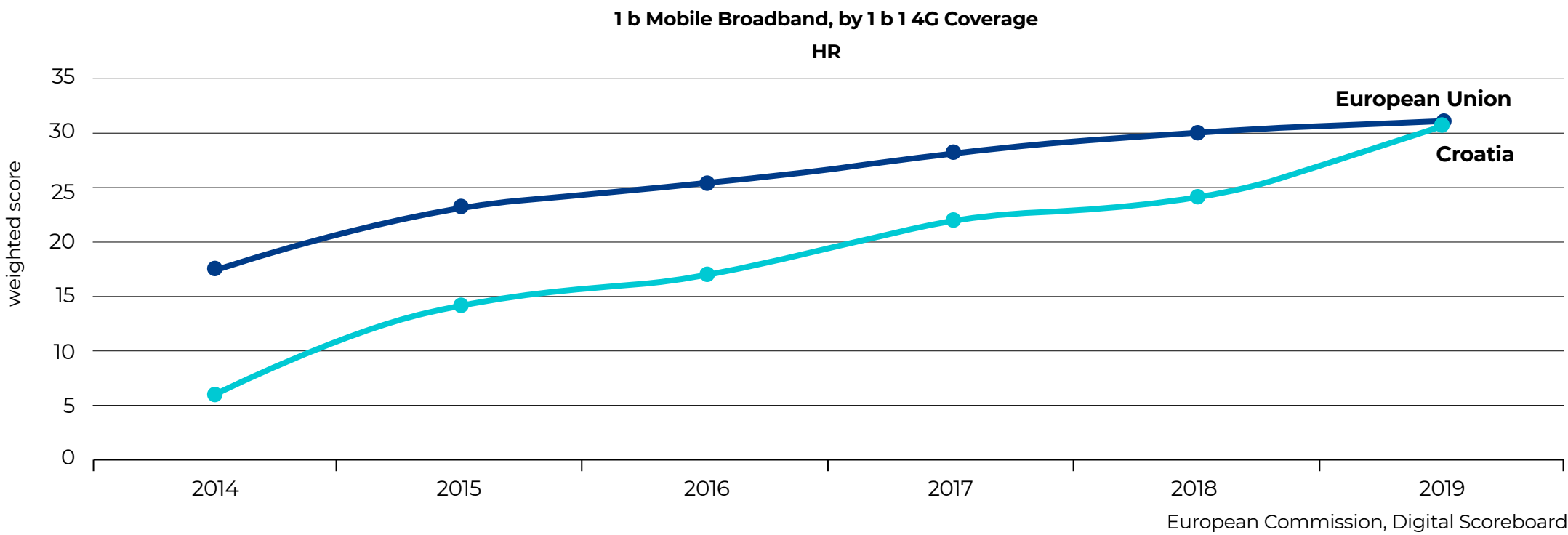
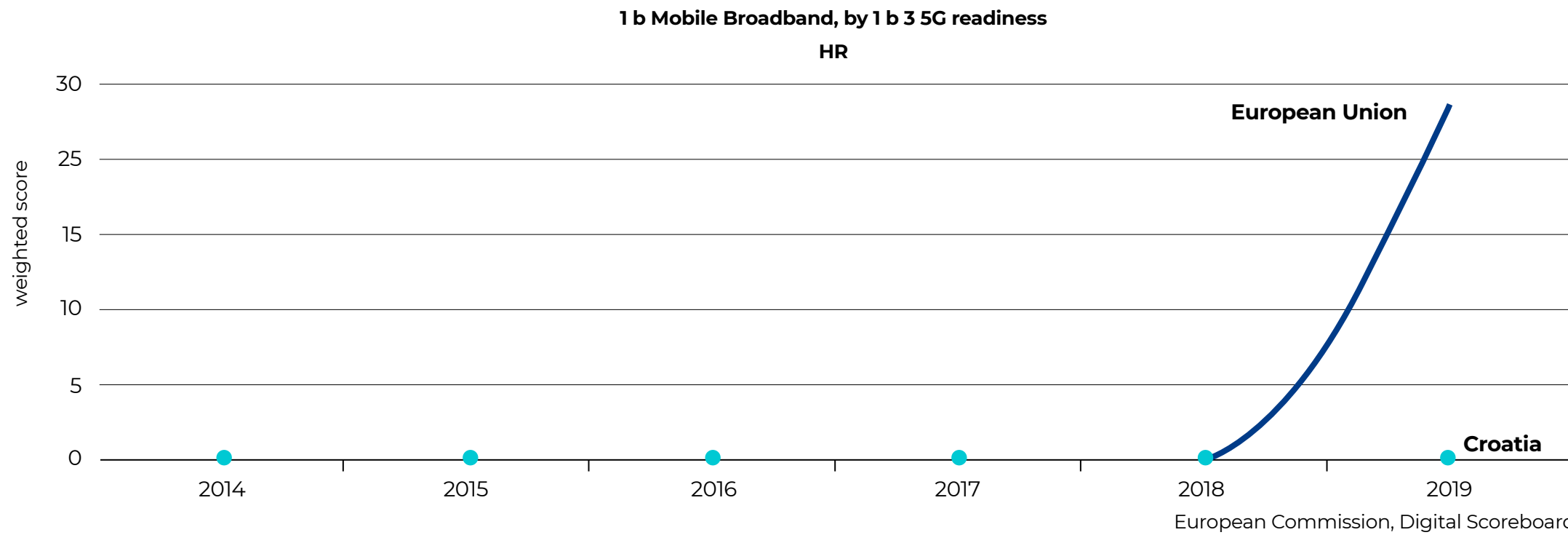


Figure 1.36. DESI category Connectivity and dimensions 1a1 to 1b2 (RU and EU), evolution over time

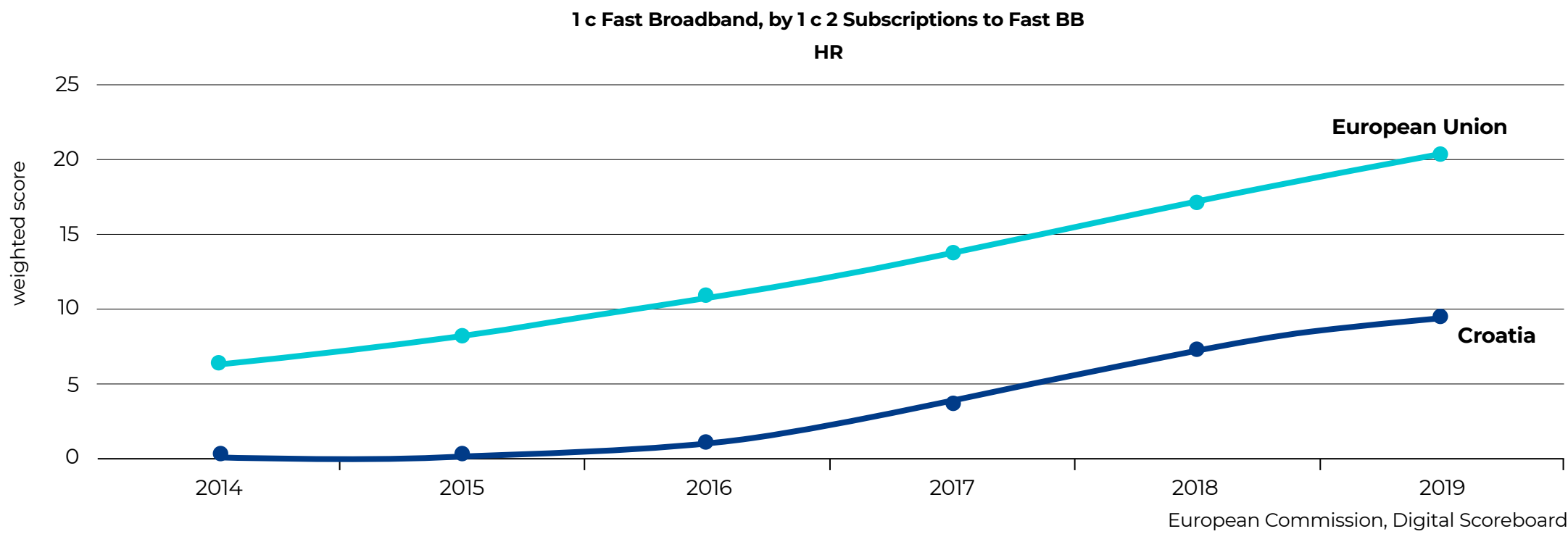
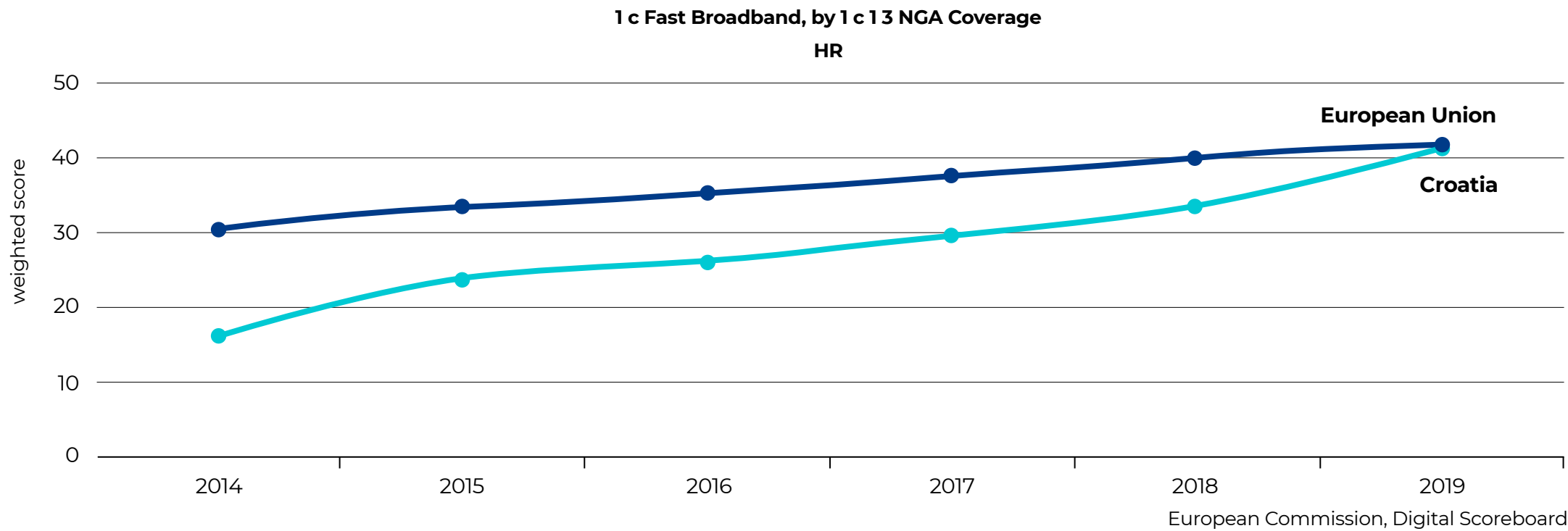
4G signal coverage reached the EU average of 94 percent. Based on the licences already issued for the use of the RF spectrum and the growth of investments in mobile networks, it is expected that coverage will further grow in line with the rest of the EU or even faster. **The number of mobile Internet users** is smaller than average, and the reason is certainly not the price. The mobile Internet price index, which is not counted and shown as a subdimension, even though the data are collected and publicly displayed in a DESI report, is on EU average. This indicates fewer digitally literate people in the Republic of Croatia than the EU average.



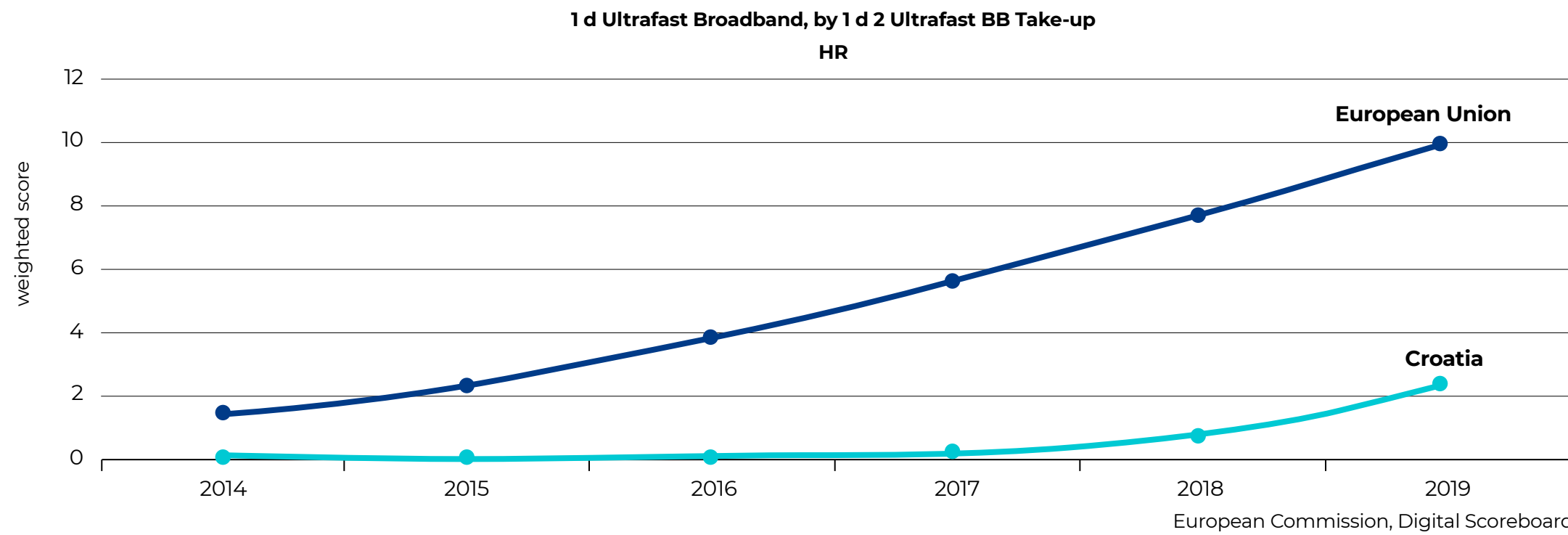
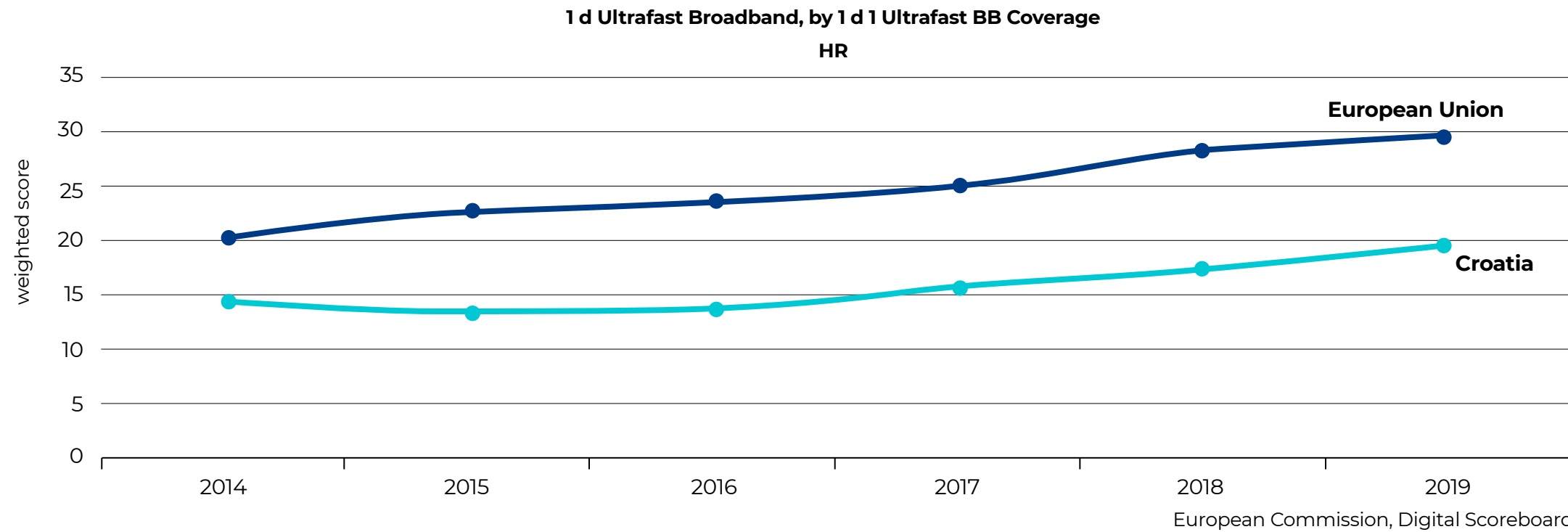
The Republic of Croatia has reached the EU average of 83 percent of households in terms of **NGA Internet access coverage**, that is, access with speeds above 30 Mbit/s.



At the same time, the **demand for NGA Internet** is half that of the EU average and is one of the largest areas for growth and improvement in indicators.



RH is the worst in the **availability and use of ultra-fast access**, that is, ports with speeds above 100 Mbit/s. Availability will certainly increase and the Republic of Croatia will reduce the gap, especially if the opportunity to invest from development funds is used, but the demand for such an Internet is proving to be a greater challenge. Without the widespread use of high-speed services, the interest of the average user should not be expected to increase significantly.



The price index is an indicator of purchasing power parity and takes into account only the supply of fixed Internet to a specific basket of products. The Republic of Croatia has been reducing the gap, and official data of indexed prices according to offers for fixed and mobile Internet are presented, in which the Republic of Croatia is much better than the 26th place. The position in indexed prices is especially better in mobile Internet. Here the Republic of Croatia is on the EU average.

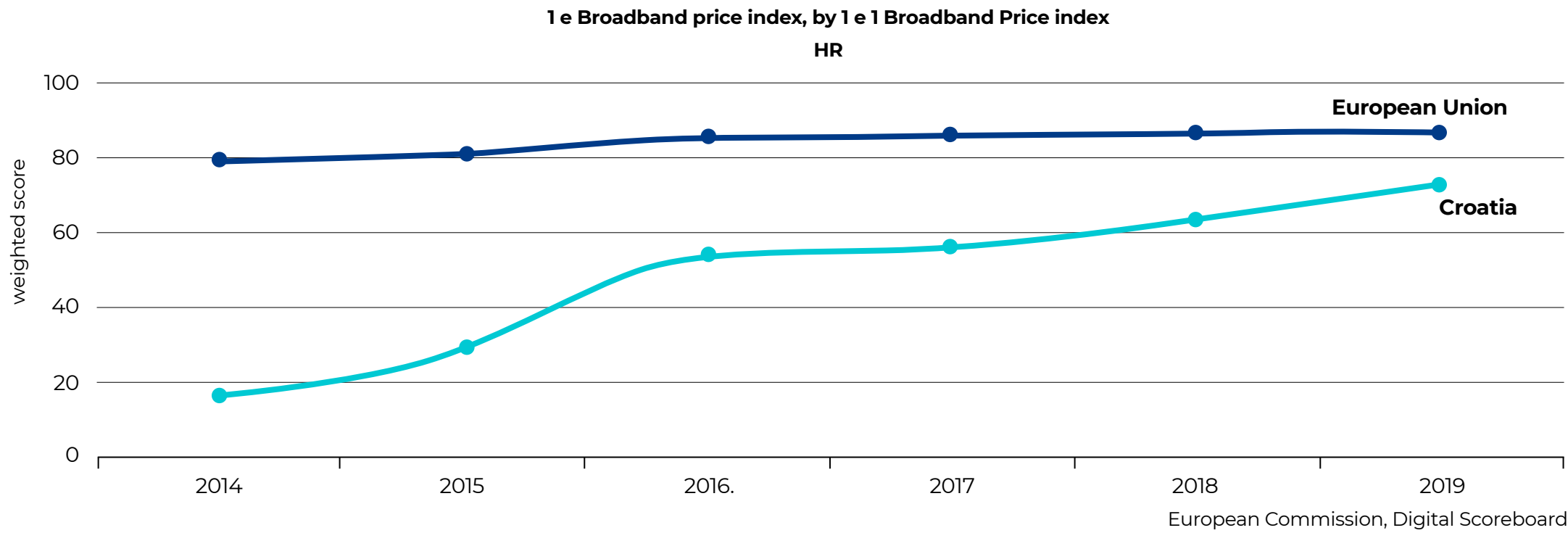


Figure 1.38. DESI dimension 1e1 (RU and EU), evolution over time

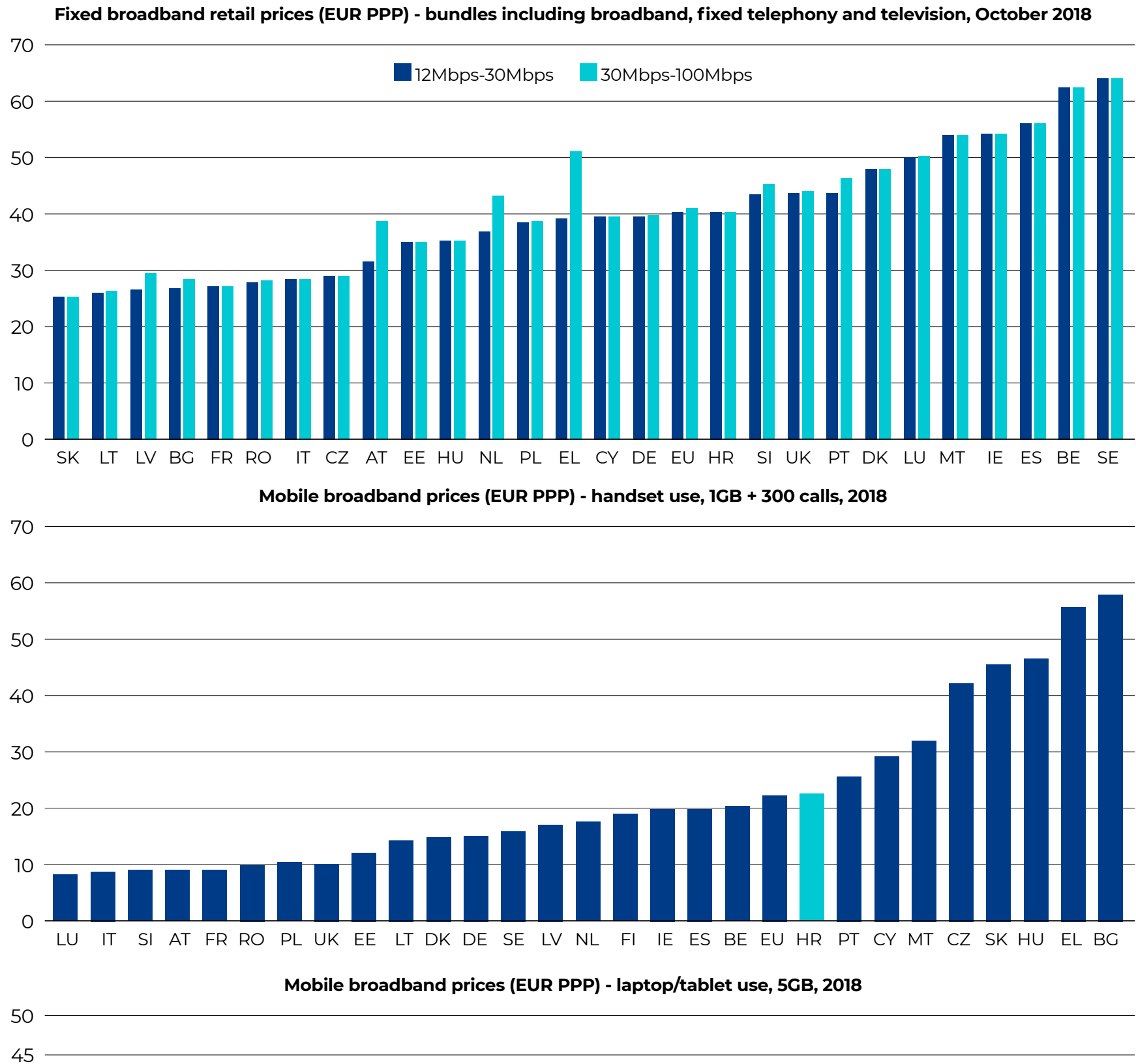
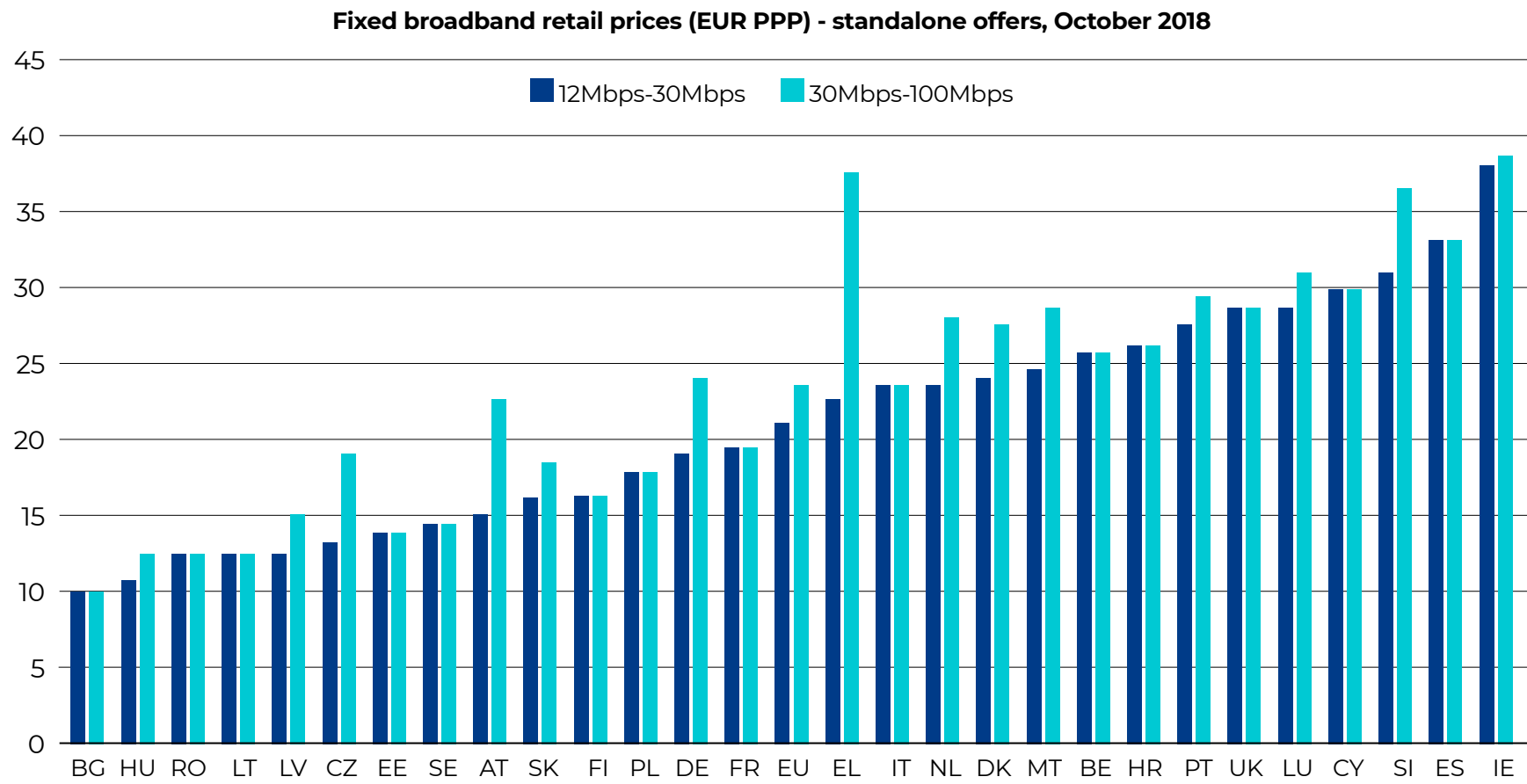


Figure 1.39. Comparison of Croatian prices from EU to PPP (Source: <https://ec.europa.eu/digital-single-market/en/node/66894>)

03

POSTAL SERVICES



MARKET OVERVIEW **34**
REVENUE **35**
POSTAL SERVICES **35**
UNIVERSAL SERVICES **36**
OTHER POSTAL SERVICES **37**



Basic indicators

Market revenue (HRK)	1.658 bn
Number of post offices	1016
Number of employees	11,853
Number of services (total)	309,549,518
Printed matter	31.82 million
Letter items	256.78 million
Parcels	20.95 million
Universal P service	185.79 million
Other P services	85.80 million
Interchangeable P Services	37.95 million

Figure 2.1. Basic data on the postal services market in the Republic of Croatia

MARKET OVERVIEW

The Croatian postal services market is fully liberalized and is part of the EU single market. Certain trends on our market are the same as in the rest of the EU, except that in some segments they are not so pronounced. The reason is that the process of liberalization in the Republic of Croatia was carried out last of all EU countries and coincided with the past economic crisis. Also, the growth and development of the postal market across the EU is heavily influenced by electronic communications services, which are increasingly replacing the use of traditional written forms of communication. Classical and other postal services are under constant pressure of change, and the result is the emergence of new business models in the provision of postal services, as well as the provision of new and innovative postal services to users.

In line with the trends in the EU postal market, in the Republic of Croatia the decline in the number of postal services continued in 2018, but it was slightly lower than in the previous year. The decline was largely driven by the decrease in the number of letter items and printed matter, while the number of parcels increased (the number has been increasing for several years in a row, primarily due to the growth of e-trade services, where postal services are an indispensable link in the supply chain). E-trade benefited, in part, letter items, as some of the smaller goods are also sent by means of letter items. The positive effects of the open market are particularly visible in international traffic. The number of provided services has been increasing year by year, so 2018 was no exception. The growth was further fuelled by cross-border e-trade delivery. These trends are expected to continue, that is, a further decline in the total number of postal services and letter items, with a simultaneous increase in parcel traffic, especially in terms of cross-border traffic, given the expected effects of the [Regulation on Cross-Border Parcel Delivery Services](#). The positive trend of higher revenues was realized primarily due to the growth of revenues from services that had some added value and therefore had a higher service cost. This is the direction in which providers should orient their businesses for further growth and development, that is, they should also focus on new services which will be even more suitable for different user requirements and include added value. Expectations are realistic within e-trade, as it has not yet reached its full potential.

At the end of 2018, there were a total of 22 postal service providers, which is the same as in the previous year, with one provider starting the business during the year, while another stopped providing services. The only universal service provider is Hrvatska pošta d.d. (HP), which acquired this right and obligation pursuant to the Postal Services Act (PSA), for a period of 15 years. In addition to the universal service, HP also provides interchangeable and other postal services and is the largest provider on the market. Out of the other notified providers, some of which operate on the global market (DHL, DPD, GLS and others), 20 were notified for the provision of other postal services, out of which three also provided interchangeable postal services, whereas only one provider was notified for the provision of interchangeable postal services. Domestic and international services were provided by 14 providers, while others provided only domestic services. The total number of postal services workers at the end of 2018 was 11,853.

REVENUES

Market revenue also grew in 2018, continuing this trend that has been present for some years, although the total number of services has been decreasing. In total, it generated more than HRK 1.65 billion in revenue, which is about 108 million more than in the previous year and represents an increase of almost seven percent on an annual basis. The largest impact on the increase in revenue was the increase in the number of parcels or value added services.

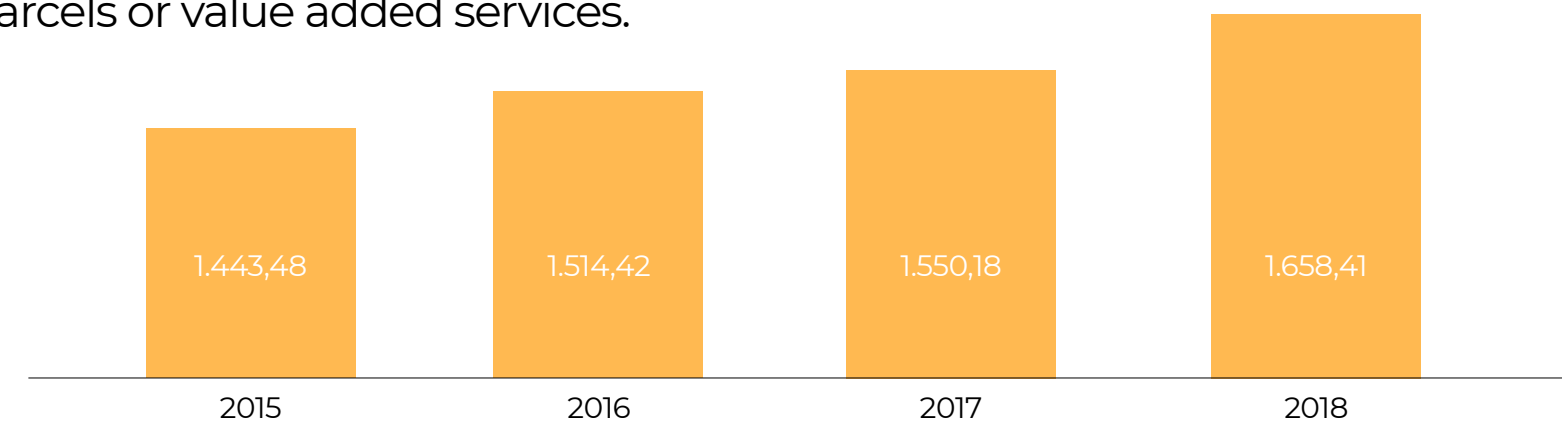


Figure 2.2. Total revenue from postal services (in HRK million)

Overall revenue was increased in all providers, but HP increased its revenue by about nine percent and other providers by 1.6 percent jointly. By increasing its revenue, HP increased its revenue share in the overall market by more than two percent and it now amounts to more than 71 percent. HP continues to derive most of its revenue from the provision of “traditional” postal services as part of universal service, and other providers from the provision of “high-value” services within other postal services. A similar situation is expected in the coming period, except that the ratio of revenue generated will change and the income from “high-value” services will increase, while the “traditional” ones will decrease.

POSTAL SERVICES

The total number of postal services has been steadily declining for several years, with 2018 being no exception when as more than 309 million services were realized, down 2.6 percent from the year before. This trend was expected as such trends are also present in other European postal services markets.

POSTAL SERVICES

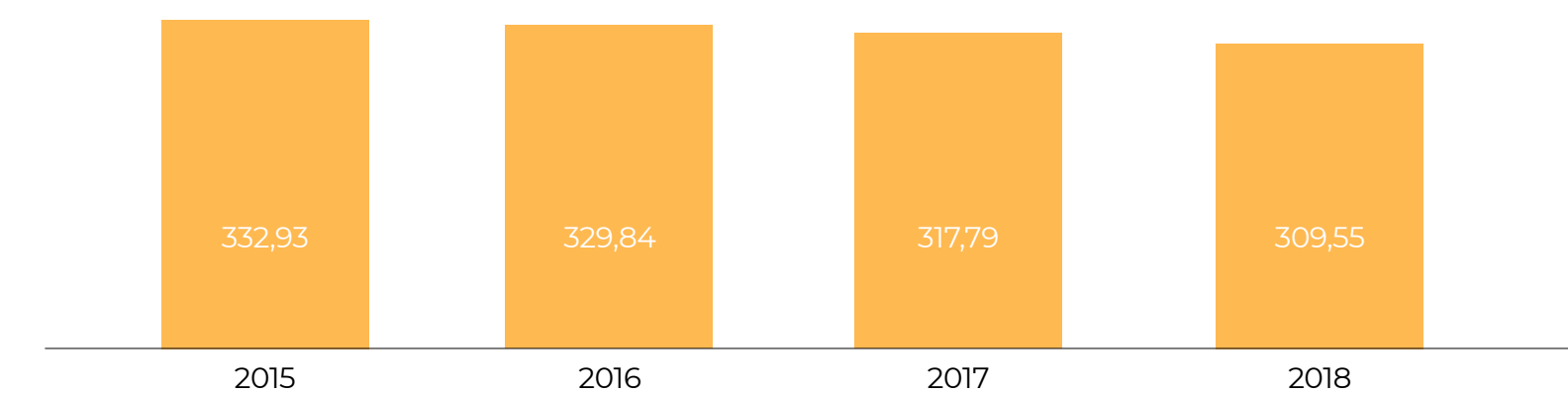


Figure 2.3. Total number of postal services (in millions)

Nearly 92 percent of services were provided in domestic traffic, which is about two percent less than at the beginning of liberalization. The EU single and open market, of which the RoC postal services market is a part, has particularly influenced the increase in international incoming services which grows year by year, primarily due to e-trade services. International traffic is expected to continue to grow, including growth in the number of services and market share since in 2018 the Regulation on Cross-Border Parcel Delivery Services came into force. The Regulation aims to increase price transparency and protect users and use the potential of e-trade.

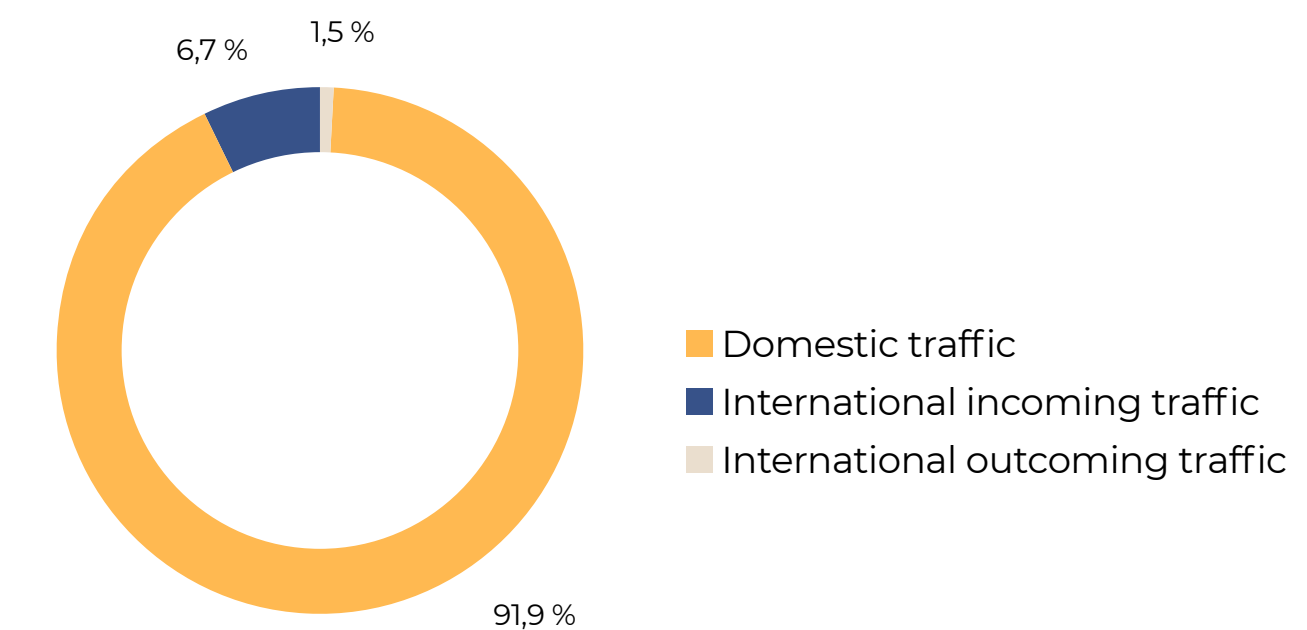


Figure 2.4. Shares of postal services by types of traffic

HP is the leading postal service provider and has increased its market share by the number of services provided. HP maintained almost the same number of postal services compared to the previous year, while other providers dropped 15 percent, primarily as a result of the decline in interchangeable service providers and direct mail and printed matter.

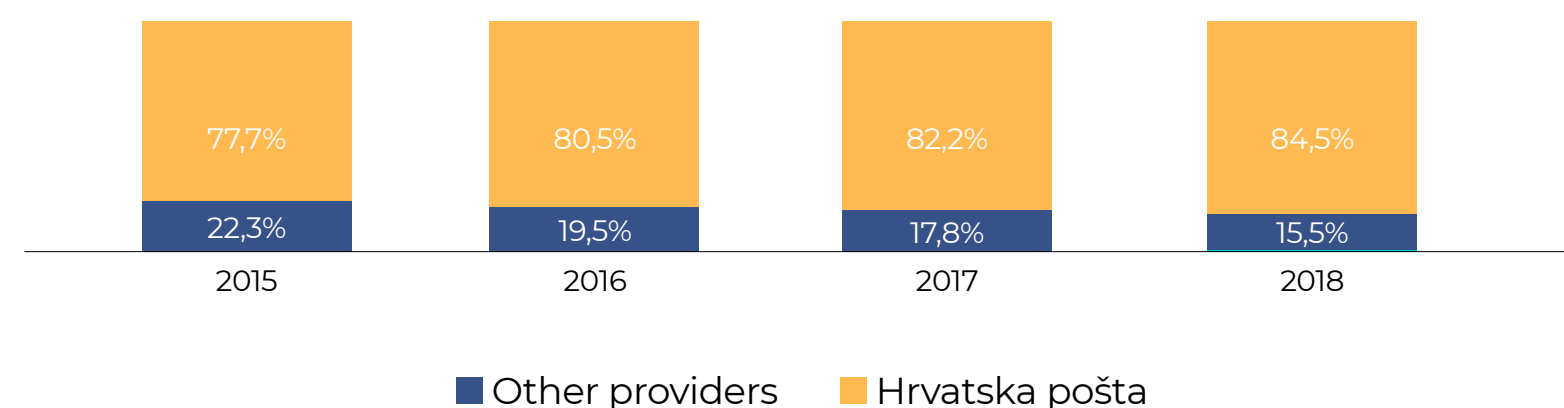


Figure 2.5. Provider market shares by number of services provided

Universal service, with a 60 percent share, has the highest share of total postal services in 2018. Other postal services follow with around 28 percent, with the lowest share being interchangeable postal services.

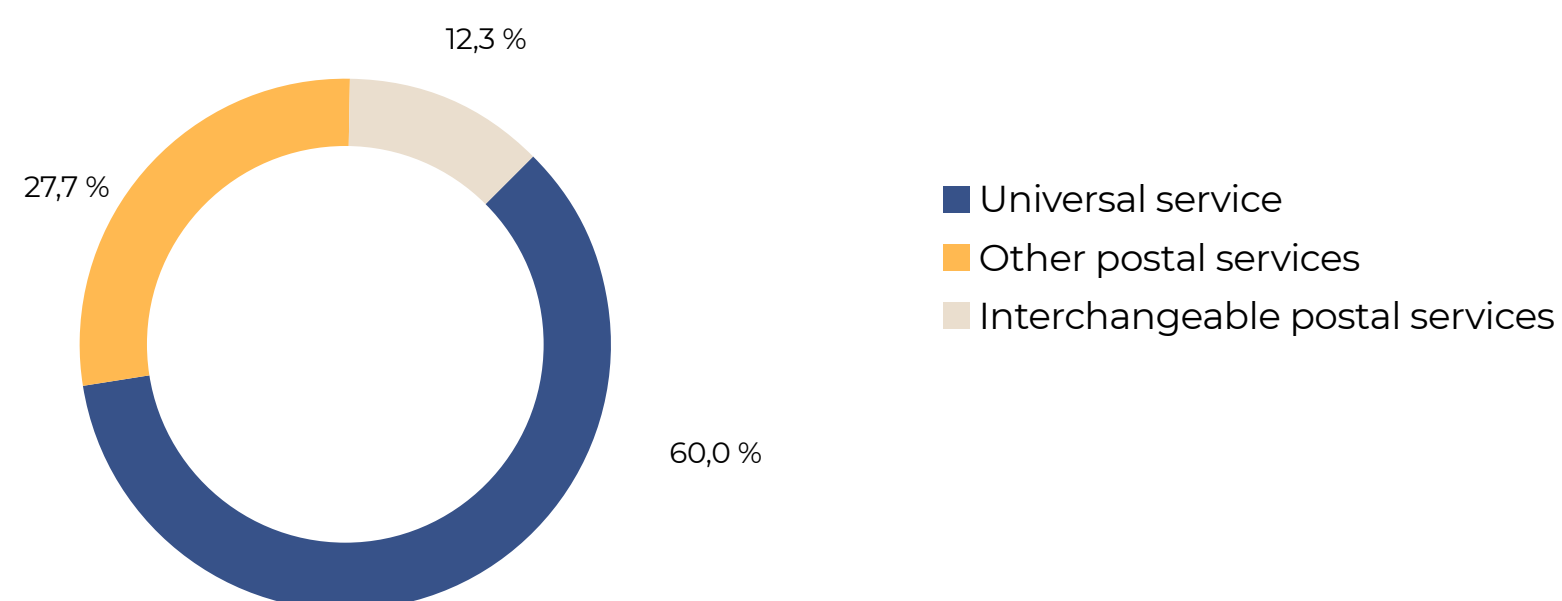


Figure 2.6. Shares of types of postal services

In line with global and EU trends, the number of letters items and printed matter continued to decline, while the number of parcel related services increased. The number of letter items decreased by about four percent, while the number of parcels increased by about 12 percent. The growth in the number of parcels has been present for several years now, and the share of parcels in the overall market has been increasing comparatively, with the share of parcels increasing by one percent compared to the previous year, amounting to seven percent. Continuation of such trends is expected in the coming years, and the drop in the number of letter items is certain, given that written communication is being replaced by more modern ways of communication. Unlike written communication, the transfer of goods by parcels cannot

be replaced so the increase in the volume of e-trade – a two-digit increase – is expected to cause an increase in parcel services.

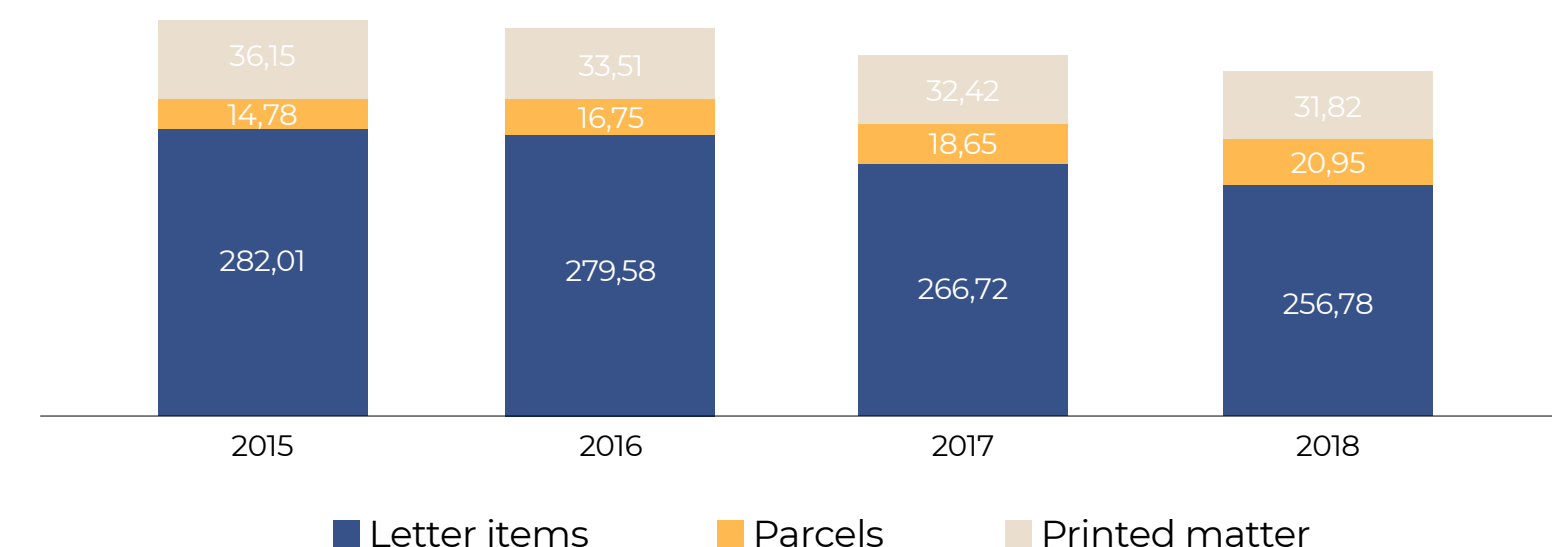


Figure 2.7. Number of postal items by type (in millions)

UNIVERSAL SERVICE

The provision of universal service is of interest to the Republic of Croatia and must be provided to all users throughout the Republic of Croatia under the same conditions. Universal services include domestic and international services. HP is designated as the universal service provider in the Republic of Croatia, which in 2018. realized a total of 185,792,981 universal services, down about one percent from the previous year. Although expected to decline, it is smaller than in other EU Member States. It is certain that the downward trend will continue in the coming years as written communication, which is dominant in the universal service, will be replaced by more modern modes of communication.

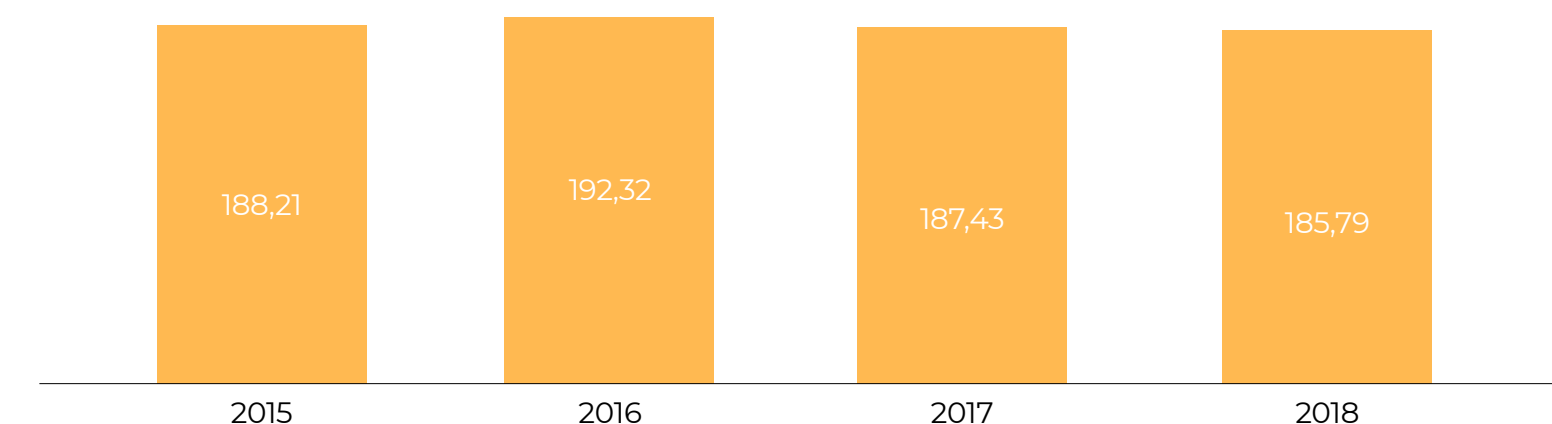


Figure 2.8. Total number of services within the scope of the universal service

(1) Universal service comprises postal services in internal and international traffic: clearance, sorting, transport and delivery of items of correspondence up to 2 kilograms, parcels up to 10 kilograms, certified postal items and insured items, cecograms up to 7 kilograms and sorting, transport and delivery of parcels up to 20 kilograms in international incoming traffic.

Universal service accounted for 60 percent of total services, an increase of one percent over the previous year. The decrease in the number of services did not affect the decline in revenues, so in 2018, HRK 865.85 million was generated, which is about five percent more than in the previous year. Primarily due to the revenue generated from the delivery of registered shipments and parcels.

Letter items with 83% share have the highest share in universal service, followed by registered items, with no significant changes in the shares compared to the previous year.

The postal services market also provided interchangeable postal services, which were provided by four other providers in addition to HP, the universal service provider. The negative trend continued, with a total of 37,952,715 interchangeable services being realized, down 21 percent from the previous year. The decline is largely the result of the “spillover” of these services into services from the scope of universal service and the fact that some providers are no longer place them in the main focus of their business. Interchangeable postal services accounted for about 12 percent of the total postal market, generating a total of 83.4 million in revenues. The number of interchangeable services is projected to decline further.

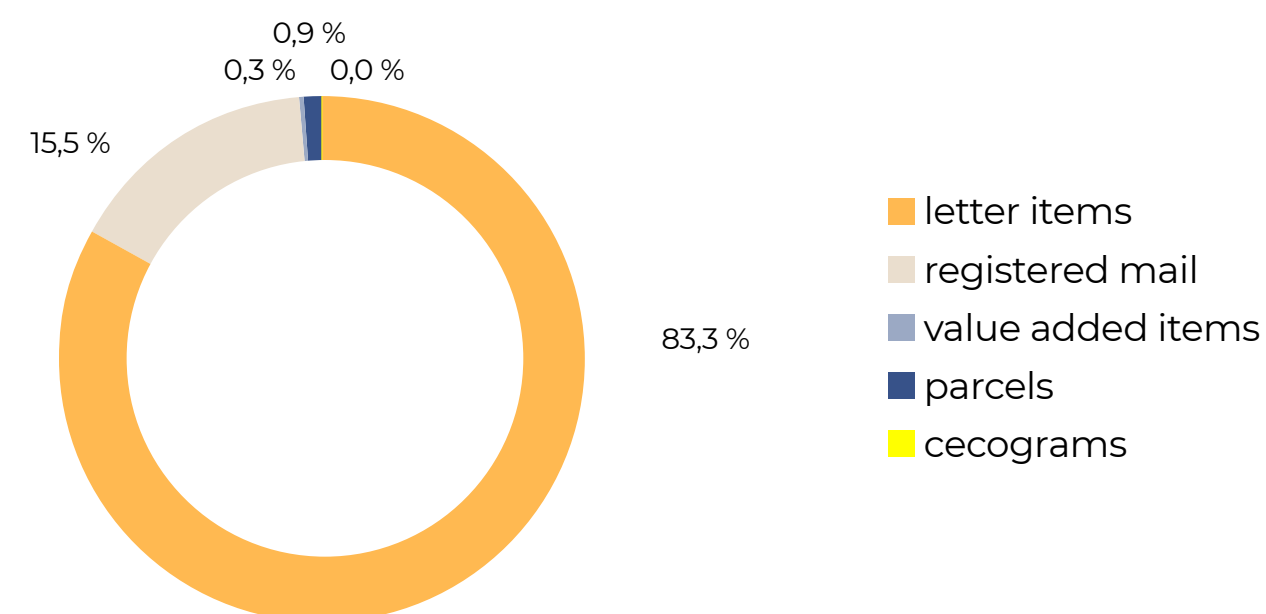


Figure 2.9. Shares of services rendered within the scope of universal service by type

OTHER POSTAL SERVICES

Other postal services are also part of postal services, which are basic postal services (letters and parcels) that have some added value, that is, express parcels and printed matter and direct mail. A total of 85,803,822 other services were realized, which is about four percent more than in the previous year

(2) Interchangeable postal services are postal services within the scope of universal service, which may deviate from the conditions of universal service, such as the obligation to provide daily delivery or the provision of services throughout the country.

(3) Direct mail – a postal item communication consisting solely of advertising, marketing or publicity material and comprising an identical message, except for the addressee's name, address and identifying number as well as other modifications which do not alter the nature of the message, which is sent in at least 500 copies.

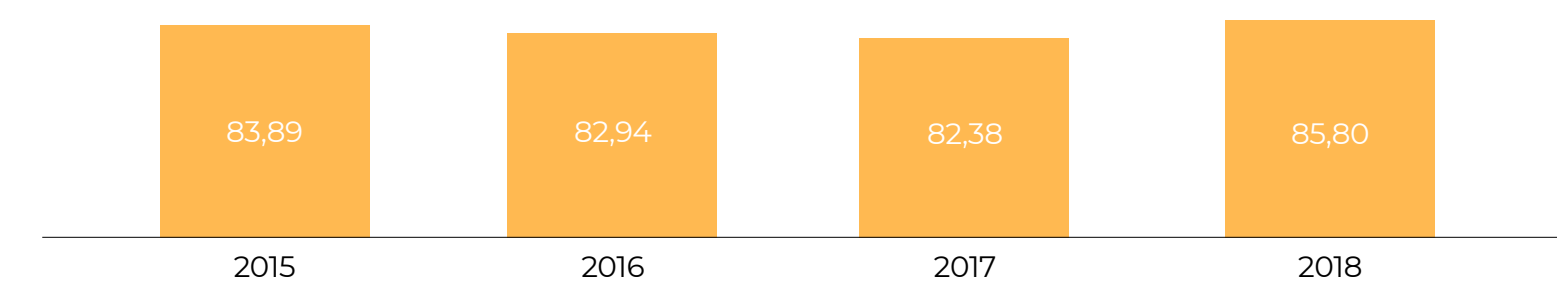


Figure 2.10. Total number of other postal services (in millions)

Competition is the greatest in this market segment, because almost all providers in the market provide these services, with most providers providing exclusively other postal services. The reason is the greatest ability of providers to provide services tailored to meet the new needs and requirements of users, thereby increasing their revenue.

This primarily refers to the part of services that appear within e-trade and have some added value. Given that these are increasingly demanding services, which have the highest potential for growth and development, the trend is expected to continue.

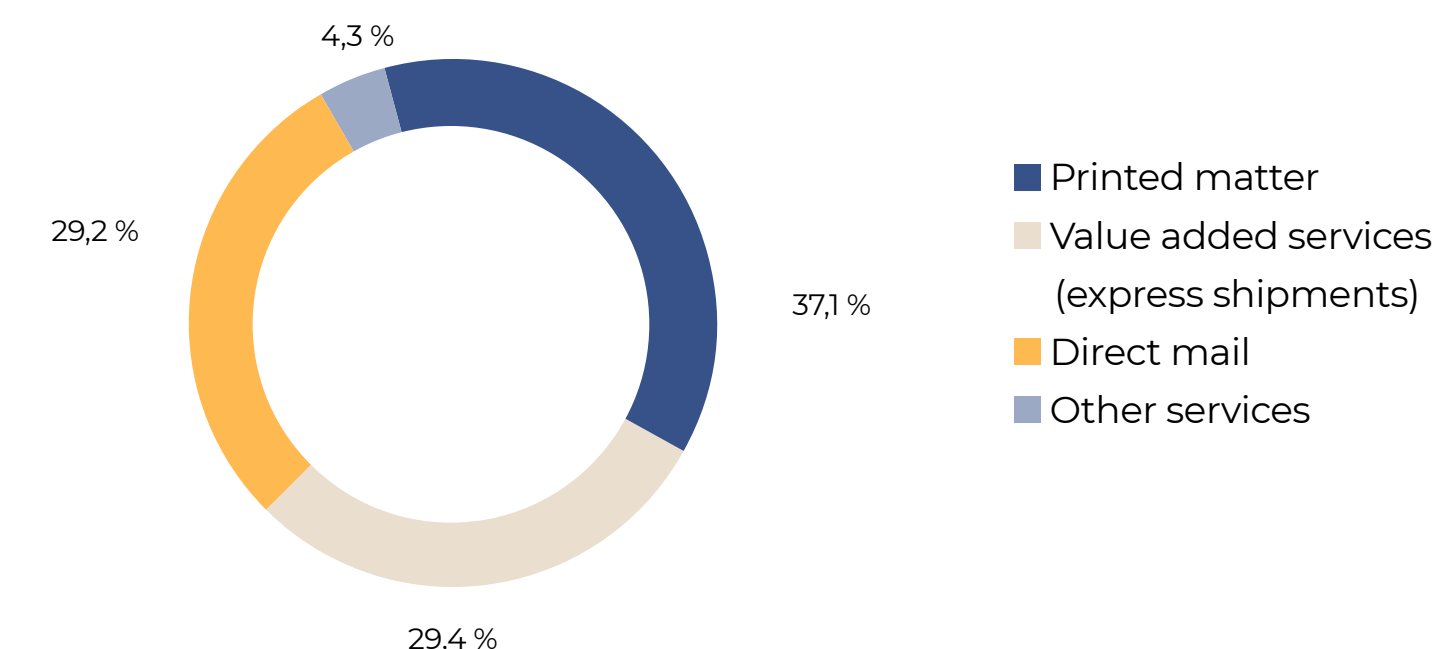


Figure 2.11. Shares of services realized within the scope of other postal services by type

Other postal services provided a total of 709.2 million revenue, which was about 12 percent more than the previous year. Although other postal services account for only about 28 percent of all services on the market, they accounted for about 43 percent of total revenue, which is two percent more than in the previous year. Other postal services include high-value services, which in 2018 accounted for about eight percent of the total market, and generated more than 35 percent of total revenue. If providers want to ensure further growth and development, they should take advantage of the opportunities offered by other postal services. It primarily refers to the potential of e-trade services, that is, high-value services.

REGULATORY ACTIVITIES

As in the previous years, HAKOM continued its activities of proactive and corrective action in the postal market, which were primarily aimed at stimulating competition and investing in the postal sector, protecting users of all postal services and ensuring the efficient provision of universal service. The focus of the activity was on all stakeholders in the market in the Republic of Croatia, education of postal service users and protection of their rights, supervision of postal service providers (especially the universal service provider in terms of quality of universal service provision), accounting separation, net universal service cost and analysis and assessment of the effectiveness of the universal service.

As part of its regular activities, data, notices and other documents were collected and published for the purpose of monitoring and analysing the state and development of the postal services market. The position of the independent postal market regulator in recent years has been strengthened by frequent contacts and cooperation with all market stakeholders, and in particular with all postal service providers in order to develop the market. In 2018, HAKOM organized a round table for stakeholders in the postal services market with the participation of representatives of the academic community. Discussions were initiated on topics and challenges common to all stakeholders and a “Market Day” was established, where stakeholders were introduced to HAKOM’s most significant activities and plans.

Part of the activities was focused on harmonizing the applications and general conditions of postal service providers when changing their business and on one new provider, which in 2018 applied for postal services provision. Regulatory activities were also focused on ensuring the sustainability of universal service provision, with particular emphasis on maintaining quality and accessibility, as well as price acceptability for all users throughout the Republic of Croatia.

Accounting separation (regulatory report)

An independent audit of the regulatory financial statement and the universal service provider’s cost model was conducted. In accordance with [the Instructions on Accounting Separation and Cost Accounting](#), HP submitted to HAKOM the documentation about the cost model and the Regulatory Financial Statement for 2017, and HAKOM initiated the audit procedure over HP’s Report and cost model and hired the independent auditing company BDO Hrvatska d.d. (BDO) to verify that HP’s regulatory report and cost model were in accordance with the Guidelines. During the audit process, BDO confirmed that the 2017 regulatory report and cost model of HP were in all key respects prepared in accordance with the provisions of the Guidelines and the accounting records.

In October 2018, HAKOM issued a [Statement of Compliance](#), confirming that HP’s 2017 Regulatory Financial Statement complies with the requirements of the Guidelines in its form, content and methodology.

Universal Service Provider Net Cost

The calculation of the universal service provider’s net cost and the estimation of an unfair financial burden were also carried out pursuant to the PSA and HP’s claim for universal service cost reimbursement. The costs represent an unfair financial burden in 2017 with the accompanying Commercial Scenario, annual Financial Statement and the independent auditor report for 2017, and by calculating the actual net cost of HRK 92,231,783.

HAKOM hired the independent auditing company BDO to verify the calculation of the net cost submitted upon HP’s request and sought an opinion on the Commercial Scenario as well. In addition, a series of workshops were held with representatives of the independent audit company and HP to discuss certain elements of the net cost calculation. BDO submitted the Commercial Scenario Report and the HP net cost calculation for 2017 which found that in certain elements HP’s calculation was incorrect, that is, the independent auditor concluded that instead of HRK 92,231,783, as shown in the attached Commercial Scenario and the calculation of the net cost for 2017, the net cost amounted to HRK 79,797,020, which means it was lower by HRK 12,434,763. In November, a [Decision](#) was adopted which found that the amount of HRK 79,797,020 represented an unfair financial burden for the universal service provider HP in 2017.

Analysis and evaluation of the performance of universal service

The new regulatory activity, an assessment of the performance of HP as the universal service provider, was performed ex officio. The independent audit firm, BDO, was hired for the purpose of the assessment, and the aim was to collect and process data through a comprehensive analysis of key business performance indicators from the universal postal service segment and to compare HP’s effectiveness with other national universal postal service providers in EU Member States. During the process, an “internal benchmark analysis” of HP’s mail process efficiency and an “external benchmark analysis” of HP’s efficiency were conducted, identifying key differences in efficiency and capacity, that is, HP’s ability to improve and increase the overall performance of universal services. HAKOM held several expert workshops with representatives of BDO and HP consultants to further analyse the possible steps of both HAKOM and HP for overall improvements and increase of overall efficiency for the next regulatory period.

Quality of universal service performance

Within its regulatory activities in 2018, HAKOM paid great attention to meeting the prescribed standards of quality of universal service provision. Quality is one of the most important elements of user satisfaction, and the meeting the prescribed quality standards is an objective pursued by all EU Member States within the single market for postal services. The quality criteria and conditions are prescribed by the PSA

and the Ordinance on the Performance of the Universal Service, and one of the quality parameters is ensuring the delivery of postal items within the prescribed deadlines, which is carried out by measuring the time of transfer of certain postal items from clearance to delivery and measuring the number of complaints and compensation claims in accordance with the prescribed standards.

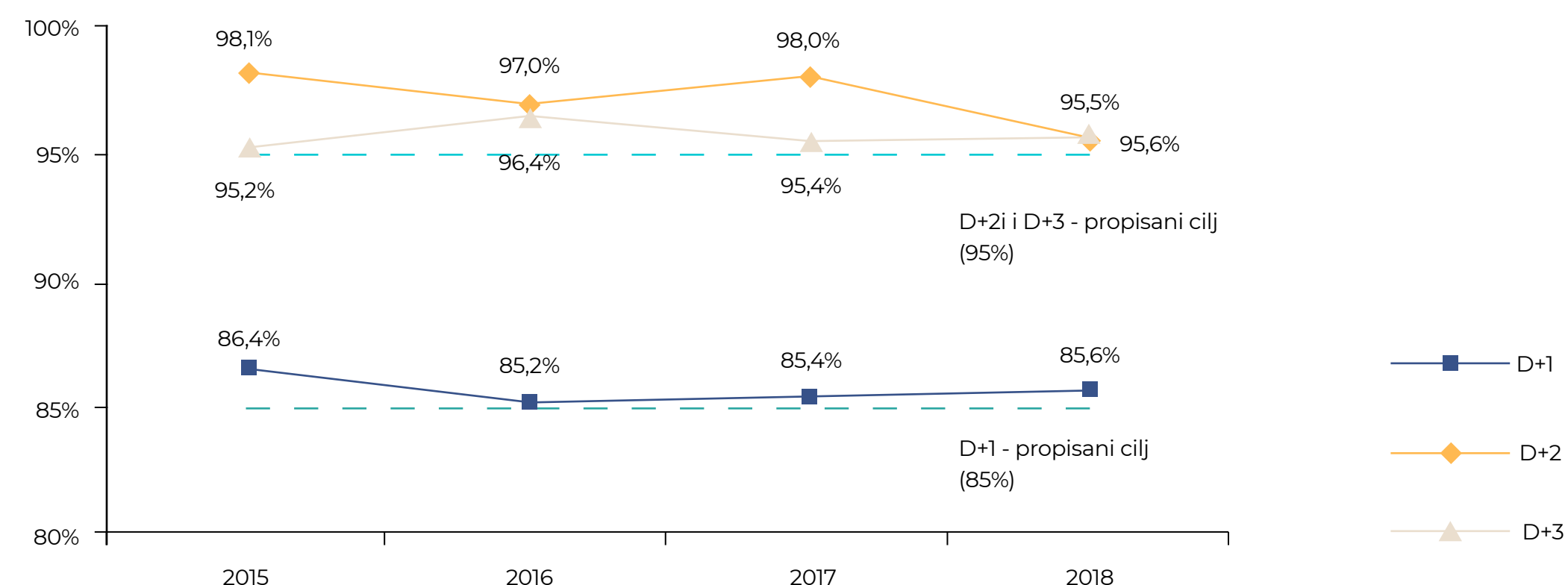


Figure 2.12. Measuring the quality of universal service in domestic traffic

Measuring the quality of transfer of priority postal items in international postal traffic between the Republic of Croatia and other EU countries has shown some improvement compared to the previous year, but all the prescribed quality criteria are still not met, since within D+35 limit 71.5 percent of shipments were delivered, and within the D+5 93.5 percent of shipments were delivered. HP stated that EU measurement results show that HP is no exception as the quality decline continues across the EU, and that there are certain factors affecting quality that HP has no influence on (airline delays, destination post offices do not accept shipments / shutdowns from the airline and similar). The quality of universal service in domestic traffic was measured by the transfer of priority and non-priority letter items, and the obtained results showed that all the prescribed criteria were met.

By measuring the number of universal service complaints and damage claims, in 2018 HP received 33,848 user complaints, of which 64 percent concerned domestic traffic and the rest concerned international traffic. More than 91 percent of complaints were resolved within the legal deadline, and the most common reasons for filing were due to loss of shipment and exceeding the deadline for delivery.

The quality of the universal service provision is also reflected in the universal service provider's postal

network. The PSA stipulates that a universal service provider is obliged to establish, maintain and develop a postal network to ensure universal service provision throughout the territory of the Republic of Croatia, and it also stipulates the density of the access point network (a network of post offices must be organized so that one post office operates on an area of up to 80 km² on average, or a maximum of 6000 inhabitants, and there must be a minimum of 700 regular post offices).

HP has fully complied with the prescribed access point network density and in 2018 it did not change compared to the previous year. At the end of 2018, there were a total of 1016 post offices distributed throughout the Republic of Croatia, 30 percent above the legal minimum. HP also proved to be a socially sensitive company, as closing down unprofitable post offices, primarily located in sparsely populated areas (islands, mountain areas, etc.), would reduce the quality of life. HP did not close offices to streamline its operations, but chose a model for relocating post offices, that is, finding new locations with a higher frequency of people. For this reason, in 2018, several offices were relocated to shopping centres. Working hours were changed in a number of post offices to accommodate organizational changes, user needs, and further streamline their operations. Most of the changes were related to shortening of the working hours, with no significant impact on the quality of universal service performance. Two providers used access to HP's postal network in accordance with the PSA.

Other regulatory activities

In 2018, HAKOM also continued to monitor the situation on and development of the postal services market and periodically collect statistical and other data. The processed data was used to create the various analyses which enabled better insight into the postal services market, but also responding to different requirements, questions or queries. The most important indicators of the state of the postal services market in the Republic of Croatia were regularly published on HAKOM's website, and were additionally presented through media releases.

Databases and a register of postal service providers were kept, and a list of providers was published on the website. In 2018, several expert opinions and explanations were given regarding the application of the PSA and the regulations adopted pursuant to the Act, with participation in the drafting of implementation plans and other documents related to the development of the postal market in the Republic of Croatia.

An analysis of the situation in the postal services market in the Republic of Croatia was initiated to determine whether there were any other postal service providers other than HP that could provide the universal service.

Good practice from the previous years was continued, and HAKOM provided postal service users every day with information on various queries related to the provision of postal services, as well as other "postal" questions via a direct telephone number.



04

RAIL SERVICES

MARKET OVERVIEW **42**
USE OF INFRASTRUCTURE **44**
TRANSPORT INDICATORS AND REVENUE **45**
HŽI REVENUE **46**

As undertakings in the railway services market, railway operators compete equally in the provision of both rail transport and rail services and they develop their businesses, while HAKOM takes all measures to ensure unhindered and non-discriminatory access to railway operators or applicants to the railway infrastructure capacity of rail services. The railway is one of the most efficient and environmentally friendly means of transport and, as such, has a great potential for reducing the harmful impact of greenhouse gas emissions on the environment and improving the citizens' quality of life, as evidenced by the fact that the rail sector has committed to reducing emissions by 30 percent until 2020. Rail transport has a strong impact on the economic and socio-economic development of all countries, and the geo-strategic position of the Republic of Croatia enables the positioning of rail transport on one of the most important international corridors, the Mediterranean TEN-T Corridor.



Figure 3.1. Basic information on the railway market in the Republic of Croatia

Basic market indicators	
Market Revenue (HRK)	1,658bn
Length of rail lines in the RoC	2,605 km
Number of freight carriers	8
Number of passenger carriers	1
Seaports	4
Inland waterway ports	3
Goods transported (t)	13.8 million
Total number of train kilometres	21.3 million
Total net tonne kilometres	2.7 billion
Train kilometres in freight traffic	6 million
Transported passengers	20.3 million
Realized passenger kilometres	755.6 million
Realized train kilometres in passenger transport	15.3 million

MARKET OVERVIEW

The only railway infrastructure manager in the railway services market in the Republic of Croatia is HŽ Infrastruktura d.o.o. (HŽI), which is also the largest service facilities operator. Rail services are provided by service facility operators, as well as other legal entities whose primary activity is not rail transport, which contributes to the complexity of this specific market. With the increase in the number of railway undertakings, the need for the development of the rail services market is more pronounced in terms of providing services required for auxiliary operations and train preparation, such as train formation and disformation, coupling, uncoupling, garaging, weighing, fuel supply and similar. The market of railway service facilities and services available in them requires additional measures to make the services transparent, but there is no database or register of service facilities and services available at the facilities. According to the [Commission Implementing Regulation \(EU\) 2017/2177 on Access to Service Facilities and Rail-Related Services](#) all service facility operators from 1 June 2019 must make the Service Facility Description public and available free of charge.

In 2018, all service facility operators were informed of the obligation to disclose information, and a roundtable discussion was held with stakeholders of the rail services market. Insufficient knowledge of obligations and lack of recognition of railway companies as service facility operators, as well as neglect of service obligations, are some of the key challenges of service provision in service facilities and access to the very service facilities. Further efforts will be directed towards resolving the situation with service facilities and services in order to provide transparent and quality rail transport services. At the end of 2018, there were eight freight rail carriers operating in the Republic of Croatia, six of which registered in the Republic of Croatia and two in other EU Member States. Transport was realized by 7 carriers, while the last carrier on the market received a *Licence to perform rail transport services within the Union and in the European Economic Area*, issued by the Ministry of the Sea, Transport and Infrastructure, but did not start freight transport.

There is still only one passenger railway operator on the market - the incumbent railway undertaking HŽ Putnički prijevoz d.o.o..

RAILWAY INFRASTRUCTURE

Railway infrastructure is a public good in general use and is owned by the Republic of Croatia, managed by the Infrastructure Manager HŽI who, under the Railway Act (RA), is obliged to enable all interested railway undertakings to use the infrastructure under equal, transparent and non-discriminatory terms. Pursuant to the same Act, HŽI is obliged to issue and publish a Network Statement (NS), the purpose of which is to inform applicants for infrastructure access about charging principles,

principles and criteria for the allocation of infrastructure capacity, and information conditions of access to service facilities and the provision of services in the service facilities. Pursuant to the relative legal basis, HŽI published the Draft Network Statement and the Statement within the stipulated deadline. HAKOM systematically monitors the legality and accuracy of published information and its application and participates in joint preliminary meetings of the Infrastructure Manager and the operators prior to the publication of the NS. In November, HAKOM participated in a meeting on objections expressed by three railway operators in relation to the 2020 Draft NR. HŽI must publish any amendments to the NR on its website. The 2018 NR was in force in 2018, and it referred to the period from 10 December 2017 to 8 December 2018, and HŽI saw three amendments, all duly made public on the HŽI website.

The length of railway infrastructure in the Republic of Croatia has not been changed since 2017, so HŽI operated a network of 2605 km of railway lines and maintained 545 stations and stops, 1511 railway-road crossings, 109 tunnels, 544 bridges, 3877 culverts and 4263 switches. HŽI is responsible for the organization and the regulation of the railway traffic, the reconstruction, maintenance and construction of the rail infrastructure. Quality can also be monitored by the speed of transportation, and so in 2018, 49 percent of the rail network had a maximum speed of up to 80 km/h, 17 percent of the network allowed speeds above 100 km/h, and six percent of the network was out of traffic. 241,301 trains were in transport on the railway network.

The railway lines and tracks on the territory of the RoC have standard gauge track, that is, 1435 mm. Of the overall length of railway lines, 2,351 kilometres or 90.25 percent are single-track lines, and 254 kilometres or 9.75 percent are double-track lines. The share of double-track railway lines in the total sum of the length of railway lines remains unchanged compared to 2017.

The electric traction system has not been changed since 2015, and neither has the overall length of the electrification, whereby only 980 kilometres of the railway lines are electrified. The alternating current system of electrification, 25 kV 50 Hz, electrified only 977 km, only 3 km with the 3 kV alternating current system, which together represents only 37.62 percent of the overall length of railway infrastructure. The European average of electrified lines in 2018 was greater than 52 percent. It is indisputable that there is a need for further electrification and modernization of the traction power supply system in order to achieve reliable and high-quality rail transport services, as well as to meet the White Paper criteria. The importance of electrification lies in the fact that rail transport could thus seriously compete with other modes of transport, in particular road transport. In addition to competitiveness, electrification also has a strong effect on reducing greenhouse gas emissions.

INVESTMENTS

Unlike the road, the railway is only used for rail traffic. Bearing in mind the characteristics of traffic infrastructure that differentiate traffic from other industries and individual traffic industries, it should be emphasized that investments in the railway infrastructure have, in addition to creating new values, indirect effects that are a prerequisite for the development of the rest of the economy and society. Continuous maintenance, replacement and modernization of the railway infrastructure is necessary, and in the RoC this is not implemented quickly enough in relation to market needs. In 2018 a little over 12 km of railway lines were built and 20.56 km were renewed and upgraded. An efficient absorption and utilization of EU funds, the exchange of information, and cooperation among all interested parties in railway traffic are key to maximizing the use of available resources from EU development funds and to a faster modernization of an outdated railway infrastructure. The figure shows HŽI investments, some of which started in the previous years and continued into 2018, and some are planned for the future.

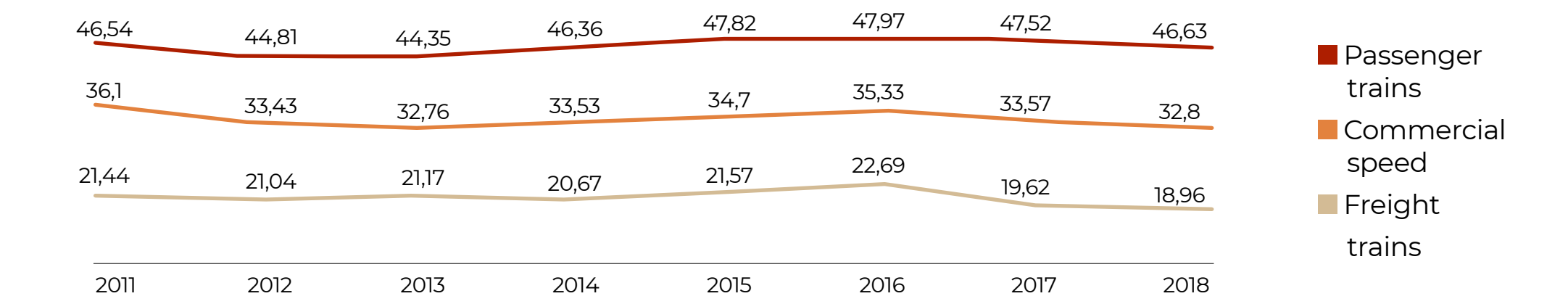


Figure 3.2. Average train speeds on Croatian lines (km/h)

The most important indicator of transport quality, in addition to as small a number of unforeseen events and line closures, is the commercial speed of trains which has been decreasing for two years. Irregular maintenance and insufficient investment into the railway infrastructure have caused reduced capacity in recent years, but also speed limitations, increased breakdowns, unforeseen events causing the trains to be delayed and directly affecting the transport quality.

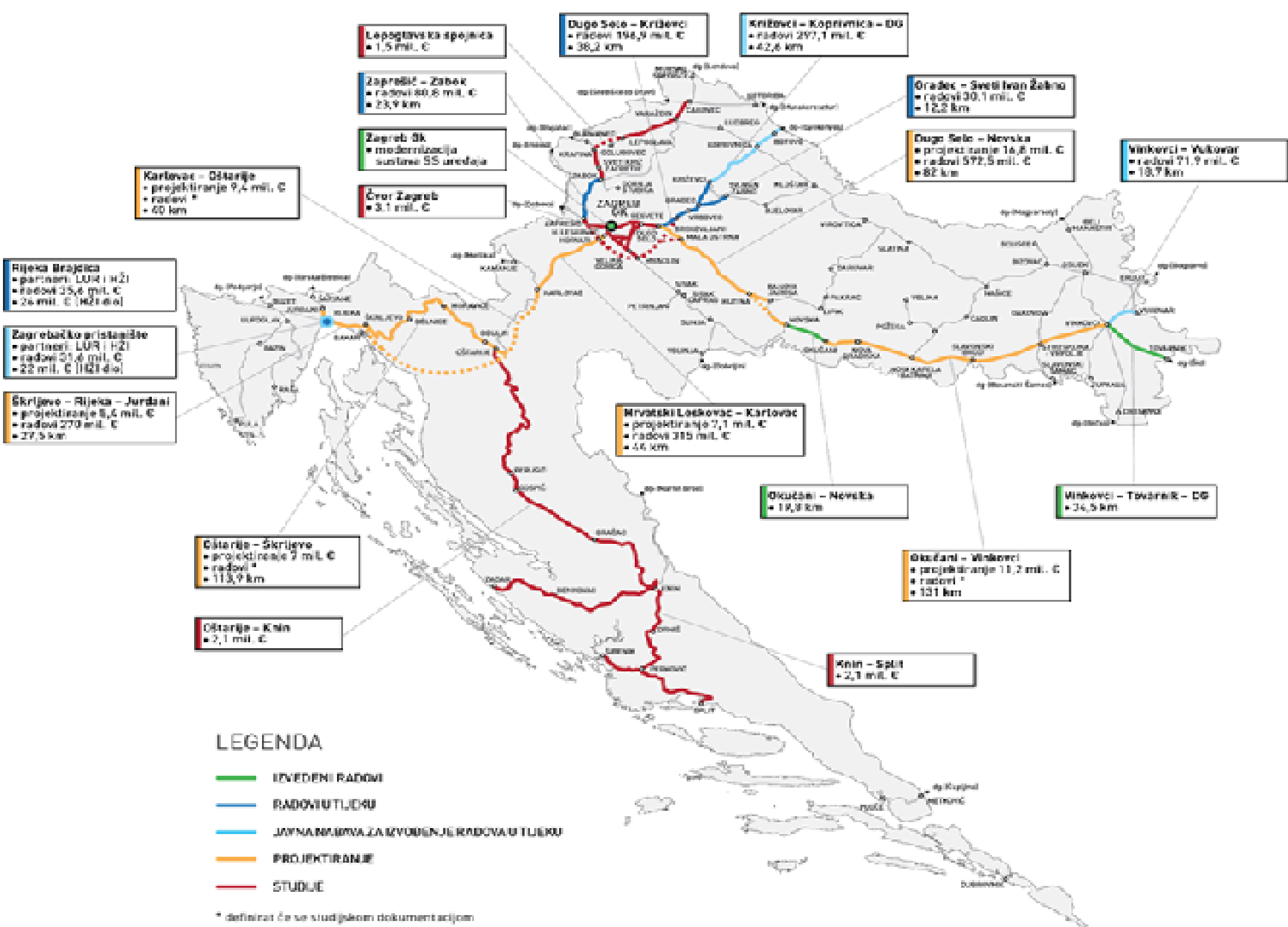


Figure 3.3. Projects implemented by HŽ infrastruktura (Source: HŽI)

USE OF INFRASTRUCTURE

On the rail services market the Railway Act regulates the relations between the infrastructure manager, operators, service facility operators and applicants for infrastructure capacity. HŽI, as the only railway infrastructure manager in the RoC, is obliged to provide rail services to everyone fulfilling the requirements. Operators of service facilities have the same obligation, among which the largest operator is HŽI.

The RA defines rail services as follows:

1. minimum access package - processing of requests for infrastructure capacity, rights of use of allocated infrastructure capacity, use of infrastructure (including railroad crossovers and hubs), tra-in traffic management (including signals, regulation, handling of trains and communication and provision of information on train movements), use of equipment for the power supply necessary for power engines and all other information necessary for the provision or exercise of the service for which the capacity was granted. The only provider of the minimum access services is HŽI.

2. access to service facilities and the services provided at those facilities, including railway acce-ss to the service facilities – passenger terminals, terminal buildings and other facilities, including information displays about trains and the appropriate facilities for selling tickets, cargo terminals, marshalling yards and classification yards, including manoeuvring facilities, stabling tracks, main-tenance facilities, except for facilities for regular maintenance in particular intended for high-speed trains or other types of rolling stock requiring special facilities, other technical facilities, including cleaning and washing facilities, sea and inland waterway ports connected to the railway network, additional facilities and facilities for fuel supply and fuel supply in those facilities.

3. additional services – power necessary for train traction, pre-heating and pre-cooling of passenger trains, special contracts on the following: supervision during transport of hazardous substances and assistance in running trains with extraordinary parcels.

4. auxiliary services – access to the telecommunications network, provision of additional informa-tion, technical check of rolling stock, sales of tickets at passenger terminals, regular maintenance services provided in maintenance facilities particularly intended for high-speed trains and other types of railway vehicles requiring special facilities.

In 2018, almost all freight transport operators, except for CER Cargo d.o.o., were active in the use of railway services provided by HŽI. The trend of increasing the basic indicators for the use of railway infrastructure – train kilometres (tkm) continues in 2018. The number of generated tkm in 2018 is 21.3

million, which is an increase of 1.4 percent compared to 2017. The growth generator is the increase in traffic, mostly on local lines (+11.1 percent) and to a lesser extent on international (+0.6 percent) and regional lines (+0.5 percent). As in the previous year, the use of almost all rail services increased, with the exception of weighted cars, which fell by 56 percent, and the services of forming and disforming of trains with a decline of five percent.

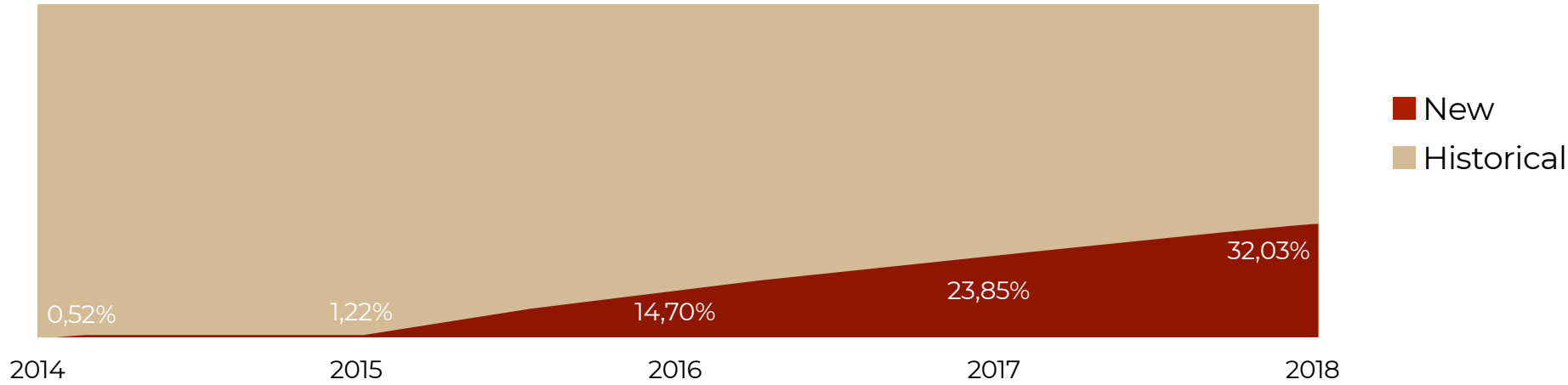


Figure 3.4. Use of the infrastructure by freight operators (shares in tkm)

Use of rail services	2013	2014	2015	2016	2017	2018
Minimum access package						
Travelled tkm	21.019.458	20.320.062	20.378.684	20.798.904	21.011.120	21.287.558
Use of service facilities						
Garage services [vehicle*hours]	8.643.663	6.146.501	7.784.000	10.362.590	14.226.657	15.116.019
Formation/disformation of trains	1.193.010	946.617	2.047.847	1.883.940	1.858.399	1.771.237
Use of passenger termi-nals (number of stops)	0	136.335	2.933.973	3.030.773	3.035.656	3.055.129
Transport of extraordinary postal items (number of trains)	890	729	429	1.104	914	960
Amount of weighted cars	14.240	8.334	7.411	6.627	4.917	2.158
Realized gross tonne kilo-metres of supplied power for train haulage	4.396.983.563	4.404.088.510	4.677.177.124	6.701.149.491	7.237.801.033	6.646.565.749

Table 3.1. Use of rail services (basic indicators)

TRANSPORT INDICATORS AND REVENUE

As part of its activities, HAKOM collects information on the rail services market as well as on the rail transport market. Among other things, data are collected on the number of transported passengers and the amount of carried goods, as indicators of the situation on the rail transport market which are directly a result of the situation on the rail services market. The emergence of competition in the rail freight market in 2016 points to continuous positive developments in the rail transport market, but also in the rail services market. Although the volume of goods carried by rail grew in 2018, this is not enough to increase the competitiveness of rail transport, especially when compared to other modes of transport. The data published by the Central Bureau of Statistics, as well as the data collected by HAKOM as the market regulator, show that road transport is dominant.

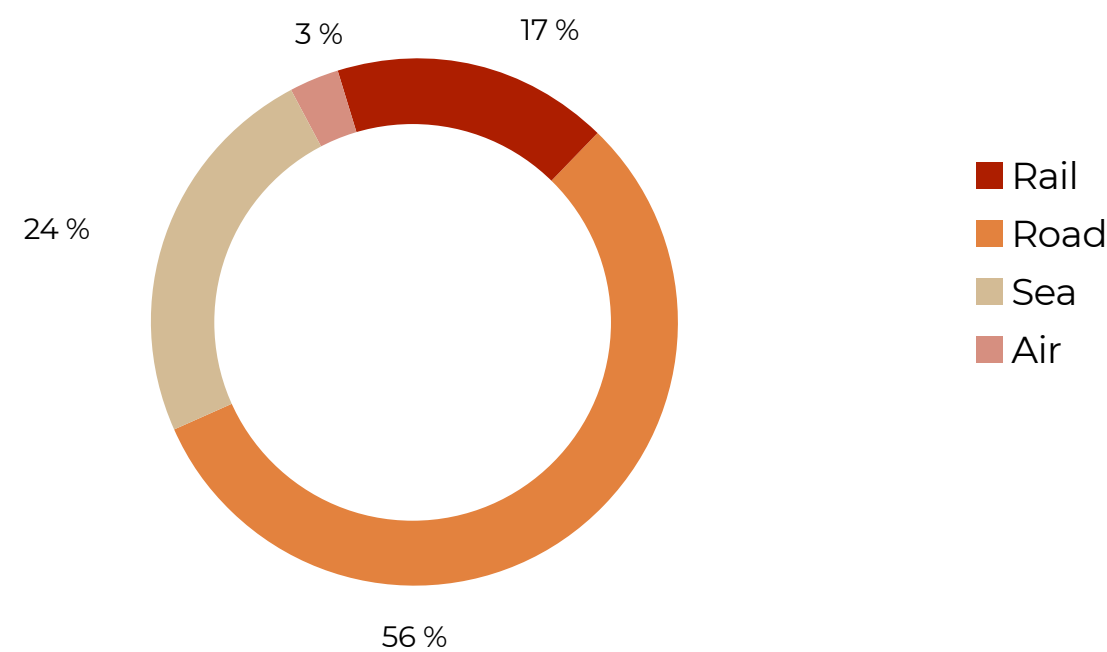


Figure 3.5. Shares of transported goods by type of transport

Between January and December, 118.3 million tonnes of goods were transported in Croatia, with rail transport having the highest growth, by as much as 10.4 percent. With the accession of the Republic of Croatia to the EU, the opening of the rail market and the emergence of new carriers, the quantity of goods transported on the railway market has been constantly increasing. The historical freight carrier almost halved its share of goods carried on the market.

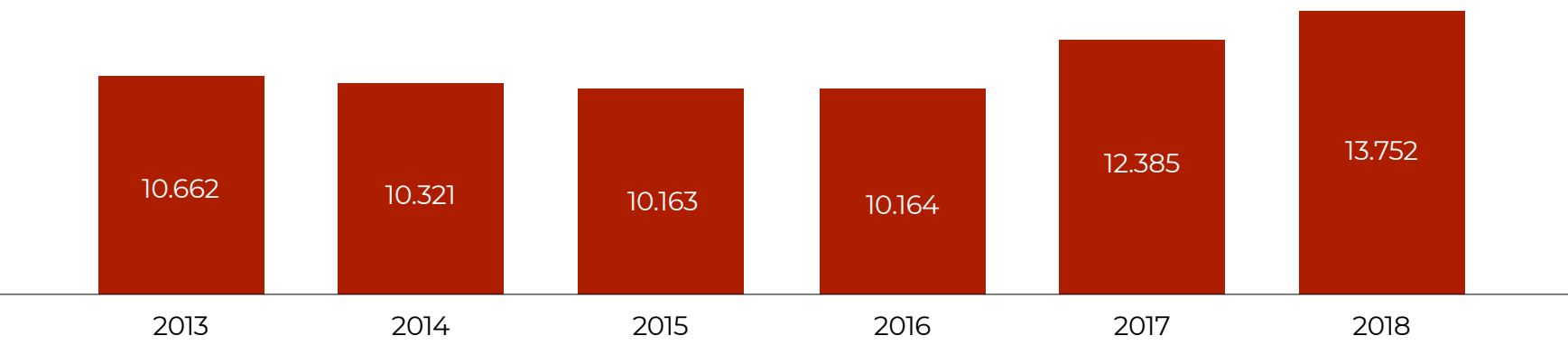


Figure 3.6. Quantity of goods transported by rail (in 000 t)

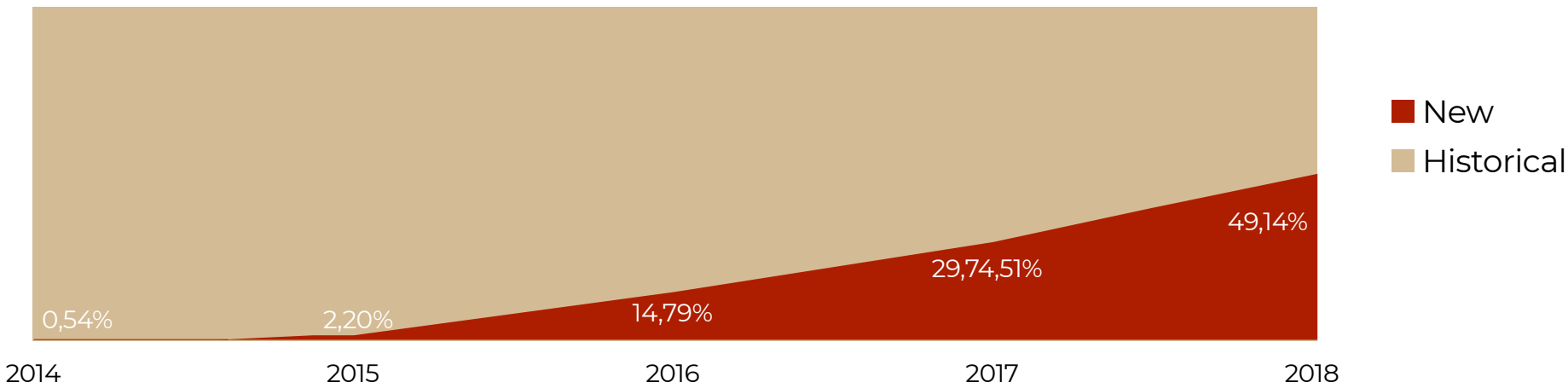


Figure 3.7. Shares of goods transported by freight carriers

With the entry of new freight operators into the liberalized market, the historical operator reduced its share of total net tonne kilometres by almost 35 percent between 2014 and 2018, as new rail operators strengthened their position in the market and increased their shares in total net tonne kilometres and in other performance indicators.

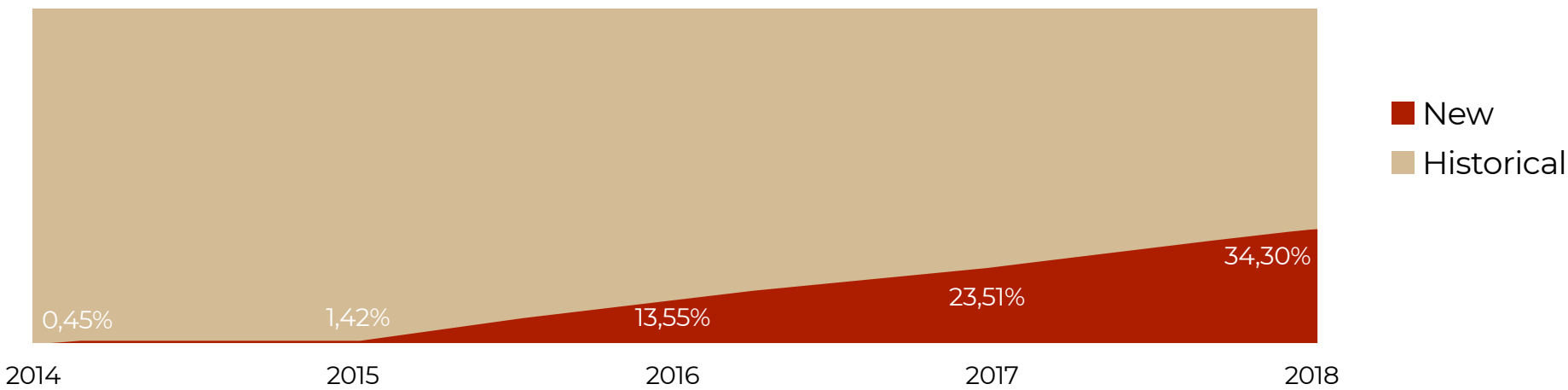


Figure 3.8. Shares of new carriers in net tonne-kilometres of goods transported

In 2018, railway passenger transport recorded an increase in the number of transported passengers of 2.1 percent compared to the previous year 20,248,000 passengers were transported, who realized 755,600,000 passenger kilometres (Pkm). When considering the total transport in the Republic of Croatia, the decrease in the number of passengers carried was realized only in regular road transport, while growth was recorded in all other modes of transport.

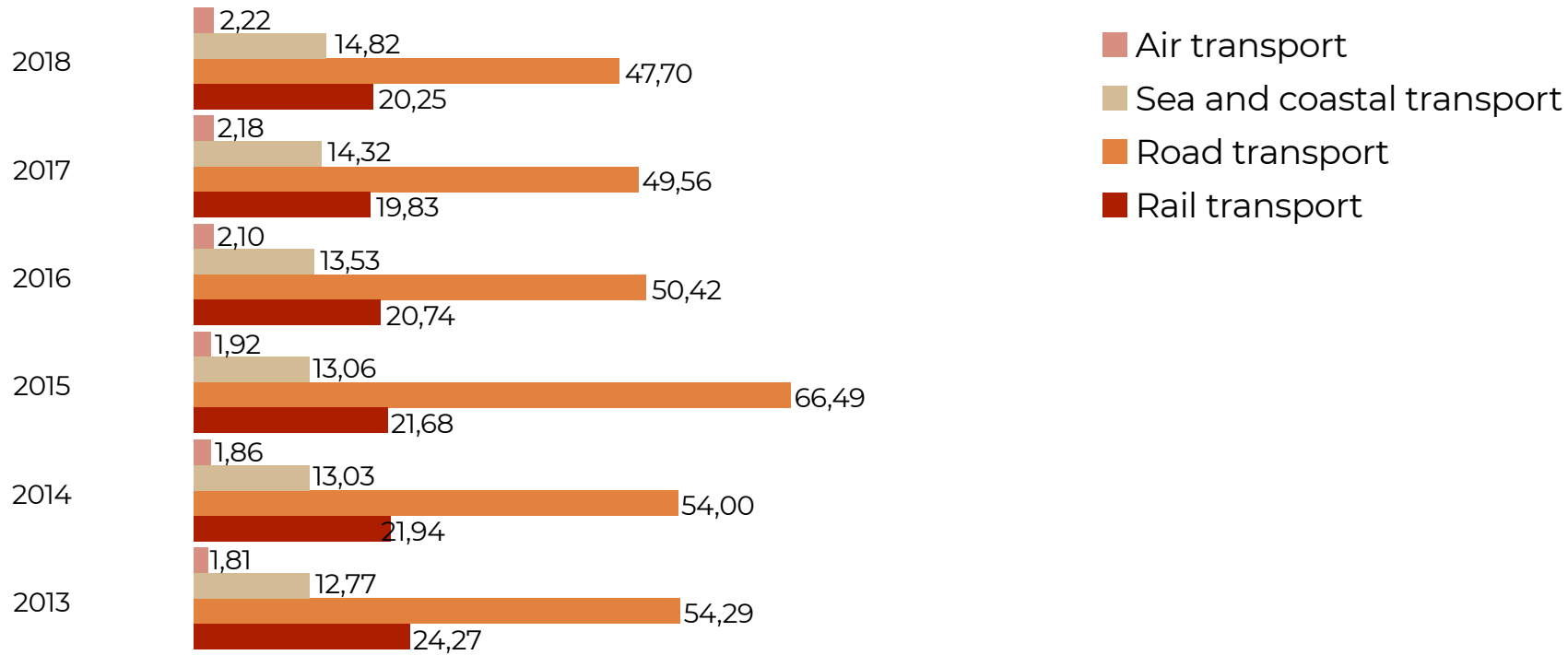


Figure 3.9. Number of transported passengers by type of transport (in millions)

REVENUE OF HŽ INFRASTRUKTURA d.o.o.

The total HŽI revenue from rail services consists of fees for the minimum access package, fees for the sale of tickets and cashier-accounting activities, fees for the use of track scales, the formation and disformation of trains, the use of garage tracks, fees for extraordinary shipments and the use of passenger stations, station buildings and other passenger reception and dispatch facilities. The total HŽI revenues from rail services are at almost the same level as in the previous year.

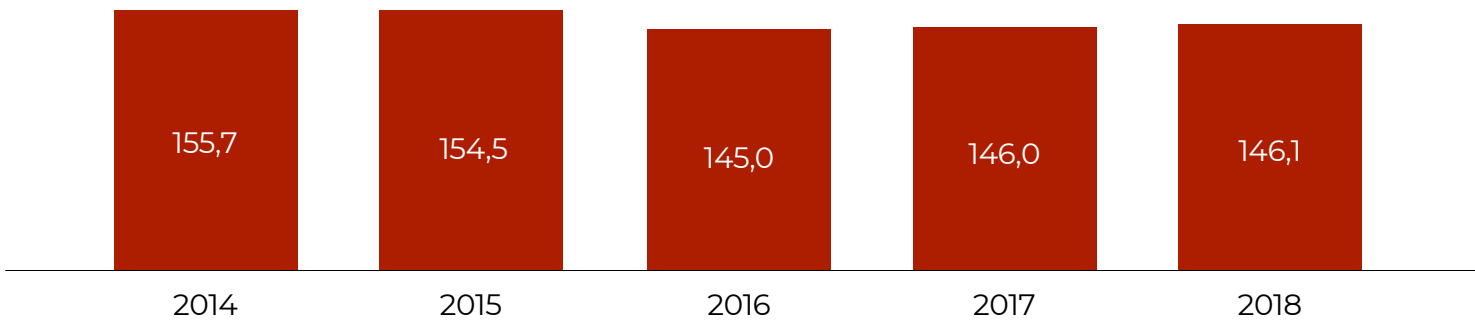


Figure 3.10. Total HŽI revenue (in HRK million)

There was a noticeable increase in revenue from extraordinary shipment services, garaging services and a minimum access package, while at the same time there was a decline in the services track scales and shunting during weighing. Revenues from ticketing and cashier-accounting services also decreased.

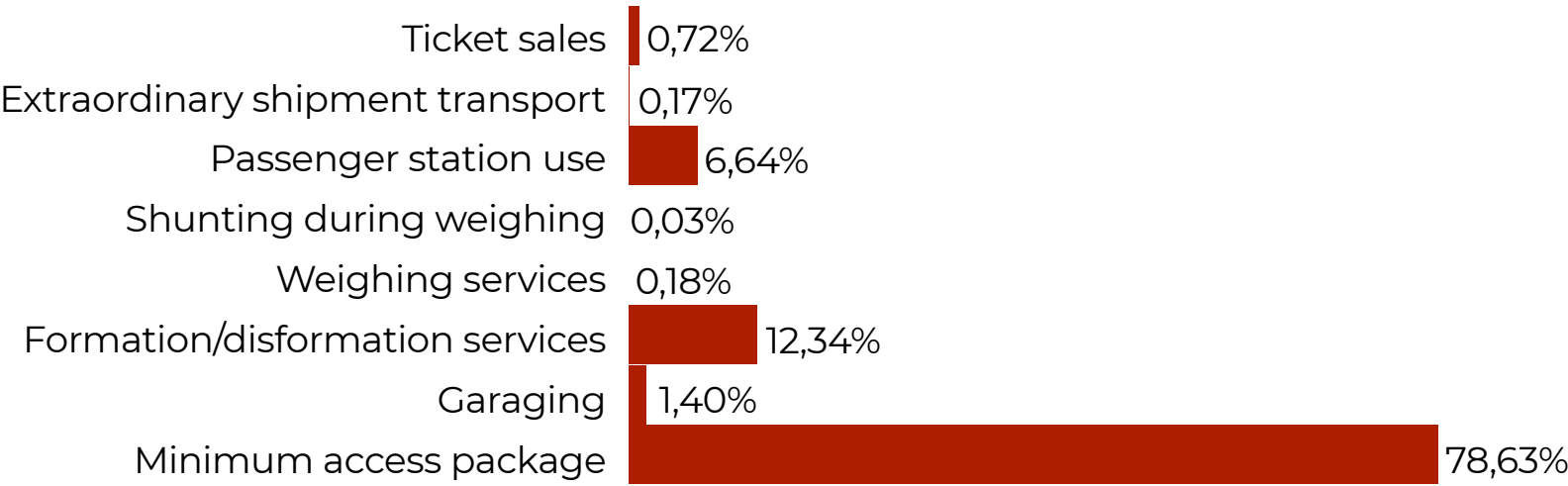


Figure 3.11. Shares of individual services in HŽI revenue

REGULATORY ACTIVITIES

In 2018, HAKOM handled the appeal initiated by HŽ putnički prijevoz d.o.o. (HŽPP) in relation to the Access to Railway Infrastructure Contract. The operator considered that the Contract limits the liability of HŽI (the infrastructure manager) in respect of damages due to traffic jams or disruptions because the operator is not able to compensate for the actual damage caused and that this reflects the monopoly position of the infrastructure manager and damages the railway operator. In view of the way in which the train-standing fee was defined in the disputed article of the Contract, in its essence it represented a contractual penalty pursuant to Article 350 of the Civil Obligations Act, which is charged as soon as the described circumstances occur, irrespective whether the railway operator in the particular case suffered any damage at all. However, in the application of this provision there may be situations in which the operator will not only suffer damage but, in his opinion, the damage will exceed the amount stipulated in the contractual penalty. In such a case, the railway operator shall have the right to claim the amount up to the full compensation for the damages in court proceedings before the competent court, without any restriction. In particular, the contractually agreed limit of 5 percent per month does not constitute an obstacle because the operator has the opportunity to seek full damages in court proceedings, without prejudice to the contractual limit of 5 percent. In the present case, it was concluded that the disputed provisions of the Contract are not discriminatory because they are equally applicable to all other operators, that is, they are contained in their contracts on access to railway infrastructure, and compensation for actual damages can be obtained in court proceedings.

During the previous year in an ex officio procedure, pursuant to the Act on the Regulation of the Rail Services Market (ARRSM), HAKOM set a reasonable time limit within which the operator of the service facility must respond to a request by a rail operator to access the service facility and provide services in the service facility. When accessing service facilities and the services provided in service facilities, it is the duty of the service facility operator to act in a non-discriminatory manner, in accordance with the RA. One of the prerequisites for such action is to respond to the request of a railway operator for access and provision of services within a reasonable time period. A service facility operator is a legal entity responsible for the management of one or more service facilities (service facility manager) or for the provision of one or more rail services to railway operators. In setting a reasonable time limit, HAKOM took into account the diversity of service facilities and services, good practices and experience of EU Member States regulatory authorities, the opinion of railway operators, the state of the service facilities, the state of the railway market in the Republic of Croatia, and in particular the impact of this time limit on rail transport.

In addition, in order for the railway undertakings to be able to plan do their business in an economical way, it is necessary to obtain the information necessary for the organization of transport as soon as possible, without undue delay. Such provision of rail services should contribute to the development and improvement of rail transport in the Republic of Croatia and the common European railway area, which requires

efficiency and reliability in the provision of transport services, which contributes to the competitiveness of rail transport in relation to other types of transport. HAKOM set a reasonable three-day time limit and it applies to all service facility operators in the Republic of Croatia. The time limit begins to run from the date of receipt of the railway operator's request by the service facility operator. If the current situation changes significantly, HAKOM will react in a timely manner and adopt a new decision, in accordance with the new circumstances related to the access to service facilities and the use of services in those facilities.

In order to meet the challenges in the railway market, in 2018 HAKOM organized the 8th Round Table of Rail Services Market Stakeholders with the topic "The role and importance of service facilities in the rail services market". The round table was attended by representatives of the Ministry of Sea, Transport and Infrastructure, railway operators, the infrastructure manager and service facility operators. Particular emphasis was placed on the availability of service facilities and the services provided in service facilities. HAKOM representatives provided an overview of the situation on the rail services market, in particular service facilities, as well as an overview of information on the railway transport of goods and passengers and all activities undertaken by HAKOM through legislative, economic and technical support. The participants of the Round Table were informed about the obligations that service facility operators have under the current legislation, as well as the changes that are expected and, in this context, a discussion was conducted, as well as an announcement of data collection by service facility operators. Cooperation with the Ministry of Sea, Transport and Infrastructure was the most pronounced in the area of drafting strategic documents and legislation or byelaws. HAKOM actively participated in the working group for the drafting of the Railway Act, the working group for the drafting of the Integrated Passenger Transport Act, the working group for amending the Act on Transportation Contracts in Railway Traffic, the working group for the implementation of the NIS Directives, and it has its representative in the Commission for the development of strategic and legislative framework in the field of railway and road transport.

05

RF SPECTRUM MANAGEMENT



EFFECTIVE USE OF THE RF SPECTRUM **49**
5G **50**
THE SECOND DIGITAL DIVIDEND **51**
PUBLIC MOBILE COMMUNICATION NETWORKS **51**
PRIVATE MOBILE COMMUNICATION NETWORKS **52**
MICROWAVE AND SATELLITE NETWORKS **52**
RADIO NETWORKS **53**
TELEVISION NETWORKS **54**
SPECTRUM CONTROL **54**

Management of the radio frequency spectrum as a limited good is becoming increasingly important in the digital society. Wireless communications have become indispensable to at the heart of many services, and the future 5G network is seen as driving the next step in the development of Industry 4.0 and artificial intelligence-based services. Effective spectrum management is one of HAKOM's core tasks and includes frequency planning and the preparation of network technical parameters, licensing and approval of RF spectrum use, and spectrum control and monitoring, precisely to make the frequencies available to the market when required. Spectrum use in the Republic of Croatia is internationally aligned with the decisions and recommendations of the International Telecommunications Union (ITU) and the European Conference of Postal and Telecommunications Administrations (CEPT), as well as with international agreements. RF spectrum management ensures the smooth operation of radiocommunication services, as well as health protection and safety.

Effective use of the RF spectrum

The development of new technologies drives changes in the use of the RF spectrum, and the prerequisite for their successful introduction is the effective management of this limited public good. This includes spectrum planning and re-planning and the optimization of existing technologies, thus freeing up the spectrum for new applications and new services.

The most significant activities to be emphasized in 2018 in this area are the preparations for the introduction of the new, fifth generation mobile communication networks (5G), the drafting of the National Action Plan for the use of the 470-790 MHz band, the test operation of the DAB+ radio and the introduction of obligatory registration for all WAS/RLAN devices in the open air. Activities were also undertaken in the area of dynamic frequency use, frequency sharing between different services and users, and the use of cognitive radio as one of the models of frequency use dynamization, an important topic in order to prepare Croatia for future challenges in the market and to increase the effectiveness of use of the radio frequency spectrum.

Due to technological advances and market developments in the area of short-range devices and in order to comply with changes to relevant EU decisions, in particular [Decision 2017/1483/EU and ERC Recommendation 70-03](#), new or amendments to existing general licenses have been published. This, among other things, has made the spectrum available for radio devices used in transportation, for M2M and IoT applications based on networked, network-controlled short-range devices (the so-called data networks) as well as radio frequency identification (RFID) applications. All applicable general licenses are available on HAKOM website under [Licences](#).

In May, due to the announced use of meteorological radars in the RoC in the frequency band 5470-5725 MHz the conditions of use for WAS/RLAN devices were changed to reduce the possibility of radar interference. The amendment of the conditions of use imposes an obligation to register radio stations used in the open air. In October, following a public consultation, the general licence was further amended following requests from participants in order to facilitate the radio station registration process. Meteorological radars have a key in warning of imminent severe weather and represent an important line of life and property protection in floods and major storms. At the end of 2018, the first phase of the experimental transfer of digital radio from the locations of Učka, Mirkovica, Sljeme and Ivanščica was completed, and the second phase was initiated, in which the experimental transfer was further extended to Slavonia and Dalmatia. In November, provisional licences were issued for the use of RF spectrum in broadcasting for digital radio at the locations of Učka, Sljeme, Ivanščica, Belje and Brač-Vidova Gora for a period of one year. When the provisional licences expire, further options will be considered as well as market interest.

An important tool in spectrum management, especially in terms of ease of access and transparency, is HAKOM's interactive [GIS portal](#). In order to improve the portal, while enabling the provision of relevant user queries, the existing radio station data were prepared and adapted for further public announcement.

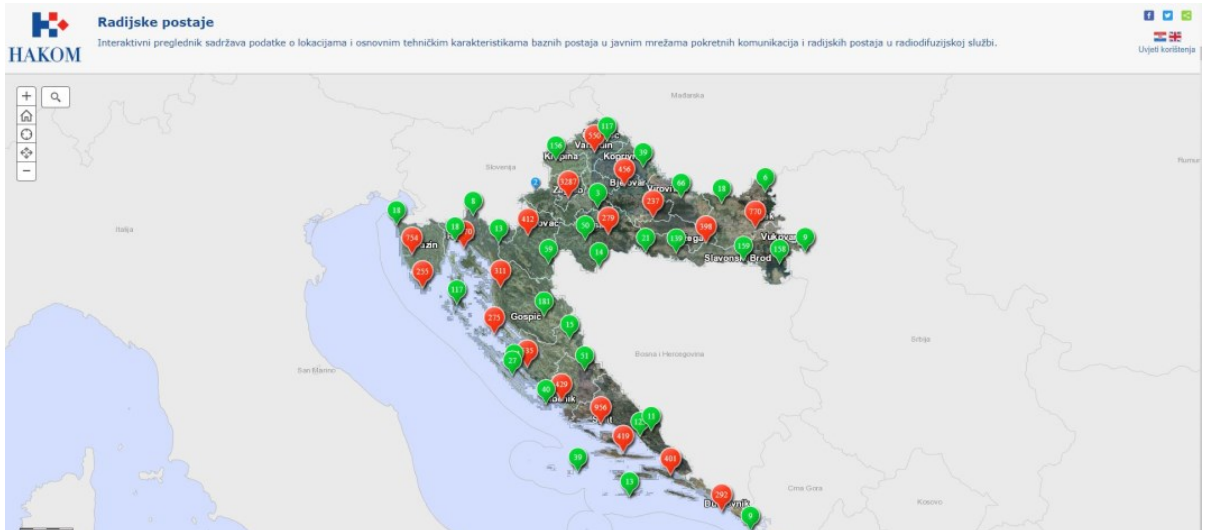


Figure 4.1. Thematic overview of “Radio Stations” on the GIS portal

Type of documentation issued	quantity
RF spectrum use licences	5.751
Approvals for services of particular importance	5
Compliance certificates	2.135
Fiscalization certificates	7

Fifth generation of mobile communication networks - 5G

Availability of broadband internet access to all EU households and 5G signal coverage of all major transport routes and urban areas by 2025 are some of the main goals of the EC are defined in the [5G Action Plan and Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society](#). These documents are related to the drafting and adoption of the Electronic Communications Code, in which HAKOM was actively involved. The introduction of 5G networks is one of the key factors in making broadband access available to all households. 5G is expected to create the preconditions not only for new mobile communications services, but also for completely new services/applications in other industries such as automotive, healthcare, agriculture, tourism, education, media and more. Given that some of the goals set out in the Action Plan were expected to be achieved as early as 2018, HAKOM paid close attention to the activities related to 5G. These networks conceptually represent a whole new ecosystem that includes not only stakeholders in the electronic communications market but also other markets. Therefore, in May, as part of the MIPRO 2018 conference, a round table called “Introduction of 5G Networks in Croatia” was held. Some of the 5G and IoT solutions were demonstrated and presented to the audience, showing the practical possibilities that this technology gives us, some anticipated problems related to the introduction of 5G were pointed out, along with highlighting some good examples of local self-government units which have launched pilot-projects, testing advanced technologies in their area.

At the end of 2018, HAKOM organized an event called “5G Day” with the aim of highlighting the benefits of introducing 5G technology. Attempts were made to bring this new technology closer to end-users, local government units, relevant state institutions and the economy. Ericsson Nikola Tesla, Nokia and Huawei presented some of the functionalities and applications of 5G with interesting demonstrations and presentations, while Rimac Automobili, Photo Math, Stemi and King ICT presented their needs and their vision. Representatives of the Cities of Split and Zagreb presented the plans and implementation solutions for IoT/smart cities. The aim is to use technology development as an impetus for the development of the Croatian economy, and the success of Croatian people and companies in this area as a contribution to the formation of the public and society’s attitudes towards new technologies. The recording from the event can be viewed at HAKOM’s [YouTube channel](#).

The 5G standard will be gradually developed with the development of the 5G radio network as an upgrade to the existing 4G network and the development of a 5G core part of the network, which requires serious investment. In order to introduce 5G technology in the Republic of Croatia on time and without delay for the benefit of society and the economy and meet the goals of developing broadband Internet access on the path to a gigabit society, it is necessary to ensure a favourable investment climate, as well as to prepare an appropriate regulatory framework, remove obstacles that stand in the way of the introduction of 5G technology and drive innovation. Therefore, the to-

Mobile communications: from 1G to 5G

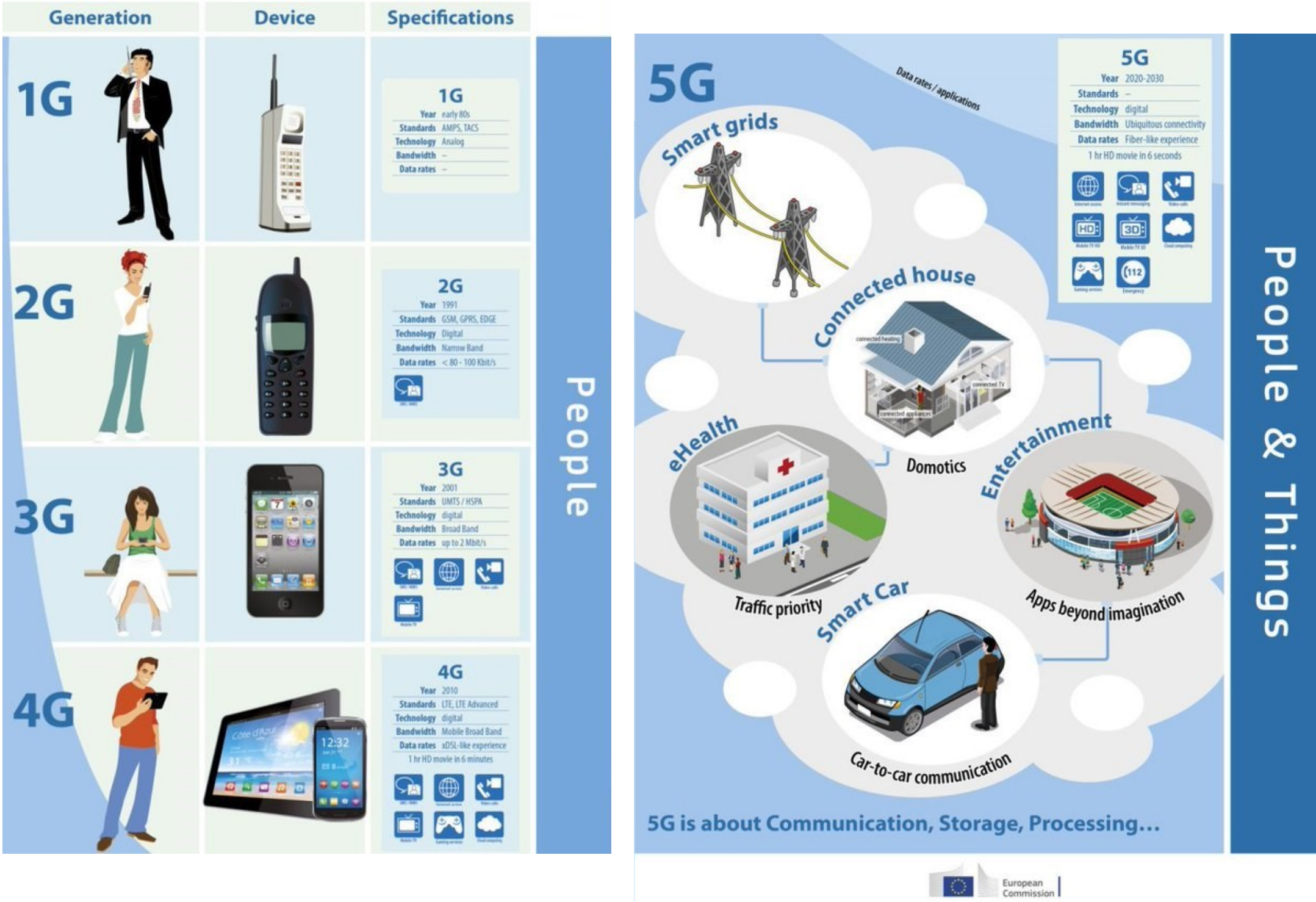


Figure 4.2. Development from 1G to 5G (Source: EC)

pic of fees was discussed within the 5G Working Group, which resulted in two amendments to the Ordinance on Payment of Fees for the Right to Use of Addresses, Numbers and Radio Frequency Spectrum – in June and November 2018.

The one-off fee for the use of new RF bands and the fees for the use of the 1900 MHz-1920 MHz band were abolished, and the annual fee was reduced by 50 percent and returned to the 2014 level. The main objective of these changes was to rationalize fees and unleash the investment potential of network operators and ensure the introduction of 5G technologies and services in the Republic of Croatia.

Within the scope of its powers, HAKOM has started addressing key challenges for the introduction of 5G networks in the RoC. Although the importance of 5G is also recognized at the highest state level (Croatia is a signatory to the EU-wide Ministerial Declaration on 5G), there is still no coherent action at all levels. In this regard, the decision on the manner and intensity of implementation of 5G technology in the Republic of Croatia should be made at the state level and the active cooperation between all involved state bodies (MSTI, Ministry of Health, MCPP, Ministry of Public Administration, MEEC) should be encouraged so that the decision can be implemented uniformly. The introduction of 5G technology is not only a technical issue, nor is 5G just another generation of mobile communications. All government bodies need to be informed and educated about the benefits of 5G introduction in order for this technology to be successfully introduced in the Republic of Croatia, but more importantly, to take full advantage of its benefits.

The second digital dividend

Technology developments in recent years have brought about a new and more efficient DVB-T2 digital television system and H.265/HEVC encoding. By using the new standards, it is possible to use the RF spectrum more efficiently, using a smaller portion of the spectrum to transmit existing channels and improve their quality. This will free up the RF spectrum of the other digital dividend for mobile communications services. The start of the switchover of free terrestrial digital broadcasting services from DVB-T to DVB-T2 in the Republic of Croatia is planned in 2019.

HAKOM continued presiding over the Commission for the drafting of the proposal for the Digital Terrestrial Television Switchover Strategy to the DVB-T2 system and the 700 MHz bandwidth (Strategy) in 2018 with two main tasks. These are the drafting of the Strategy proposal, which will be fully aligned with the goals and the Action Plan of the EC, and the defining of measures and activities that will ensure the implementation of the Strategy, that is, its main goals – the development of new services in mobile communications networks and the preservation of competitiveness of digital terrestrial television while ensuring effective management of the RF spectrum. According to international guidelines, the release and allocation of the 700 MHz band is expected as early as 2020, by which time digital terrestrial services must be enabled in the 470-694 MHz band. In the Republic of Croatia, the switchover of digital terrestrial television to DVB-T2 and H.265/HEVC is planned, and it can ensure long-term competitiveness of the terrestrial distribution platform, but it is a time-consuming and financially demanding process that affects all participants in the terrestrial digital television market and which needs to be carefully planned.

In November 2018, a proposal of the National Action Plan for the use of the 470-790 MHz band was drafted. Further work on the National Action Plan, involving other public authorities and the interested

public, and finally its adoption, is planned for 2019. The current proposal for the National Action Plan lists 2019 as the start of the transition to the DVB-T2 system and the H.265/HEVC encoding system.

With the Recommendation for DVB-T2 reception published in July 2017, one of the prerequisites for the switchover to DVB-T2 and H.265/HEVC encoding system was fulfilled, and during 2018, the digital television receiver compliance test pack was continuously maintained. The test pack enables manufacturers to test the compliance of their receiver models with the Croatian specifications. It can be used by HAKOM or a third-party certification laboratory to ensure that the receiver complies with the Croatian specifications, and the testing continued into 2019.

The operation of LTE base stations in the 790-862 MHz band may interfere with end-user television reception, since television receivers and antenna amplifiers are pre-adapted for reception throughout the 470-862 MHz band. In 2018, following the procedure prescribed by HAKOM, the removal of interference caused by the operation of LTE800 base stations was continued. Since July 2017, the operators of mobile communications networks took over dealing with the interference, while HAKOM was included with the role of monitoring and supervising of the procedure.

Public mobile networks

Valid licenses for the use of the RF spectrum issued to mobile communications operators are technologically neutral and the corresponding assignment plans permitted a flexible implementation technology, which means that operators are free to use all existing technologies permitted for mobile communications (GSM, UMTS or LTE) even in the previously assigned bands.

In 2018, an increase in the number of UMTS and LTE base stations was recorded, which indicates further development of networks and operator investments. The construction and upgrading of networks will continue in the future, given the constant increase of user needs and the exponential growth of data traffic, the development of technology and the fulfilment of the Digital Agenda goals. Therefore, there is a need for mobile operators to offer additional spectrum, which is why at the end of 2018 HAKOM launched a public auction for the 1920-1980/2110-2170 MHz radio frequency band. The three remaining 2x5 MHz blocks were offered with an initial amount of HRK 24,000,000.00 for each block. The auction documentation limited the total amount of spectrum after allocation to 140 MHz per operator. The process was completed in 2019 and 2x10 MHz was assigned Tele2 at the price of HRK 48,500,000.00, and 2x5 MHz to A1 Hrvatska at the price of HRK 57,900,000.00. HAKOM's further activities related to the allocation of frequencies in the 2600 MHz band, and the release of DD2 and ensuring the availability of the 3.4-3.8 GHz band as basic areas for the implementation of 5G technology, are key to meeting the increasing capacity needs.

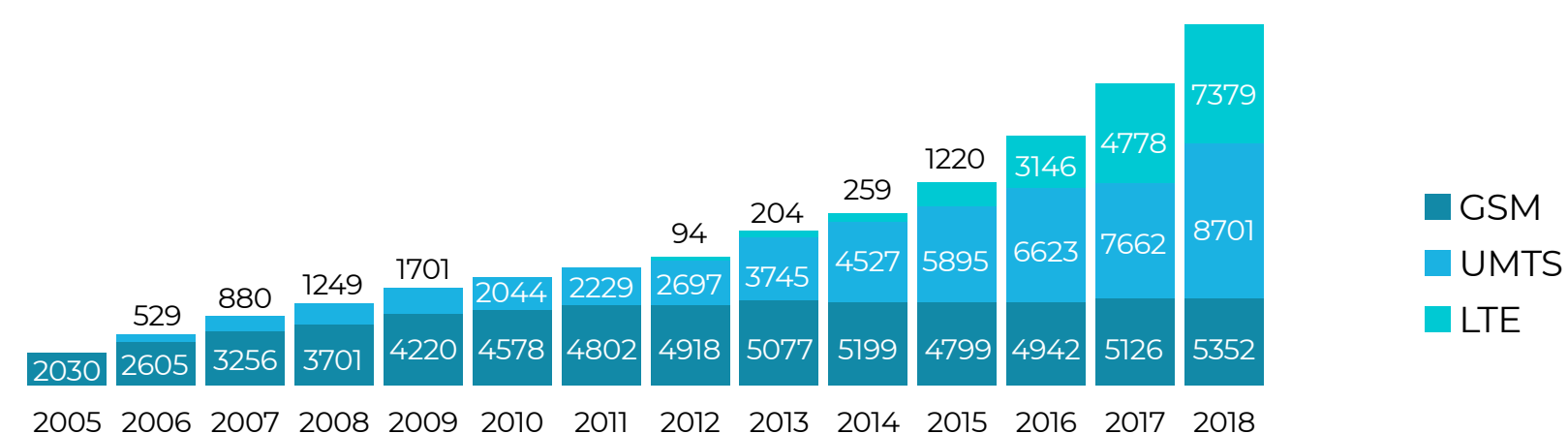


Figure 4.3. Number of base stations in the RoC

In February, following negotiations, HAKOM signed implementing agreements between Austria, Hungary, Romania, Serbia, Slovakia, Slovenia and Croatia on the coordination of technical parameters in the 700 MHz, 800 MHz, 1500 MHz, 2100 MHz and 2600 MHz frequency bands in the border regions, thus creating the preconditions for more efficient use of these bands for new broadband technologies.

During 2018, HAKOM issued, based on operators' reports, certificates of compliance for radio stations complying with restrictions laid down in the Ordinance on Protection Against Electromagnetic Fields. In the verification process, special attention was dedicated to the areas of increased sensitivity (residential areas, schools, kindergartens, hospitals, and similar). In case of need or public interest, HAKOM also drafted estimations and carried out additional measuring of the electromagnetic field levels in order to verify the compliance with regulations, that is, in order to make the entire verification procedure more transparent and publicly available.

Private mobile networks communications

The number of licences issued in 2018 did not change significantly compared to previous years. The tendency is to use digital technologies in new networks, but also to replace old technologies in existing networks in order to make more efficient use of the RF spectrum.

Part of the 700 MHz (694-790 MHz) frequency area can be assigned to PPDR systems for disaster prevention, preparedness and disaster response. Harmonized technical conditions of use were prescribed and the possibility of implementing the PPDR system with the most appropriate implementation model was predicted (construction of a dedicated network, commercial contracting or a hybrid solution). The Ministry of Defence, the Ministry of the Interior, the National Protection and

Rescue Directorate and the Croatian Institute of Emergency Medicine expressed the need for 2x10 MHz in the 700 MHz frequency area for their designated PPDR system in the Republic of Croatia. Further steps have been agreed, which include the rationale of these bodies for the reported spectrum allocation request in order to determine the conditions for spectrum allocation and use in the 700 MHz frequency allocation procedure. A strategic decision needs to be made on the implementation of the PPDR system and the most appropriate implementation model at the national level.

A Statement on Joint Aviation Frequency Band Management was signed with Croatia Control (CCL), and it transferred part of the RF spectrum management powers for the aviation service to the CCL. Under the guidance of the Ministry of Sea, Transport and Infrastructure, the process of introduction of an 8.33 kHz channel raster in aviation communications in the Republic of Croatia was continued. Co-operation with the Ministry of Defence continued in order to effectively manage the spectrum and eliminate potential harmful interference.

Microwave and satellite networks

The activities of frequency planning and international coordination of microwave links were carried out as part of regular HAKOM's activities, with the consideration of principles for effective use and management of RF spectrum. Frequency planning is necessary for ensuring continuous operation of microwave links within the borders of the Republic of Croatia, while the uninterrupted operation of microwave links in the international context is ensured through their international alignment pursuant to the provisions of the HCM agreement.

5.3 percent more microwave link licences were issued than in 2017. Of all the licences issued in 2018, the largest number was related to the changes of the existing microwave links, which was primarily related to the increase of the transfer capacity of already active links of the operators of mobile communications networks.

The 50-percent annual transfer capacity increase trend started in 2015. This is the result of the further upgrading of mobile communications networks to the fourth generation (4G) and indicates a tendency for users to increasingly depend on data transfer over wireless networks. It can be expected that the trend will continue in the coming years. Also, it is possible to notice a significant increase in transfer capacity in the upper 6 GHz (U6) frequency band with a slight decrease in the 7.5 GHz frequency band, which is a result of the strategy of replacing the links of one major operator due to a lack of capacity in the 7.5 GHz band. This indicates that in some locations and in some frequency bands, there was a saturation and a lack of available radio channels required for the realization of the required transfer capacities. In light of the expected further increase in transfer capacity of microwave links in the coming years, the problem will become more frequent and operators will have to use new, mostly higher frequency bands such as 70/80 GHz that already in 2018 showed an increase in transfer capacity

of over 290 percent over the previous year. The average transfer capacity of digital microwave links in 2018 was 282 Mbit/s, which also indicates that the average bandwidth of the radio channels in use is now greater than 28 MHz (the largest number of channels has a 56 MHz bandwidth.)

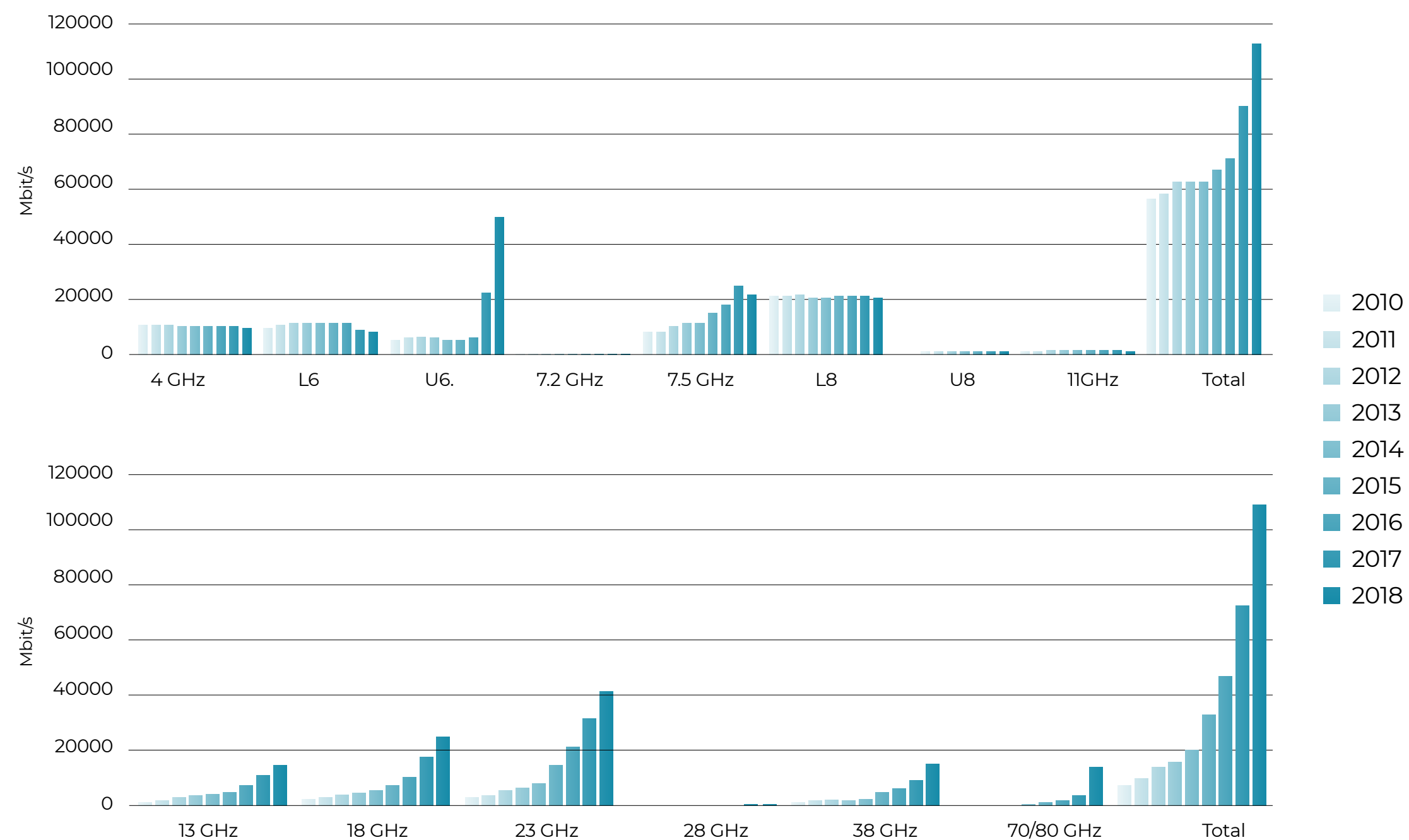


Figure 4.4. Total transfer capacity of microwave links

As part of its regular activities, HAKOM processed requests received for satellite links licences and applications for installation of radio stations in the satellite service (operating on the basis of the issued general licenses). The received coordination requests for satellite networks were analysed and processed pursuant to ITU's procedures. During 2018, the Faculty of Electrical Engineering and Computing in Zagreb announced to HAKOM its plans to launch the first Croatian satellite in the LEO orbit. The satellite would be used for scientific purposes, and the use of frequencies from the

amateur frequency area is planned for the management and transfer of data. HAKOM in this case provides regulatory support, especially in the part of ITU internationally prescribed procedures. For fixed and satellite systems operating on the basis of issued general licences, HAKOM regularly held and maintained a list of registered radio stations.

Radio Networks

In compliance with the obligations laid down in the ECA, 2018 saw the continuation of activities of planning and optimization of FM radio networks in 87.6 MHz – 107.9 MHz frequency band, as well as activities of international coordination of radio stations, ensuring technical conditions for new concessions for the provision of media radio services and improvement of coverage of the existing broadcasters.

A public tender was launched for the award of 29 concessions for the provision of radio media service for which HAKOM prepared and submitted to the Electronic Media Agency the necessary technical parameters (five new concession and 24 existing concessions that ceased to be valid in 2018). At the end of 2018, the Republic of Croatia had 154 active analogue radio networks: 11 public (HRT: 3 state and 8 regional level ones) and 143 commercial (3 state, 3 regional, 20 county and 117 city/local level ones). There is still interest for starting new radio stations as well as for the improvement of coverage quality of the existing radio stations. Therefore, in 2018 as well HAKOM conducted a number of detailed technical analyses to determine the possibility of approving such requests considering the congestion of the radio spectrum.

Data on free frequencies and on the already assigned frequencies were published in the database for the RF spectrum for radio area and have been publicly available at HAKOM's website. HAKOM regularly updated the stated data on the basis of results of the international alignment, planning and optimization, that is, on the basis of cooperation with the EMA.

In 2018, HAKOM regularly submitted to the EMA the notifications on amendments to technical parameters of existing broadcasters and it replied to questions concerning the granting of concessions in individual areas. Furthermore, HAKOM processed requests for granting the licenses for the use of the RF spectrum in broadcasting and issued new licenses for putting into operation new broadcasters, the amendment of data from the existing licenses and the renewal of validity of licenses for transmitters with expired licenses. Within the legal framework for temporary licences, HAKOM approved a number of licences for temporary radio broadcasting for the purpose of radio programme broadcasting of temporary entertaining, religious and educational events.

At the end of 2018, the first phase of the experimental transmission of digital radio from the locations of Učka, Mirkovica, Sljeme and Ivanščica was completed, and the second phase was initiated, in which the experimental transmission was further extended to Slavonia and Dalmatia. In mid-November,

HAKOM issued provisional licences for the use of the RF spectrum in broadcasting for digital radio at the locations of Učka, Sljeme, Ivanščica, Belje and Brač - Vidova Gora for a period of one year. Once the provisional licences expire, further options will be considered as well as market interest.

The procedure for the coordination of radio stations with the relevant administrations in the neighbouring countries (Austria, Bosnia and Herzegovina, Montenegro, Italy, Hungary, Germany, Slovakia, Slovenia and Serbia) continued in 2018. HAKOM has hence received and replied to a large number of requests for the coordination of technical parameters of Croatian radio stations and initiated a series of procedures of harmonization of the technical parameters of Croatian radio stations. Furthermore, FM and T-DAB radio stations published in the ITU BRIFIC (Radiocommunication Bureau International Frequency Information Circular) notification were analysed on a regular basis, especially those that could possibly influence the internationally harmonized transmitters network of the Republic of Croatia. In June, a meeting was held with Bosnia and Herzegovina regarding the open coordination requirements of FM radio stations and a number of requests from both administrations were successfully harmonized. Also, a multilateral coordination meeting was held on the interference caused by non-harmonized Italian FM radio stations, attended by representatives of the Italian administration, ITU and the surrounding countries. HAKOM submitted to Italy a list of Croatian radio stations suffering from severe interference from Italy and further steps are expected to be taken to eliminate interference. Open coordination requirements in VHF band II were also discussed.

Television networks

In RoC, there are 4 operational terrestrial digital television networks with national coverage, 1 network with national and regional coverage and 3 networks with local coverage. Out of those, two national networks transfer the DVB-T2 signal of the MUX C and E multiplexes, which are coded in the H.264/AVC standard, while the remaining networks transfer DVB-T signals of MUX A, B, D multiplexes (national-regional and local level) and L-ZA, free for public reception, which have been coded according to MPEG-2 standard. PAY TV programmes of the EVO TV platform are broadcasted within the MUX C and E multiplexes.

In accordance with the issued licences for the use of the RF spectrum for digital television, an operator of digital television networks may optimize the network by putting into operation new transmitters or by changing the parameters of the existing networks. In 2018 HAKOM issued the necessary parameters and certificates of compliance of the radio station for all transmitters put into operation.

HAKOM continued with the preparatory activities for freeing the spectrum in the 694-790 MHz band which is currently used by digital television and which will be used at the European level for mobile communications networks. HAKOM continued developing the international frequency plan for digital television in the 470-694 MHz band, which is based on the DVB-T2 standard. Moreover, the procedure for the international coordination of Croatian DVB-T/DVB-T2 stations with the neighbouring countries

through work at the international SEDDIF forum and group of countries that encompass the area of the Adriatic and Ionic sea. Within the framework of both these groups, by the end of 2017 agreements were signed under which the RoC agreed with all the neighbouring countries the distribution of television channels so creating the preconditions for a successful planned switchover to DVB-T2 and for freeing DD2 spectrum for the purpose of providing broadband services in mobile communications networks.

Control and monitoring of the spectrum

HAKOM has built a control and measuring system in the Republic of Croatia for the purpose of ensuring efficient use of the RF spectrum, harmonizing the use of radio frequencies at the domestic and international level, ensuring the protection and unimpeded use for authorized users and preventing the unauthorized use of the RF spectrum, and for the purposes of measuring, testing and determining and removing causes of interference, as well as other professional and technical work within the effective management of RF spectrum. Four control and measuring centres (CMC) were established in the four largest cities. For daily tasks of RF spectrum control and other technical tasks within its competence, in addition to the system of CMCs and CMSs, HAKOM also uses five control-measuring vehicles equipped with appropriate measuring equipment.

CMCs are operationally supplemented by ten remotely controlled unmanned control and measuring stations (CMS), out of which two are portable (PCMS), distributed around the continental Croatia and along the Adriatic Coast thus enabling quality measuring of the RF spectrum on the entire territory of the Republic of Croatia and the neighbouring countries and quality protection of the RF spectrum.

In 2018, as in previous years, much of the RF spectrum control related to measuring interference from the Italian Republic. Other measurements were systematically conducted to protect the RF spectrum. Measuring was carried out from all four CMCs and ten remotely controlled CMSs, while the measuring vehicles carried out measuring in the areas where the immobile part of the measuring system does not provide satisfactory control of the RF spectrum. In addition to the stated measuring aimed at the protection and control of the RF spectrum, measuring for frequency planning and international frequency coordination were also carried out.

In 2018, all planned measuring activities were successfully implemented, including RLAN measurements - 5470 MHz, 5725 MHz (5600-5650 MHz meteorological radar), T-DAB+ network measurements and FM transmitter technical inspections, as well as other RF spectrum measurements focusing on interference protection and EMF measurement. As a part of everyday and periodic measuring from immobile control and measuring stations, for the purpose of controlling the RF spectrum, about 4000 measurements were carried out in 2017, and there were around 1400 various field measurements. In general, the results of the conducted measurements indicate a similar situation as in 2017.

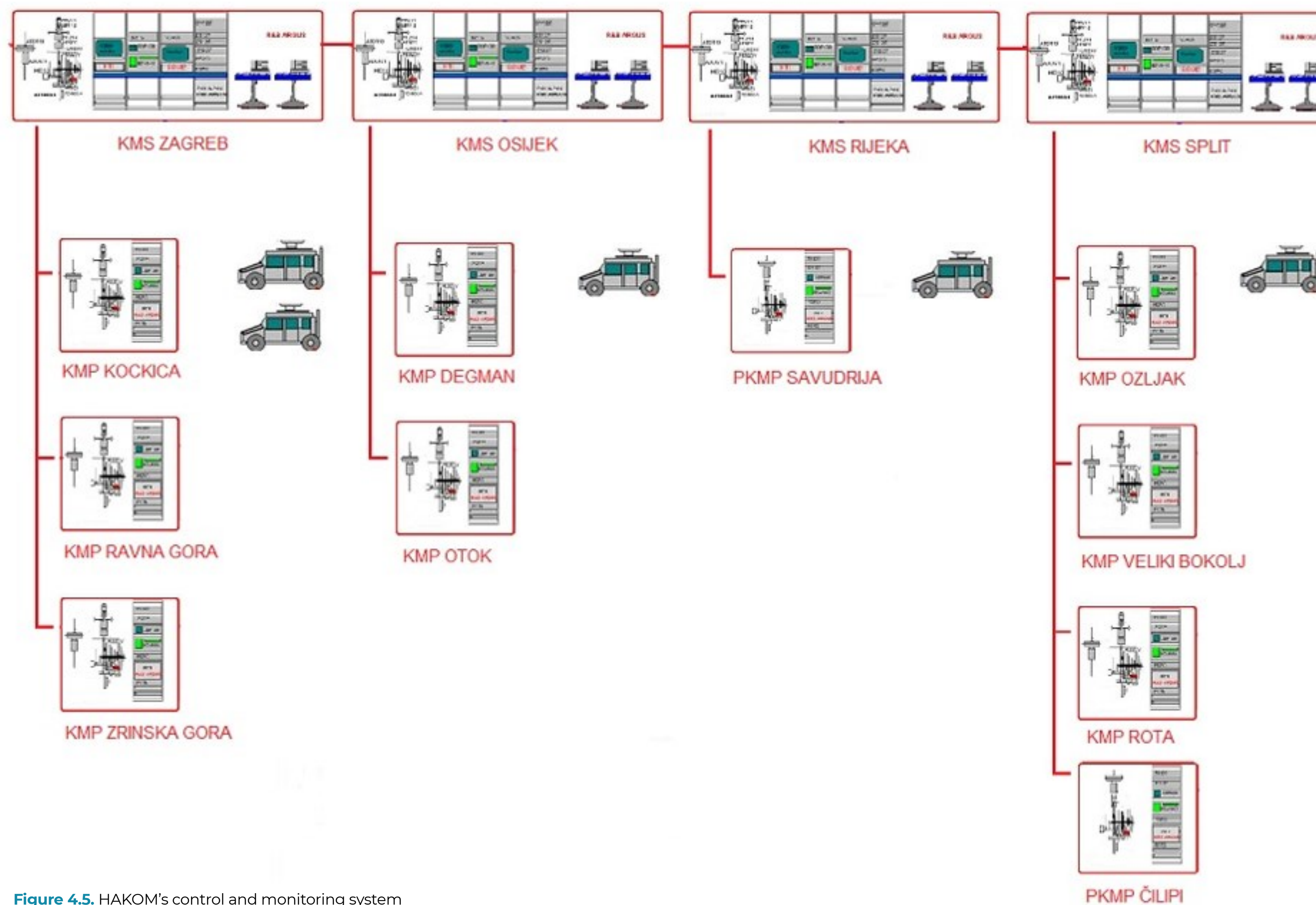


Figure 4.5. HAKOM's control and monitoring system

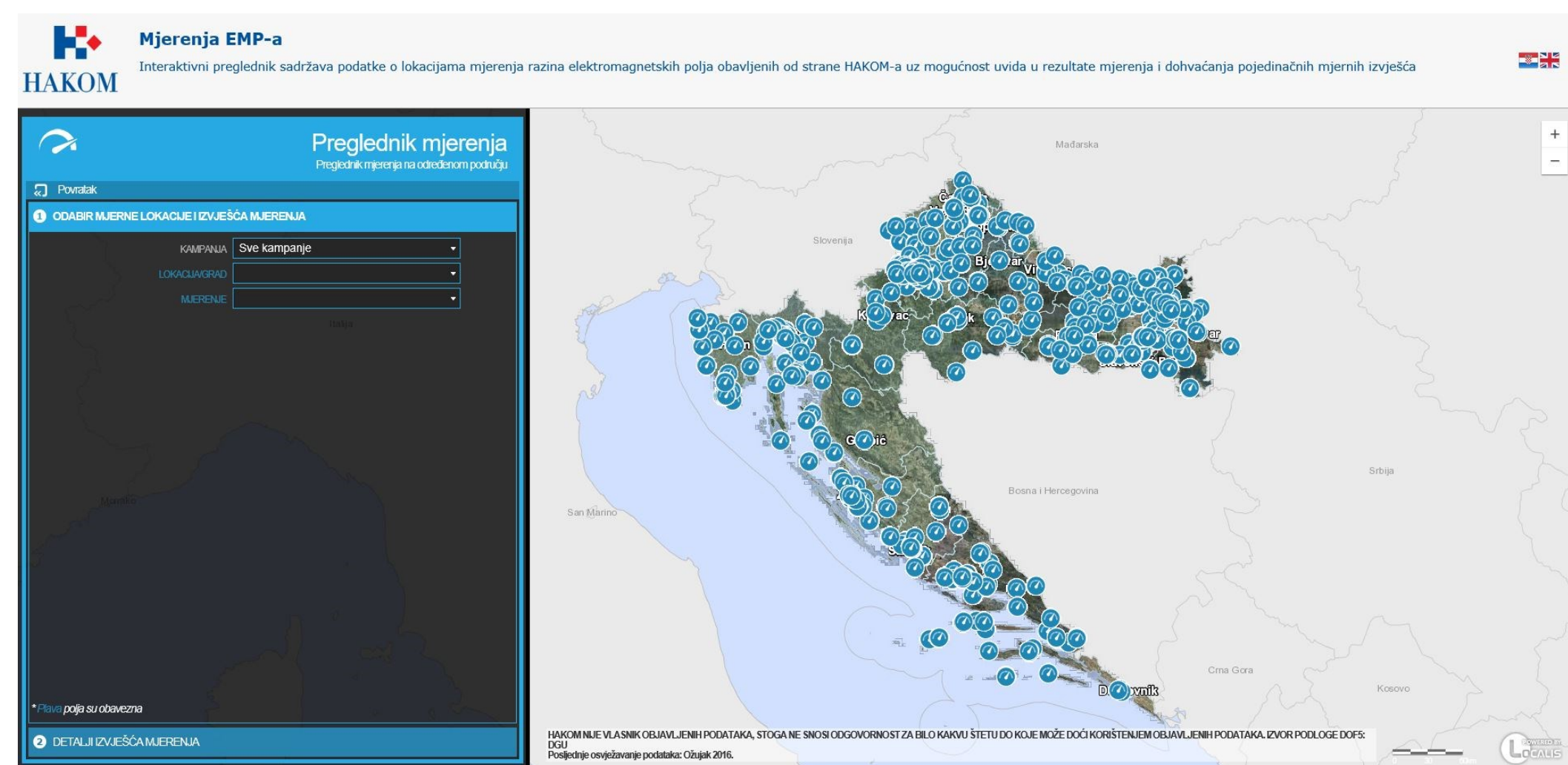


Figure 4.6. Interactive Viewer with EMF measurements

Measuring of electromagnetic fields

The RF spectrum control also included the measuring of the size of electromagnetic fields (EMF) in the areas of increased sensitivity for the purpose of efficiently protecting human health from the influence of the electromagnetic fields. Legal persons authorised for measuring electromagnetic fields regularly checked and submitted measurement results, thus verifying whether standards were complied with. In 2018 no measurements found values exceeding the maximum limit so the conclusion is that designers respect the norms and operators set their radio stations in accordance with the rules of the profession.

All measuring reports with the marked locations where the measuring of the EMF source was conducted are publicly available under the EMF Measurements browser on HAKOM's GIS portal. This portal also provides the possibility to browse the data on the locations and basic technical characteristics of base stations in public mobile communications networks and radio stations in broadcasting service. In this way, citizens can access all measurements performed so far.

Interferences

The protection from interferences in radio communications ensures an uninterrupted operation of electronic communications systems and the related services. Special attention was paid to the state administration bodies in charge of search and rescue, emergency services, maritime and air traffic control radio communications, which are important for the safety of human lives and protection of property, and to the operators of electronic communications.

The number of reported and removed domestic interferences, those reported by domestic users of the RF spectrum, was somewhat higher as compared to 2017. The number of reported interferences in the area of maritime and aviation services is evenly divided. In addition to interference from the Republic of Croatia, in 2018, through daily monitoring and monitoring of the RF spectrum in the Republic of Croatia, HAKOM worked on finding and identifying foreign interferences and initiated procedures for their removal in accordance with international regulations.

A regular signal measuring campaign for FM radio and TV was carried out during summer months in the coastal area with the aim of monitoring the situation and existence of interference at frequencies allocated to Croatia in accordance with the international agreements and plans for radio and television frequencies (GE84 and GE06). Measuring conducted in 2018 showed that there is still a significant number of interferences originating from the Italian Republic, which mostly in summer months prevent a quality reception of the Croatian radio programmes in majority of Istria and along the Croatian coast. On the basis of the

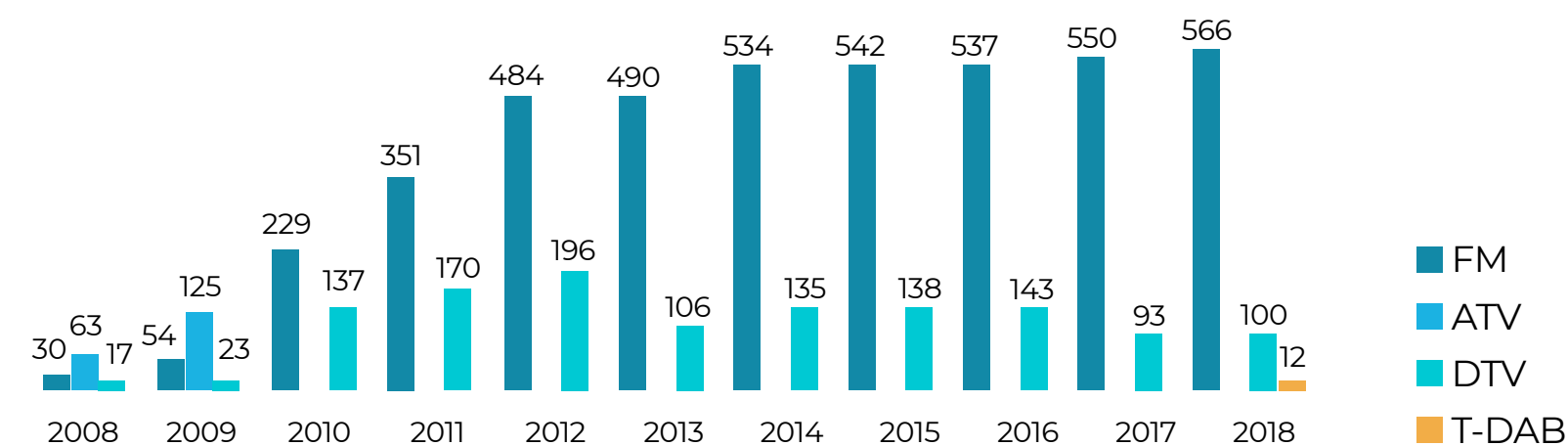


Figure 4.7. Italian interferences

measurement action carried out, HAKOM addressed to the Italian administration a report of the interference according to the ITU prescribed procedure. Also, a multilateral meeting was held with the Italian administration, with the presence of representatives of the ITU and surrounding countries, who also suffer from Italian interference. At the meeting, the Italian administration was asked to eliminate interference with Croatian radio stations as soon as possible. In addition to this meeting, HAKOM also participated in meetings of the EC working groups, at which the problem of Italian interference was also presented.

06

CONSUMER PROTECTION



PROTECTION OF USERS OF ELECTRONIC COMMUNICATIONS **58**
NUMBER PORTING **61**
PROTECTION OF USERS OF POSTAL SERVICES **61**
PASSENGER PROTECTION **62**
PERSONS WITH DISABILITIES **63**
PROTECTION OF CHILDREN **63**

The protection of users and passengers is one of the pillars of HAKOM's activities as the regulator. It implies a whole set of authorities that include all the levers of regulation: sectoral regulations, inspection powers and dispute resolution. Disputes have proven to be an indispensable part of regulation, as they provide exact information on everything that needs to be changed, improved or, in extreme cases, prohibited in relations with consumers.

PROTECTION OF USERS OF ELECTRONIC COMMUNICATIONS

The development of modern technologies, the diversity of offer in the electronic communications market and the extent to which communications services are used today represent a particular challenge in user protection. The great importance of widely used quality-dependant services for each individual, as well as the frequent lack of transparency of the offer or the information provided to the user about the service, result in many complaints regarding the amount of the bill, the quality of service or the violation of contract provisions. If users fail to resolve them alone, they have the right to bring a dispute before HAKOM instead of initiating a lawsuit. Dispute decisions are made using the principles of objectivity, transparency and non-discrimination, and are additionally used to analyze the market situation and propose remedies.

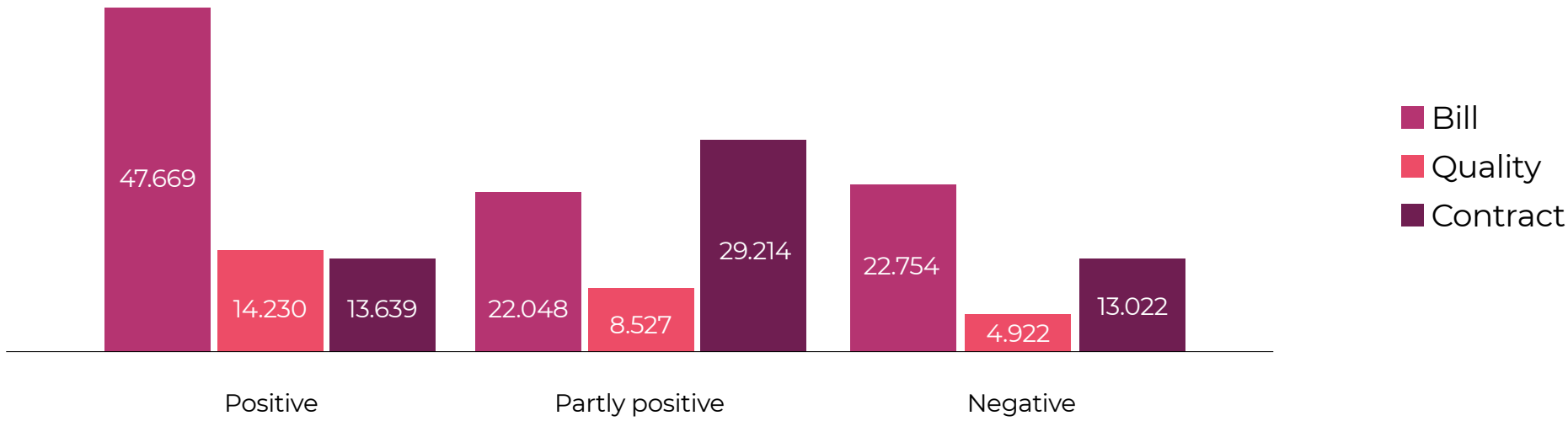


Figure 5.1. Type and outcome of complaints (1st instance)

The first step in resolving the resulting dissatisfaction of each user is to file a complaint to the operator. If the operator rejects the complaint, the user may file a complaint to the operator Consumer Protection Commission within 30 days. In addition to the operators' representatives, each commission is composed of representatives of consumer protection organizations. In some cases, users only ask for an explanation for some of the costs incurred and will not proceed in the second instance if they receive a satisfactory answer, a part of the users give up regardless of the negative reply, while a part of them file the complaint and continue with the procedure. Most complaints are related to the amount of the bill, then compliance with contractual provisions, and the rarest are complaints about the quality of service.

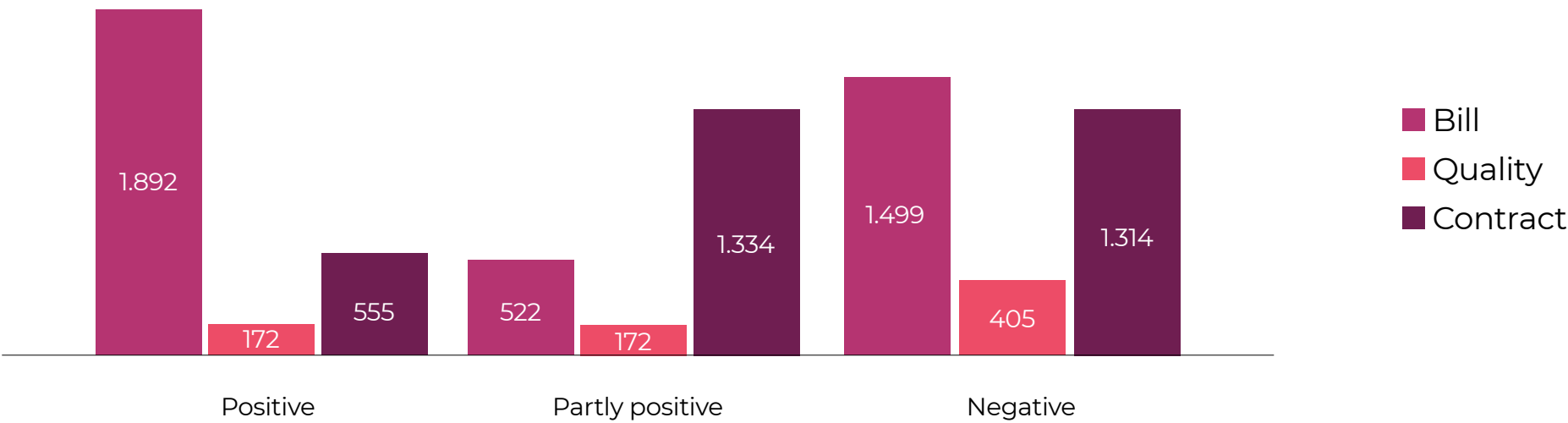


Figure 5.2. Type and outcome of complaints (2nd instance)

Only a small proportion of partially settled complaints are lodged with the operators' commissions, and the proportion of accepted and partially accepted complaints (second instance) falls relative to the percentage of complaints accepted in the first instance. This situation is expected because it is one of the measures that shows how well the operator's services worked in resolving the complaint.

DISPUTES

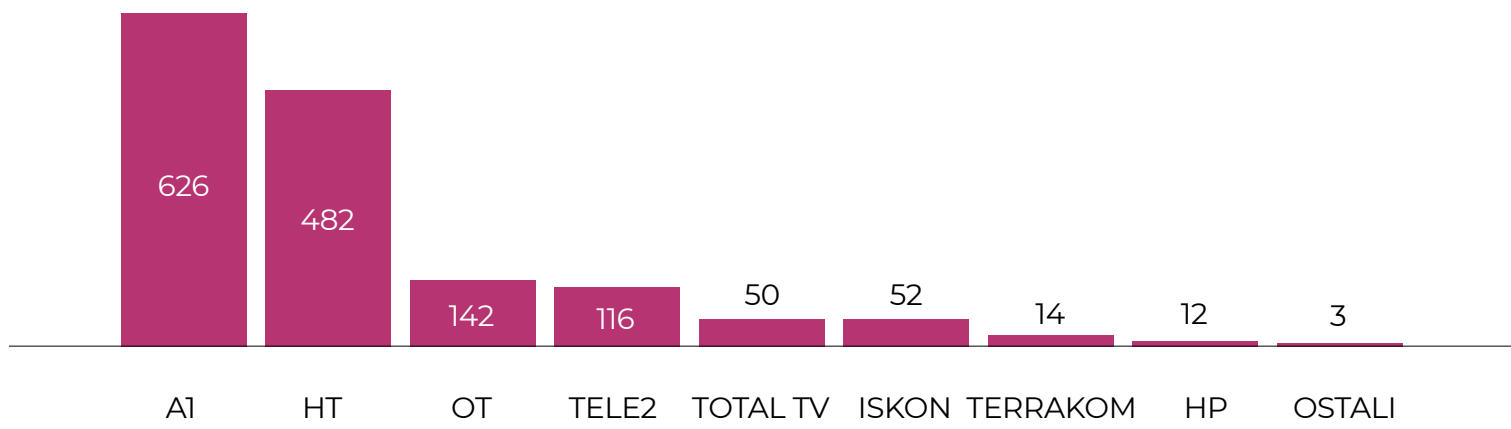


Figure 5.3. Number of resolved claims per operator (3rd instance)

In 2018, 1497 claims for dispute settlement were resolved (1457 claims in 2017). The largest number of requests were submitted by end-users of the two biggest operators.

The number of requests per operator is not a representative indicator until it is correlated with the total number of users of each operator.

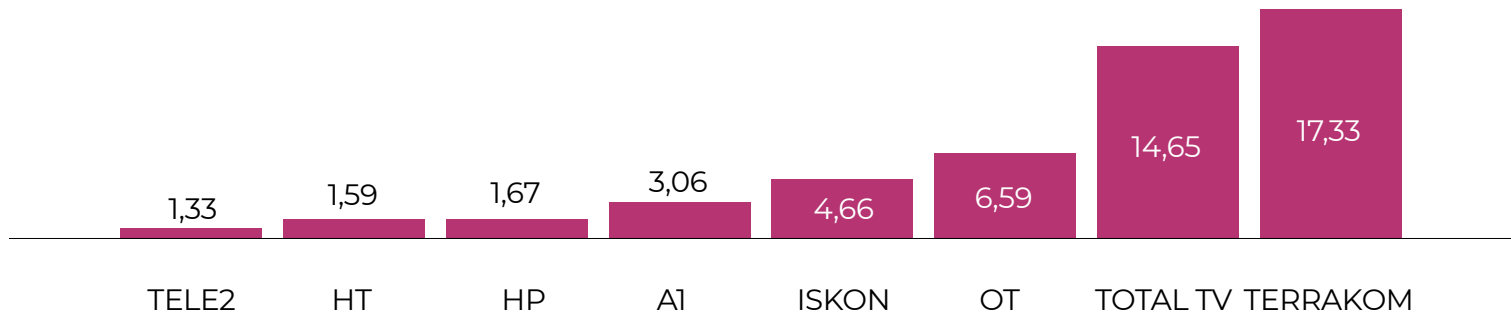


Figure 5.4. Number of disputes for every 10,000 users of each operator

The ratio between the number of disputes and users is a comparable measure, so a lower ratio is an indicator of better performance of operator services in the first and second instances of complaint resolution.

382 disputes were resolved without the need to enter the merits of the case itself, most often because the operator subsequently changed his decision. In the majority of such cases, the user accepted the way the operator resolved the complaint, that is, the user withdrew, and the cases which were not under HAKOM’s jurisdiction or which were filed outside the prescribed deadline and similar were less frequent.

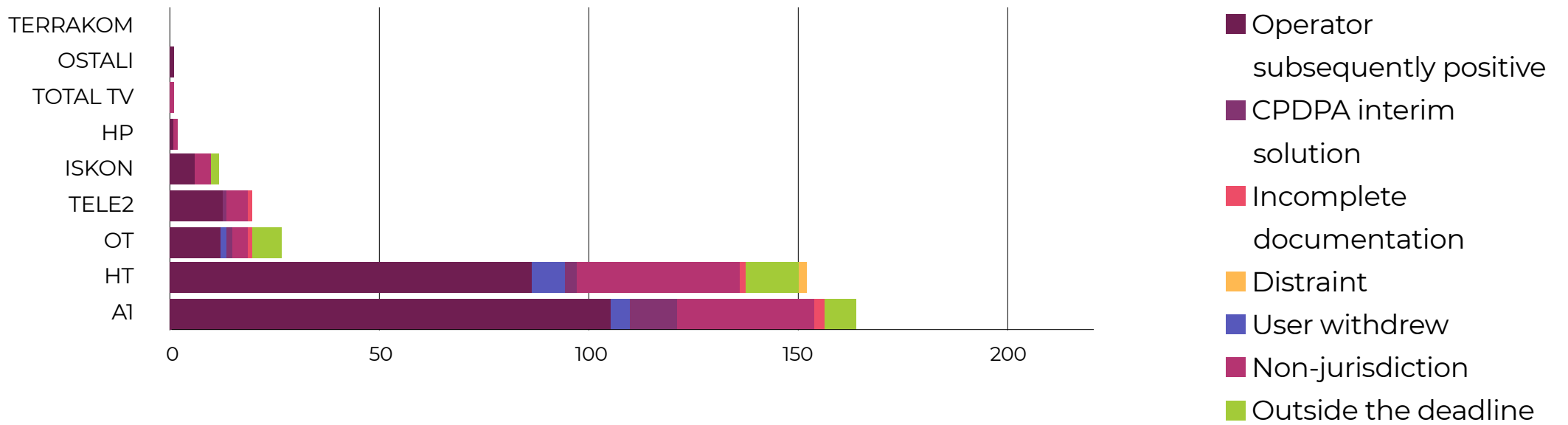


Figure 5.5. The ratio of adopted decisions by type and operator

Most of the end-user and operator disputes, 1,115 of them, were resolved with a decision after all the necessary facts had been established. With almost all operators, the percentage of changed decisions is greater than 50 percent. Only Tele2 d.o.o. commission makes the decisions which HAKOM mostly affirms.

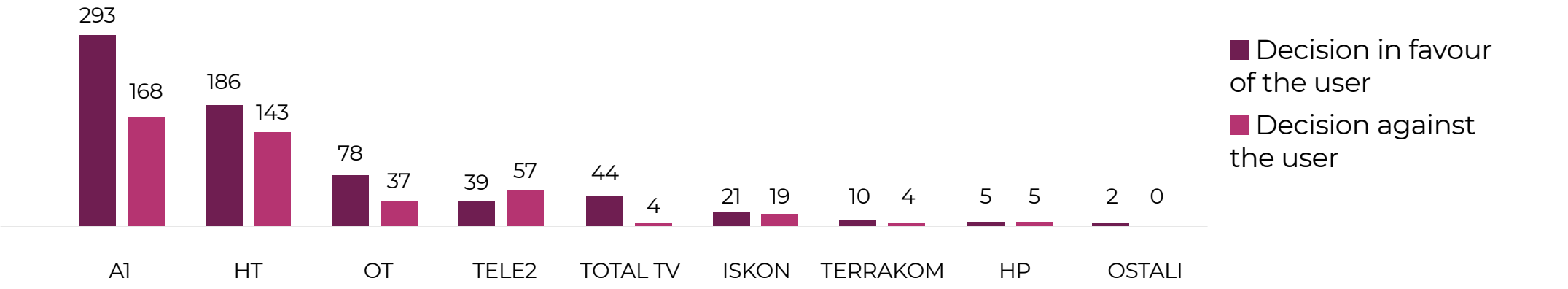


Figure 5.6. Ratio of disputes in favour of users and those in favour of operators

The ratio of committee decisions that HAKOM changes and adopts a different decision compared to the ones it affirms is an indicator of correct treatment. The better the committee does and follows and adopts the practice of HAKOM, the smaller the ratio. The minimum that should be the initial goal for each operator is for at least half of the decisions to be affirmed as correct.

The analysis of the reasons why users initiated disputes shows that they are largely related to early

termination of the contractual obligation, and only then to billing, consumption and realized traffic, which had been the most common reason for disputes for years. There are still many complaints regarding the right of termination within 14 days from the date of conclusion of the contract, to which the users are entitled in accordance with the Consumer Protection Act in cases of off-premises or remote sale. A positive indicator is the small number and ratio of decisions concerning the quality of all services, as well as the small number of disputes over services with a special tariff.

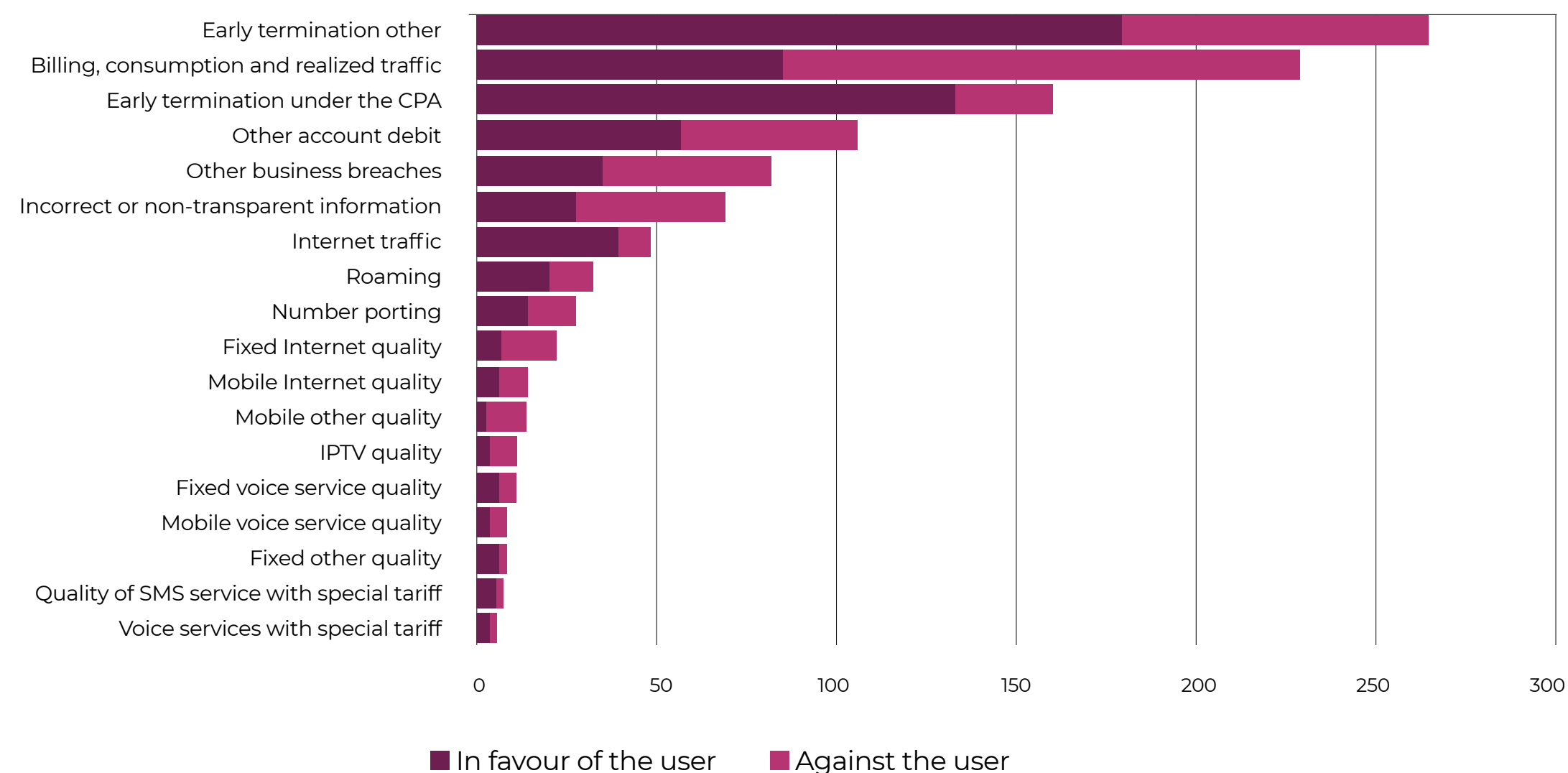


Figure 5.7. Ratio of adopted decisions per reason of dispute

Dispute resolution is just one of the segments of implementing a high level of user protection policy. The second, equally important, is all activities that may be considered preventive, because, among other things, they prevent the occurrence of situations in which users might be harmed as a weak party to the contractual relationship. This group of activities includes direct contacts with users and representatives of consumer protection organizations, either to inform or collect information from the market, or to provide expert advice, control of general business conditions, price lists and conditions of use, as well as co-operation with other bodies to improve the consumer protection policy in the Republic of Croatia. A good example of successful collaboration is the [“Do Not Call” Register](#). The Register is a joint project of the Ministry of Economy, Entrepreneurship and Crafts (MEEC) and HAKOM, where all consumers can

enter their phone numbers and traders are then forbidden to contact them for advertising and sales purposes. The Register had the most success with the elderly, and at the end of 2018, more than 38,000 phone numbers were entered. The collaboration with MEEC should be emphasized in relation with raising consumer awareness and access to information on their rights, as well as conducting dialogues with consumer protection organizations. HAKOM participated in the development of the [Consumer Handbook](#) with other bodies involved in services or sales in the context of consumer protection, and jointly marked the Consumer Protection Week in March. In the second half of the year, cooperation continued with the project [Central Consumer Portal](#) and participation in an inter-ministerial dialogue on consumer protection and promotion of consumer policy in the Republic of Croatia.

Some of the ways of implementing preventative activities during the year:

- [market analysis](#), including the identification of challenges in resolving disputes, and proposing measures under sectoral regulations (amendment of sectoral regulations in 2019)
- control of operators' general acts (general business terms and conditions, terms of use and price lists) defining their business operations and special obligations related to the protection of users of electronic communications
- verification of changes of price lists and operators' promotional offers
- interpreting regulations and providing expert opinions in the field of End user protection
- informing users via the website and the “Ask Us” website section; queries in the area of user protection answered within the shortest possible time, as priority
- informing users through Facebook page; publication of users' rights and operators' obligations and replies to users' queries
- a direct telephone line for contacting HAKOM's experts during regular business hours for information about specific cases, that is, assistance and instructions on how to act in case of problems with operators
- a direct telephone line for helplines for consumers so that employees in help centres could obtain information from HAKOM quicker and easier
- active participation in the work of other state institutions on projects concerning user/consumer protection, especially in the work of MEEC

NUMBER PORTING

In order to remove the barrier to the entry of new stakeholders into the market, HAKOM introduced a number porting service in 2005 in such a way that users may select any operator and switch to its network while maintaining the previous number, a process performed by the new operator. HAKOM takes care of the timely upgrading and introduction of new functionalities and regularly maintains the Central Administrative Data Base of Ported numbers (CABP). A quality administrative and technical process of the number porting service is an important factor for end-user satisfaction.

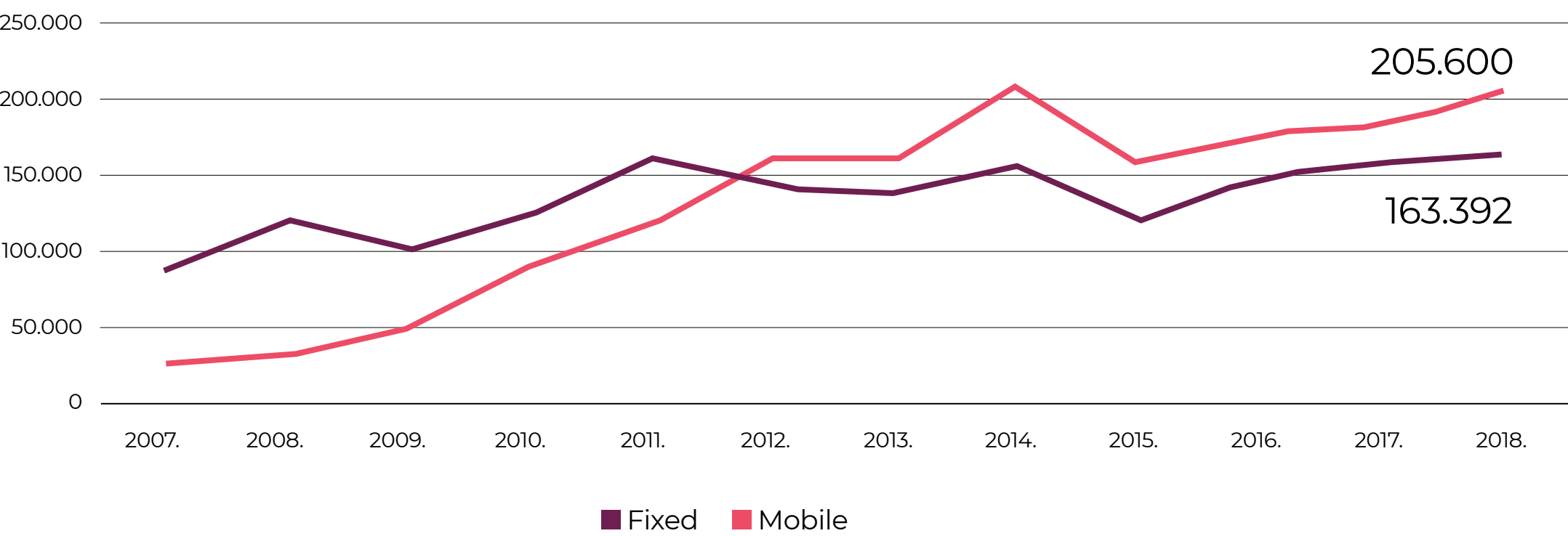


Figure 5.8. Amount of ported numbers in the mobile and fixed networks

A widely used e-Portability application is also available on HAKOM's web portal and it allows the user to follow the status of the number portability procedure and get information about the network which the number is currently located in, all in real time, synchronized with the Central Administrative Base of Portability.

PROTECTION OF POSTAL SERVICE USERS

Although the number of letter items has been declining for years because they are being replaced by electronic communications, parcels as a result of online trade represent an increasingly important segment of the business. Such changed circumstances present a challenge for postal service providers, and often have implications for user relations. Sometimes this relationship ends with user

dissatisfaction complaining about the postal service. The procedure for resolving complaints by users of postal services is a three-instance procedure and is in line with the procedure for protecting the rights of end-users of public communications services pursuant to the ECA.

Pursuant to the provisions of the PSA, a user of postal services may submit a written complaint to a postal service provider in a complaint resolution procedure in case of loss of a postal item, non-compliance with the deadline for the delivery of a postal item, if the postal service provider did not provide the service or did not provide it entirely or in case of damage or loss of contents of a postal item. A user may submit a claim to the Consumer Complaints Commission of the postal services provider against the written reply of the postal services provider. In case of a dispute between the user and the provider of postal services concerning the resolution of the complaint, the user may submit to HAKOM a dispute resolution request within 30 days from the submission of the written reply to the Consumer Complaints Commission of the postal services provider.

Disputes are resolved by adopting a decision, on the basis of the opinion of the Consumer Complaints Commission, an advisory body established at HAKOM. HAKOM's decisions in disputes between users and providers of services are final and may not be appealed but an administrative dispute may be initiated.

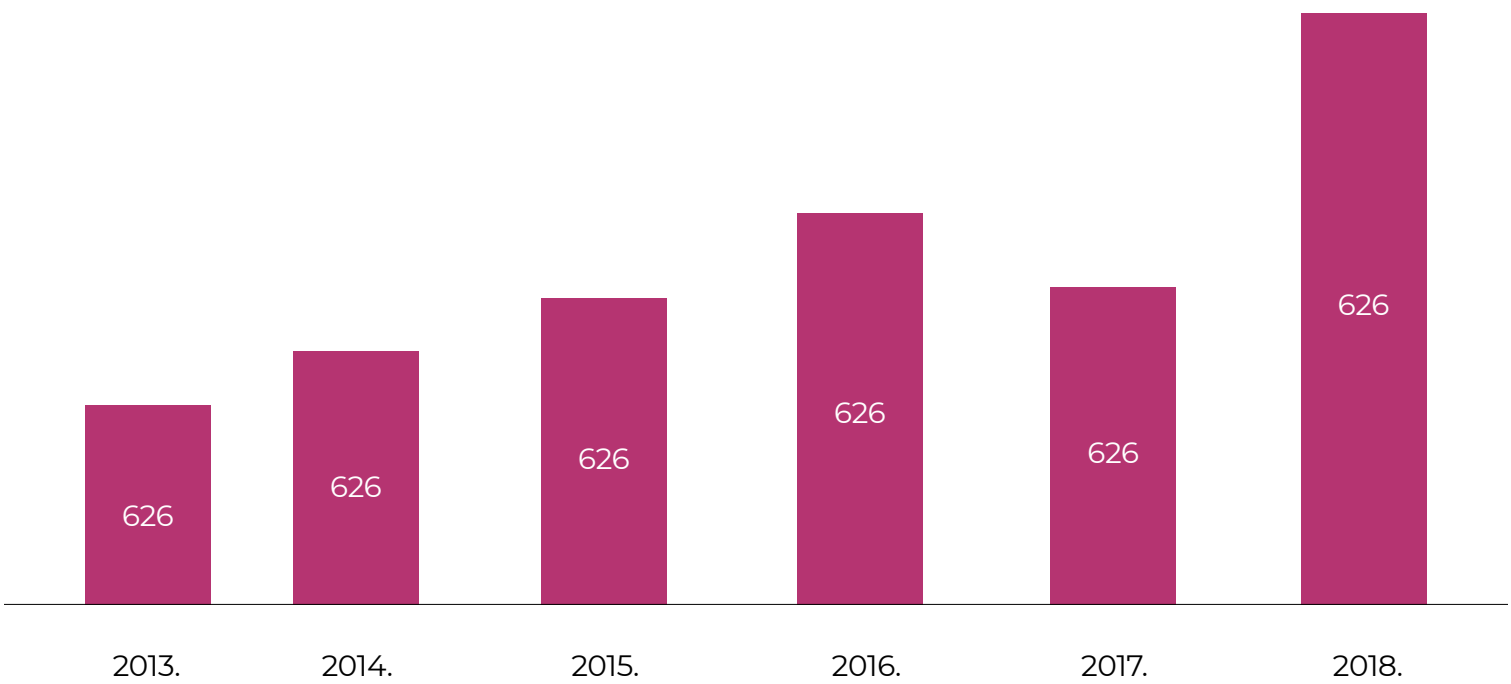


Figure 5.9. Number of dispute settlement requests received for postal services

Since 2010, there has been a trend of and annual increase in the number of requests. In 2018, 134 requests were received, of which 105 related to disputes with HP, the universal service provider, and 29 to other postal service providers.

PROTECTION OF USERS OF RAIL SERVICES

Pursuant to the provisions of the Act on the Regulation of the Rail Services Market (hereinafter: ARRSM), HAKOM is competent for the protection of passenger rights and for resolving passenger complaints against railway undertaking's decisions. Pursuant to the provisions of the Act, a passenger may submit a written complaint to the railway undertaking for the protection of his or her rights. The provisions were simplified in 2017 organized into three instances of resolution, the same as in electronic communications and postal services. The first instance is the railway undertaking, the second is the Consumer Complaints Commission, and the third one is HAKOM. HAKOM resolves disputes by adopting a decision, on the basis of the opinion of the Consumer Protection Commission. HAKOM's decisions in disputes between passengers and railway undertakings are final and may not be appealed but an administrative dispute may be initiated before a local administrative court.

In 2018, HAKOM adopted decisions in seven proceedings initiated following passenger complaints. The majority of passenger complaints referred to the payment of an additional HRK 500.00 for riding without a valid ticket, which is paid regardless of the route and class of train, but also to train delays, rights of persons with reduced mobility and a refund for not using the ticket. Compared to the 2,437 complaints submitted to the railway undertaking as the first-instance body, the number of complaints resolved by HAKOM as the third-instance body is almost negligible. Compared to the previous year, it was significant that there were no cases that involved procedural assumptions without entering into the merits of the passenger requirements. In previous years the requests often had to be rejected due to the lack of fulfilment of procedural requirements, and simpler regulation of the legal protection procedure could be the main reason for this result in 2018.

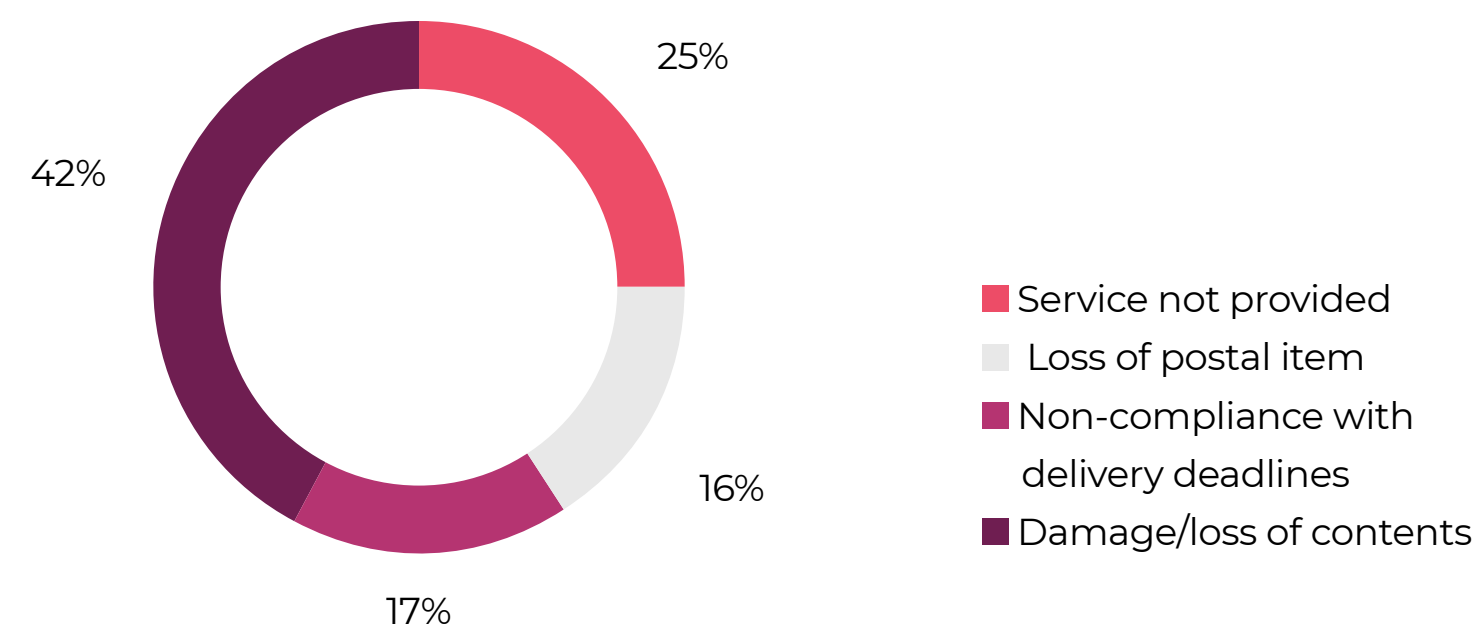


Figure 5.10. Shares of types of complaints in the solved disputes user-provider

Concerning the types of complaints, most were complaints about damage or loss of contents of the postal items, 34 of them. 13 disputes were initiated due to the loss of postal items, 14 complaints regarded non-compliance with deadlines for delivery, and 20 regarded failure to provide the contracted service.

Concerning the types of services the complaints were related to, most disputes were initiated regarding services with some added value and parcels (around 60 percent), and registered mail (around 27 percent), which also include judicial documents under administrative, tax and other proceedings that are sent in special envelopes by courts and other administrative bodies pursuant to special laws.



Figure 5.11. 2018 leaflet for passengers

In 2018, leaflets were produced and distributed at passenger stations in the Republic of Croatia, outlining basic information on how to file a complaint with HAKOM, the deadlines, methods of filing a complaint and similar information on passenger rights and obligations of undertakings.

PERSONS WITH DISABILITIES

The digital society and digital services can be a help and sometimes a solution to some of the challenges faced by people with disabilities. This is why accessibility to digital society services, which begins with each user's relationship with the operator, is one of the priorities in HAKOM's corporate social responsibility. Thus, at the end of the year, in cooperation with the Faculty of Electrical Engineering and Computing (FER) in Zagreb, a second conference was organized on the topic "Persons with disabilities in the digital society", which gathered the representatives of the associations for persons with disabilities, the Office of the Ombudswoman for persons with disabilities, operators and other institutions. The aim of the round table was to provide an overview of the situation of persons with disabilities as users of electronic communications services and to provide guidelines for further improvements.



Figure 5.12. Prototype of an accessible website

The conference presented the work on a prototype accessible website, a project in collaboration with FER. The prototype is an accessible website with offers from operators that will serve as a basis for improving the accessibility of the website of HAKOM as the regulator, but it will also offer to the operators optimal solutions for the improvement of their site in view of the wishes and needs of persons with disabilities in the Republic of Croatia. The conference ended with thirteen conclusions, and cooperation with organizations for persons with disabilities is crucial for the successful continuation of work on an accessible network website. Operators will continuously educate sales staff on how to communicate with persons with disabilities and tailor the access to points of sale. In their stores, operators have also adapted, or will be redesigning, the accessibility of pricing and performance information on displayed devices so that there is no barrier to wheelchair users.

PROTECTION OF CHILDREN

HAKOM has focused part of its activities on raising awareness and knowledge of children and their parents about responsible behaviour when using electronic communications services, because modern society has new ways of accessing information and communicating, new ways of spending free time, new ways of shopping, socializing, education and performing daily tasks. All of this shapes opinions, attitudes and values during the sensitive period of growth and development of children and young people in a different way than before the advent of the "digital society". Children today are equal users of electronic communications services, so they need to be given special attention because they represent the most vulnerable group of users. Collaboration with experts working with children and the Internet has resulted in a new and updated HAKOM brochure entitled "How to keep your child safe in the world of Internet, network technologies and mobile phones", which contains practical and useful tips on the dangers and safety of the Internet, protection of privacy and personal data, acceptable behaviour and responsible use of social networks and similar.



Figure 5.13. Title page of HAKOM's brochure for children and parents in the 2018/2019 school year

The brochure is part of HAKOM's education programme for children and parents, which has been implemented in cooperation with the Ministry of Science and Education for two school years, and is distributed in printed form to students in the fifth grades of primary schools (more than 40,000 of the 50,000 printed brochures are distributed in all primary schools). Great emphasis is placed on education, so HAKOM's experts held a series of trainings for children and parents in schools. The program is aimed at all elementary school students in the Republic of Croatia and will be continued in the coming period.

It is important to mention the extension of cooperation with civil society organizations dealing with child safety on the Internet, and the main conclusion is that it is necessary to use the synergy of all stakeholders dealing with this issue and to jointly spread awareness about responsible and safe use of modern technologies. It should also be noted that the Safer Internet Day was celebrated in February, during which the first Children's Internet Safety Charter was publicly signed between Vipnet (today AI Hrvatska), Hrvatski Telekom, Tele2, HAKOM, the Safer Internet Centre / Centre for Missing and Exploited Children. The purpose of the charter was to raise public and parent awareness on this important topic, while at the same time demonstrating the determination and readiness of the electronic communications market and the most important stakeholders in creating a better and safer environment for children. Further development of cooperation and concrete joint activities to raise awareness of a responsible and safe way of using the Internet were agreed for 2019.

07

INSPECTION



ELECTRONIC COMMUNICATIONS **66**
POSTAL SERVICES **67**
INSPECTION **67**

It is under HAKOM's competence to perform inspection supervision in the fields of electronic communications, postal services and part of the rights of rail passengers. Inspectors are fully integrated into HAKOM's organizational structure and cooperate with other experts on a daily basis, which facilitates inspection activities. The supervisions are always implemented in accordance with the principles of proportionality and appropriateness, and the areas of focus were primarily defined in the Annual Work Programme.

INSPECTION SUPERVISIONS

Inspection supervisions covered all three markets, with particular emphasis on compliance with regulatory obligations, universal services, user and passenger protection, quality of access networks, conformity of R&TT equipment, unsolicited communication, timely payment of fees to the users, and roaming and network neutrality.

ELECTRONIC COMMUNICATIONS

Electronic communications are the most challenging of all the three markets within HAKOM's competence, so the largest number of on-site evaluations, inspections and/or inspection supervisions was done in this market. Electronic communications inspectors performed 78 inspection supervisions (108 inspections and on-site evaluations) of the provision of electronic communications services from the ECA and related regulations with the following operators: Hrvatski Telekom d.d. Zagreb, VIPnet d.o.o. Zagreb (AI Hrvatska d.o.o. Zagreb), Tele2 d.o.o. Zagreb, OT-OPTIMA TELEKOM d.d. Zagreb, IT JEDAN d.o.o. Zagreb, H1 Telekom d.o.o., Iskon Internet d.d., IF-TEH rješenja d.o.o., Tehnoline t.o. Pula, NEX COM d.o.o., Metronet telekomunikacije d.o.o., Terrakom d.o.o., BT NET d.o.o. Zagreb, EL-KOM M.B.I. d.o.o. Rijeka, NTH Mobile d.o.o. Varaždin, MAGUS MUNDI d.o.o. Sveta Nedelja, SKYNET TELEKOMUNIKACIJE d.o.o. Zagreb, TELE FOCUS d.o.o. Pula, 3 SL SOLUCIJE d.o.o. Zagreb

and VEDEL MEDIA d.o.o. Sesvete, and two legal entities regarding the compliance of radio stations (Komunalne usluge Cres Lošinj d.o.o. and ISTARSKI VODOVOD d.o.o. Buzet), and one legal entity regarding a pre-paid account (Margento tehnologije d.o.o. Zagreb).

Inspections were, among other things, carried out in connection with regulatory obligations, user protection, provision of services with a special tariff, access with fair and non-discriminatory conditions, change of operator, that is, number porting, number portability and quality of service.

In 2018, the inspection of aggregation and access networks continued, with the Counties of Istria, Primorje-Gorski Kotar and Lika-Senj in the forefront. Inspection of aggregation rings R3-West and R3-East was carried out in the territory of these counties. All DWDM locations were inspected (15 in total) with special attention to the method of connecting fibre optic cables to DWDM node objects, so as not to affect the reduction of reliability and availability, the method of cabling and terminating fibre optic cables within the facility, the correctness and dimension of the backup power supply (batteries and aggregate) and other. The reliability and availability of all key transmission links is at an enviable level, except for Mali Lošinj. Only this transmission node with high traffic does not have the ability to alternatively route traffic through two spatially (disjointly) separate fibre optic cables. Therefore, the inspector ordered the construction of a new transmission section (submarine cable of approx. 33 km) Mali Lošinj-Novalja, which will provide ring connections of not only Mali Lošinj but also Cres to the parent transmission node. The realization of this project is expected in the spring of 2020.

The inspection supervision of access networks covered the following areas: Buzet, Žbandaj, Fun-tana (Istria County), Fužine, Mali Lošinj, Cres (Primorje-Gorski Kotar County), Lovinac, Sveti Juraj, Pag (Lika-Senj County). In all of these networks the maintenance is not at a satisfactory level, and this is especially true for the distribution segment of the TC network. Some irregularities were observed in the joint cabling of the TC cables along the low-voltage feeder pillars, and in particular non-compliance with the minimum prescribed distance in the joint cabling and intersecting. In all these networks, for a number of objective and subjective reasons, the problem of overvoltage due to atmospheric discharges is strongly present on the user side. Some minimal activities need to be undertaken (installation of a certain type of combined surge protection on the user side) to somewhat alleviate this problem. A suitable surge protection is installed on the side of the access network node (switchboard) so no problems occur here.

Taking into account the occurrence of systematic problems in the market, that is, particularly serious and serious infringements of the law, an indictment was filed against the operator IT JEDAN d.o.o. for sending SMS messages repeatedly for the purpose of direct advertising without obtaining the subscribers' permission, for concealing the sender's identity and precluding the users from stopping

further communication, and for sending messages without the cost and age limit information, that is, messages that deceive and mislead users.

In 2018, HAKOM's electronic communications inspectors adopted 14 decisions and issued two misdemeanor rulings, which are publicly and regularly published on the website <https://www.hakom.hr/default.aspx?id=45>.

POSTAL SERVICES

In 2018, HAKOM's postal inspectors performed 13 inspection supervisions (36 inspections and on-spot evaluations) related to the provision of the universal, interchangeable and other postal services prescribed by the PSA over three postal service providers: HP-Hrvatska pošta d.d., GLS Croatia d.o.o. and OVERSEAS TRADE Co LTD d.o.o., and over the legal entity Vodoopskrba i odvodnja Zaprešić d.o.o. regarding self-delivery. Respect for the manner and timing of shipment delivery was in a constant focus of Hrvatska pošta as the universal service provider.

The postal inspectors issued three rulings and two enforcement rulings, which were made public on the Internet:

[Ruling to the operator HP regarding ways of resolving complaints of service users](#)

[Ruling to the operator HP regarding ways of delivering notices of arrival of shipment](#)

[Ruling to the operator HP regarding ways of transport and delivery of postal shipments](#)

[Enforcement ruling to the operator HP regarding of resolving complaints of service users](#)

[Enforcement ruling to the operator GLS Croatia regarding ways of resolving complaints of service users](#)

RAIL SERVICES

Inspection supervisions in the field of protection of passenger rights in railway transport were primarily focused on the protection before and during the journey and on the protection of persons with disabilities and persons with reduced mobility. The inspections are carried out on the basis of the ARRS, and particularly in view of implementing the [Regulation \(EC\) No.1371/2007](#) of the European Parliament and of the Council on rail passengers' rights and obligations.

In 2018, the inspection initiated in 2017 over the company HŽ Putnički prijevoz d.o.o. was continued to determine the implementation of the Regulation, the ARRS, the Act on Transportation Contracts in Railway Traffic (ATCRT), the General Terms and Conditions of Carriage (Tariff 101, the tariff for the transportation of passengers in domestic traffic (TPDT) Transport conditions, privileges and transportation of hand luggage, hereinafter: Tariff 101) and the Ordinance on the Preparation and Publication of the Train Schedule in Railway Traffic. Particular attention was paid to determining compliance with the obligation to provide information during the journey pursuant to the Regulation. In the inspection process, it was determined whether HŽ Putnički prijevoz d.o.o. complied with the obligations under Annex II, Part II of the Regulation – "Information during the journey", where the inspection focused on information about the official name of the place, that is, the stopping of trains in official places, train delays and on-board services. The inspection supervision over these segments will continue to be carried out due to the comprehensiveness and the need to control all train grades and the entire territory of the Republic of Croatia.



08

HAKOM

BROADBAND OFFICE **69**
COOPERATION **69**
PUBLICITY OF HAKOM'S OPERATIONS **73**
COURT PROCEEDINGS **74**
e-AGENCY **75**
COMPETENCE DEVELOPMENT **75**

BCO NETWORK SUPPORT FACILITY

HAKOM participates in the work of the *Broadband Competence Offices Network Support Facility (BCO)* at EU level. In 2018, HAKOM representatives participated in the international conference Broadband Days 2018 and at several meetings and workshops organized by the BCO aimed at sharing knowledge and experience between Member States and addressing practical issues.

In 2018 the EC realized the first round of EU-level vouchers for funding individual municipalities and cities, based on the “WiFi4EU” initiative, which aims to strengthen local free and non-discriminatory wireless connectivity and to promote citizen connectivity in public places such as squares, parks, libraries, museums, public institutions, health centres, etc. 224 Croatian municipalities and cities used the opportunity to make use of EU grants in order to enable wireless internet in places that are considered centres of public life. Of the 336 reported, 224 won individual vouchers worth EUR 15,000, or a total value of EUR 3,36 million at the level of the Republic of Croatia, which is at the same time the maximum that could be awarded to each Member State. Only six Member States received the maximum number of vouchers.

As part of the Broadband Competence Office, HAKOM continuously informed the public and potential project holders about the “WiFi4EU” initiative, and instructed them on the ways and possibilities to use grants under the initiative, and assisted municipalities and cities in registering and applying for the competition.



Cooperation is one of the bases on which all regulatory activities rest, as national regulators such as HAKOM are often the starting point, hub or important link in the developments in individual markets. Without adequate cooperation, markets often suffer from environments which are far from optimal for development and progress. Domestic cooperation included bodies of state administration, public authorities, the academia, civil society and similar, and has been addressed in previous chapters. International cooperation is equally important, especially since HAKOM represents the Republic of Croatia in many international bodies and organizations.

The European Union (European Commission, Council)

HAKOM actively participated in the work of the **EU Council** at expert level, where it represented the views of the Republic of Croatia in the discussions at the meetings of the Working Party on Telecommunications and Information Society. The central topics in 2018 were the proposal for a Directive of the European Parliament and of the Council on the European Electronic Communications Code (EECC Directive), the proposal for a Regulation of the European Parliament and of the Council establishing the Body of European Regulators for Electronic Communications (BEREC) (BEREC Regulation), the proposal for a Regulation of the European Parliament and the Council on Privacy and the Protection of Personal Data in Electronic Communications (e-Privacy Regulation). The legislative process in relation to the EECC Directive and the BEREC Regulation was finalized in December 2018, while the legislative process for the adoption of the e-Privacy Regulation continued in 2019.

In 2018, HAKOM participated in the work of two committees chaired by the European Commission. These are the **Radio Spectrum Committee (RSC)** and the **Communications Committee (COCOM)**. The Radio Spectrum Committee (RSC) assists the EC in developing technical implementation decisions that ensure harmonized conditions for the availability and efficient use of the RF spectrum in the EU. The RSC also addresses measures that ensure accurate and timely delivery of spectrum usage information. Participation in the work of this body facilitates the communication of national regulators with the EC on their proposals before implementation to ensure that the measures are adapted to the different situations of individual countries. Notable EU Decisions in the work of RSC are Decision (EU) 2018/1538 on the harmonization of the 874-876 and 915-921 MHz frequency bands, Decision (EU) 2018/661 on the harmonization and extension of the 1427-1452 MHz and 1492-1517 MHz for broadband access and Decision (EU) on the 2018/637 frequency bands for the Internet of Things. COCOM assists the EC in adopting implementing and delegated acts in the field of application of the directives governing the electronic communications market. In addition, the Committee is a forum for the exchange of experience of Member States and the EC in the implementation of European and national regulations in the field of electronic communications. HAKOM representatives participate in the work of COCOM's committees together with MSTI representatives.

HAKOM also participates in the work of the **EC Radio Spectrum Policy Group (RSPG)**, a high-level advisory group that assists the EC in developing RF spectrum policy, in particular regarding its harmonization, harmonized availability conditions and the effectiveness of use of the RF spectrum and the policy of establishing and functioning of the internal market. The RSPG adopts opinions, positions and reports and advises the EC at the strategic level. Important documents include the RSPG Opinion on the ITU-R World Radiocommunication Conference, the RSPG Opinion on 5G Networks, the Report of the Working Group on Cross-Border Coordination of Interference Mitigation, and the Report on Facilitating Mobile Connectivity in Challenge Areas. Since the EC decisions are directly applicable to the Republic of Croatia, which is obliged to implement them, participation in the RSC and RSPG is crucial in order to influence the final decision in a timely manner, depending on the national situation of the individual parts of the RF spectrum.

BEREC

HAKOM participates in the work of BEREC, the Body of European Regulators for Electronic Communications, and votes on all decisions adopted at BEREC's plenary meetings. Moreover, HAKOM's experts actively participate in the working groups of BEREC and on drafting of documents for the regulation of the electronic communications market at the EU level.

Particular emphasis should be placed on analyzing the proposals for legislative acts that form the new regulatory framework for EU electronic communications. The legislative acts in question are the BEREC Code and Regulation, and the work on these acts was particularly intense in 2018. Consequently, work was started on the preparation of a work programme related to the development of guidelines to be adopted by BEREC under the new regulatory framework. In addition, HAKOM's experts were in 2018 again members of the **BEREC Roaming Working Group** as drafters, that is, members of the core team involved in the direct preparation of BEREC Roaming Group documents. Thus, HAKOM was a drafter in the preparation of BEREC's report on transparency and of roaming tariffs, and in the first half of 2019 participated in the drafting of the BEREC Opinion on the Impact of RLAH, prepared on the basis of a European Commission questionnaire, completed by EU/EEA regulators, operators and MVNOs. HAKOM experts were responsible for drafting a part of the report concerning the impact of RLAH on the quality of roaming services.

Also, BEREC defined five strategic priorities for the period from 2018 to 2020, judged to be key in regulatory terms, which are also challenges for the market and technological development, and in this respect, it also amended its work programme for 2018. The priorities are the following: *developing very high-speed networks, identifying barriers to digital service development, 5G, network neutrality, enhancing user protection*.

The result of the work on the priorities is various reports on the regulation and practice of national regulatory authorities and potential challenges, as well as an overview of best practices and common positions on specific issues. Important documents include the Report on pricing for access to infrastructure and civil works, the Report on IoT indicators, the Report on practices on spectrum authorization and award procedures and on coverage obligations with a view to considering their suitability to 5G, the Report on infrastructure sharing, Common Position on monitoring mobile coverage, Report on implementation of network neutrality, Report on terminating contracts and switching provider, Report on NRAs' practices for ensuring equivalence of access and choice for disabled end-users, Report on contractual simplification, and more. In addition to these documents, in 2018 BEREC issued a number of documents which are part of its regular work, such as roaming reports, regulatory accounting reports, termination price reports, as well as other various reports and opinions on European Commission proposals.

ITU

HAKOM is one of the RoC representatives at ITU, and HAKOM's experts regularly participate in the work of the working groups. HAKOM experts participated in the work of the World Radiocommunication Seminar (WRS-18) in Geneva. The seminar covered topics related to the use of the RF spectrum and satellite orbits and the implementation of ITU Radio Regulations. Also worth mentioning is the work in the **ITU-R Working Party on Spectrum Monitoring (WP1C)**, which deals with all relevant ITU-R recommendations and documents in the field of RF spectrum control and monitoring.

CEPT

In 2018 HAKOM continued to actively participate in the work of CEPT so that regulations in the Republic of Croatia could be prepared in time to comply with the technical and procedural regulations at CEPT level. HAKOM participated in the umbrella working group of ECC, where decisions and recommendations regarding the management of RF spectrum and number space are made as a result of the work of the working groups.

Also, active participation continued in the work of the **Working Group Frequency Management WGFM**, which monitors the development of use of the RF spectrum and its harmonization.

Participation also continued in the work of the **FM44 project team**, which deals with satellite issues, in order to take into account the interplay of new satellite systems on existing microwave and satellite connections in the Republic of Croatia.

In 2018, HAKOM's representative continued to serve as Vice President of the **Working Group Spectrum Engineering (WGSE)**, which is responsible for the analysis of sharing capabilities of the RF spectrum between different radiocommunication services such as mobile, fixed, satellite and short-range devices (SRD). Considering the limitation of the spectrum as a natural resource, sharing of the spectrum is necessary in order to enable the work of a large number of wireless applications that the modern society functioning depends on.

HAKOM continued to participate in the work of the **ECC PT1 project team**, which deals with the area of IMT (International Mobile Telecommunications) technologies in the sense of development of regulations for the existing and new generations of mobile communications and radiofrequency planning. The most important topics in 2018 were about enabling the use of the RF spectrum for 5G systems and further development of the regulatory framework for narrowband and broadband Machine-to-Machine communications (M2M) and IoT (Internet of Things) technologies.

In 2018, HAKOM continued to participate in the work of the **Short Range Devices/Maintenance Group (SRD/MG)**. These devices are mass-produced and use the RF spectrum without individual licences (e.g. alarms, medical implants, RFID, transportation systems, and communication equipment like WiFi). Given the abundance and widespread use of SRD devices, the industry is heavily involved in the work of this group, with a strong interest in facilitating new applications and technologies and harmonizing the use of spectrum for these devices. In 2018, the group produced a CEPT report for ultra-wideband applications for potential updating of the Commission's decision, a CEPT report on the extension of the seatbelt for intelligent transport systems, and the CEPT report for short-range devices as part of the seventh update of the EU decision for short-range devices. Also, the group continued with the usual revisions to various appendices to Recommendation 70-03 and to all ECC decisions and recommendations in the SRD area.

The WG FM PT22 Working Group deals with the control and monitoring of the RF spectrum, drafting international recommendations and developing harmonized measurement techniques and procedures for the monitoring of the RF spectrum. In the previous year, reports from other working groups were also monitored, at the level of analysis of output documents.

In 2018, HAKOM continued to participate in the work of the **WG NaN Working Group**, which is responsible for the development of rules regarding addresses, numbers and appointments, and for providing advice on technical regulatory issues. HAKOM actively participates in the work of the working group entitled **Future numbering issues**, which primarily focuses on the allocation, sub-allocation and distribution of E.164 numbers in electronic communications. The group addresses various issues, following market development, and, while addressing current challenges, it seeks to anticipate future problems, aligning the different experiences of participating countries in the working group.

HCM

The Republic of Croatia is a signatory to the HCM Agreement (Harmonized Calculation Method), which defines unique criteria and methods for interstate coordination of the operation of private mobile networks and routing. Among the neighbouring countries, Austria, Hungary and Slovenia are also signatories, and HAKOM coordinated the parameters of individual radio stations with them in 2018. In addition, the work on harmonizing the frequency registers for private mobile networks with Slovenia was also continued, and finally completed in 2019.

EMERG

EMERG (The European Mediterranean Regulators Group) is a body that through its activities attempts to apply BEREC's manner of work to the broader Mediterranean region. It mostly comprises the Mediterranean countries, but other countries too (23 in total). Since March 2015, HAKOM has been a full member of EMERG and it has actively participated in the plenary sessions, workshops and meetings organised by EMERG. Three workshops were held in 2018: a workshop on cost accounting and price regulation, a service quality workshop and a workshop on IoT/M2M services. The results of each workshop are relevant recommendations for EMERG member countries.

ERGP

HAKOM has been an active participant in the work of the **European Regulators Group for Postal Services (ERGP)**. The working groups discussed and addressed the issues related to the universal service, regulatory accounting, prices of postal services, the state of the postal services market, quality of services, satisfaction and protection of users, cross-border traffic of postal items and more. One of the most important jobs of ERGP in 2018. was to provide expert assistance in the implementation of the legislative procedure for the adoption of a Regulation of the European Parliament and of the Council on Cross-Border Parcel Delivery Services. The aim of the EC Regulation on cross-border delivery of parcels is to amend the regulatory framework for postal services, with the aim of removing cross-border barriers to the movement of postal items and developing e-trade services. HAKOM representatives attended the 15th ERGP plenary session in November.

CERP

HAKOM continued to participate in the work of the European Committee for Postal Regulation (CERP), as part of the working groups and by attending meetings organized by CERP.

SPU

The Second Extraordinary Congress of the Universal Postal Union (UPU) was held in Addis Ababa, Ethiopia in September. Within the delegation of the Republic of Croatia, in addition to the representative of the Ministry of the Sea, Transport and Infrastructure, as the head of the delegation, a representative of HAKOM also attended the Congress as the deputy head. On the congress, a ministerial conference on the future challenges of the universal postal system was held in addition to current topics related to postal industry.

ENRRB

The European Network of Rail Regulatory Bodies is the European Commission advisory body which meets several times a year to discuss issues and practice under the competence of regulation of the rail services market. For the purposes of the work of the ENRRB, a database of regulatory bodies (DAREBO) was established. In 2018, HAKOM actively participated in meetings to discuss the economic equilibrium test and the interpretation of Article 56, Paragraph 9 of the Directive 2012/34/EU, fees for access to infrastructure, protection of passenger rights, delays and quality in rail passenger transport and other. Also, the issue of implementation of the 4th Railway Parcel and the creation of a European regulation was discussed.

IRG Rail

IRG-Rail is the independent regulators group for railway services, within which HAKOM participates in the work of all six working groups. HAKOM participated in the preparation of the sixth annual report on the state of the European rail market, the drafting of a review of the Commission Implementing Regulation 2015/1100 and the plenary sessions in May and November. Important topics discussed on the meetings were the quality of the freight rail corridors, the development of a common form for service facilities, the redesign of the timetable process and the technical barriers to access in cooperation with the European Union Agency for Railways (ERA).

NEB

In 2018, HAKOM participated in the meeting of the National Enforcement Bodies of the EC Regulation no. 1371/2007 (NEB) on Rail Passenger Rights and Obligations for the purpose of revising the Regulation and for its comprehensive implementation and application. The aim of the meeting was to exchange experiences, to establish best practices for the protection of the users of rail passenger transport and to harmonize practices and propose changes to the EU legislative framework in the field of rail passenger protection.

RNE

Organized by the EC and the association of European railway Infrastructure Managers (RNE), HAKOM participated in the annual conference for representatives of the regulatory bodies of EU Member States, presenting further actions and achievements in their area of activity.

Ostalo

HAKOM participated in the Expert Conference **FibreWeek2018** held in April 2018. Within the topic "Development of Broadband Access in Croatia: Regulation, Standardisation, Planning, Designing, Financing, Roll-Out, Management, Services", HAKOM participated with three presentations: "Fibre Optic Networks in Croatia - Overview of Construction Plans and Built Fibre Optic Access Networks", "Low Voltage Electrical Installations in the Building Intended for Electronic Communications" and "Developing Next Generation Access Networks through Projects Funded by European Structural and Investment Funds".

In November, HAKOM participated in the **MMS 2018** - 3rd EAI International Conference on Management of Manufacturing Systems in Dubrovnik, organized by the European Alliance for Innovation (EAI) and co-organized by the Faculty of Transport and Traffic Sciences in Zagreb. HAKOM presented regulatory challenges regarding 5G technologies. The basic features of 5G technology and the benefits expected in the automotive, healthcare, agriculture, industrial, and other industries were explained. The need for multidisciplinary in the introduction of technology was highlighted, since successful implementation requires consideration of more base stations than with the current technologies, which will also entail issues related to health (electromagnetic radiation) and construction.

In September, HAKOM participated in a meeting regarding the QoS memorandum and the display of QoS in applications, which was held at the **Czech Telecommunications Office (CTU)**. Representatives of regulators from the Czech Republic, Poland, Slovenia, Serbia and Croatia participated and presented the development and current status of QoS displays in applications. Most administrations are developing or have already developed tools for QoS and portals to publish measurement results on a map.

At the 60th International Symposium **ELMAR-2018**, held in September in Zadar, HAKOM participated in a special section called Digital Radio DAB+ in the Republic of Croatia. Also, HAKOM employees presented at the conference the work Preparations for the Second Digital Dividend in Croatia..

At the invitation of the independent international organization **WorldDAB Forum**, which is responsible for the implementation and promotion of DAB (Digital Audio Broadcasting), HAKOM experts

participated in the general conference held in Berlin. The conference brought together more than 200 experts in the fields of economics, broadcasting and the radio industry, and the focus of the conference was the application and development of digital radio.

HAKOM's experts participated in the 16th meeting of regional broadcasting organizations and transmitting equipment manufacturers – **MBT 2018** held in Vodice. The main topics were digital radio DAB+ and the future of broadcasting.

As part of international cooperation, a bilateral meeting of representatives of the **railway regulatory authority of the Republic of Northern Macedonia** and representatives of HAKOM was held in June 2018, in accordance with Article 57 of the Directive 2012/34/EU establishing a single European railway area (Recast). The meeting was the opportunity to exchange experiences on the application of legislation in the field of regulation of the rail services market and on the protection of passenger rights in rail transport, and hold meetings with representatives of the MSTI, the Infrastructure Manager (HŽI) and the Railway Safety Agency, to discuss the rail services market and changes in legislation, and on the fees related to the rail services market.

PUBLICITY OF HAKOM'S OPERATIONS

The publicity of its operations is extremely important for HAKOM, not only in terms of the availability of information on the basis of the ECA, PSA, ARRSM or the Right to Access to Information Act, the General Administrative Procedure Act and the Public Procurement Act, but also in order to have better communication with the public it addresses or with whom it does business.

Restrictions in relation to public access to HAKOM's work only exist to the extent that personal data or official and business secrets are protected.

All relevant information is published on the website, including HAKOM's decisions and rulings and decisions and judgments made in connection with HAKOM's decisions. All bylaws within HAKOM's competence have been published with unofficial consolidated texts for ease of reference.

The [website](#) is regularly updated with:

- I. all adopted decisions and other administrative acts, and all judgments of the Administrative Court and the High Administrative Court of the Republic of Croatia as well as the final misdemeanor rulings
- II. proposals for regulations, measures and decisions that must be subject to public consultation, and other documents for which this was not prescribed but it was assessed that there is a need for public

consultation on those documents

III. data for databases of all registers

IV. statistical data on the markets of electronic communications, postal and rail services

In addition to the transparent presentation of data or information in the field of regulatory work, an important segment of public action is the public consultations that are held for any decisions that may have an impact on market stakeholders. In 2018, 13 public consultations were initiated. All discussions are published on the Internet as part of the special section of HAKOM's public consultation site.

Occasionally, HAKOM publishes news releases about important events, decisions, judgments and regulations related to the electronic communications, postal services and rail services markets, as well as news releases from HAKOM's area of competence. Alerts to users were also published about market fraud, as well as short news about HAKOM representatives' participation in working groups, conferences and seminars. There were 157 such news releases in the past year.

It has become a common task for the regulator to participate in radio and television broadcasts aimed at informing the public about important issues in the field of electronic communications, postal and rail services. The largest part of such public appearances was related to consumer protection issues, and the majority of public appearances occurred on the public radio and television as part of informative programmes or specialized consumer-related broadcasts.

A direct contact with HAKOM is provided for the citizens through [special telephone lines for individual areas](#), where they can get information every day from 9 a.m. to 11.30 a.m. Moreover, the citizens can forward queries by using the application ["Ask Us"](#) on its website. In 2018 there were 973 queries received through that application. Finally, the citizens can contact individual departments by electronic mail address published on the website, or use a special address for suggestions, complaints and praise in the work of HAKOM.

HAKOM continued using its [Facebook](#) page, for providing information and user support, and the primary objective is to raise awareness and knowledge of the rights and obligations and provide prompt and important information when necessary, such as to alert to fraud or network failure on an operator's network.

HAKOM received 31 requests for [access to information](#) pursuant to the Act on the Right of Access to Information. All requests were resolved within the statutory time limit and the Commissioner for Informing received a report on the implementation of the Act on the Right of Access to Information.

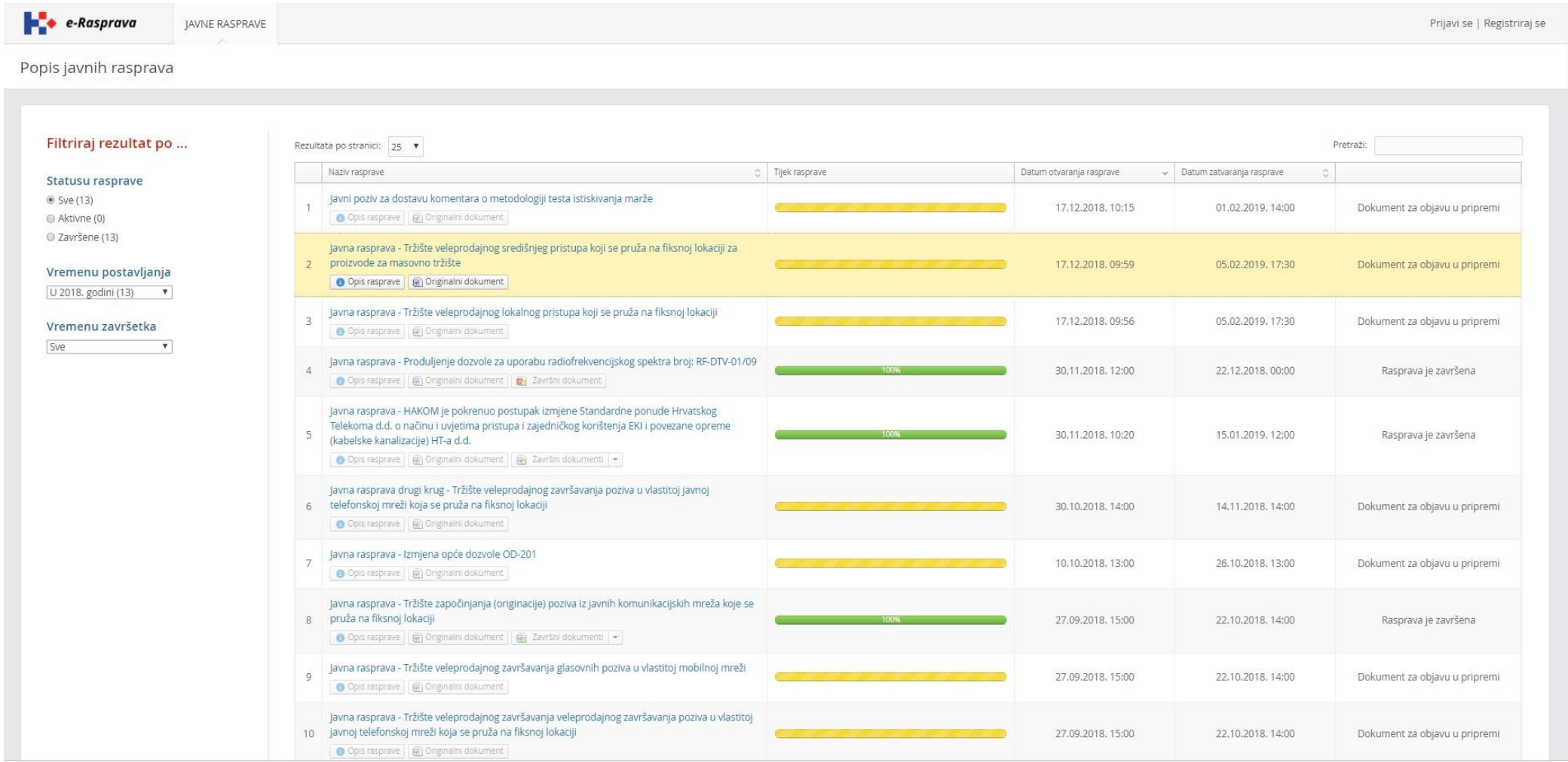


Figure 7.1. HAKOM's 2018 Public Consultation Portal

The first instance administrative courts (Zagreb, Osijek, Rijeka and Split) are competent for disputes against decisions adopted in disputes between users of electronic communications services and postal services and operators, that is, between providers of services and the railway services sector..

2018	Number
Decisions	1718
Administrative complaints	161
Hearings held	41
Type of decision	Number of lawsuits
Determining the infrastructure operator and the right of way fee	90
Disputes user—operator	43
Regulatory decisions	5
Legalization of joint use of the ECI	11
Rulings in inspection supervisions	12
Total	161

Table 7.1. Statistics on administrative complaints

COURT PROCEEDINGS

Court proceedings covered by this report include administrative disputes initiated against HAKOM’s final decisions, misdemeanor proceedings initiated by HAKOM against natural and legal persons due to violations of laws under HAKOM’s competence and enforcement proceedings against legal and natural persons for non-payment of fees for the right of use (State Budget) and for HAKOM’s work.

Administrative disputes

All of HAKOM’s decisions in administrative disputes are final and may not be appealed but legal protection is ensured in an administrative dispute. The High Administrative Court is directly competent for disputes against decisions adopted by the Council of HAKOM in the electronic communications and postal services sectors and against decisions adopted by HAKOM’s inspectors in case of very serious and serious violations of the ECA and the PSA.

The analysis of the filed administrative complaints shows that the majority of the complaints was filed in the equivalent cases by HT against decisions adopted in the proceedings initiated by local self-government units for the purpose of determining the infrastructure manager and determining of the fee for the use of way for HT infrastructure in the area of individual local self-government units.

Type of decision	Number of judge-ments	Con-firmed decisions	Annulled decisions
Determining the infrastructure operator and the right of way fee	77	25	52
Disputes user—operator	47	42	5
Regulatory decisions	4	4	0
Legalization of joint use of the ECI	2	0	2
Rulings in inspection supervisions	3	3	0
Total	133	74	59

Table 7.2. Statistics on administrative complaints judgments

Misdemeanour proceedings

In 2018, six misdemeanor proceedings were initiated in the field of electronic communications, and 12 Misdemeanor/High Misdemeanor Court judgments were adopted.

Enforcement proceedings

In 2018, a total of HRK 4,500,000.00 was claimed and the principal amount was paid in full. Also, under the enforcement/litigation procedures initiated in 2018, HRK 6.700.000,00 was collected and all litigation was closed.

e-Agency

Through its e-Agency programme, HAKOM intends to provide the best possible public service to all participants of the postal, rail and electronic communications markets, including end-users. The implementation of the programme allows all citizens, companies and organizations to cooperate with the regulator in an easy and quick way, with a reduction of costs.

The architecture of the e-Agency is multifaceted and consists of an IT infrastructure, back-end systems and systems displayed to the users. The entire application platform is located on hardware located in the data centre in the central office in Zagreb, while in Split there is a system of disaster recovery and business continuity (Disaster Recovery Site). The IT infrastructure is based on virtualization technologies and a scalable server and network architecture to provide maximum flexibility and optimization of resources. The back-end systems support HAKOM's core processes and are critical to the day-to-day work of the agency and, in order to improve their efficiency and develop business processes, the systems are continually upgraded to meet user or legal needs while maintaining data security. The presentation layer, that is, the public services implemented within the e-Agency are available through HAKOM's web portal and provide end-users with electronic services through based network applications such as e-Main Project, e-Licences, e-Operator, e-Market and similar. Particular attention is paid to the security of the IT environment and the high level of quality and reliability of services whose implementation and changes are carried out according to the established project management procedures. Although the e-Agency has become an indispensable part of all HAKOM's major processes, further development is needed to improve the electronic form of business, and intensive work is still being done to modernize and improve application systems, resulting in faster, more efficient and safer business.

- e-Agency
- e-Operator
- e-Market
- e-Complaints
- e-Portability
- e-Procurement
- e-Licences
- e- Right of Way
- e-Register “DO NOT CALL”
- e-Main Project
- e-Conditions
- e-Guidelines
- e-Discussion

Figure 7.2. e-Agency services on the web site www.hakom.hr

COMPETENCE DEVELOPMENT

The acquisition, use, development and sharing of knowledge, skills and experience are the most important factors in the success of any organization. HAKOM therefore continuously invests in employee education in order to develop competencies that are considered key drivers of success. Professional development of employees involves continuous education and training, monitoring of technologies and trends of the profession, development of communication skills, and participation or work in research projects, conferences and workshops.

In addition to encouraging lifelong learning and development of its employees, that is, acquiring knowledge and competences in formal and non-formal education, HAKOM paid great attention to the organizational climate and culture within the organization. This is done to improve existing and establish new work processes that encourage employees to work dynamically and be motivated to achieve specific organizational goals.

STAFF

HAKOM consists of the Council and of the administrative service. HAKOM is managed by the Council of HAKOM which consists of five members, including the President and Deputy President of the Council. The administrative service carries out expert, administrative and technical tasks and it is governed by a Director appointed by the Council of HAKOM. At the end of 2018, HAKOM employed 177.

132 employees have completed university or specialist graduate studies. Of this number, five percent of employees have completed postgraduate doctoral studies, 11 percent of employees have completed postgraduate master of science degrees, and 18 percent of employees have completed postgraduate professional studies. Considering that HAKOM's main activity is the regulation of the electronic communications, rail and postal services markets, HAKOM is primarily represented by engineering professions and experts in the legal and economic fields. 45 percent of employees have higher education in the field of electrical engineering and transport, 26 percent in economics and 15 percent in law. 17 have completed university and professional undergraduate studies.

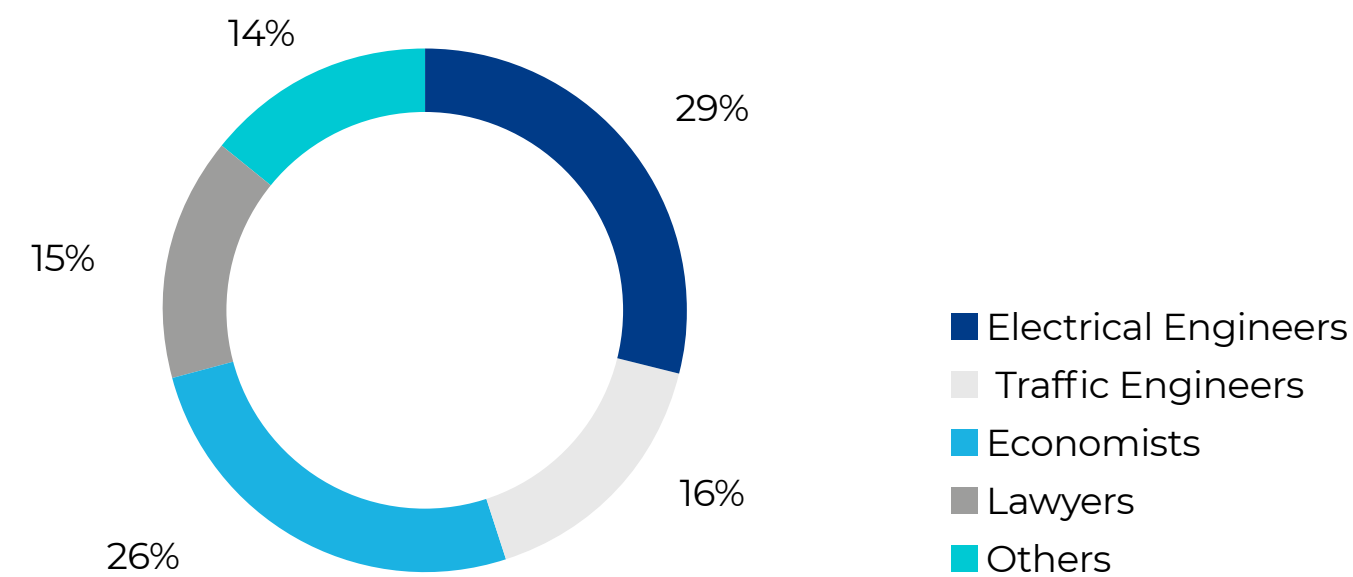


Figure 7.3. Share of professions among employees

09

FINANCIAL STATEMENT



INTRODUCTION **78**
REVENUE **78**
EXPENDITURE **79**
REVENUE SURPLUS **81**
BUDGET IMPLEMENTATION **81**

INTRODUCTION

The Croatian Regulatory Authority for Network Industries (HAKOM) pursuant to Article 13 (1), Point 6 of the Electronic Communications Act (Official Gazette no. 73/08, 90/11, 133/12, 80/13, 71/14 and 72/17; hereinafter: ECA) and Article 10 of the Statute of HAKOM (Official Gazette no. 11/19), submits to the Government of the Republic of Croatia the Financial Report for the year 2018. This report is an integral part of the 2018 Annual Activity Report.

HAKOM is an independent, autonomous and non-profit legal entity with public authority within the scope and competences prescribed by the ECA, the Postal Services Act (Official Gazette no. 144/12, 153/13 and 78/15) (hereinafter: PSA) and the Act on the Regulation of the Rail Services Market and the Protection of the Rights of Passengers in Rail Transport (Official Gazette no. 104/17, hereinafter: ARRSM).

The founder of HAKOM is the Republic of Croatia, and the founding rights are exercised by the Croatian Parliament and the Government of the Republic of Croatia. HAKOM is responsible for its work to the Croatian Parliament.

In accordance with ECA, HAKOM is governed by a five-member Council, appointed by the Croatian Parliament on the proposal of the Government of the Republic of Croatia. HAKOM's professional affairs are performed by the Administrative Service headed by the Director of HAKOM.

In 2018, there were changes in the Council of HAKOM. On 27 April 2018, the Croatian Parliament adopted the decision on the appointment of the President, Deputy President and members of the Council of HAKOM (Official Gazette no. 41/18). The term of office of the previous Council of HAKOM ended on 23 February 2018.

By the end of 2017, HAKOM had non-profit organizations accounting. As of 1 January 2018, HAKOM is included in the State Budget of the Republic of Croatia as a budget beneficiary and has switched from non-profit accounting to budget accounting. The budget user is the third organizational level and belongs to only one division. HAKOM is within the scope of work of the Ministry of the Sea, Transport and Infrastructure, as the relevant ministry, that is, the central body of state administration.

In accordance with the Act on Execution of the State Budget of the Republic of Croatia for 2018 (Official Gazette no. 124/17 and 108/18), HAKOM plans the assigned revenues and receivables and its own revenues in the state budget, while the obligation to pay these revenues into the state budget does not apply to HAKOM. The generation and expenditure of assigned revenue and receivables are reported on a monthly basis in the Treasury system.

HAKOM's financial statement for 2018 was adopted in accordance with budget regulations as part of the budget of the Ministry of the Sea, Transport and Infrastructure..

Register of budget users: 45902
LEVEL: 11, Divison: 065
ACTIVITY: 8413 Regulating and improving business in the economy

In 2018, HAKOM generated assigned revenue, own revenue and reimbursements from EU institutions, which were sufficient to cover all expenditures for carrying out and developing HAKOM's activities. At the end of 2018, a surplus of revenue was generated, which is planned to be used in the coming period to ensure the liquidity and financial stability of the business and for investments.

Table 8.1. Revenue overview (in HRK)

Account from Acc. Plan	Operating revenue	Realized in 2018
63	Aid from abroad and from entities within the general budget	220.522
632	Aid from international organizations and EU institutions and bodies	220.522
64	Revenue from assets	135.564
641	Revenue from financial assets	135.564
65	Revenues from oper. and admin. fees, fees pursuant to special legislation and fees	98.599.494
652	Revenues under special regulations	98.599.494
68	Penalties, administrative measures and other revenue	169.395
681	Penalties and administrative measures	10.625
683	Other revenues	158.770
6	Total revenue	99.124.975

HAKOM's revenue is ensured on the basis of HAKOM's annual financial plan in compliance with the ECA, PSA and ARRSM from the following sources:

- from the fee for the addressing and numbering space management
- from the fee for the radio frequency spectrum management

- 3. from the fee for the performance of other activities in the percentage of the annual gross revenue of the service providers in the previous calendar year in the activities of electronic communications networks and services on the market, except broadcasters broadcasting their radio or television programmes through their own electronic communications networks, which they use solely for this purpose
- 4. from postal services fees, as a percentage of total annual gross revenue generated by postal service providers in the previous calendar year
- 5. from the fee for performing activities in the field of rail market regulation, as a percentage of the total annual gross revenue generated by infrastructure managers in the previous calendar year

In addition to the assigned revenue, HAKOM may generate revenue from other sources in accordance with special laws, and these revenues may be used in accordance with the act governing the planning, preparation, adoption and execution of the budget.

The calculation and amount of fees and the manner of payment of fees for the financing of HAKOM's activities are laid down in the Ordinance on the Payment of Fees for the Performance of HAKOM's Activities (hereinafter: Ordinance) adopted by the Council of HAKOM. The fees are established pursuant to the principles of objectivity, transparency, proportionality and non-discrimination. Before adopting the Ordinance, a public consultation procedure is carried out.

Revenues pursuant to special legislation constitute the most significant revenues for the performance and development of HAKOM's activities. The most significant sources of revenue are from radio frequency spectrum management fees. In relation to 2017, the revenue was much higher this year due to the transition from non-profit accounting to budget accounting, that is, from the accrual principle to the modified accrual principle. Revenues pursuant to special legislation in 2017 amounted to HRK 75,867,275.

Aid from abroad and from entities within the general budget consist of current aid from EU institutions and bodies in the amount of HRK 220,522. Revenues from financial assets relate to interest income on time deposits and demand deposits, income from default interest and foreign exchange gains in the amount of HRK 135,564.

Table 8.2. Revenue from administrative and operating fees, fees pursuant to special legislation and fees (in HRK)

Revenue from administrative and operating fees, fees pursuant to special legislation and fees (in HRK)		Realized in 2018
1	Revenue from the fee for the radio frequency spectrum management	66.214.311
2	Revenue from the fee for the addressing and numbering space management	6.816.607
3	Revenue from the fee for the performance of other activities in the percentage of the annual gross revenue of the service providers in the previous calendar year in the activities of electronic communications networks and services on the market, except broadcasters broadcasting their radio or television programmes through their own electronic communications networks, which they use solely for this purpose	20.568.009
4	Revenue from postal services fees, as a percentage of total annual gross revenue generated by postal service providers in the previous calendar year	3.085.479
5	Revenue from the fee for performing activities in the field of rail market regulation, as a percentage of the total annual gross revenue generated by infrastructure managers in the previous calendar year	1.606.106
6	Other revenue	308.982
TOTAL		98.599.494

EXPENDITURE

HAKOM's expenditure in 2018 amounts to HRK 73,501,245.

Table 8.3 shows operating expenditure by area. Operating expenditure and expenditure for the acquisition of non-financial assets are separate. In the area of postal services and in the area of regulation of the rail services market, there was no expenditure in 2018 incurred for the acquisition of non-financial assets.

HAKOM's total expenditure consists of the following: expenditure for the electronic communications sector, expenditure for the postal services sector and expenditure for the regulation of rail services market. HAKOM's expenditure in 2018 was significantly lower than in 2017, when it amounted to HRK 86,822,525.

In 2018, financial resources were spent for the acquisition of non-financial assets (investments in other people's property for the right of use, for the purchase of computers and computer equip-

ment, for the acquisition of measuring and control devices for the purposes of spectrum control and management, for the acquisition of computer programs, etc.), for payment of salaries and other employee benefits for a total of 177 employees, for covering employees' expenses (official trips for radio frequency measurements, interference studies, technical inspections, participation in regular meetings and conferences of European bodies where HAKOM has representatives, compensation for employee transport costs, professional development of employees in accordance with the 2018 Training Plan etc.), for the costs of office supplies and literature, in accordance with the regular needs of employees, overheads and fuel costs for HAKOM's official vehicles, for the services of regular and investment maintenance of vehicles, measuring devices, control and measuring centres and control and measuring stations, for publicity and information services (HAKOM organizes events to inform the public about child protection on the Internet, about consumer protection, about the development of the electronic communications market, promoting equality of women in the field of information technology etc.), as well as for utilities, rents and lease, intellectual services and other operating expenditure .

Employee expenditure amounted to HRK 42,663,656. In 2017, employee expenditure amounted to HRK 39,924,964. In accordance with the ECA, to the members of the Council of HAKOM whose term ended on 23 February 2018, remuneration was paid after the expiration of the period for which they were appointed, until the beginning of realization of the salary on another basis, six months from the date of dismissal from the amount of salary earned by the person in that position, and for the next six months to the amount of 50 percent of the salary earned by the person in that position.

At the end of 2017, HAKOM employed 175 employees, while at the end of 2018 there were two more employees, 177 in total.

The second most represented group of expenditures in HAKOM's total expenditures is material expenditure. Material expenditure in 2018 amounted to HRK 27,190,726. The most significant expenditure is related to the expenditures for services. Within the expenditures for services, the most significant is the expenditure for rents and lease. This is followed by computer services expenditure, regular and investment maintenance expenditure, telephone, mail and transport services, and intellectual and personal services.

Table 8.3. Operating expenditure (in HRK)

Account from Acc. Plan	Operating expenditure	HAKOM	Electronic communications	Postal services	Railway market regulation
	Expenditure total	73.501.245	69.653.628	2.399.718	1.447.899
3	Operating expenditure	70.073.475	66.225.858	2.399.718	1.447.899
31	Employee expenses	42.663.656	40.297.872	1.374.620	991.164
311	Salaries (gross)	33.200.066	31.424.182	1.000.796	775.088
312	Other employee expenses	3.752.446	3.467.936	201.749	82.761
313	Contributions on salaries	5.711.144	5.405.754	172.075	133.315
32	Material expenditure	27.190.726	25.715.510	1.020.568	454.648
321	Compensations of expenses to employees	3.179.400	2.995.708	84.347	99.345
322	Expenditures for materials and energy	2.033.921	1.966.006	31.608	36.307
323	Expenditure for services	20.781.351	19.595.274	881.763	304.314
329	Other unmentioned operating expenditure	1.196.054	1.158.522	22.850	14.682
34	Financial expenditure	189.093	182.476	4.530	2.087
343	Other financial expenditure	189.093	182.476	4.530	2.087
37	Compensations to citizens and households based on insurance and other fees	30.000	30.000	0	0
372	Other compensations to citizens and households	30.000	30.000	0	0
4	Non-financial assets expenditure	3.427.770	3.427.770	0	0
41	Expenditure on the acquisition of non-produced long-term assets	154.546	154.546	0	0
412	Non-material assets	154.546	154.546	0	0
42	Expenditure on the acquisition of produced long-term assets	2.400.065	2.400.065	0	0
421	Building structures	58.875	58.875	0	0
422	Facilities and equipment	2.268.690	2.268.690	0	0
426	Non-material produced assets	72.500	72.500	0	0
45	Expenses for additional investments on non-financial assets	873.159	873.159	0	0
454	Additional investments in other non-financial assets	873.159	873.159	0	0

Table 8.4. Representation of individual types of expenditure in total expenditure (in %)

Account form Acc. Plan	Expenditure total	HAKOM	Electronic communications	Postal services	Railway market regulation
31	Employee expenses	58,04	57,85	57,28	68,46
32	Material expenditure	36,99	36,92	42,53	31,40
34	Financial expenditure	0,26	0,26	0,19	0,14
37	Compensations to citizens and households based on insurance and other fees	0,04	0,04	0	0
41	Expenditure on the acquisition of non-produced long-term assets	0,21	0,22	0	0
42	Expenditure on the acquisition of produced long-term assets	3,26	3,45	0	0
45	Expenses for additional investments on non-financial assets	1,19	1,25	0	0
TOTAL		100	100	100	100

SURPLUS REVENUE

When switching from non-profit accounting to budget accounting, HAKOM made an initial adjustment. The initial correction was made in cooperation with the relevant ministry (Ministry of the Sea, Transport and Infrastructure) and the Ministry of Finance.

The initial balance of the surplus revenue as of January 1 2018 was HRK 6,777,594. In 2018, a surplus of operating revenue was recorded in the amount of HRK 25,707,833, which resulted in a total surplus of revenue available in the following period in the amount of HRK 32,485,427.

In 2018, the generated revenues exceeded the planned amount of revenue due to the transition from non-profit accounting to budget accounting. Revenues collected in 2017 relating to the 2018 period were not recognized in the 2017 revenue because according to the principle of accrual they referred to the year 2018. They were recorded in the ledger account under 29 - deferred revenue recognition. These revenues were recognized in 2018, in accordance with the modified accrual principle, although they were not paid in 2018 but in 2017. They amounted to HRK 21,976,040.

The plan for using the surplus revenue is determined by the Financial Plan for 2019 and projections for 2020 and 2021.

BUDGET REALIZATIONS

Budget realizations are defined by the Act on Execution of the State Budget. HAKOM’s financial resources were spent in accordance with the planned activities. The generation and expenditure of assigned revenue and receivables are reported on a monthly basis in the Treasury system.

When preparing the financial plans and monitoring the execution of the budget, the modified accrual principle is not applied, but rather revenue and expenditure is presented only under the cash principle. For this reason, the data in Table 8.6. Budget realization - Analytics are different from the data in Table 8.3. Operating expenditure.

Article 50 of the Budget Act (Official Gazette no. 87/8, 109/7, 136/12 and 15/15) gives flexibility in the execution of assigned revenues and receivables so that it prescribes the possibility of their execution in amounts higher than planned, and the limit is set at the level of revenue generation, that is, up to the amount paid.

Table 8.5. Budget realization (in HRK and %)

	Execution 2017 (HRK)	2018 Plan (HRK)	Execution 2018 (HRK)	Index execution 2018/plan 2018	Index execution 2018/plan 2017
3107-Development of the postal services and electronic communications markets	0	87.245.200	72.833.144	83,5	0

Table 8.6. Budget realization – analytics (in HRK)

	NAME	Plan	Realized	%
3 + 4	Croatian Regulatory Authority for Network Industries	86.675.200	72.833.144	84
3	Operating expenditure	78.900.000	69.169.567	88
31	Employee expenses	44.637.400	41.940.043	94
32	Material expenditure	33.921.300	27.039.934	80
34	Financial expenditure	176.300	159.590	91
37	Compensations to citizens and households based on insurance and other fees	35.000	30.000	86

	NAME	Plan	Realized	%
38	Other expenses	130.000	0,00	0
4	Expenditure for the acquisition of non-financial assets	7.775.200	3.663.577	47
41	Expenditure on the acquisition of non-produced long-term assets	1.708.750	154.546	9
42	Expenditure on the acquisition of produced long-term assets	4.316.450	2.894.644	67
45	Expenses for additional investments on non-financial assets	1.750.000	614.387	35
6	Operating revenue	78.880.000	99.124.975	126
63	Receivables from abroad and from entities within the general budget	570.000	220.522	39
64	Revenue from assets	300.000	135.564	45
65	Revenues from oper. and admin. fees, fees pursuant to special legislation and fees	78.010.000	98.599.494	126
68	Penalties, administrative measures and other revenue	0	169.396	0
7	Revenue from the sale of non-financial assets	20.000	84.103	421
72	Revenue from the sale of produced long-term assets	20.000	84.103	421

OBRASCI GODIŠNJEG FINANCIJSKOG IZVJEŠTAJA
HAKOM-A ZA 2018. GODINU

Budget accounting entities must prepare and submit annual financial statements for 2018 in accordance with the provisions of the Ordinance on Reporting in Non-Profit Accounting (Official Gazette, no. 3/15 and 112/18).

Financial statements for 2018 were submitted to the State Audit Office, the Finance Agency and the competent ministry on 30 January 2019.

Copies of the signed forms of the Annual Financial Statement for 2018 were [published on HAKOM's website](#):

1. Budget and extra-budgetary user statements for the period: 1 January 2018 –31 December 2018 -Reference page
2. Statement of revenue and expenditure, receivables and expenses for the period: 1 January 2018 – 31 December 2018
3. Balance sheet as of 31 December 2018
4. Statement of expenditure by Functional classification for the period: 1 January 2018 - 31 December 2018
5. Report on changes in the value and volume of assets and liabilities for the period: 1 January 2018 – 31 December 2018
6. Statement of commitments for the period 1 January 2018 - 31 December 2018
7. Notes to the financial statements of HAKOM for the period 1 January 2018 - 31 December 2018

10

ANNEXES

ABBREVIATIONS

ADSL – Asymmetric Digital Subscriber Line
EMA – Electronic Media Agency
AIC – Agency for Investments and Competitiveness
CCA – Croatian Competition Agency
BEREC – Body of European Regulators for Electronic Communications
BDO – auditing company
BRIFIC – Bureau Radio International Frequency Information Circular
CABP – Central Administrative Base of Portability
CEPT – European Conference of Postal and Telecommunications Administrations
CERP - European Committee for Postal Regulation
COCOM - Communications Committee
DAB - Digital Audio Broadcasting
DESI - Digital Economy and Society Index
DOCSIS - Data Over Cable Service Interface Specification
SGA – State Geodetic Administration
DTV – Digital Television
DVB-T - Digital Video Broadcasting –Terrestrial
DWDM - Dense wavelength division multiplexing
ECC - Electronic Communications Committee
EEA - European Economic Area – the entire territory of the EU and Iceland, Liechtenstein and Norway
EECC - European Electronic Communications Code
ECI – Electronic Communications Infrastructure
EMERG - Euro-Mediterranean Regulators Group
EMF – Electromagnetic Field
ENISA - European Network and Information Security Agency

ENRRB - European Network of Rail Regulatory Bodies
ERGP - European Regulators Group for Postal Services
EU - European Union
FER - Faculty of Electrical Engineering and Computing
FM - Frequency Modulation
FTTB - Fibre To The Building
FTTDP - Fibre To The Distribution Point
FTTH - Fibre To The Home
GSM - Global System for Mobile Communications
HAKOM - Croatian Regulatory Authority for Network Industries
HCM (Harmonized Calculation Method) Agreement – International agreement for the harmonization of frequencies for mobile and fixed terrestrial systems
HP – Hrvatska pošta d.d.
HRT – Hrvatska radiotelevizija
HT – Hrvatski Telekom d.d.
HŽI – HŽ infrastruktura
HŽPP – HŽ putnički prijevoz
ICT - Information and Communication Technologies
NR – (Rail) Network Report
IoT - Internet of Things
IPTV - Internet Protocol Television
IRG - Independent Regulators Group
IRG-R - Independent Regulators Group - Rail
ISP - Internet Service Provider
ITU - International Telecommunication Union
LSU – Local Self-Government Units
CMC - Control and Measuring Centre

CMS - Control and Measuring Station
LTE - Long-Term Evolution
MCPPP – Ministry of Construction and Physical Planning
MEEC – Ministry of Economy, Entrepreneurship and Craft
MPEG - Moving Picture Experts Group
MSTI – Ministry of the Sea, Transport and Infrastructure
MRDEF – Ministry of Regional Development and EU Funds
MUX - Multiplex – in digital television: a stream of digital signals containing several radio or television programmes and/or other data simultaneously transferred via one radio frequency channel
M2M - Machine to Machine – communication between two machines
NGA - Next Generation Access – next generation access network
FNPH – Framework National Programme Holder
OiV – Odašiljači i veze
FNP - Framework National Programme
OTT – Over-the-top service
PAY-TV – Television programmes with payment
PCMS – Portable Control and Measuring Station
PPP - Purchasing power parity
PBID - Plan for the Broadband Infrastructure Development
RF – Radiofrequency
RFID - Radio Frequency Identification
RSC - Radio Spectrum Committee
RSPG - Radio Spectrum Policy Group
RoC – Republic of Croatia
R&TT – Radio and telecommunications terminal equipment
CFCA - Central Finance and Contracting Agency
SAT TV – Satellite television
SEDDIF – South European Digital Dividend Implementation Forum
SMS - Short Message Service

FIGURES AND TABLES

Figure 1.1 Republic of Croatia, basic data on the RoC and the electronic communications market

Figure 1.2 Total revenue in the electronic communications market (in HRK million)

Figure 1.3 Shares of services in total revenue in the electronic communications market

Figure 1.4 Total investments of electronic communications operators in the Republic of Croatia (in HRK million)

Figure 1.5. Investments in the network and network equipment (in HRK million)

Figure 1.6 Operator investments in the RF spectrum (in HRK million)

Figure 1.7 Electronic communications market, number of subscribers: landline phones, mobile phones, landline Internet, mobile Internet, pay-TV

Figure 1.8 Total broadband Internet access service revenue (in HRK million)

Figure 1.9 Number of users with different bundled services

Figure 1.10 Fixed broadband Internet access availability. All landline and NGA networks.

Figure 1.11 Share and number of households using broadband Internet access over fixed communications networks

Figure 1.12 Number of broadband connections by speed

Figure 1.13 Number of fixed broadband connections by technology

Figure 1.14 Geographical coverage with 4G signal

Figure 1.15 Population coverage by 4G signal

Figure 1.16 Data traffic growth

Figure 1.17 Data traffic in mobile networks by quarter (in PB)

Figure 1.18 Revenue from telephone services in the fixed network (in HRK million)

Figure 1.19 Distribution of the number of prepaid and postpaid telephone service users in the public mobile communications network in the RoC - all users

Figure 1.20 Distribution of prepaid and postpaid telephone service users in the public mobile communications network in the RoC -

private users (consumers)

Figure 1.21 Revenue and duration of roaming calls made by domestic users in international networks

Figure 1.22 Revenue and duration of roaming calls made by foreigners in national networks

Figure 1.23 Shares of TV distribution services in the RoC in 2015 and 2018

Figure 1.24. Number of pay-TV users in the RoC by technology

Figure 1.25 Total revenue from pay-TV by technology (in HRK million)

Figure 1.26 Total revenue from telephone services in the fixed network (in HRK million)

Figure 1.27 Number of users of telephone services in the fixed public communications network

Figure 1.28. Statistical report available in HAKOMetar Plus

Figure 1.29 Number of M2M tariffs

Figure 1.30. Notices of intent to build an optical fibre distribution network

Table 1.1 Movement of the number of LSU requests for the regulation of property-law relations

Table 1.2 Certificates of the right of way and length of the route through the years

Table 1.3 Special conditions for construction and certification of main projects through the years

Figure 1.32 Received PBID drafts by local/regional self-government units by the end of 2018

Table 1.4. PBID drafts received by the end of 2018

Figure 1.33 DESI (Source: <https://ec.europa.eu/digital-single-market/en/desi>)

Figure 1.34 DESI Connectivity (Source: <https://ec.europa.eu/digital-single-market/en/desi>)

Figure 1.35 DESI Connectivity for Croatia (Source: <https://ec.europa.eu/digital-single-market/en/node/66894>)

Figure 1.36 DESI dimension Connectivity and dimensions 1a1 to 1b2 (RU and EU), evolution over time

Figure 1.37 DESI dimensions 1b3 to 1d2 (RU and EU), evolution over time

Figure 1.38 DESI dimension 1e1 (RU and EU), evolution over time

Figure 1.39 Comparison of Croatian prices from EU to PPP (Source: <https://ec.europa.eu/digital-single-market/en/node/66894>)

Figure 2.1 Basic data on the postal services market in the Republic of Croatia

Figure 2.2 Total revenue from postal services (in HRK million)

Figure 2.3 Total number of postal services (in millions)

Figure 2.4 Shares of postal services by types of traffic

Figure 2.5 Provider market shares by number of services provided

Figure 2.6 Shares of types of postal services

Figure 2.7 Number of postal items by type (in millions)

Figure 2.8 Total number of services within the scope of the universal service

Figure 2.9 Shares of services rendered within the scope of universal service by type

Figure 2.10 Total number of other postal services (in millions)

Figure 2.11 Shares of services realized within the scope of other postal services by type

Figure 2.12 Measuring the quality of universal service in domestic traffic

Figure 3.1 Basic information on the railway market in the Republic of Croatia

Figure 3.2 Average train speeds on Croatian lines (km/h)

Figure 3.3. Projects implemented by HŽ infrastruktura (Source: HŽI)

Figure 3.4. Use of the infrastructure by freight operators (shares in tkm)

Table 3.1. Use of rail services (basic indicators)

Figure 3.5. Shares of transported goods by type of transport

Figure 3.6 Quantity of goods transported by rail (in 000 t)

Figure 3.7 Shares of goods transported by freight carriers

Figure 3.8 Shares of new carriers in net tonne-kilometres of goods transported

Figure 3.9. Number of transported passengers by type of transport (in millions)

Figure 3.10. Total HŽI revenue (in HRK million)

Figure 3.11. Shares of individual services in HŽI revenue

Figure 4.1 Thematic overview of “Radio Stations” on the GIS portal

Table 4.1 Issued acts and licences for the RF spectrum

Figure 4.2 Development from 1G to 5G (Source: EC)

Figure 4.3. Number of base stations in the RoC

Figure 4.4. Total transfer capacity of microwave links

Figure 4.5. HAKOM's control and monitoring system.

Figure 4.6. Interactive Viewer with EMF measurements

Figure 4.7. Italian interferences

Figure 5.1 Type and outcome of the complaint (1st instance)

Figure 5.2 Type and outcome of the complaint (2nd instance)

Figure 5.3. Number of resolved claims per operator (3rd instance)

Figure 5.4 Number of disputes for every 10,000 users of each operator

Figure 5.5 The ratio of adopted decisions by type and operator

Figure 5.6. Ratio of disputes in favour of users and those in favour of operators

Figure 5.7. Ratio of adopted decisions per reason of dispute

Figure 5.8 Amount of ported numbers in the mobile and fixed networks

Figure 5.9 Number of dispute settlement requests received for postal services

Figure 5.10. Shares of types of complaints in the solved disputes user-provider

Figure 5.11. 2018 leaflet for passengers

Figure 5.12. Prototype of an accessible website

Figure 5.13. Title page of HAKOM's brochure for children and parents in the 2018/2019 school year

Figure 7.1 HAKOM's 2018 Public Consultation Portal

Table 7.3 Statistics on administrative complaints

Table 7.3 Statistics on administrative complaints judgments

Figure 7.2 e-Agency services on the web site www.hakom.hr

Table 8.1. Revenue overview (in HRK)

Table 8.2. Revenue from administrative and operating fees, fees pursuant to special legislation and fees (in HRK)

Table 8.3. Operating expenditure (in HRK)

Table 8.4. Representation of individual types of expenditures in total expenditures (in %)

Table 8.5. Budget realization (in HRK and %)

Table 8.6 Budget realization – analytics (in HRK)

