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Croatian Regulatory Authority for Network Industries

2016 Annual Activity Report

Zagreb, June 2017

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INTRODUCTION

Croatian Regulatory Authority for Network Industries (hereinafter: HAKOM), pursuant to its legal obligation, submits its Annual Activity Report for 2016. The report contains all the required information referring to the electronic communications, postal and railway services markets.

In 2016 HAKOM primarily worked on the achievement of regulatory objectives and principles on the electronic communications, postal and rail services markets. The objectives and principles of HAKOM's work were laid down in HAKOM's 2016 Annual Work Programme[1] and they include promotion of market competition, ensuring the protection of users of services and efficient management of limited natural resources, such as the frequency (hereinafter: RF) spectrum and the addressing and numbering space. In its work HAKOM was particularly focused on the promotion of investments and innovations while ensuring the protection of market competition and respect for the principles of non-discrimination, promotion of regulatory predictability, prevention of discrimination in relationships towards operators, ensuring a high level of consumers protection and efficient management of limited natural resources. HAKOM has achieved the set objectives and ensured the preconditions for stable business operations on the markets that it regulates while placing a special emphasis on the users protection.

The report is divided into ten chapters preceded by the summary of the Annual Report. The list of abbreviations, figures and tables are provided at the end of the report.

Chapter 1 covers electronic communications market divided into five parts – market overview, overview of regulatory measures, building, access to and use of the electronic communications infrastructure and inspection supervision in electronic communications. The Market Overview covers investments and revenue, telephone services in the fixed network, Internet access services, telephone services in the mobile network, television (hereinafter: TV) services, network and line leasing services and other services such as increased tariff services, universal services or cloud computing and M2M. The Overview of Regulatory Measures covers HAKOM's most important regulatory decisions on markets susceptible to ex-ante regulation. The part of the chapter on the electronic communications infrastructure covers the overview of data on the use of infrastructure, including the right of way and adoption of spatial plans, and the quality of Internet access and network neutrality. The end of the chapter describes inspection supervisions in electronic communications.

Chapter 2 covers management of limited resources of special interest to the RoC - the RF spectrum and the addressing and numbering space. The management of the RF spectrum is presented in general and through the most important radio communications networks. There is, in particular, an overview of RF spectrum control and R&TT equipment. The part concerning the management of the addressing and numbering space contains information on numbering plans and on number portability.

Chapter 3 contains an overview of the situation on the postal services market which comprises providers on the postal services market. Moreover, it includes an overview of regulatory measures and activities, and information on accounting separation and net cost of the providers of universal service, the quality, the network, and the market conditions and development.

Chapter 4 contains an overview of the railways services market state. Therefore, this part of the report includes a presentation of market subjects and offered services on the market, and an overview of HAKOM's regulatory activities. The chapter also comprises an overview of the state of railway infrastructure in the Republic of Croatia (hereinafter: RoC) as well as the most important data on the transport of goods and passengers.

Chapter 5 contains an overview of the implemented tasks concerning consumer protection on the markets of electronic communications, postal and rail services. Every market is covered individually

[1] http://www.hakom.hr/default.aspx?id=512

with data on the number of disputes and other activities in the area of consumer protection. A special emphasis was placed on the protection of children and access to services for disabled persons.

Chapter 6 describes HAKOM's publicity of work. It includes the stipulated obligations and activities implemented for the purpose of transparent business operations and for the purpose of facilitating communication with the public.

Chapter 7 deals with court proceedings initiated against HAKOM's decisions or proceedings initiated by HAKOM.

Chapter 8 covers HAKOM's cooperation abroad and at home, and it presents the cooperation activities within professional working groups and bodies on important projects or for the purpose of positioning HAKOM as a relevant factor in the area of regulation of markets under its competence.

Chapter 9 describes HAKOM's work on developing its own capacities, upgrading its own regulation and market development capacity or on special HAKOM's programmes. It includes an overview of the current state of the IT introduction into processes and services as well as the development of regulatory competences. This chapter presents the work of HAKOM as the implementing body of the National Framework Programme for the Development of the Broadband Infrastructure in Areas Lacking Sufficient Commercial Interest for Investments.

Chapter 10 contains the financial statement and final statement for 2016. This Chapter includes the income statement, expenditure statement, overview of revenue surplus /deficit, balance sheet, investments report, statement on revenue from the state budget and findings of an independent external audit.

SUMMARY

HAKOM's Annual Activity Report contains a report on the activities on the electronic communications, postal and railway services markets, that is, on the activities on the markets regulated by HAKOM and HAKOM's financial report for 2016.

Financial activities

HAKOM is not financed from the Croatian Budget but from the collection of fees on the markets it regulates and its accounting is kept in accordance with the Act on Finances and Accounting of Non-Profit Organizations, the Electronic Communications Act (ECA), the Postal Services Act (PSA) and the Act on the Regulation of the Rail Services Market (ARRSM). The revenue and expenditure are shown according to the principle of occurrence of events regardless of the collection or payment.

HAKOM conducted its business in 2016 diligently and responsibly. HAKOM's regular expenditure is fully covered by the operative revenue collected by HAKOM, with the consent of the Government of the Republic of Croatia, on the markets under its competence. In the previous year HAKOM collected financial funds that have remained non-disbursed. The financial funds surplus occurred due to HAKOM's very responsible business management, among other things also because less money was spent in the public procurement procedures and in the projects realization than it had been planned for individual activities. The surplus funds incurred during previous years, HAKOM, in accordance with the ECA, was returning to the market through the socially responsible regulation contributing in that way to the development of not only the electronic communications market, but the entire national economy as well.

By implementing socially responsible regulation, in 2016 HAKOM returned a part of the non-disbursed funds to the market through, among other things, investments into software and hardware. Investments are part of HAKOM's *Programme for the development of the Internet and broadband access in the areas of special state concern, hilly and mountainous areas and on the islands*.

Furthermore, in addition to the expansion of high-speed Internet availability in Croatia to the areas where it did not exist before, an additional value of the realized projects from the Programme was a positive impact on the economic development in the RoC and outside of the electronic communications sector. Croatian companies that were successful in the tenders for the implementation of the Programme employed new people and secured references for jobs carried out in an EU Member State. Unfortunately, the envisaged amount of the capital donations for 2016 was not fully realized primarily because in the preparation of the allocation procedure HAKOM is dependant on the prior delivery of the necessary documentation by the selected target users, the ministry and state institutions. In the absence of the delivery of the necessary documentation, not even the legal conditions of the allocation were fulfilled.

HAKOM's total revenue in 2016 amounted to HRK 77,093,121, which is lower than planned by around 1 percent, or lower than in the previous year by around 3 percent. HAKOM's total expenditure in 2016 amounted to HRK 82,335,755, which is around 20 percent lower than planned, or around 28 percent lower than the expenditure in the previous year. The expenditure for employees of HAKOM were around 6 percent lower in 2016 than planned. The remainder of the savings was achieved as a result of HAKOM's good management. The negative accounting results derive from the fact that in compliance with the 2016 Financial Plan the capital donations and part of HAKOM's investments and revenue were financed from the collected funds in previous years, which was, in compliance with the ECA, transferred to 2016 and not from the operating revenue in 2016.

HAKOM's total investments in 2016 amounted to HRK 14,841,391, which is around 80 percent more than in the previous year, primarily because the building of a new control and measuring centre in Split was completed and control and measuring equipment for that centre was purchased. The surplus revenue available in the next period, which is transferred to 2017 in compliance with the Financial Plan, totals HRK 52,921,660. The surplus will be primarily used for the investments into the

development of markets regulated by HAKOM, meaning for the development of the digital economy of RoC.

In compliance with the applicable legislative provisions, in 2017 the total of HRK 729 977 285 was paid in favour of the State Budget of RoC on the basis of the collected fees for the right to use the radio-frequency spectrum, addresses and numbers, and fees for authorities and licenses. This amount is somewhat lower than in 2015 because in the autumn of 2016 the Government of the RoC abolished for the users of mobile communications networks, who have the contractual obligation with an operator, a monthly fee in the amount of HRK 5.00 for the use of the radio-frequency spectrum. The collection process was somewhat difficult because of numerous pre-bankruptcy settlements of stakeholders on the electronic communications market. In 2016 the amount of the due, but outstanding receivables for the State Budget was significantly lowered from HRK 11,043,940 to HRK 7 386 072. A total of 33 enforcement proceedings were initiated in 2016, their total value amounting to HRK 339, 997, out of which HRK 161,857 was collected.

Activities on the markets regulated by HAKOM

In 2016 HAKOM continued with its work aimed at the achievement of regulatory objectives and principles on the electronic communications, postal and rail services markets. The objectives and principles include the market competition protection, protection of users of services, and efficient management of limited national natural resources, such as the radio-frequency spectrum and the addressing and numbering space laid down under the Annual Work Programme fro 2016. The main focus of HAKOM's activities was the promotion of efficient investments and innovations while ensuring the market competition protection and respect for the principle of non-discrimination, promotion of regulatory predictability, prevention of discrimination in dealings with operators, a high level of consumer protection and efficient management of limited national natural resources. A special emphasis was placed on new technologies on the electronic communications market, and on consistent implementation of the Postal Services Act and the Act on the Regulation of the Rail Services Market for the purpose of achieving complete liberalization of these markets as a part of the EU single market as soon as possible.

Electronic communications market

In 2016 the revenue amounted HRK 11.258 billion, what is 2.84 percent more than in 2015. This is the first revenue increase since 2009. The revenues from all the services increased apart from the revenue from the telephone services in the fixed network, which has a downward tendency on the global level too. The fall in the revenue in the fixed network is primarily influenced by the fall in the number of users of the public voice service, and the downward trend in the amount of realized minutes. Following the trends from 2015 the operators in the electronic communications market in the RoC in 2016 continued investing into the infrastructure development, advanced technologies and innovative services. Last year HRK 2.548 billion was invested into the electronic communications market, somewhat more than in 2015, what is around 35 percent more in comparison with 2014.

The users have been increasingly using the OTT services such as, Skype, Viber, WhatsApp and other similar services, thus resulting in lower revenue from traditional services, such as the public voice service, SMS and MMS. Furthermore, pre-bankruptcy settlements of some fixed communications operators and much higher fees for the use of radio frequencies that operators of mobile communications have to pay since 2014 also had a negative impact. However, in spite of all the difficulties during 2016, the market consolidation has been continued, and the market as a whole remained stable, with a high level of protection of the end-users. The electronic communications market in the Republic of Croatia was characterized in 2016 by further development of broadband services and increased revenue from the Internet access services.

During 2016 there was a slight increase in the number of the fixed broadband connections with a significant increase of data traffic. According to the fixed broadband penetration RoC is still in the group of less developed countries in comparison to the EU Member States, and according to the mobile broadband penetration it is in the group of the more developed countries.

Around 24 percent of the citizens of the RoC has Internet access what is less than in EU where around 32 percent has access. However, it is wrong to view the development of Internet only in relation to the number of citizens. Namely, no matter how many citizens there are in an individual household, there will be only one connection. There are 2.8 people in an average-sized household in the RoC, while that average in the EU is 2.3 persons. Therefore, the stated indicates that according to the above mentioned indicator the RoC would reach the EU Member States average only if all the households in the RoC had Internet access. According to the broadband Internet availability and presence indicators the RoC is at the EU level. Broadband access is available in 97 percent of the households, and 70 percent of the households already has Internet access.

Regardless of the increase in the number of users, there is still room for a stronger growth in this segment, in particular in the area of fibre access network. In the past period a significant increase in the number of connections with access speeds of 30 Mbit/s and more was recorded, what only shows, along with large investments made by the operators in the last year, the trend of coming closer to the EU average levels in the years to come. At the end of 2016 their share increased to around 12 percent of the total number of the broadband connections, while a year before it had been negligible. The growth in the number of such connections and increased investments by the operators are followed by the regulatory measures adopted in the past period, and an additional incentive will also be the availability of the EU funds for the construction of new networks in rural areas lacking sufficient commercial interest for their construction.

This growth in the RoC is necessary, among other things, because of the possible widening of the digital divide between the Roc and EU Member States.

There are significant regional differences in the RoC in relation to the number and penetration of broadband connections in the fixed network and this currently represents a greater challenge than increased broadband penetration at the national level. Regional differences were somewhat mitigated in 2016 by investments into rural areas and islands through HAKOM's aid programme, and by means of regulatory measures and allocation of the digital dividend and the introduction of the LTE technology into mobile networks.

HAKOM's Programme for the development of a broadband ecosystem in rural areas, that is, HAKOM's "Programme for the Internet and Broadband Development in Areas of Special State Concern, Hilly and Mountainous Areas and on the Islands" was included in the *Strategy for Broadband Development in Croatia for the Period 2016-2020.* The objective and purpose of the aid programmes is to achieve balanced regional development, to connect the target groups such as educational, health and public institutions to the broadband network and to introduce applications and services that make the economy more dynamic and improve the quality of life in the above-mentioned areas.

The number of connections by means of data cards in mobile communications networks decreased in statistical terms, in the first place because foreign tourists have been taking advantage of low EU roaming prices and have, therefore, stopped buying the Croatian operators' pre-paid cards in such a large numbers. The second reason is that almost three out of four end-users in mobile communications networks own a 'smart phone' and use tariffs including significant data traffic, which is why their needs for a separate broadband connection have decreased.

One positive market indicator that must be singled out is a significant increase in the number of users of bundled services, as well as the increased share of other operators in relation to HT in the broadband Internet access via fixed communications networks. The revenue from leased networks and lines also increased. All this is a proof of efficient market competition and good regulatory decisions adopted by HAKOM.

Overall digitalisation of TV broadcasting resulted in a growth of the market of transmission of TV pay-per-view channels. At the end of 2016, more than a half of households in the RoC were using pay-tv services offered by one of the operators. This shows that citizens are willing to pay for the TV content in spite of their decreased purchasing power and regardless of the fact that they are already paying for one TV subscription to HRT.

HAKOM has been paying more attention to the topics like 'Communication between Machines' (M2M), as part of the "Internet of Things" (IoT), 'Big Data' and "Smart city", primarily because of regulatory challenges brought about by this topic.

In mid 2016 within HAKOM's interactive GIS portal data was published on the locations of basic radio stations in the mobile communications networks and DVB-T transmitters as well as the results of measuring conducted within the procedure for checking the conformity of the base station regarding the permitted levels of electromagnetic fields. In order to meet the requirements for the growth of data traffic and enable quality service for the users the installation of new base stations is necessary, and the collected data have been published for the purpose of public interest with the aim to achieve accessibility and transparency of information.

During 2016, as well as in previous years, a large part of work regarding the RF spectrum control was dedicated to measuring the interferences from Italy that, along the coastal area of the RoC, from Savurdija on the north of Istria to Prevlaka on the south of Dalmatia, have been interfering with the reception of the Croatian radio and television channels. The multiannual measuring activities and reporting of interferences, as well as international activities through the ITU and EU institutions, at the beginning of November 2016 resulted in positive developments in the field, meaning the commencement of disconnecting the Italian internationally incompatible transmitters that transmit on the channels used by the RoC pursuant to international regulations. The first disconnections started in the regions of Friuli Venezia Giulia, Veneto and Puglia, and the process had continued during November by disconnecting the transmitter in the regions Emilia Romagna, Abruzzo and Molise, to be fully completed somewhat later in January 2017 by disconnecting the transmitter in the region of Marche, what resulted in better quality of reception of the Croatian TV channels along the coast.

Moreover, extensive measuring of electromagnetic fields (EMF) were carried out including more than 120 measurings of EMFs in 70 cities and municipalities, as well as an additional EMF measuring action on the locations of kindergartens and elementary schools in whose vicinity there are the sources of electromagnetic fields. At that occasion the measuring was performed on 156 locations all over the RoC encompassing 82 kindergartens, 67 schools and 7 children playgrounds. The conducted measuring showed that the levels of electromagnetic fields are significantly below the levels of electromagnetic fields stipulated under the ordinance by the Ministry of Health on all the locations where measuring was performed.

Additionally, within the daily and periodical measuring from the fixed control and measuring stations for the purpose of the radiofrequency spectrum control more than 4000 measurings were carried out during 2016, while more than 1300 different field measurings were conducted too.

After several years of looking for a suitable location for CMS and the branch office in Split HAKOM found an adequate location on the territory of the City of Split, which meets all the requirements for measuring the radiofrequency spectrum as well as business conditions for the accommodation of equipment and employees. After obtaining all the necessary documentation and contracting the construction during 2015 HAKOM had started with the construction of a business building for the Split branch office and control and measuring centre, and the same was finished and moved into in the second half of 2016.

Upgrading, introduction of new functionalities and regular maintenance of the ported numbers database, management of the addressing and numbering space, inspection supervision in the area of electronic communications networks and services, and radio and telecommunications terminal equipment are also some of the activities under HAKOM's competence that have contributed to successful market development in 2016.

Activities that need to be singled out among other HAKOM's activities during 2016. include the issuing of certificates for the right of way, preliminary opinions on spatial planning documents and special building conditions, and issuing of confirmations of main designs, which, in addition to the building of the electronic communications infrastructure base, contribute to the regulation of this area. In cooperation with the operators and local and regional self-government units, projects for construction, access to and use of electronic communications infrastructure and networks are being prepared, what will directly contribute to faster and more efficient use of EU funds and to the public private partnership projects.

HAKOM's regulatory measures in 2016 focused on the definition of wholesale conditions in compliance with the market interests in the Republic of Croatia and further development of the market competition. They were all approved without any problems by the EC and successfully implemented on the market, what is a great success and another confirmation that the RoC was fully prepared for the entry onto the EU single market in this respect.

Postal services market

The postal services market in the RoC is a part of a single EU market, and certain trends occurring on the EU market are present on our market too. The total number of postal services is somewhat lower than a year ago, so the negative trend continued, however the fall is not as pronounced as in other EU states. Contrary to the traditional postal services where a fall was recorded, packages and value added services registered an increase in the number of services, primarily as a result of an increasing volume of e-trade where postal services play an important role. A decrease of the total number of services did not affect the realization of the revenues from performing postal services, therefore, the total revenue increased in comparison to the previous year the positive trend being continued in 2016 too.

A total of around 330 million postal services were performed on the postal services market in the RoC in 2016 generating the revenue of HRK 1 514 420, what is around five percent more than in 2015. A larger number of services with some of the additional values and packages within the framework of e-trade had the biggest impact on the revenue growth. In the structure of the realized postal services the universal service had the largest share, around 58 percent, followed by other postal services with the share of 25 percent and interchangeable postal services with the share of 17 percent on the market.

At the end of 2016, there were 23 registered postal service providers in the Republic of Croatia who provided postal services on the basis of an application. The largest provider is HP that had a share on the total postal services market of 80.5 percent, what is for 3 percent more than in 2015. HP is the only provider of universal postal services and it acquired its right and obligation to provide universal services on the entire territory of the Republic of Croatia on the basis of the PSA for 15 years.

The most important regulatory activities carried out by HAKOM to be singled out are the revision of the regulatory report and HP's cost model, the calculation of net cost of universal service provider and supervision and regulation of the universal service prices. The above-mentioned activities were important considering the importance and role the universal service has, meaning ensuring its sustainability and accessibility on the entire territory of the RoC, particularly in the rural areas of the RoC where they represent a precondition for the improvement of the quality of life.

HAKOM's activities on the postal services market were proactive and corrective including the implementation of measures for encouraging the market competition and investments into the postal sector with the aim of creating equal conditions for all the providers, protecting the users of all postal services and ensuring efficient provision of the universal service. A special emphasis is on preserving the quality and availability as well as affordability of the universal service for all the users on the entire territory of the RoC, thus offering to all the users equal right and possibility to use that basic postal service guaranteed by the RoC. HAKOM's activities were focused on all the stakeholders of the postal services market in the RoC, on the education of the postal services users and protection of their rights as well as supervision over the postal services providers.

HP's post offices network did not change in 2016, so the number of post offices remained the same as in the previous year. Therefore, HP, taking into consideration the importance of post offices for the quality of life in rural areas, kept over 300 post offices more than stipulated under the Act and the Ordinance. In the rationalization of its operations regarding the number of post offices HP was not focused on closing individual offices but on finding new locations to move to.

Rail services market

The liberalization of the freight rail transport resulted in the emergence of new railway undertakings along with the historical freight rail transport undertaking. So in 2016 two more freight rail undertakings acquired the conditions to perform transport activities on the territory of the RoC. In 2016 there were seven rail transport undertakings, one passenger transport undertaking and six freight rail transport undertakings. However, the presence of competition on the freight rail transport market in 2016 does not indicate any significant developments on the market, nor did it bring about increased competitiveness of the rail transport in comparison with other types of transport what is evident from the data collected by HAKOM within its activities of market analysis. According to the Croatian Bureau of Statistics data on the transport of goods it is evident that the road transport is still dominant. The occurrence of competition on the freight rail transport market did bring about some changes as the share of the historic freight rail undertakings was decreased in tons of the transported goods.

Although the use of the railway infrastructure and service in 2016 increased in comparison to a year before, and that more undertakings were using the railway infrastructure, in 2016 HŽ Infrastruktura d.o.o. reported the revenue from the provision of rail services totalling HRK 144,570,868, which is a 6 percent drop compared to the previous year. Passenger traffic recorded a continuous decrease in the number of carried passengers. The quantity of the transported goods and the realized ton kilometres are at the same level as in the previous year, while a decreased number of passengers is still recorded in the passenger rail transport.

Over one billion HRK was invested in the reconstruction and modernization of railways in 2016, out of which the largest amount, as much as 51.19 percent was invested into the construction of new railway lines and tracks. The largest share of the remaining total investment, as much as 33.58 percent was invested into the programme of reconstruction and modernization of railway lines for international traffic. The stated investments brought about the increase of the average commercial speed of trains, the passenger ones as well as freight trains.

HAKOM continued with the implementation of the proactive and corrective regulatory measures aimed at promoting market competition and interests of users of the rail services. The measures substantially referred to the content and implementation of the Report on the infrastructure managers network and Report on the service facilities managers network. Those acts were key for the relationship between the infrastructure manager and operators of service facilities towards the applicants for the infrastructure capacity.

Consumer Protection

HAKOM worked hard on ensuring a high level of protection of end users of services in their dealings with operators/service providers/railway undertakings, in particular by making available simple and inexpensive complaint resolution procedures.

Protection of users of electronic communications services – 2016 was marked by adopted sectorial regulations paying significant attention to the preventive activities particularly concerning sales outside operator's business premises or by means of distant communication. So, the regulation regulating this issue under the CPA for all traders was amended by the rules to be adhered by operators when acting as traders, if they offer their services or sell them through these channels. As an additional

form of protection of a particularly vulnerable group of consumers like senior citizens HAKOM in cooperation with the Ministry of Economy designed «Do Not Call» register. All natural persons who contracted the public voice service with some of the operators on the Croatian electronic communications market can register themselves in it. The consumers who register their number in the Register, and who do not have user's valid direct consent, traders are not allowed to call for the purpose of selling and advertising as by doing so they are violating the Consumer Protection Act. Consumers protection was carried out also additionally carried out by dispute resolution, meaning by adopting binding decisions and resolutions in cases of dispute between users and operators. In 2016 there were 1415 such disputes, out of which around 30 percent was resolved positively, with the note that the less positive decisions for the users there are, the better is the work of the Consumer Protection Commissions at operators. In comparison to 2015 the need to adopt a different decision than the operator's one decreased for five percent. The largest number of users' complaints the operators manage to resolve on their own with the user in the first two levels of user's complaint resolution. All the users' inquiries submitted by means of all regular communication channels, including also a direct telephone line, were answered in the shortest possible period.

By analysing all the cases, including the dispute resolution requests, it can be concluded that more users are aware of their rights and operators' obligations, and they are ready to realize their rights in an objective way – by dispute resolution before HAKOM.

Protection of users of postal services – The majority of complaints by the users of postal services were resolved by providers of postal services themselves, among which HP was the most efficient as the largest provider in the RoC. HAKOM received 90 requests in 2016, and a total of 84 disputes were resolved. The efforts invested into informing users on their rights were efficient because the users are increasingly aware that certain rights may be realized before HAKOM.

Passenger protection - The provisions of the Act on the Regulation of the Rail Services Market on the inspection supervision in the area of passenger protection has been in force since 2015, and disputes were resolved by HAKOM on the basis of an opinion issued by HAKOM's Consumer Protection Commission. In 2016 7 disputes following the passengers'' complaints were resolved, and a brochure was printed on the passengers' rights for the purpose of informing the passengers. The brochure was distributed, among other places, at all the railway stations in the RoC.

Protection of children – Special attention is dedicated to yet another vulnerable group of users – children. The best way of protection is being informed and knowing the services along with responsible conduct and parent responsibility. Therefore, HAKOM directed a part of its activities towards raising awareness and knowledge of children and their parents about responsible conduct when using electronic communications services. Apart from celebrating Safer Internet Day, in cooperation with the Ministry of Science and Education and Croatian Post, HAKOM initiated a project of designing 46 500 informative brochures for school children and their parents and delivering them to all elementary schools in the RoC.

Protection of people with disabilities - HAKOM requested and received from the public communications service operators a submission on their business relations with people with disabilities. Taking into consideration the received submissions from the operators, they ensure equal possibilities of access to public communications services for people with disabilities. As an additional form of promoting the rights and concerns of users with disabilities, an Internet application «Quiz» was published too.

Holder of the Framework National Programme

The Government of the Republic of Croatia under its decision of July 2016 adopted a Framework National Programme for the Development of Broadband Infrastructure in Areas Lacking Sufficient Commercial Interest for Investments (FNP), and HAKOM was appointed as the FNP holder (FPH) Therefore, fundamental preconditions were created to start the work on the projects regarding the development of the broadband access in rural regions and regions of low population density in the

RoC where there is no operators' interest for investments by using state aid programmes including the ones from the European Structural and Investment Fund. The stated decision was a base for the realization of the measure regarding the implementation of FNP from the action plan for implementing the objectives of the «Strategy for Broadband Development in the RoC in the period 2016-2020».

Through the role of FPH HAKOM extended its scope of work, and it internally allocated employees for the new area of activity, who completed a basic training in the field of the EU funds. A new Internet page was opened (https://nop.hakom.hr/), where, apart from monitoring the phases in the project implementation, all relevant information, documents, guidelines and answers to FAQ regarding FNP and its implementation are published. In 2016 HAKOM, as FPH, preliminary evaluated all the received drafts of the Plans for the Broadband Infrastructure Development (PBID), and was working through workshops and counselling on informing and training of L(R)SGUs in order to ensure efficient preparation of the PBID draft. In the function of broadband Internet access development HAKOM was cooperating with numerous institutions, and particularly with the Ministry of the Sea, Transport and Infrastructure, Ministry of Regional Development and EU Funds, Agency for Investments and Competitiveness and the European Commission, and it was an active member of the Committee for Monitoring the Operational Programme Competitiveness and Cohesion and the Network of Professional Offices for Broadband Access on the EU level.

HAKOM

Cooperation - Within the framework of international cooperation, HAKOM regularly participated in the work of the international working groups related to EU (BEREC, ERG, IRG, RSPG, COCOM) and in the work of ITU's and CEPT's working groups in the sector of electronic communications markets and in CERP's and UPU's working groups in the sector of postal services markets, and ENRBB and IRG Rail in the sector of rail services markets. HAKOM's experts also participated in the international conferences HAKOM is regularly invited to.

Regarding the cooperation at the national level what needs to be pointed out is a very good cooperation with all ministries, state administration bodies, regional and local self-government units and other regulatory authorities and state agencies. Moreover, the cooperation with faculties of the Universities of Zagreb, Split and Osijek must also be particularly mentioned.

e-Agency - in 2016, HAKOM implemented several applications aimed at improving business processes through the use of web-based technologies. In addition to the applications intended for external users, by introducing new IT solutions and platforms, HAKOM has also sped up the internal processes. The implemented tools enable efficient cooperation in regulator's everyday processes and in communication with end users, which is why they are promptly accepted by the employees and end users.

Development of competences - The most important programmes aimed at improving organizational and individual and group regulatory capacities were the following: "Interdisciplinary Postgraduate Course in Regulation of Electronic Communications Market" at the University of Zagreb, "Looking to the Future" project in cooperation with the faculties in Zagreb, Split and Osijek and foreign language training, in particular English.

Employees -At the end of 2016, HAKOM employed 173 people. Even though it took over new responsibilities, the total number of HAKOM's employees did not increase. Approximately 84 percent of employees have university or college education, and the majority are electrical engineers who make up 34 percent of all of HAKOM's employees. They are followed by the economists who make up 23 percent of employees, then lawyers making up 15 percent, traffic engineers 13 percent and 16 percent are employees of other professions. More than 50 percent of all employees are under 40 years of age. HAKOM employs 7 PhD holders and 17 masters degree graduates. The gender structure of HAKOM

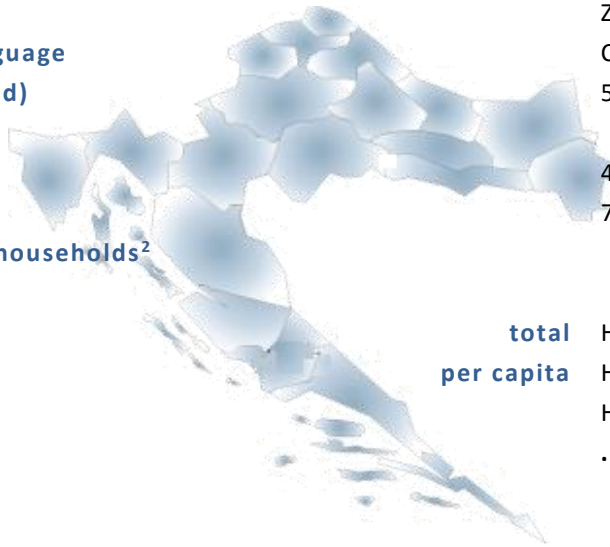
shows slightly more female employees than male employees. It is worth mentioning that HAKOM has the same number of male and female heads of departments.

HAKOM employs a significant number of Homeland War volunteers and veterans or members of the veteran families. The employee turnover in HAKOM has been very low for years and in 2016 it negligible. In 2016 only one female employee left HAKOM to be employed in her own company. out of which four relocated to other countries, two retired, one employee died, while one employee's employment contract was terminated. In 2015 HAKOM initiated one labour dispute and three criminal proceedings, and two labour disputes and three misdemeanour proceedings were initiated against HAKOM.

The interests of HAKOM's employees are also represented by the Works Council. The cooperation between the management and the Works Council was deemed very good by both parties. The employees' satisfaction with the working conditions and labour rights in HAKOM is very high.

1 ELECTRONIC COMMUNICATIONS MARKET

Figure 1.1. Republic of Croatia – basic data



Capital		Zagreb
Official language		Croatian
Surface (land)		56.542 km2
Inhabitants		
total		4.284.889
density		75,8/km2
Number of households[2]		
GDP[3]		
	total	HRK 343.194.823.015
	per capita	HRK 82.289
Currency		HRK (100 lipa)
Domain		**.hr**

In 2016 HAKOM continued consistently with the socially responsible market regulation and together with other stakeholders worked on further developing the market. The electronic communication market showed positive trends in 2016. It is the responsibility of HAKOM, as well as of other stakeholders on the market, to maintain its value and to create the preconditions for further growth and development because the electronic communications market plays an important role in the development of the overall Croatian economy.

The electronic communications market in the Republic of Croatia was in 2016 marked by the growth of data traffic, almost 40 percent in one year, the growth of telephone traffic in mobile networks and the decrease in fixed networks, the consolidation process as well as the increase of revenue and investment the continuation of which is expected in 2017, especially into broadband infrastructure. The speed of Internet access is important for the users but also the availability of the service.

In the forthcoming period, HAKOM's work will be directed towards maintaining and further improving a stimulating regulatory framework for investing into the modernisation of access networks and introducing new services while simultaneously protecting users and sustainable competition.

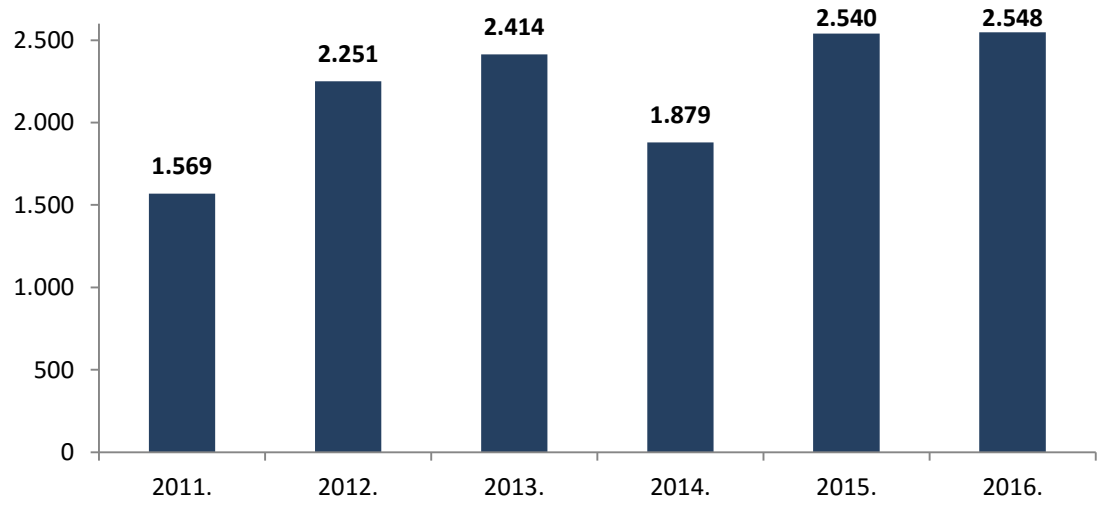
[2] http://www.dzs.hr/Hrv/censuses/census2011/results/htm/h03_01_02/H03_01_02.html
[3] Assessment of the three-month calculation of the gross domestic product in 2016

1.2 Market overview

1.2.1 Investments and revenue

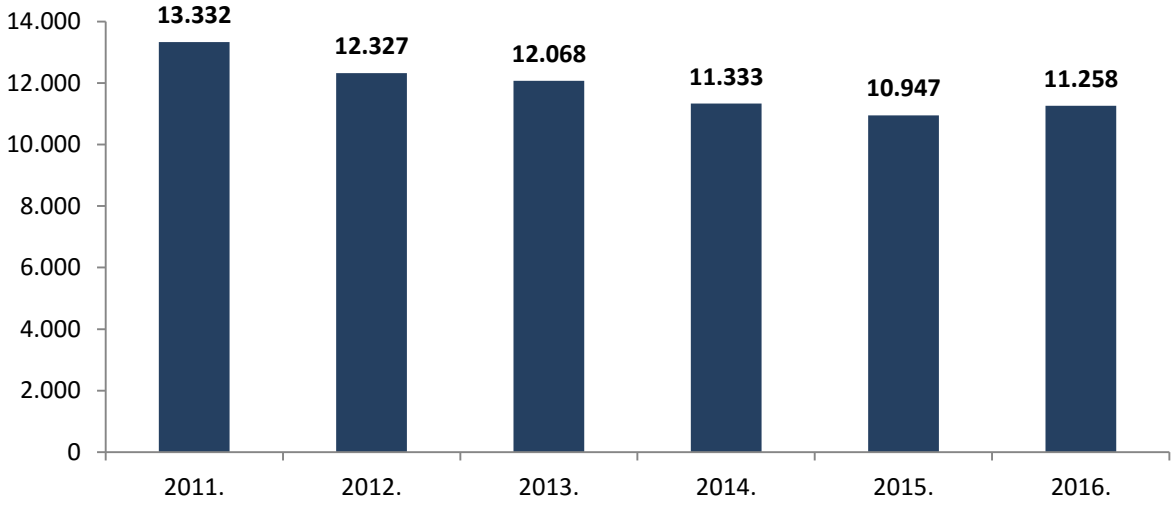
Following the trends from 2015, operators on the electronic communications market in the Republic of Croatia continued also in 2016 with investments into the development of infrastructure, advanced technology and innovative services. More than HRK 2.5 billion was invested last year into the electronic communications market, same as in 2015 and around 35 percent more than in 2014. In order to follow trends in electronic communications, operators need to invest into research and development, development of infrastructure and introduction of new technologies.

Figure 1.2. Total investments of electronic communications operators in the RoC (in HRK million)



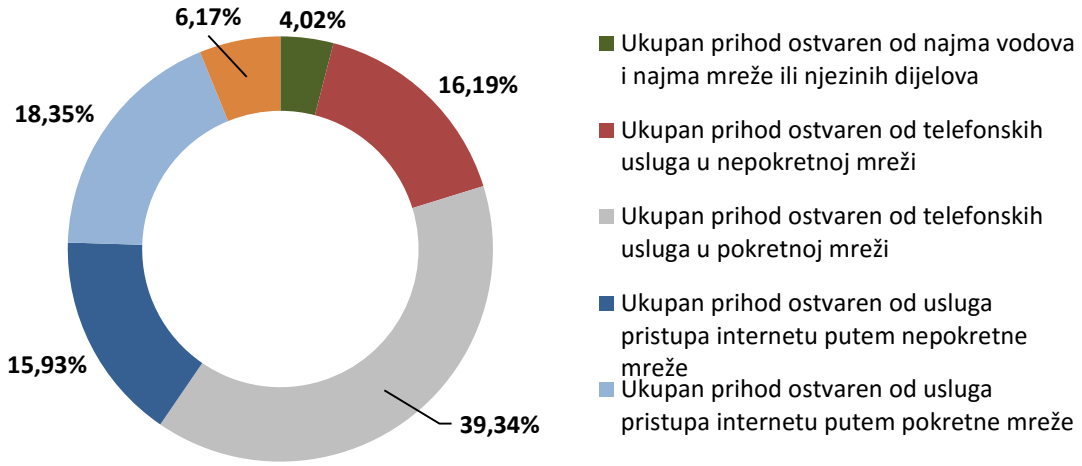
In 2016, HRK 11,258 million in revenue was earned, which is 2.84 percent more than in 2015. Revenue from all services increased, apart from the revenue from telephone services in the fixed network which is declining also on the global level. The decrease of the revenue was primarily influenced by the decrease of the number of users of voice services and the trend of the decrease in the amount of realised minutes.

Figure 1.3. Total revenue on the electronic communications market (in HRK million)



On the other hand, the revenue from Internet access services continues to grow. This positive result was influenced also by the increase of revenue from pay-tv service. In terms of market segments, the largest share of the revenue is still realised from telephone services in the mobile network which comprise almost 40 percent of the total market revenue.

Figure 1.4. Share of services in total revenue on the electronic communications market



1.2.2 Telephone services in the mobile network

Following the stagnation of revenue in the previous period, the market of telephone services in the mobile network shows positive results based on revenue growth. Even though the total number of users in the mobile network is somewhat lower than in 2015 and amounts to 4.4 million, the revenue from telephone services in the mobile network has increased for about 5 percent which is a sign of an encouraging recovery of this market segment.

Figure 1.5. Total revenue from telephone services in the mobile network (in HRK million)

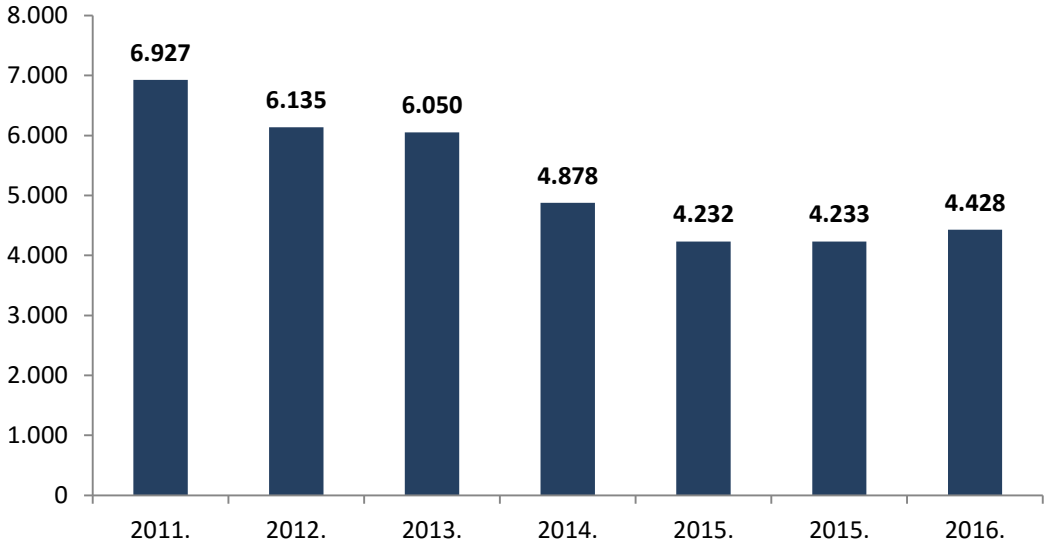
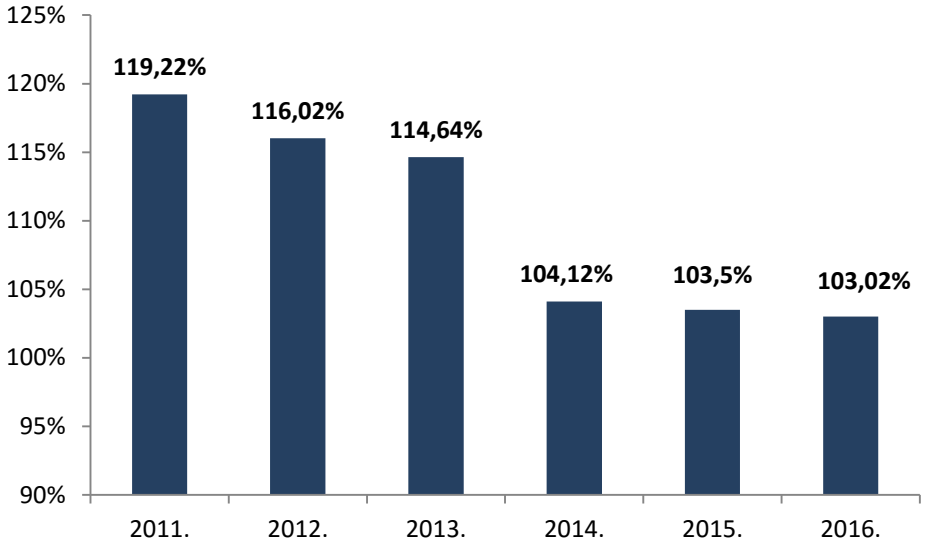
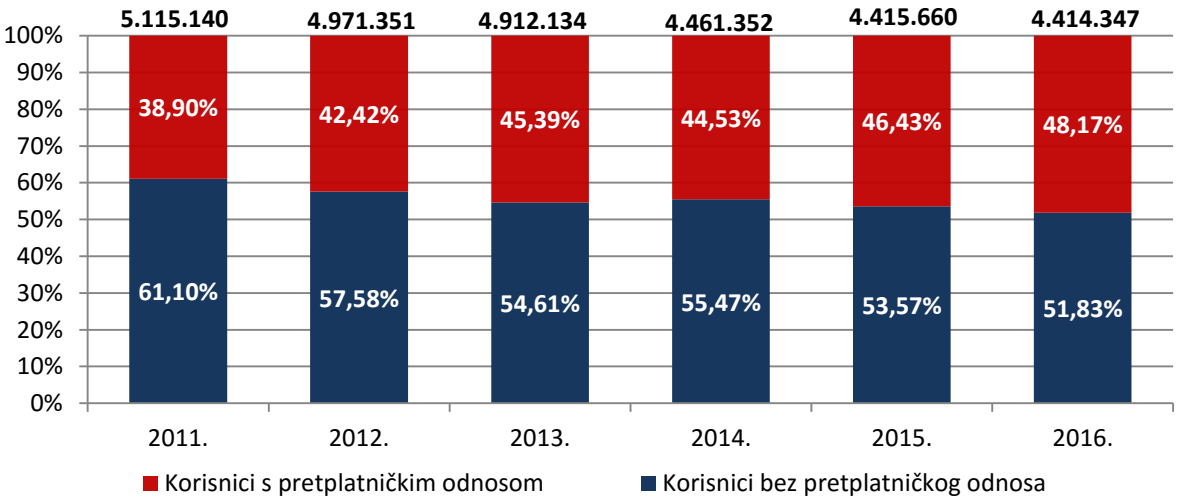


Figure 1.6. User penetration in public mobile communications network in the RoC



At the end of 2016, non-subscribers prevailed in the structure of mobile network users with 52 percent. However, due to various tariff packages with attractive offers of devices/tablets and the increase of popularity of smart phones, the number of subscribers is constantly on the rise. Because of the increased importance of broadband Internet access, which is closely linked to the larger use of smart phones, similar trends are expected in the upcoming period.

Figure 1.7. Distribution of the total number of telephone services in the public mobile communications network in the RoC



Foreigners in the Republic of Croatia realise almost 400 minutes of roaming a year whereas the Croatian citizens realise almost four times less abroad. In 2016, the decrease of roaming prices resulting from the accession to the EU continued which resulted in the drop of revenue from own roaming users in international networks with simultaneous significant increase of own roaming users' traffic. RLAH+ regulation entered into force in April 2016 according to which roaming prices are at the level of domestic prices increased for additional roaming fee. In mid-2017, mobile network operators in the EU, hence also in the Republic of Croatia, expect the "cancellation" of roaming, i.e. the alignment of roaming service prices with the domestic service prices with the implementation of the reasonable use criterion (this criterion only applies to data traffic). HAKOM will continue to proactively follow the implementation of obligations of mobile network operators arising from the Roaming III Regulation.

Figure 1.8. Revenue and duration of calls of own users in roaming in international networks

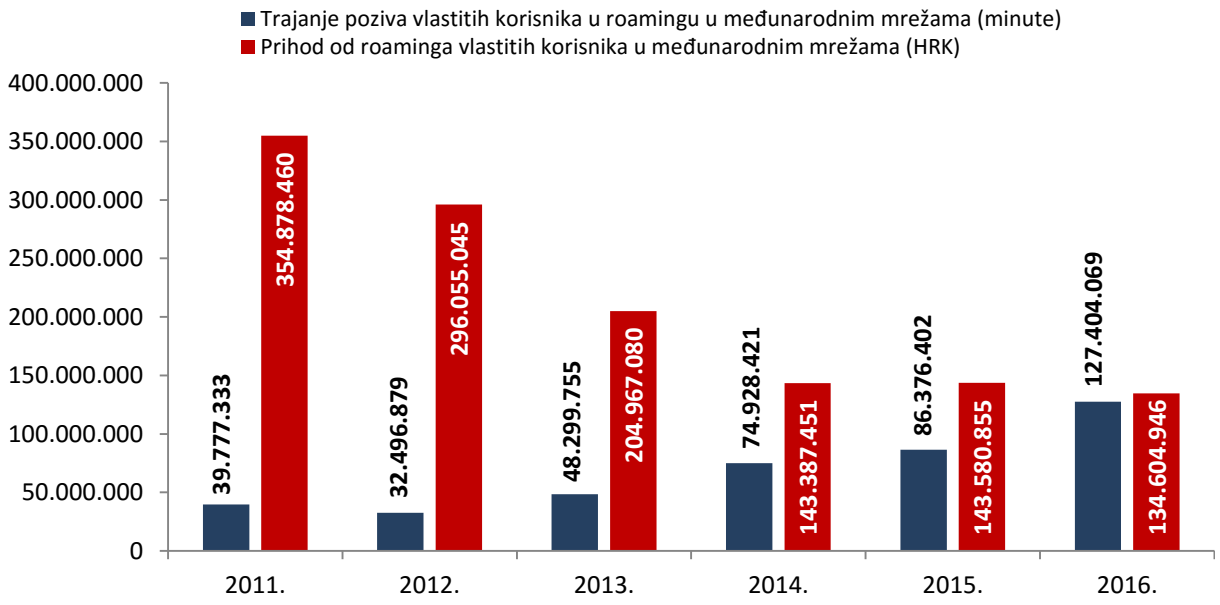
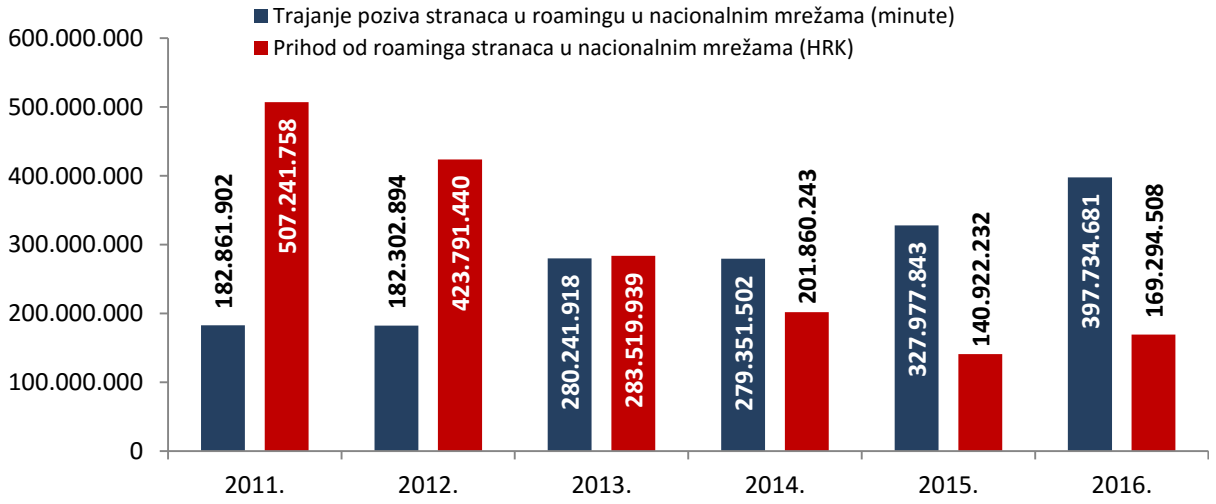


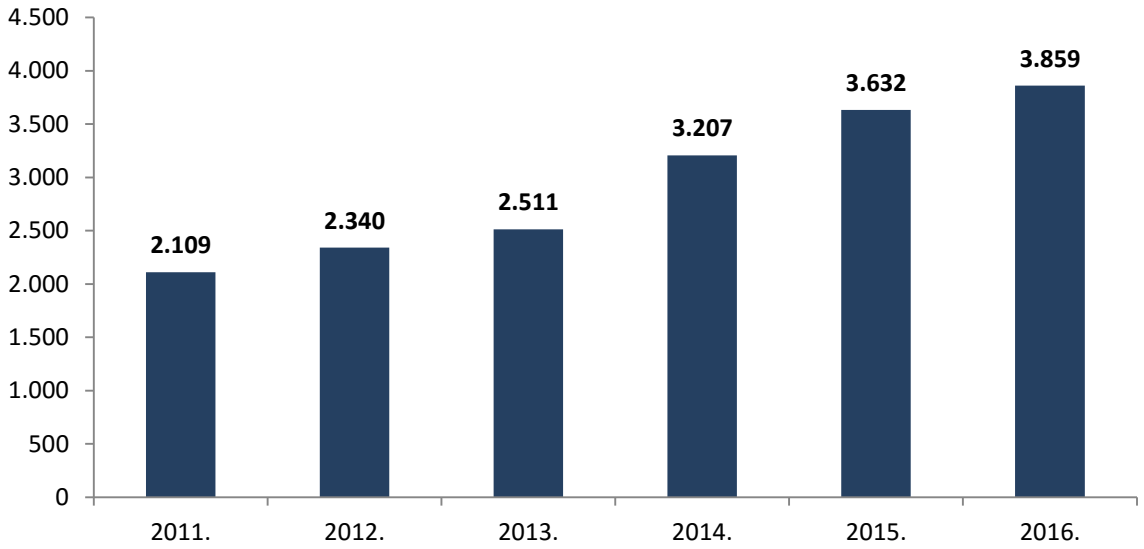
Figure 1.9. Revenue and duration of calls of foreigners in roaming in national networks



1.2.3 Internet access service

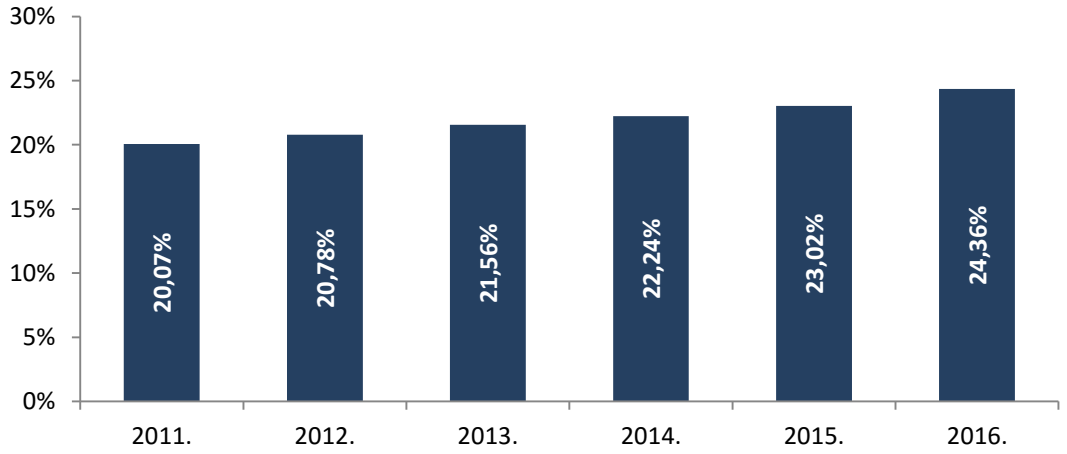
Development of broadband services is of a large significance for the economic development of the Republic of Croatia and of key importance for the establishment of a knowledge-based society.

Figure 1.10. Total revenue from Internet access services (in HRK million)



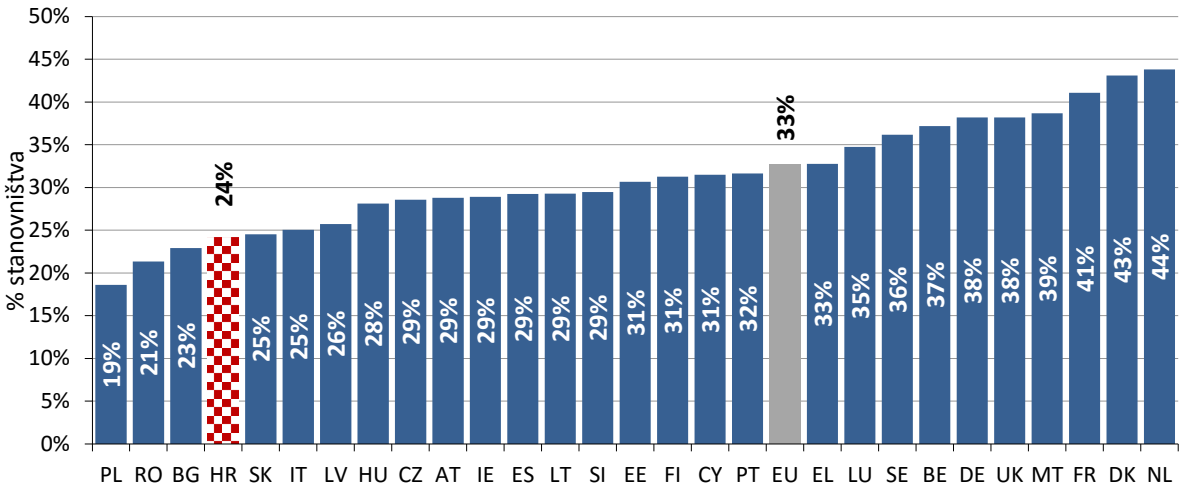
The total number of Internet users and the availability of broadband connections in EU Member States and the Republic of Croatia as well as in the whole world shows the growth tendency. However, there are differences in the presence of broadband connections among individual Member States.

Figure 1.11. Fixed network broadband penetration rate



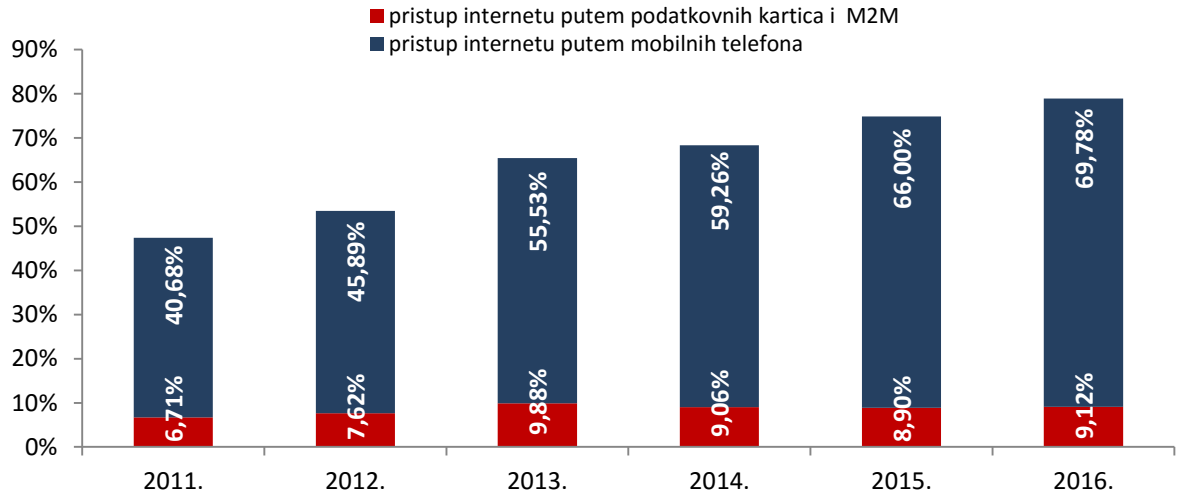
About 24 percent of Croatian inhabitants has Internet access which is below EU average (32 percent). However, it is wrong to consider the Internet development on the basis of the number of inhabitants. Namely, regardless of the number of people in a household, there is always one connection. The average size of the Croatian household is 2.8 persons (in the EU there are 2.3 persons per household). This shows that, according to the above indicator, the Republic of Croatia would reach the average of EU Member States only if all households in Croatia would have Internet access. According to the indicators of availability and presence of broadband Internet, the Republic of Croatia is at EU level. Broadband Internet access is available in 97 percent of households and 70 percent of households already has Internet access.

Figure 1.12. Broadband penetration rate over the fixed network in the EU[4] and RoC



Broadband access over the mobile network accounts for an increasingly large share of the Internet access market which is shown by the constant increase of the number of users, traffic and revenue from the mobile network broadband Internet access service. Considering all active users, i.e. those who access the Internet over smartphones and data cards, mobile broadband access in the Republic of Croatia amounted to almost 79 percent at the end of 2016. Due to the needs and demands of users for new and more advanced mobile network services, further growth of the users of mobile broadband Internet access is expected in electronic communications. Hence, the increase of consumption of mobile broadband Internet access is also expected what will require the modernisation of infrastructure to be able to offer such capacities.

Figure 1.13. Mobile network broadband penetration rate



[4] Source: *Digital Agenda Scoreboard, June 2016*

Figure 1.14. Broadband penetration rate over the mobile network in the EU[5] and RoC

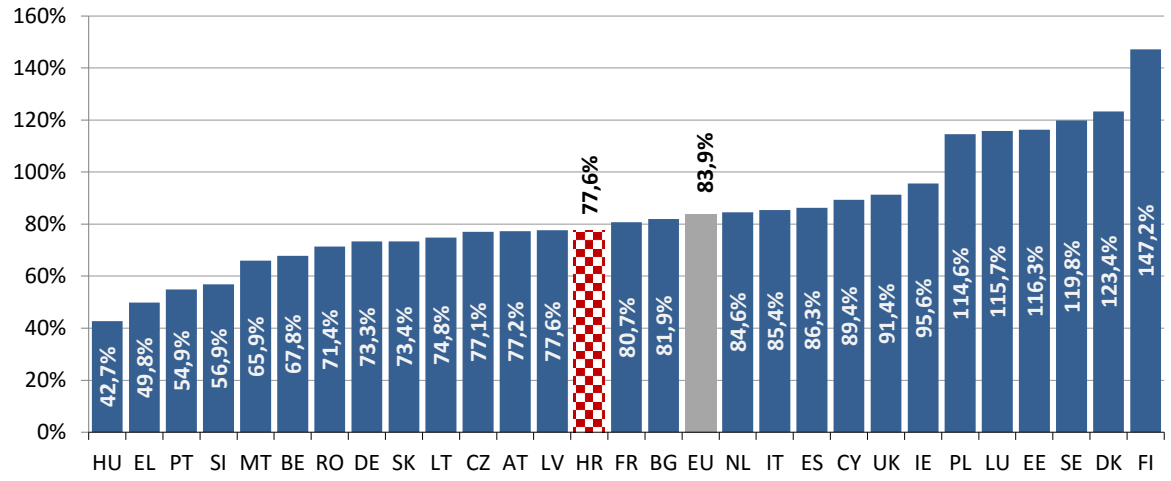
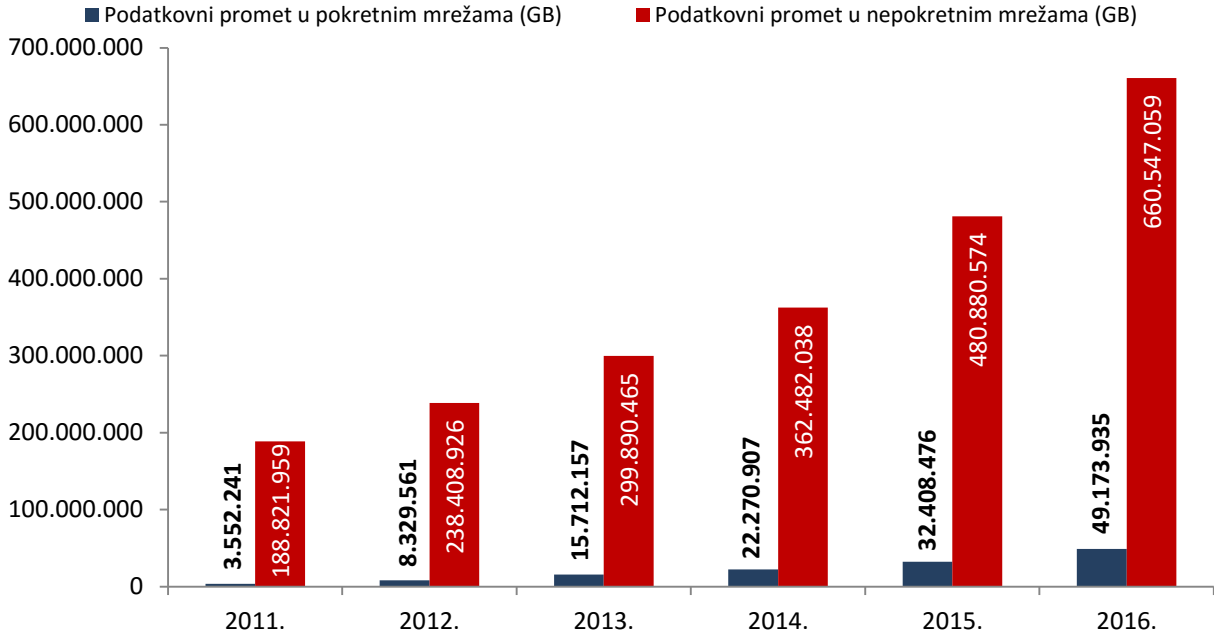


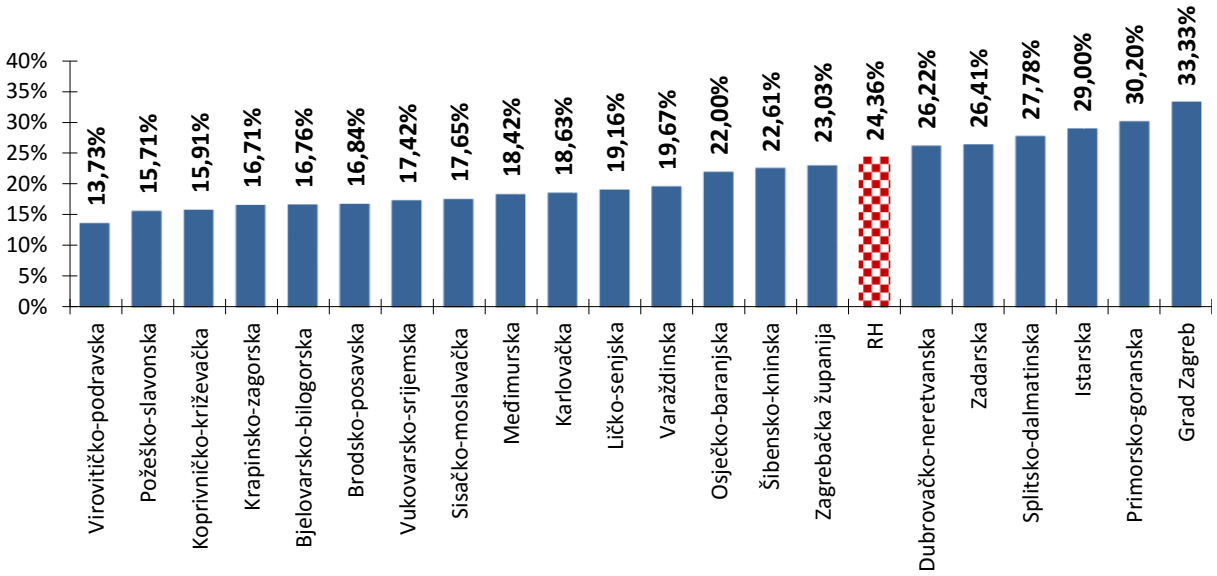
Figure 1.15. Data traffic (in GB)



When implementing broadband access, it is important to pay a special attention to rural areas where globally the development of electronic communications is lower than in urban areas. In the Republic of Croatia there is the so-called digital divide between certain Croatian regions, i.e. inequality in the use and availability of broadband Internet access between certain counties. The greatest penetration of broadband termination points was recorded in the City of Zagreb which is at the EU average of 33.33 percent, while penetration is at the lowest level in Virovitica-Podravina County.

[5] Source: *Digital Agenda Scoreboard, June 2016*

Figure 1.16. Penetration of fixed broadband termination points in the RoC per counties



Such inequalities should in future be overcome or at least alleviated through the regard of development plans resulting from other relevant sectorial strategies. In the upcoming period the digital divide will be further decreased by the allocation of the second digital dividend band to mobile communication network operators the positive economic and social effect of which is seen in overcoming the digital divide between developed urban and underdeveloped rural areas which is one of the aims of both the EU (Digital Agenda 2020) and the Republic of Croatia (Strategy for Broadband Development in the Republic of Croatia for 2016 – 2020).

Today the development of electronic communications is unthinkable without investing into infrastructure development. Digital Agenda for Europe is one of seven pillars of the Europe 2020 strategy and its aim is to develop the potential of the information and communication technology. In terms of the development of broadband Internet access at EU level, Digital Agenda for Europe (DAE) contains certain measures, aims and recommended deadlines for meeting those aims in order to achieve the largest benefits from such development for EU economy and society. The overall aim of the Digital Agenda is to deliver sustainable economic and social benefits from the digital single market based on fast and ultra-fast Internet access and interoperable applications.

The latest broadband services require corresponding transfer capacity which can be achieved through optical access infrastructure and corresponding new generation technology. In terms of the availability of high-speed broadband Internet and its reception, the Republic of Croatia is under EU average, however the availability of NGA infrastructure continuously grows which shows that the Republic of Croatia is heading in the right direction. In the previous period there was a significant increase of the number of connections with access speed of 30 Mbit/s and more which, together with operators' significant investment in the previous year shows the trend of approaching the EU average in the following years. At the end of 2016 its share increased to about 12 percent of the total number of broadband connections whereas in the year before it was about 6 percent. The increase of the number of such connections and the increased investment of operators follows regulatory measures adopted in the previous period and an additional stimulus will be the use of EU funds for constructing new networks in rural areas with insufficient commercial interest for their construction.

Figure 1.17. Availability of broadband Internet access[6]

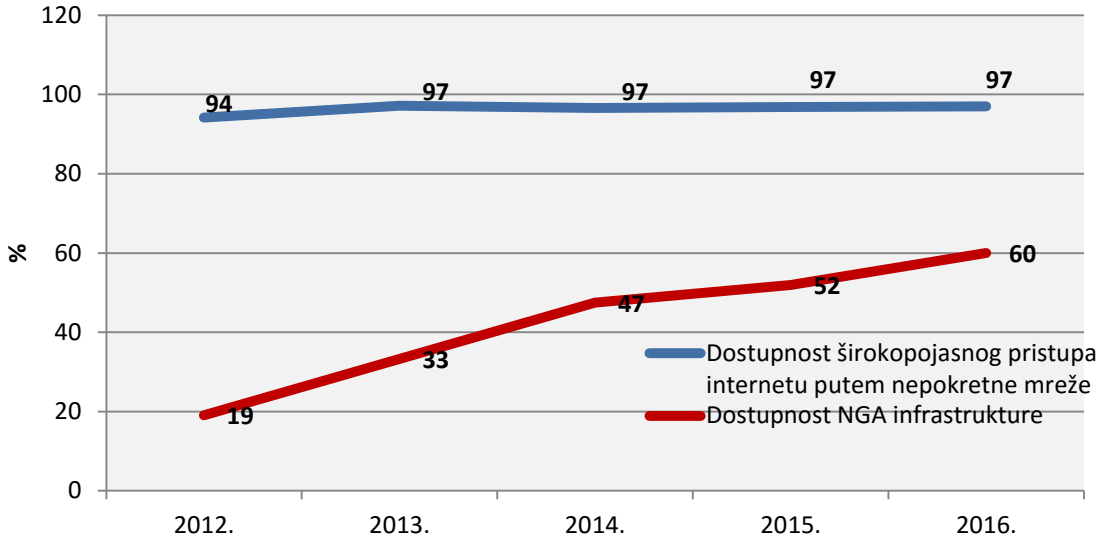
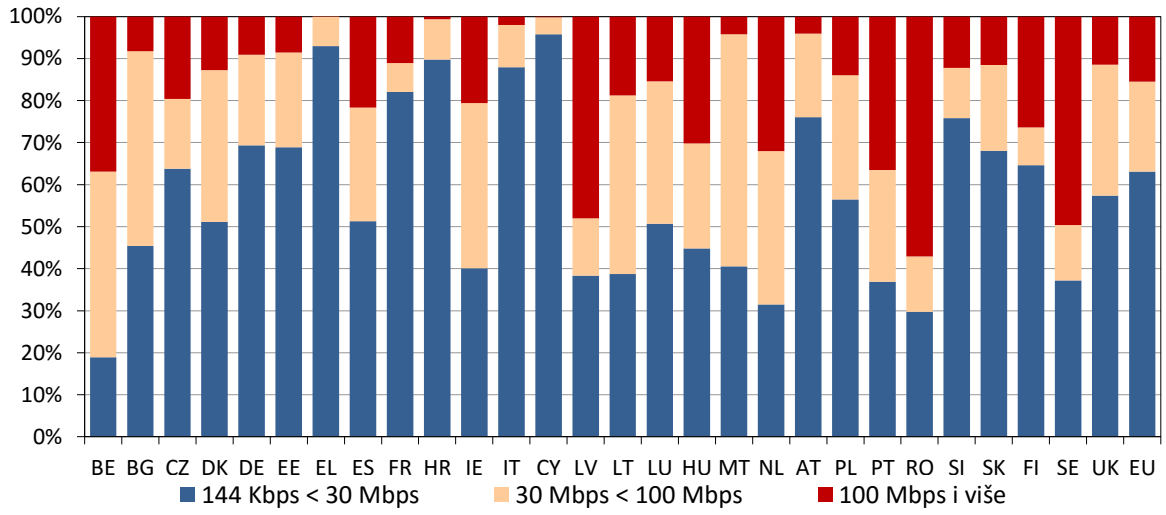


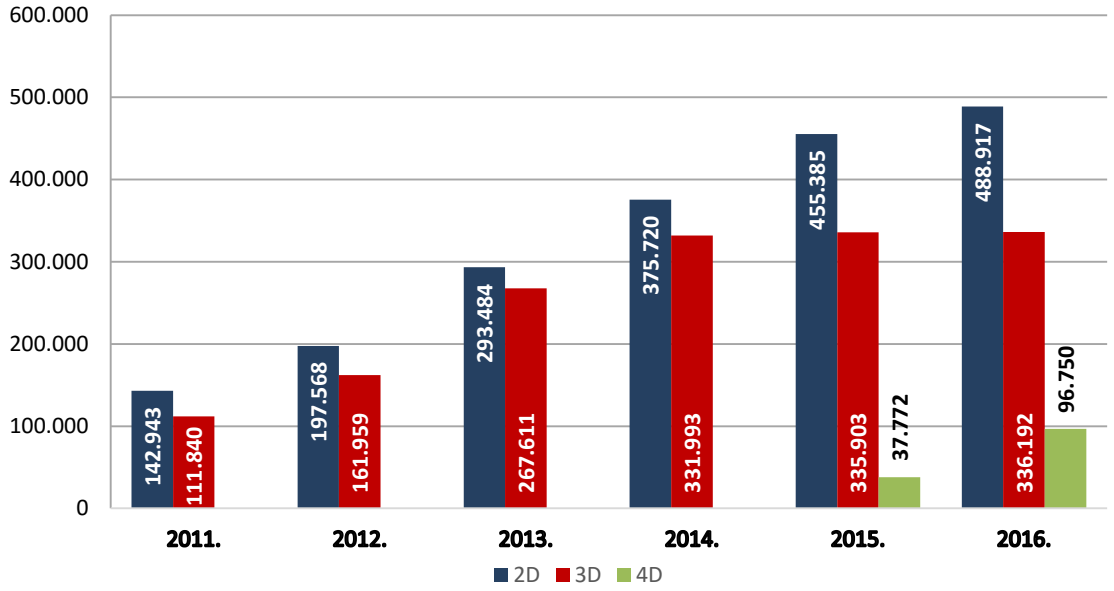
Figure 1.18. Distribution of the number of broadband Internet access connections over the fixed network per speed in the EU[7] and RoC



[6] *Digital Agenda Scoreboard, June 2016*

[7] Source: *Digital Agenda Scoreboard, June 2016*

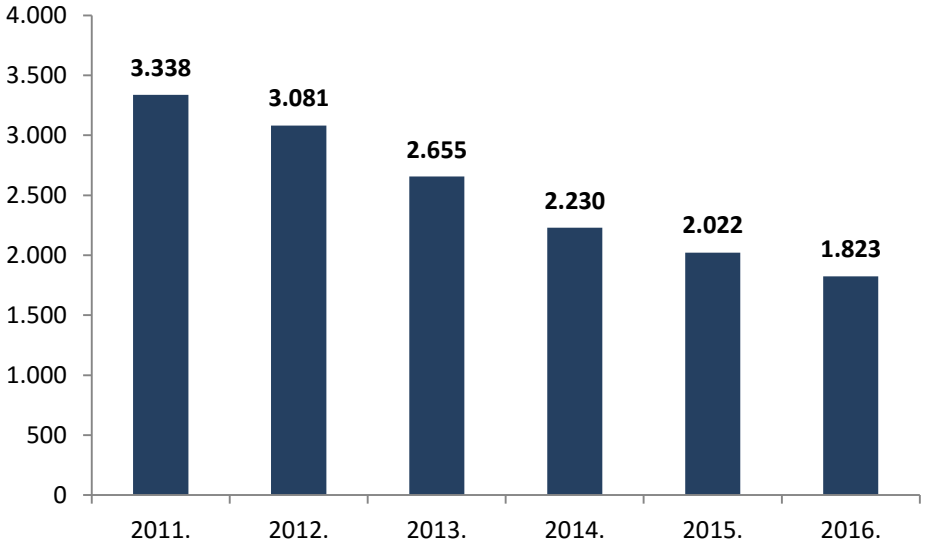
Figure 1.19. Number of users of bundled services



1.2.4 Telephone services in the fixed network

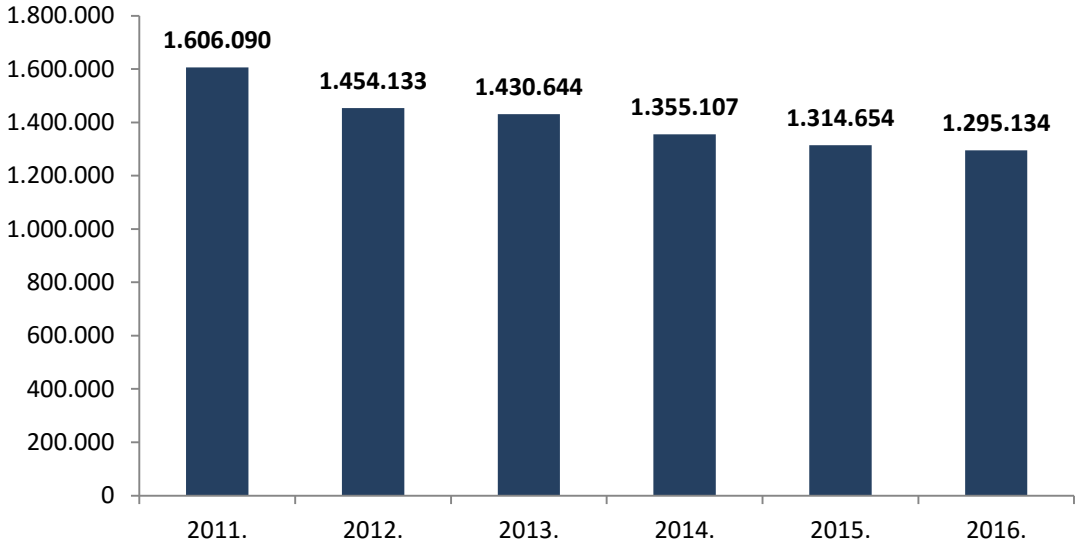
As compared to 2015, the national operators recorded a 10 percent drop in revenue in the segment of telephone services in the fixed network in 2016. The drop in revenue from telephone services in the fixed network was mostly influenced by changing habits of users who, due to more favourable terms of use, increasingly use telephone services in the mobile network as a replacement for telephone services in the fixed network

Figure 1.20. Total revenue from telephone services in the fixed network (in HRK million)



The total number of users of telephone services in the fixed network also records a drop, but it is evident that the drop rate of the number of users becomes lower year after year so there is a certain stabilisation of the number of users of telephone services in the fixed network. The fact that the number of users of telephone services in the fixed network mostly stagnates shows that regardless of the existence of the so-called fixed-mobile substitution, the fixed network still has users who choose this type of service.

Figure 1.21. Total number of users of telephone services in the fixed public communications network

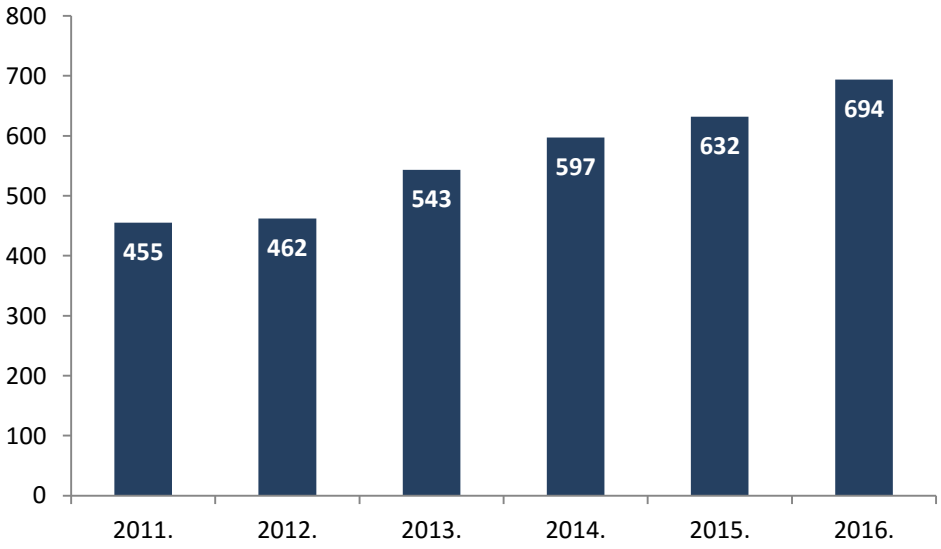


However, most subscribers choose the above service indirectly, through a bundle of services offered by the operators to their users with significant discounts where the telephone service in the fixed network is offered together with Internet access and television service. The prevailing manner of the provision of services in fixed networks is broadband access which is the same situation as in 2015. The number of users of carrier pre-selection service (CPS) continues to decrease. New operators have been increasingly transferring users to their own infrastructure, which is illustrated by the increase of LLU users.

1.2.5 Television services

The market of pay-tv services in the Republic of Croatia shows great potential for growth. Due to an increasing demand for bundled services it is expected that, in accordance with the existing trends, this market segment will continue to rise in the future. According to 2016 data, revenue from the television service increased by about 10 percent compared to 2015.

Figure 1.22. Total revenue from TV service (in HRK million)

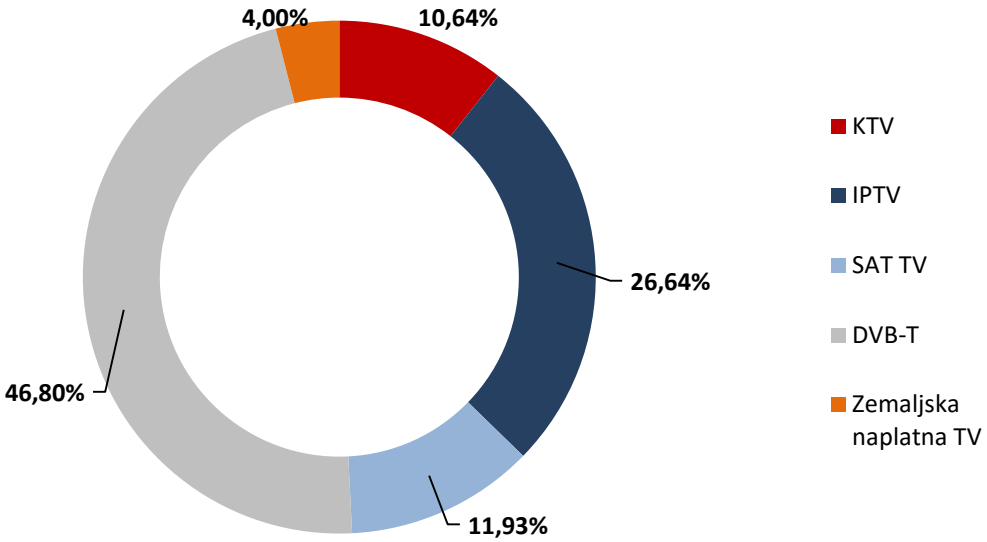


If the market is observed through access technology, IPTV technology has the largest market share which at the end of 2016 amounted to 26.64 percent. Distribution technology which shows a significant additional growth potential is SAT TV which records the largest increase of the number of connections of 8.52 percent and the revenue thereof increases 17.63 percent annually. Almost all operators of

electronic communications services offering IPTV services also offer SAT TV services in places of insufficient Internet bandwidth, which is one of the reasons behind the increase in the number of SAT TV connections.

At the end of 2016, the share of households which only have digital terrestrial TV connection in the total number of TV connections amounted to 46.80 percent and that is at the same time the share of the market with the potential of growth of television service, i.e. new users who are ready to additionally pay for TV content. It is expected that in the forthcoming period the primary manner of distribution over terrestrial transmitters will continue to decrease in terms of the number of users due to pay-tv platforms which offer more numerous and more exclusive TV content, interactivity, additional services and broadband Internet access.

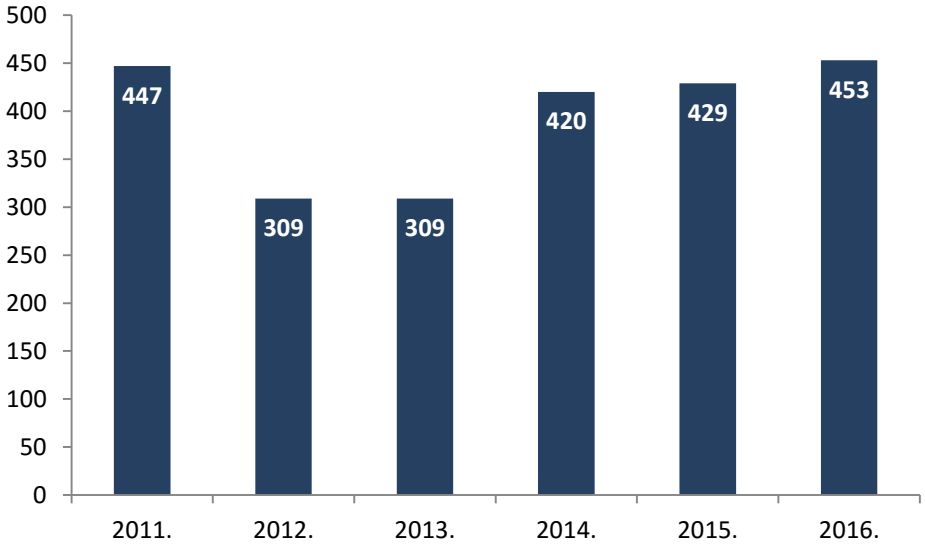
Figure 1.23. Share of households according to technologies used for receiving TV contents



1.2.6 Network and line leasing

Network and line leasing continues to be the smallest market segment on the electronic communications market in terms of total revenue. Thus, total revenue at the end of 2016 amounted to HRK 453 million which is 4.02 percent of the total revenue on the electronic communications market, i.e. an almost 6 percent growth compared to the previous year.

Figure 1.24. Total revenue from the leased network and line services (in HRK million)



1.2.7 Other services

1.2.7.1 Special tariff services

In 2016, HAKOM has been taking actions to prevent breaches of laws by service providers and to prevent possible financial damage for subscribers. Furthermore, HAKOM received, via its e-mail address for reporting unsolicited SMS messages, reports on actions of operators that are unlawful in accordance with the ECA and inspection supervision has been conducted to stop the sending of unsolicited electronic communications.

1.2.7.2 Universal services

Ensuring access to universal services for all users of electronic communications services is one of the main principles and objectives of regulation of the electronic communications market in the Republic of Croatia. HAKOM regularly conducted checks of universal service operators in 2016 related to the provision of the above-mentioned services to end users. As of 1 January 2015, HT is obliged to ensure minimum data transfer speed of 1 Mbit/s for the above-mentioned service.

Universal services in electronic communications are the smallest set of electronic communications services of a certain quality that must be available to all end users at an affordable price in the entire territory of the Republic of Croatia regardless of their geographical location and with the least possible degree of distortion of competition. The Council of HAKOM adopted in 2015 decisions on the designation of universal service operators on the territory of the Republic of Croatia for a period of four years. The company Imenik d.o.o. was designated as the universal service operator for the service of access of end users to a comprehensive directory of all subscribers of publicly available telephone services which may be printed and/or electronic and which must be regularly updated and the universal service operator for the service of access of end users, including users of public pay phones, directory enquiry service about subscriber numbers. HT was designated as the universal operator for the following services:

1. access to a public communications network and publicly available telephone service at a fixed location
2. installation of public pay phones or other publicly available access points for the public voice service on public places available at any time
3. special measures for disabled persons, including access to emergency services, access to directory enquiry service containing subscriber number and to the subscriber directory in the same manner as for other end users of services
4. special tariff systems adjusted to socially disadvantaged groups of end users of services.

On the basis of HT's annual reports HAKOM has been following the fulfilment of obligations concerning the provision of universal services and the quality of provided universal services in the previous year, which is published on HAKOM's official website[8].

[8] https://www.hakom.hr/default.aspx?id=323

1.2.7.3 New services

M2M/IoT

Even though machine-to machine-communication, as a part of the Internet of Things (IoT), is an area in its initial phase of a more pronounced growth and which is estimated to include up to 10 billion devices until 2020, HAKOM has already assigned special numbering for these services in its Numbering Plan. With the current projections of the growth of IoT services, the need for increased numbering will occur since each device must be given a number. Machine-to-machine (M2M) communication refers to automated communication (data transfer) between two or more communication (ICT) entities. Furthermore, with the growth of M2M services, a significant part of HAKOM's attention will be focused on the issue of privacy and data security. The aim is to set stable and sustainable foundations for the regulation of IoT/M2M services. It is necessary to foresee possible directions of market trends and to propose regulatory guidelines which do not prevent growth and the progress of services but provide security for users.

HAKOM has been actively participating in the work of BEREC's M2M/IoT project team and CEPT's working group, WG NaN, dealing with M2M/IoT topics.

Cloud computing

Cloud computing continues to be one of the fastest growing branches of information and communication technology. HAKOM has been following the development of cloud computing services in the Republic of Croatia and on the international market. The Croatian market has been following international trends in this area as well which is why numerous national telecommunication operators have expanded the offer of various cloud services and solutions for their clients. Although this market is not regulated in the Republic of Croatia or in the rest of the EU, HAKOM will continue to monitor the development of this service in order to be able to timely react in case of problems.

1.3 Overview of regulatory measures

According to the ECA, HAKOM shall conduct analysis of the relevant market at least once in every three years. Since in 2015 HAKOM adopted decisions based on conducted analyses of all relevant markets which are a part of the EC's recommendation regarding relevant markets, HAKOM's activities in 2016 were mostly directed towards supervising and implementing regulatory obligations of operators with significant market power on markets susceptible to *ex ante* regulation, with the emphasis on monitoring main efficiency indicators in order to determine whether an SMP operator complies with non-discrimination obligation. Regulatory obligations prevent the occurrence of possible problems on markets lacking effective competition, that is, operators with significant market power are prevented in advance from exploiting their dominant position on the market.

During 2016 HAKOM finished the procedure for updating cost models' data and adopted a number of decisions on wholesale prices for SMP operators. In line with the updated results of cost models for the fixed and mobile network, HAKOM stipulated new prices for:

- the services of voice call termination in own network
- the services of interconnection in a public fixed communication network
- the service of unbundled access to the local loop
- the service of wholesale broadband access.

The promotion of efficiency and sustainable competition and ensuring of the largest benefits for users are three main HAKOM's objectives related to the introduction of the measure of cost-orientation of prices. A clear forward-looking vision ensures market stability and business planning of market participants, which has proven to be of key importance for the development of efficient competition.

Furthermore, at the beginning of 2016, HAKOM updated the calculation of the reasonable rate of return on capital invested in fixed and mobile network for the upcoming period. Namely, when determining wholesale prices, HAKOM must take into consideration the investors' investment through enabling reasonable rate of return for the invested capital.

Building on the HT's request to increase the price of WLR service due to the increase of the retail price of the basic standalone voice package, a new price for the wholesale line rental service (WLR) is stipulated which will enter into force on 1 January 2017 at the earliest. This deadline represents an optimum balance between the protection of end users and the creation of preconditions for infrastructure market competition, two main tasks of HAKOM. Namely, HT's request to increase the price of WLR service due to the increase of the retail price of the basic standalone voice package is not a request which influences only HT's users of the above package but also influences all users of standalone voice package which includes the users of alternative operators whose retail policy is not to increase the price of that basic package. The reason thereof can be found in the fact that the price of WLR service is determined on the basis of the retail-minus principle in relation to the HT's reference standalone voice package. Another reason is that the alternative operators provide the above service for their users mostly on the basis of HT's wholesale service considering the distribution of HT's network. Namely, only HT can provide services to end users on the whole territory of the Republic of Croatia over its own infrastructure. Due to the fact that there is a stable/large base of users who only need standalone voice service, their impossibility to use a substitute tariff service would disturb the market to their detriment. However, even though it recognizes the needs of end users, HAKOM must according to the ECA also take into account the market competition based on infrastructure. Therefore, considering the fact that the new wholesale price for the LLU service and NBSA service should enter into force on 1 January 2017 at the earliest, HAKOM determined 1 January 2017 as an appropriate deadline for the entrance into force of the new WLR price in order for the insufficient economic space between prices for services requiring larger investment into network (such as LLU and NBSA services) and WLR not to influence negatively the infrastructure market competition.

In 2016 HAKOM updated the methodology of margin squeeze test adopted in November 2016. The obligation to conduct the margin squeeze test is stipulated for HT and the companies under its control, Iskon and Optima, on the basis of relevant market analyses. In order to implement this obligation,

HAKOM adopted in July 2014 the methodology of margin squeeze test which represents a key regulatory instrument providing the appropriate conditions for the development of alternative operators and profitable competition with SMP operators. Considering the fact that since the date of its adoption important changes occurred at the electronic communications market in the Republic of Croatia, HAKOM found it necessary to revise the existing and publish a new methodology of margin squeeze test the aim of which is to prevent the definition of service prices which are lower than the costs in the manner that the minimum level of retail price must cover operators' all costs (wholesale, own network, retail and gifts/advantages).

What follows is an overview of the most important HAKOM's decisions adopted in the previous year on markets susceptible to *ex ante* regulation with a view to preserve efficient competition.

Table 1.1. ***Overview of the most important decisions on markets susceptible to ex ante regulation***[9]

Decision imposing on the company Hrvatski Telekom d.d. the obligation to amend its Reference Offer for the wholesale broadband access service in the part concerning the implementation of new profiles, the definition of VDSL coverage and the verification of technical ability to provide the wholesale broadband access service
Decision imposing on the company Hrvatski Telekom d.d. the obligation to amend its Reference Offer for the service of unbundled access to the local loop concerning the reduction of the minimum distance between FTTC nodes and CO location in HT's network
Decision in the procedure for the imposition of a monthly fee for the service of fully unbundled access to the local loop on the basis of a copper pair established on the basis of an updated BU-LRAIC+ cost model
Decision in the procedure for the establishment of a rate of return on capital invested in fixed and mobile network
Decision on the granting of consent for HT's 2015 regulatory accounting documentation
Decision imposing on the company Hrvatski Telekom d.d. the obligation to amend its Reference Offer for the service of wholesale broadband access in the part of conditions concerning the service of wholesale broadband access on the basis of FTTH solution, when the optical axis of the building is not owned by HT
Decision in the procedure for the definition of the price for the call termination service on own mobile network on the basis of the updated bottom-up cost model through the application of the pure LRIC approach
Decision in the procedure for the imposition of a fee for the interconnection service in the public fixed communications network calculated on the basis of an updated BU-LRAIC+ cost model
Decision imposing on the company Hrvatski Telekom d.d. the obligation to charge monthly fees for the service of wholesale broadband access calculated on the basis of an updated BU-LRAIC+ cost model
Decision imposing on the company Hrvatski Telekom d.d. the obligation to charge monthly fees for the service of wholesale high-quality access calculated on the basis of an updated BU-LRAIC+ cost model
Decision imposing on the company Hrvatski Telekom d.d. the obligation to apply an amended monthly fee for the user line rental service
Decision in the procedure for the amendment of the Reference Offer of Hrvatski Telekom d.d. for the service of unbundled access to the local loop concerning an incorrect realization of the service
Decision in the procedure for the amendment of the Reference Offer of Hrvatski Telekom d.d. for the wholesale broadband access service concerning an incorrect realization of the service
Methodology of margin squeeze test

When performing regulatory tasks stipulated by the ECA, HAKOM takes into account the relevant EU *acquis* in the area of electronic communications and market competition as well as opinions and joint positions adopted by BEREC in order to ensure the development of the consistent regulatory practice and the consistent implementation of the relevant EU *acquis*. Apart from the cooperation with BEREC, HAKOM actively cooperates with the EC where, depending on needs, it participates in the development of appropriate legal documents. In order to ensure that the decisions adopted at the national level do not negatively influence the single EU market or the aims to be realised according to the regulatory framework in force, national regulatory bodies are obliged, according to the provisions of the framework directive, to submit proposals for decisions to the EC for approval. Hence, HAKOM continued in 2016 to conduct the notification activities.

[9] *All decisions are available on www.hakom.hr*

During 2016, HAKOM has been following obligations arising from the Roaming III Regulation[10] which entered into force on the date of accession of the Republic of Croatia to the EU. The measures are mostly related to roaming prices and transparency obligations. As before, HAKOM's experts have participated in many working groups dealing with the development of a series of documents related to the roaming market which have served as a basis for the adoption of EC decisions in that area.

[10] *Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union*

1.4 Building, access to and use of electronic communications infrastructure and network

In 2016 special attention was dedicated to activities including monitoring the joint use of the existing cable ducts, surveying of electronic communications infrastructure (hereinafter: ECI) and the resolution of property related issues with owners of land on which the ECI was built. The end objective of all of these activities is the establishment and ensuring of network security, network integrity and interoperability of electronic communications services.

Table 1.2 Electronic communications infrastructure and network in the RoC

Type of electronic communications infrastructure	Quantity
Cable ducts (km)	21.800
Underground cables (km)	26.300
Surface electronic communications network (km)	33.000

Surveying of electronic communications infrastructure

The analysis of the collected data led to the conclusion that out of the total ECI the following has not been surveyed and migrated into the integral on-line database:

- 6,346 km of cable ducts
- 9,923 km of underground cables without ducts
- 33,000 km of surface cables.

With a view of establishing an integral database, HAKOM initiated surveying activities in the entire territory of the Republic of Croatia, the drafting of geodetic surveys for the cadastre of lines and entry of data into a single on-line database. The following has been surveyed until 31 December 2016:

- 4,907 km of cable ducts
- 11,213 km of underground cables without ducts
- 28,254 km of surface cables with the associated poles.

The SGA is competent for establishing the National Integrated Utility Geoinformation System Infrastructure (Croatian Register of Communal Infrastructure). Furthermore, pursuant to the framework agreement on business cooperation with the SGA, HAKOM has the access to the digital ortophoto (DOF5) through WMTS service and to graphic data of the register of business entities and is using them as a cartographic basis for its public “Interactive GIS portal” containing the list of the areas with broadband access availability and the list of transmitters. Within its competence, HAKOM participated in the development of technical specification of the module for geographic information system of the electronic communications infrastructure and other associated facilities (hereinafter: GIS ECI), that is, of a single GIS ECI database that should provide access to data on the existing electronic communications infrastructure and available electronic communications capacity in the Republic of Croatia, all with the aim of establishing a central Croatian register of communal infrastructure in the Republic of Croatia. The analysis of the existing state of construction of the ECI and broadband communications network at the regional and local level, along with other available infrastructure data, will serve as a basis for the building of broadband communications networks.

1.4.1 Regulation of property-law relations between infrastructure operators and managers of common good and real estate owners

Regulation of property-law relations between local self-government units and infrastructure operator

In 2016, HAKOM received a total of 143 requests for the regulation of property-law relations between local self-government units and the infrastructure operator out of which 76 requests were resolved as well as 19 requests received during 2015. The resolution of the above-mentioned requests by HAKOM depends on the accuracy of documentation. In this manner, local self-government units will regulate property-law relations with infrastructure operators who own the ECI on real estate owned by local self-government units with the aim to achieve monetary compensation for the use of their real estate.

Right of way

The certificate of the right of way is issued by HAKOM on the basis of the ECA and the Ordinance on right of way certificate and fee based on requests submitted by infrastructure operators, common good managers and real estate owners. In 2016 a total of 163 right of way certificates for a total length of 909,210.00 m were issued

Table 1.3 Development of the number of issued certificates concerning the right of way

	2010	2011	2012	2013	2014	2015	2016
Number of issued certificates	2654	1254	255	1700	1050	276	163
Total length of path (m)	153.394,36	95.548,69	24.008,25	114.395,1	77.480,15	155.365,91	909.210

Removal of electronic communications infrastructure and other associated facilities

In 2016, a total of 92 requests for the removal of 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 dynamics of resolution was monitored. A total of 72 were resolved while the remaining 20 cases are in the final resolution stage. It must be mentioned that procedures conducted pursuant to a submitted request for the removal are long-lasting procedures which are faced by numerous obstacles and restrictions that are out of HAKOM's control from unresolved land registration issues, to unresolved ownership relations, procedures related to the obtaining of various consents and approvals, development of technical solutions, etc. HAKOM has invested significant efforts to resolve the requests for the removal of the ECI within a reasonable time limit which is acceptable to the person who submitted the request and to avoid putting at risk the ECI and the provision of EC services at any time.

Relocation of connections, repairs of faults and damage caused to the network by third persons and regular maintenance of the network and equipment

Within the framework of its authority and obligations, in 2016 HAKOM has been continuously monitoring and checking procedures and deadlines related to physical relocation of fixed connections, removal of faults arising as a consequence of various types of damage on the network and it took timely action to shorten the deadlines as much as possible and prevent possible financial damage for users who are unable to use the electronic communications services. During the carrying out of its activities, HAKOM paid special attention to network maintenance.

1.4.2 Preliminary opinions on physical planning documents

In accordance with the legal obligations pursuant to the Physical Planning Act (OG No. 153/13) HAKOM participates as a public law authority in the area of the ECI and other associated facilities in the adoption of physical plans at all levels. In 2016 HAKOM issued 484 documents defining guidelines and requirements to be complied with during the development of physical plans of all levels and 257 opinions during public consultations concerning proposals for physical plans of all levels.

1.4.3 Special building conditions and approval of main projects

HAKOM establishes and publishes special conditions and approvals of major projects for all interventions into space within the zone of electronic communications infrastructure and other associated facilities and in the safety zone and the radio corridor of certain radio stations in compliance with the Physical Planning Act (OG 153/13) and the Building Act (OG No. 153/13). In 2016, HAKOM issued special conditions in 7,593 cases out of which in 3,233 cases special conditions were issued on the basis of requests submitted to HAKOM through the "e-Conditions" application. In 2016, on the basis of requests for the issuing of approvals of major projects, HAKOM issued 8,479 acts.

Table 1.4. Special building conditions and decisions on building conditions

Year	2013	2014	2015	2016
Number of cases concerning special conditions	4731	5832	5930	7593
Special conditions issued on the basis of requests submitted through the web-application on "e-Conditions"	-	-	1094	3233
Number of cases concerning approvals of main projects	-	2304	4991	6895

1.4.4 Quality of broadband access in the Republic of Croatia

The analysis of the comments of users who complained about the quality of services (mostly the insufficient download transfer speed of ADSL/VDSL transfer technology) determined that the transfer parameters of subscriber loops were not in line with the relevant wholesale reference offers, i.e. quality degradation was the consequence of the inadequate maintenance of the existing access network. In order for the user operators to be able to control the quality of service they offer for users, HT must deliver the results of DSLAM measurements to all user operators every day. The organisation of such data in the form of an appropriate database can help every operator systematically monitor all parameters of service quality of the physical layer and can determine whether the provided transfer speed is larger than the minimum defined in the relevant reference offer. Following the complaints of the users from Zagreb (Huzjanova 6) and Samobor (Kerestinačka 2), it was determined that the degradation of the service quality was the consequence of external electromagnetic interferences. In cooperation with HT in the area of Jordanovac (CO Peščenica) a pilot project has been realised (dependent node) with the protected VDSL2-8b technology at CO location. With the corresponding modelling of the spectral mask (DPBO protection) of VDSL2-17a technology at the FTTC location, the complete protection of the service quality was achieved which continues to be provided from the CO location. This was experimentally confirmed with the analysis of measurement results before and after the described procedure. In the second phase, the effects of the vectorization VDSL2 technology in the real network were tested. The increase of transfer speed was not in line with the expected because the access network in the area is realised with the out-dated cable construction (air-paper insulation). The reach of VDSL-8b technology from the CO location increased from 1 km to 1.5 km. All preparations have been made for the systematic measurement of the level of interferences which can occur as a

consequence of xDSL technology operation over air network. These measurements will be conducted in all four regions at about ten previously chosen locations with predefined criteria.

1.4.5 Internet neutrality, openness and quality

The Internet has become an indispensable tool in everyday life and work. Such success of the Internet results for the most part from its openness as a platform which enables the development of innovative services and applications. Therefore, regulatory objectives such as the preservation of openness of the Internet, the promotion of end users' freedom to access the Internet and distribute its content and to start the applications of their choice, and the freedom to promote innovations are of great importance. Those objectives can be achieved if the Internet is managed according to the principle of "network neutrality".

Neutral means that all traffic on the Internet is treated equally, that is, all packages entering the Internet are treated in the same manner while travelling through the network from their source to their destination. Open means that any device which is compatible with a defined standard can be connected to the Internet. In 2016, HAKOM began the activities of monitoring the implementation of TSM Regulation[11]. This Regulation aims to establish common rules to safeguard equal and non-discriminatory treatment of traffic in the provision of Internet access services and related end users' rights. The measures provided for in this Regulation respect the principle of technological neutrality, that is to say they neither impose nor discriminate in favour of the use of a particular type of technology. When providing Internet access services, providers of those services should treat all traffic equally, without discrimination, restriction or interference, independently 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 transmission quality, traffic management measures which differentiate between objectively different categories of traffic. Any such differentiation should, in order to optimise overall quality and user experience, be permitted only on the basis of objectively different technical quality of service requirements (for example, in terms of latency, jitter, packet loss, and bandwidth) of the specific categories of traffic, and not on the basis of commercial considerations. Such differentiating measures should be proportionate in relation to the purpose of overall quality optimisation and should treat equivalent traffic equally.

Furthermore, there is demand on the part of providers of content, applications and services to be able to provide electronic communication services other than Internet access services, for which specific levels of quality, that are not assured by Internet access services, are necessary. In order to avoid the provision of such other services having a negative impact on the availability or general quality of Internet access services for end-users, sufficient capacity needs to be ensured. The provision of such services other than Internet access services should not be to the detriment of the availability and general quality of Internet access services for end-users. In mobile networks, traffic volumes in a given radio cell are more difficult to anticipate due to the varying number of active end users, and for this reason an impact on the quality of internet access services for end users might occur in unforeseeable circumstances. In mobile networks, the general quality of Internet access services for end users should not be deemed to incur a detriment where the aggregate negative impact of services other than Internet access services is unavoidable, minimal and limited to a short duration. National regulatory authorities should ensure that providers of electronic communications to the public comply with that requirement. In this respect, national regulatory authorities should assess the impact on the availability and general quality of Internet access services by analysing, inter alia, quality of service parameters (such as latency, jitter, packet loss), the levels and effects of congestion in the network,

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

actual versus advertised speeds, the performance of Internet access services as compared with services other than Internet access services, and quality as perceived by end users.

Any significant and continuous or regularly recurring difference, where established by a monitoring mechanism certified by the national regulatory authority, between the actual performance of the service and the performance indicated in the contract should be deemed to constitute non-conformity of performance for the purposes of determining the remedies available to the consumer in accordance with national law. The methodology should be established in the guidelines of the Body of European Regulators for Electronic Communications (BEREC) and reviewed and updated as necessary to reflect technology and infrastructure evolution. National regulatory authorities play an essential role in ensuring that end users are able to exercise effectively their rights under this Regulation and that the rules on the safeguarding of open Internet access are complied with. To that end, national regulatory authorities should have monitoring and reporting obligations, and should ensure that providers of electronic communications to the public, including providers of Internet access services, comply with their obligations concerning the safeguarding of open Internet access. Those include the obligation to ensure sufficient network capacity for the provision of high quality non-discriminatory Internet access services, the general quality of which should not incur a detriment by reason of the provision of services other than Internet access services, with a specific level of quality. National regulatory authorities should also have powers to impose requirements concerning technical characteristics, minimum quality of service requirements and other appropriate measures on all or individual providers of electronic communications to the public if this is necessary to ensure compliance with the provisions of this Regulation on the safeguarding of open Internet access or to prevent degradation of the general quality of service of internet access services for end users. In doing so, national regulatory authorities should take utmost account of relevant guidelines from BEREC.

Having in mind all the above, at the end of 2016 HAKOM undertook the following activities:

a) definition of the manner of implementation of operators' transparency obligation (publication of the categorisation of services, technical characteristics and minimum quality of the same category of services) and justifications for any traffic management measures applied,

b) definition of the manner of managing operators' traffic and the duration of special traffic management, for example in the case of congestion or network security,

c) definition of the manner of supervision and analysis of the impact of specialized services on Internet access service (access part and core part of the network),

d) definition of other measures to ensure sufficient network capacities for the provision of high-quality Internet access,

e) definition of measures to prohibit blocking and throttling of only certain applications.

In 2016 HAKOM did not receive any user complaints concerning difficulties with Internet access service concerning the blocking or slowing down of the use of certain applications or services or concerning price discrimination thereof.

With a view to achieving better monitoring of the contracted conditions regarding the quality of service (speed) of broadband Internet access, which at the EU level is stipulated in this Regulation, HAKOM has, since 2012, ensured to end users and operators a free certified tool for measuring access speed (HAKOMetar[12]) in the fixed network. Furthermore, having in mind the obligations arising from this Regulation related to the mobile network, HAKOM has defined the characteristics of a new tool which should serve the users for informative measuring of the quality of Internet access service also in the mobile network.

HAKOMetar is available to end users who may use it to test broadband speed in the fixed network and compare it to the speed agreed with the service provider. Furthermore, the results of the measuring serve at the same time as the basis for complaints to operators if such speed is lower than agreed.

[12] http://www.hakom.hr/default.aspx?id=1144

More than 17,800 individual measuring activities were carried out in 2016, that is, more than 13,000 measuring cycles were initiated and 238 completed measuring cycles initiated by the users fulfilled the requirements for submitting the complaint to the operator by the end user. All of these data show that the majority of operators provide Internet access speed that has been agreed in subscription agreements.

1.5 Inspection supervision in the field of electronic communications networks and services

In 2016 several comprehensive inspection supervisions of the existing access networks (hereinafter: AN) were carried out which focused on the quality of service, transfer parameters of subscriber loops, type of interferences and their duration, maintenance (preventive and corrective), accuracy of the existing technical documentation and other information system data of crucial importance for the removal of interferences. The AN Kaštel Stari and Kaštel Radošić (Split-Dalmatia County) as well as the AN Prespa (Bjelovar-Bilogora County) were included. The existing situation as well as the analysis of DSLAM measuring results showed the poor state of the first two networks. In AN Kaštel Stari for example, more than 30 percent of subscriber loops has the speed which is lower than the one defined in the annex 14 of the existing reference offer (hereinafter: RO) whereas in more than 80 percent of subscriber loops the longitudinal symmetry parameter (the key parameter in terms of "broadbandness") is not in line with the existing RO. The analysis of the above parameters for the AN Prespa shows that they are within 10 percent, which is tolerable. Furthermore, the first two ANs do not have a standardized and usual manner of managing technical documents so the level of the existing documentation renders the quality maintenance of those networks practically impossible. Moreover, in the AN Radošić, due to the failure to undertake certain action during the phase of project design and construction, there is the increased effect of external overvoltage which is the consequence of atmospherics and high-voltage electrical energy (hereinafter: EE) lines. In the conditions of the mass introduction of broadband services this problem becomes even more complex because the users' equipment (modems, routers, etc.) is connected to telecommunications and EE network and the condition of equipotentialisation is usually not fulfilled on the users' side. Due to all the above, in the first two cases a thorough reconstruction of ANs is ordered with the subsequent conducting of electrical measurements which should confirm that the transfer parameters are within the defined limits.

During 2016 there was an increase of the number of users' complaints related to the rejection of requests for broadband services stating the rejection reason: "Non-existent connection between the user and the AN, upgrade up to 300 m required". The analysis of the most requests having such rejection reasons proved to be incorrect, i.e. the upgrade up to 100 m was required or the building in question was already connected to the public network. That is the reason HAKOM initiated inspection supervision.

In 2016 the electronic communications and services sector was under special supervision due to the protection of users of electronic communications services with a view to improving the work of, above all, operators' external sales points and operators' procedures for dealing with user complaints.

All of the above was carried out with a view to dealing with systematic problems occurring on the market during the use of the electronic communications networks and while providing electronic communications services, universal services and protecting the rights of users of services, building, installation, maintenance and use of electronic communications infrastructure and associated facilities, conditions of fair competition and rights and obligations of participants on the market of electronic communications networks and services, data protection and safety of electronic communications, protection of security and integrity of networks, etc.

Regular activities carried out in 2016 included inspection supervision of the quality of Internet access, actions undertaken by operators to resolve user complaints concerning bills or quality of provided service in order to assess the compliance with deadlines for the resolution of bill complaints or quality complaints, fees for delayed number porting, directory of special tariff services, proper functioning of pay phones, advertising of services, manner of providing special tariff services and other.

Other activities carried out in 2016 included inspection supervision related to the participation in the work of the Commission for Communication and Coordination of Inspections Competent for Market Supervision in the Republic of Croatia, participation in court proceedings on the basis of summons or

as expert witnesses, other organizational and technical activities aimed at achieving functional unity and the necessary cooperation and coordination with other authorities competent for supervision in the Republic of Croatia (CCA, ME, MI, MSTI, etc.).

In 2016, following the amendment to the Ordinance on number portability and the Ordinance on the provision of electronic communications networks and services, the supervision was conducted of the external sales points of operators or legal entities which provide the service in the name and on behalf of the operators. During the above-mentioned supervision irregularities were found related to the change of services of the same operator. Namely, operators used the number porting forms for cases when users changed the services (brand) of the same operator, which is contrary to the Ordinance on number portability. HAKOM undertook the measures to prevent such further activities of the operators. Furthermore, during supervision inspectors checked the compliance with number portability procedures when porting numbers from one network to another and procedures related to operator change and they also inspected the expertise of sales representatives and the manner in which they informed users about the conditions of use of the service.

On the basis of received complaints from users, inspection supervision was carried out concerning fees for delayed number porting pursuant to the Ordinance on number portability and appropriate solutions were adopted ordering the operators to correct mistakes when resolving user requests. Furthermore, a series of supervisions were carried out concerning compliance with provisions prescribing appropriate advertising of special tariff services.

User complaints because of unsatisfactory transfer speed mostly resulted from problems caused by excessive length of subscriber loop. These problems were resolved by means of the universal service and additional regulatory measures facilitating the incumbent's modernization (reducing the price of modernization per termination point) of the existing access network in rural and sparsely populated areas (subscriber loop length exceeding 2.5 km).

In 2016, the supervision over HT was conducted based on user complaints related to the provision of the universal Internet access service. Namely, user complaints were related to the impossibility of using the universal Internet access service in rural areas where there is no mobile network or 3G/4G signal coverage what requires larger financial investment of universal services operators. Furthermore, the resolution of the above complaints required a more detailed explanation of the term “reasonable request”.

Moreover, inspection supervision over operators of special tariff services was conducted related to sending of unsolicited electronic communications via unregistered prepaid SIM cards. Due to the complaints of other special tariff services operators, a special attention was paid to the problem of impossibility of porting numbers of special tariff services from the networks of Terrakom and IT Jedan operators. Decisions were adopted ordering the above operators to port the numbers of special tariff services to the networks of other operators and to pay the fee for delayed number portability. These decisions were published on HAKOM’s website. A systematic solution of the above problem is currently being developed because an increased number of cases of porting numbers of special tariff services is expected from the networks of Terrakom and IT Jedan operators to the networks of other operators.

2 MANAGEMENT OF LIMITED RESOURCES

The RF spectrum and addressing and numbering space are naturally limited resources and their efficient use is of national interest in the Republic of Croatia. The efficient management of these resources enables the introduction of new technologies and services and the development of the economy in its entirety as well as the progress for the whole society.

2.1 Spectrum Management

Spectrum management is one of HAKOM's main tasks which includes planning and preparation of technical parameters of networks, the granting of licences and approvals for the use of the RF spectrum and control and supervision of the spectrum. At the international level, the use of the spectrum is harmonized with the valid decisions and recommendations of the International Telecommunications Union (ITU) and the European Conference of Postal and Telecommunications Administrations (CEPT) and the valid international agreements. By means of its activities in the area of spectrum management HAKOM ensures uninterrupted operation of radio communications services and the protection of health and safety of users and other persons.

2.1.1 Efficient spectrum usage

The focus of spectrum management in 2016 were the activities which represent the basis for the introduction of the new generation of mobile communications networks (5G). Therefore in 2016 as well, the preparations for the freeing and allocation of the 700 MHz band (the so-called second digital dividend - DD2) continued and public consultation about the amendments to the Radio Frequency Allocation Table and new assignment plans started in order to enable the future use of the spectrum for new broadband networks. At the EU level, the revision of the regulatory framework is launched with the aim of a coordinated and faster introduction of 5G and HAKOM is actively involved in drafting a new directive, especially in the part related to RF spectrum.

In mid-2016 HAKOM published on its interactive GIS portal data on the locations of base stations in mobile communications networks and DVB-T transmitters as well as the results of measurements conducted in the procedure of examining the compliance of base stations with the permitted electromagnetic field level. The data were published to enable availability and transparency of the gathered information for the public and primarily to establish new base stations as the result of development and promotion of mobile communications networks in order to meet the demands for the increase of data traffic and enable quality service for users. In addition to this publication, HAKOM has also published an educational leaflet containing basic information about mobile communications networks, HAKOM’s role and the manner of examining the compliance of base stations with the permitted electromagnetic field level according to the Ordinance on protection against electromagnetic fields of the Ministry of Health.

Having in mind the HAKOM’s proposal, the Ministry of the Sea, Transport and Infrastructure has amended the Ordinance on payment of fees for right to use of addresses, numbers and RF spectrum. The amendments include the cancellation of the provision stipulating the fee for the end radio station in the subscription system in the amount of HRK 60.00 a year, the reduction of fees for the use of RF spectrum for point-to-multipoint networks to less than half the previous amount and the reduction of fees for international point-to-point links. The amendments were made to reduce the financial burden of the users with monthly subscription for HRK 5, to stimulate the competitiveness and increase the use of RF spectrum in 3, 5, 10 and 26 GHz bands and to reduce the charging for international point-to-point links charged in both countries of the end points. The amendments to the Ordinance entered into force on 1 September 2016.

Based on the interest of the operators of public mobile communications networks and following the previously conducted public consultation, at the end of October 2016 HAKOM adopted the Radio

frequency assignment plan for frequency band 28 GHz which is used for microwave links. The 28 GHz frequency band is special because it enables the use of microwave links with non-line-of-sight between end points (NLOS) and the link is realised through diffraction or reflection of the radio ray and ray passage through vegetation.

The structure of spectrum usage is not static and it is constantly developing due to changes, in particular in the technology sector. The purpose and allocation of the spectrum for different uses must keep abreast of the changes. At the end of 2016 HAKOM drafted a new proposal for amendments to the Radio Frequency Allocation Table. The proposal includes amendments in order to implement the adopted final documents from the World Radiocommunications Conference (WRC-15) and with the aim of further alignment with the European Radio Frequency Allocation Table and alignment with CEPT decisions and recommendations. The global assignment for 694-790 MHz, 1427-1452 MHz and 1492-1518 MHz frequency bands for mobile broadband communications also needs to be mentioned. The 3400 – 3600 MHz band, even though still not assigned to mobile broadband communications, is clearly identified in region 1 (Europe, Middle East and Africa) and region 2 (the Americas) for mobile broadband communications. In the proposal for amendments to the Allocation Table, the 2010–2025 MHz band is assigned to portable and mobile wireless video links and wireless cameras used for the production of programmes and for special events pursuant to the Commission Implementing Decision no. 2016/339. Furthermore, to be mentioned here is also the assignment of certain bands for the use of short range devices (SRD) for various uses such as RFID, transport and traffic telematics, tracking, tracing and data acquisition, wireless audio/multimedia streaming systems, radio microphones and assistive listening devices or non-specific short range devices pursuant to ERC recommendation 70-03 and corresponding CEPT documents.

In December 2016 HAKOM opened a public consultation about the proposal for amendments to the Allocation Table. After the consultation, HAKOM will deliver the proposal for amendments to the MSTI so that the MSTI could adopt the Ordinance on amendments to the Ordinance on the allocation of the radio frequency spectrum.

During December 2016 HAKOM organized public consultation regarding the assignment plan for frequency band 3400-3800 MHz, the assignment plan for point-to-multipoint systems, assignment plan for frequency bands used for microwave links, assignment plan for frequency band 2500-2690 MHz and the assignment plan for frequency band 440-470 MHz. These plans are adopted with the view to aligning Croatian with the EU regulations and international agreements. Their adoption enables the use of RF spectrum for future broadband networks.

In 2016, HAKOM issued, pursuant to the Ordinance on fiscalization in cash transactions, eight certificates of inability to establish an Internet connection for the exchange of data with the Ministry of Finance and the Tax Administration. By issuing such certificates HAKOM participates in the implementation of measures for efficient supervision of cash transactions.

Within the framework of its regular activities in 2016 HAKOM issued 4,215 licences for the use of the RF spectrum, 49 approvals for especially important services and 3,400 certificates of compliance.

The second digital dividend

In 2016, HAKOM presided over the Commission for the drafting of the proposal for the Strategy for Switchover of Digital Terrestrial Television to DVB-T2 and for the allocation of the 700 MHz frequency band (hereinafter: Strategy). This Commission is tasked with drafting the proposal for the Strategy whose objectives and action plans will be completely aligned with the European Commission objectives and strategic documents and with the definition of measures and activities that will ensure the implementation of the Strategy, that is, of its main objectives – the development of new services in mobile communications networks and the preservation of competitiveness of the digital terrestrial television as well as ensuring the efficient management of the spectrum. Pursuant to international guidelines, the freeing and allocation of the 700 MHz frequency band is expected around 2020 which is the deadline for the replacement of digital terrestrial television services in the 470-694 MHz band. The Republic of Croatia has envisaged a digital switchover to the DBV-T2 system and H.265/HEVC

coding system which could ensure the competitiveness of the terrestrial distribution platform in the long run but it is a long-lasting and financially demanding process which influences all participants on the terrestrial digital television market and which must be carefully planned.

In May 2016 HAKOM organized the "Third Forum on the Future of the UHF Band - digital terrestrial television and second digital dividend". This event gathered representatives of participants on the electronic communications market and the media, of state administration bodies, of the economic community and of the scientific community with a view to explaining strategic factors and key decisions from the Strategy and to informing on the planned on-going activities. The representatives pointed out the most important aspects related to the future of the UHF band and their view of the technical and economic impacts of the switchover to DVB-T2 system and H.265/HEVC coding system and the assignment of the second digital dividend. The current status of the development of the Strategy was presented as well as the overview of international activities, future plans and legal framework in the Republic of Croatia with a special emphasis on further deadlines.

HAKOM drafted the proposal for the Strategy for Switchover of Digital Terrestrial Television to DVB-T2 and for the allocation of the 700 MHz frequency band as foreseen in its work programme for 2016. Further work on the Strategy, which includes the other state administration bodies and the interested public, and its final adoption is expected in 2017. The current proposal for the Strategy states 2019 as the beginning of the switchover to DVB-T2 system and H.265/HEVC coding system.

In order to free the 700 MHz band, it is necessary to completely re-plan the entire spectrum in the 470-790 MHz band and enable easier optimization and international coordination of the remaining spectrum for broadcasting at the regional level. For that purpose, HAKOM continued its participation in the South European Digital Dividend Implementation Forum (SEDDIF) comprising, apart from Croatian, the regulatory authorities of Albania, Austria, Bosnia and Herzegovina, Bulgaria, Greece, Hungary, Macedonia, Moldova, Montenegro, Romania, Slovenia, Serbia and Turkey. The results of the SEDDIF will contribute to the process of international coordination of frequencies necessary for the switchover to DVB-T2 and the freeing of the DD2 spectrum for services in mobile communications networks.

The operation of LTE base stations in the 790-862 MHz band may cause interferences with the reception of television channels by end users since TV receivers and aerial amplifiers are adjusted for reception in the whole 470-862 MHz band. For 2016, HAKOM has ensured funds for financing the purchase and installation of filters for the elimination of interferences caused by outdated TV receivers and aerial amplifiers to end users (TV viewers). Within the procedure defined by HAKOM, interferences caused by the operation of LTE800 base stations at 58 different locations were removed during 2016.

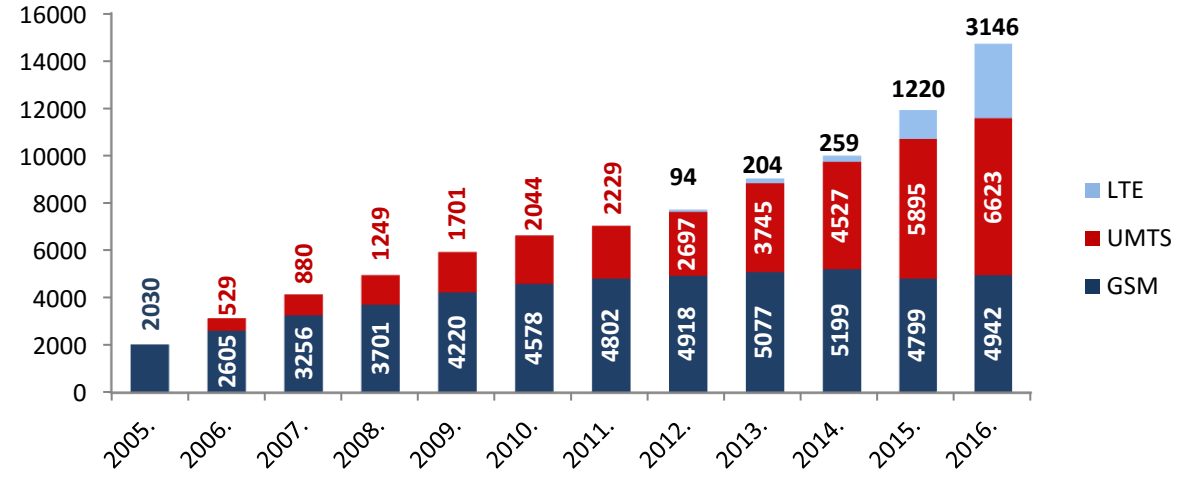
2.1.2 Public mobile communications networks

All 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.

During 2016, 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 usually dedicated to areas of increased sensitivity (residential areas, schools, pre-school facilities, hospitals, etc.). In case of need or public interest, HAKOM also drafted estimations and carried out additional measuring of the electromagnetic field level in order to verify the compliance with regulations, that is, in order to make the entire verification procedure more transparent and publicly available. Figure 2.1. shows an increase of the number of notified base stations according to technology in the Republic of Croatia. The largest increase in 2016 is recorded in LTE technology, which indicates the continued development of networks and operators' investment into 4G technology. The development in 2016 is stimulated, inter alia, by the allocation of additional RF spectrum HAKOM implemented at the end of 2015. The construction and improvement

of the network is expected also in the future considering the constant increase of the needs of users and data traffic, technology development and fulfilment of the aims of the Digital Agenda. Therefore, the increase of the operators' need for RF spectrum is also expected. HAKOM's activities related to the freeing of the DD2 spectrum as well as the participation in international working groups dealing with the allocation of additional RF spectrum for broadband Internet access, are crucial for meeting those needs.

Figure 2.1. Number of base stations



During December 2016 HAKOM organized a public consultation regarding the Radio frequency assignment plan for frequency band 2500-2690 MHz which is currently not being used in the Republic of Croatia. The plan takes into consideration technical specifications defined in the Decision of the Electronic Communications Committee ECC/DEC/(05)05 (amended on 18 March 2015) and the Decision of the European Commission 2008/477/EU. This should encourage the assignment of this part of the RF spectrum for mobile and fixed communications networks.

2.1.3 Private mobile communications networks

The total number of licences for private mobile networks issued in 2016 is similar as in previous years. The change is present in the use of technology which is digital in most PMR networks.

At the beginning of 2016, the Agreement with the administrations of Hungary and Serbia concerning the assignment of preferential frequencies for the frequency band 410 – 430 MHz for narrowband and broadband technologies was signed. This agreement enables the putting into operation of the digital network of the company Odašiljači i veze d.o.o. This network currently has 38 base stations distributed in the whole territory of the Republic of Croatia. The agreement also enables the putting into operation of the Croatian electricity provider's (HEP) TETRA network in East Slavonia.

During December 2016 HAKOM organized a public consultation regarding the Radio frequency assignment plan for the frequency band 440-470 MHz which enables the assignment of the RF spectrum in line with the Agreement between Austria, Hungary and Slovenia concerning the assignment of preferential frequency blocks in the bands 450.0 – 457.4 MHz and 458.4 – 460.0 MHz, as well as 460,0 – 467,4 MHz and 468.4 – 470.0 MHz with simultaneous keeping of the technical parameters for existing links.

At Slovenia's request related to the review of the Agreement on the coordination of frequencies in the frequency band 29,7 – 470 MHz, two coordination meetings were held. The signing of the revised agreement is expected in the first half of 2017.

Regular cooperation with the Ministry of Defence and the Ministry of the Interior continued. The cooperation with the Ministry of Defence and Croatia Control was related to drafting the agreement

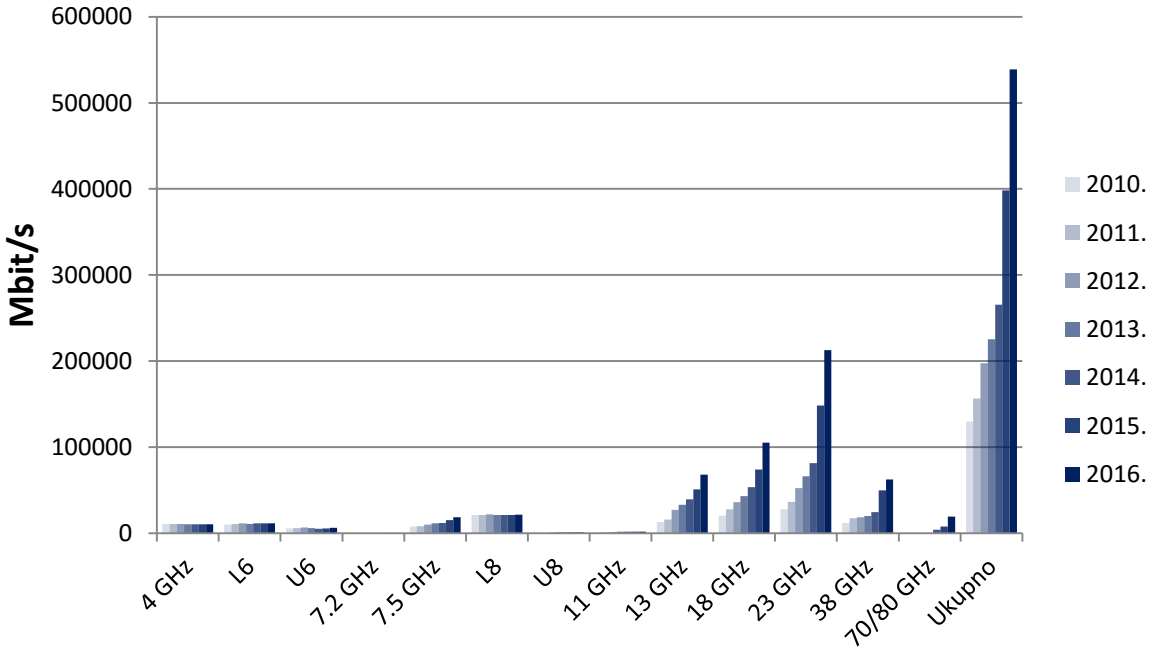
on the use of a system enabling the exchange of a larger amount of data with military aircrafts (Link-16) in the Republic of Croatia. The signing of this agreement is expected in the second half of 2017.

2.1.4 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 in 2016 with the consideration of principles for effective use and management of RF spectrum. The purpose of international coordination, which is carried out pursuant to the provisions of the HCM agreement, is to ensure uninterrupted operation of microwave links within the Republic of Croatia and with the neighbouring countries. Frequency planning is carried out as part of the procedure for the issuing of licenses for microwave links and must ensure their continuous operation in the Republic of Croatia.

In 2016 a total of 1,174 licences and 39 approvals for microwave links were issued. At the end of 2016 there were in total 3,915 active microwave links in the Republic of Croatia which is a 6.2 percent increase as compared to 2015. The largest number of licenses issued in 2016 was related to amendments of the existing microwave links which was primarily related to the increase of the transfer capacity of links.

Figure 2.2. Total transfer capacity of links per frequency areas



As illustrated in Figure 2.2., the transfer capacity of microwave links was in 2016 significantly increased in frequency bands used to the greatest extent by the operators of public mobile communications networks. The total transfer capacity was twice as large as it was in 2014 which is the continuation of the trend from 2015 and the obvious result of the mobile communications operators' switch from third generation networks (3G) to fourth generation mobile communications networks (4G). Coverage with 4G signal outside of larger cities in the Republic of Croatia requires more transfer capacity in the transport network. The average transfer capacity of microwave links in 2016 amounted to 145 Mbit/s.

In order to satisfy market needs, HAKOM has, after conducting a public consultation, amended the Radio frequency assignment plan for microwave links thus enabling the use of broad channel distribution of 110 or 112 MHz in higher frequency bands (18, 23 and 38 GHz) which can achieve larger transfer capacity. Furthermore, the frequency band 3600 – 3800 MHz was cancelled, since it will be regulated by the Radio frequency assignment plan for frequency band 3400 – 3800 MHz, as well as the frequency band 10 GHz because it is no longer used for microwave links.

At the end of October 2016, the Radio frequency assignment plan for frequency band 28 GHz used for microwave links was adopted. Apart from enabling the use of a new frequency band which has not

been used so far, the additional significance thereof is the possibility of using microwave links where there is non-line-of-sight between end points (NLOS).

During December 2016, HAKOM conducted a public consultation for the Radio frequency assignment plan for frequency band 3400 – 3600 MHz which is used in the Republic of Croatia for wireless broadband access in frequency sub-band 3410 – 3600 MHz and for portable microwave links and mobile cameras (ENG/OB) in frequency band 3600 – 3800 MHz. European Commission Implementing Decision 2014/276/EU stipulates the harmonisation of the 3400 – 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the whole European Union. Furthermore, the above-mentioned frequency band is one of the basic bands for the implementation of the new generation of mobile communications networks (5G technology) in the period of the upcoming few years. The existing users will continue to use the RF spectrum until the expiration of the existing licences and by then HAKOM will have found an alternative solution in cooperation with users.

Furthermore, a public consultation was conducted regarding the Radio frequency assignment plan for point-to-multipoint systems. Considering the above changes in frequency band 3400 – 3800 MHz, frequency sub-band 3410 – 3600 MHz is removed from the existing Radio frequency assignment plan for point-to-multipoint systems. Furthermore, frequency band 26 GHz is also removed because it is no longer used for point-to-multipoint systems and its impending harmonisation for the mobile communications networks of the fifth generation is being considered at the EU level.

As part of its regular activities, HAKOM processed requests for satellite links and applications for installation of radio stations in the satellite service operating on the basis of issued licenses. The received coordination requests for satellite networks were analysed and processed pursuant to ITU's procedures.

HAKOM also regularly kept and maintained a list of registered installed radio stations for fixed and satellite systems operating on the basis of the issued basic licenses.

2.1.5 Radio networks

In compliance with obligations laid down in the ECA, 2016 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, of ensuring technical conditions for new concessions for the provision of media radio services and improvement of coverage of the existing broadcasters.

In 2016, three radio stations stopped their operation and public tender for granting a total of 35 concessions for the provision of media radio services (four new concessions and 31 existing concessions which ceased to be valid in 2016) was opened. At the end of 2016 the Republic of Croatia had 152 active analogue radio networks: 11 public (HRT: three state and eight regional level) and 141 commercial (three state, three regional, 19 county and 116 city/local level). There is still interest for the starting of new radio stations as well as for the improvement of coverage quality of the existing radio stations. Hence in 2016 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 assigned frequencies are published by HAKOM in the database for the RF spectrum for radio which is publicly available at HAKOM's website. In 2016, HAKOM regularly updated the mentioned data on the basis of results of international coordination, planning and optimization, that is, on the basis of cooperation with the Electronic Media Agency (EMA).

As a part of its regular activities in 2016, HAKOM prepared and submitted to the EMA technical parameters necessary for granting concessions for the provision of media radio services. Furthermore, HAKOM regularly submitted to EMA the notifications on amendments to technical parameters of existing broadcasters and it replied to questions concerning the existence of conditions for the granting of concessions in individual areas. As a precondition for the signature of the concession agreement, HAKOM carried out technical evaluations of the fulfilment of minimum conditions for the carrying out

of media activities. 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.

Pursuant to international agreements, the procedure for the coordination of radio stations with the relevant administrations in the neighbouring countries (Austria, Bosnia and Herzegovina, the Czech Republic, Germany, Hungary, Italy, Montenegro, Slovakia, Slovenia and Serbia) continued in 2016. HAKOM has hence received and replied to a large number of requests for the coordination of technical parameters of Croatian radio stations. Furthermore, FM/T-DAB radio stations published in the ITU BRIFIC (Radiocommunication Bureau International Frequency Information Circular) notification were analysed on a regular basis for their possible influence on internationally harmonized transmitters network of the Republic of Croatia.

2.1.6 Television networks

In Croatia, there are four operational terrestrial digital television networks with national coverage, one network with national and regional coverage and three 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 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 2016 HAKOM issued the necessary parameters and certificates of compliance of the radio station for all transmitters put into operation.

HAKOM continued with preparatory activities for the freeing of 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 started developing the international frequency plan for digital television in the 470-694 MHz band, which is based on the DVB-T2 standard. The procedure for the international coordination of Croatian DVB-T/DVB-T2 stations with the neighbouring countries continued in 2016 as well as HAKOM’s participation in the work of the international SEDDIF forum. The database of the RF spectrum for TV was updated on the basis of the results of the planning and optimization of TV networks and international coordination of frequencies.

2.1.7 Control and supervision of the spectrum

With a view of achieving the effective use of the RF spectrum, alignment of the use of radio frequencies at the national and international level, ensuring the protection and undisturbed use of the RF spectrum by authorized users and preventing the unauthorized use of measuring, testing, establishing and removing causes of interferences as well as other technical tasks within the framework of efficient management of the RF spectrum, HAKOM has developed a control and measuring system in the territory of the Republic of Croatia.

Four control and measuring centres were established in the territory of the Republic of Croatia in HAKOM's headquarters in Zagreb, and stations were established in Osijek, Rijeka and Split, representing an optimum geographical distribution of HAKOM's control and measuring system for everyday efficient control of the RF spectrum and the carrying out of other technical activities.

Control and measuring centres are supplemented by ten remotely controlled control and measuring stations, out of which two mobile, distributed around the continental Croatia and along the Adriatic Coast thus enabling quality measuring of radiofrequency signals in the entire territory of the Republic

of Croatia and the neighbouring countries and the quality and possibility for protection of the RF spectrum, a limited natural resource of interest for the Republic of Croatia.

Everyday control of the RF spectrum and other technical tasks under HAKOM's competence are carried out with the assistance of five measuring vehicles equipped with the measuring equipment, supplementing the control and measuring centres and control and measuring stations.

After years of searching for a suitable location for a control and measuring centre and station in Split, HAKOM established that the most efficient solution would be the building of a new station on a location in Split, the Vrh Visoka street, which fulfils all the measuring (location of land, altitude, height of the surrounding buildings) and business conditions for the location of equipment and employees). After having prepared and acquired the necessary documentation and licenses and after having concluded contracts for the building of the facilities, HAKOM started the building of the station and centre in 2015 and the completion of the building and moving in occurred in the second half of 2016.

During 2016, like in the previous years, the majority of tasks concerning spectrum control were related to the measuring of interferences from Italy that have been interfering with the reception of radio and television programmes in the coastal area of Croatia, from Savudria in the north of Istria to Prevlaka in the South, so a special activity of measuring Italian interference was carried out this year as well.

Other measuring aimed at protecting the spectrum was also carried out as part of everyday supervision and control of the RF spectrum. Measuring was carried out from all four control and measuring centres and ten remotely controlled control and measuring stations, while the measuring vehicles carried out measurements in areas where the immobile part of the measuring system does not provide satisfactory control of the RF spectrum.

In addition to measuring aimed at the protection or control of the spectrum, measuring for frequency planning and international coordination were also carried out.

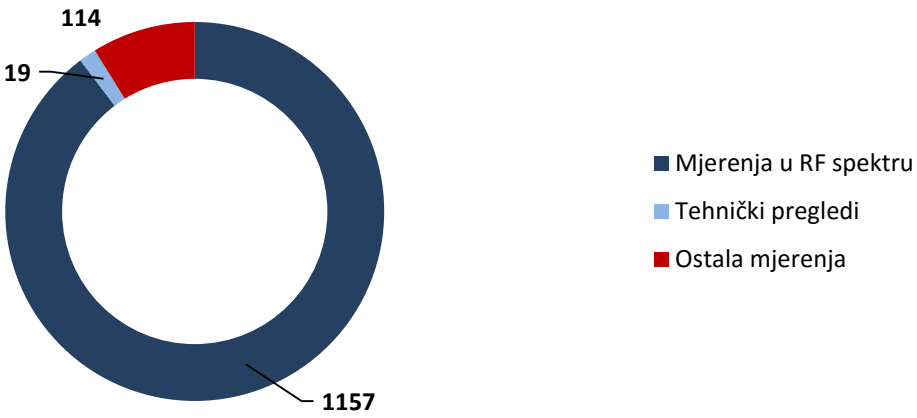
In compliance with the 2016 Measuring Plan, all planned measuring campaigns and other measuring activities in the spectrum were carried out successfully, with a special emphasis on the protection against interference and EMF measurement. The operation of radio stations in microwave links and radio stations in broadcasting was tested in accordance with the prescribed licences.

Figure 2.3 shows the distribution of measuring not covered by everyday measuring from immobile control and measuring stations.

As part of everyday and periodic measuring from immobile control and measuring stations, more than 4,000 measuring activities were carried out in 2016 for the purposes of control of the RF spectrum and there were more than 1,300 different field measuring activities.

In general, the results of the measuring show the stagnation of the number of interferences as compared to 2015. The number of interferences from internationally uncoordinated radio and television transmitters from the territory of the Italian Republic and the number of interferences from other neighbouring countries was the same as in the previous years and it included the appropriate cooperation on their removal. Since November 2016, there is a gradual decrease of Italian interferences with the reception of Croatian TV programmes in the coastal area what will be presented in more details in the following text.

Figure 2.3. Measuring


114
19
1157
Mjerenja u RF spektru
Tehnički pregledi
Ostala mjerenja

Measuring of electromagnetic fields

Spectrum control also included the measuring of the size of electromagnetic fields in areas of increased sensitivity for the purpose of efficient protection of human health from the influence of the electromagnetic field. The results of measuring submitted by legal persons authorised for measuring of electromagnetic fields were regularly checked. The conducted measuring showed a smaller deviation from the permitted levels only on one location after which, according to the measures imposed by HAKOM in line with the ECA, output power of the device was adjusted so that it could be confirmed that on all locations the electromagnetic field levels are lower than the maximum permitted levels.

Regarding the measuring of electromagnetic fields (EMF), it is important to point out that in 2016 more than 120 EMF measurements were conducted in 70 cities and municipalities where until now, due to a low number of measurement requests, measuring was never conducted to a significant extent. Furthermore, in 2016 within the whole territory of the Republic of Croatia, at the locations of pre-school facilities and elementary schools situated in the vicinity of electromagnetic fields (base stations of mobile communications networks, radio and television transmitters, etc.), HAKOM conducted an additional activity of measuring EMF levels. The measuring was conducted at 156 locations in Croatia and included 82 pre-school facilities, 67 schools and 7 children's playgrounds. The same campaign was also conducted in 2012 and, considering the fast development of new technologies and the implementation of new mobile communications networks, HAKOM repeated this activity of additional EMF checking. The conducted measuring showed that the electromagnetic fields levels are significantly lower than the EMF levels defined by the ordinance of the Ministry of Health on all locations included in the campaign. The aim of this measuring campaign was an additional verification of base stations in mobile communications networks and other radio communication transmitters in comparison to regulations on the protection against electromagnetic fields in areas of increased sensitivity. Namely, according to the Ordinance on protection against electromagnetic fields, adopted by the Ministry of Health pursuant to the Act on Non-Ionizing Radiation Protection, the areas of exposure to electromagnetic fields have been defined while basic restrictions and the reference levels of the size of electromagnetic fields have been prescribed in each band separately. According to the Ordinance the areas of increased sensitivity are residential and business buildings, schools, institutions of preschool education, maternity wards, hospitals, homes for the elderly and disabled, tourist accommodation facilities and children's playgrounds. Because of the size of defined areas, the focus was put on the measurement of electromagnetic fields in the area of pre-school facilities and schools and the results showed that all base stations of mobile communications networks and transmitters of other radio communication services at the locations have been installed in accordance with the Ordinance on the special conditions of installation and the usage of radio stations. That means that the level of electromagnetic fields in the area of pre-schools and primary schools is significantly lower than the maximum allowed level prescribed by the Ordinance on protection from electromagnetic fields. All measurement results with the marked locations where the measuring of the EMF source was conducted, including this campaign, are available under EMF Measurements on HAKOM's webpage http://mapiranje.hakom.hr/ within HAKOM's interactive GIS portal. This portal also provides information about locations and basic technical characteristics of base stations in public mobile communications networks and radio stations in broadcasting service.

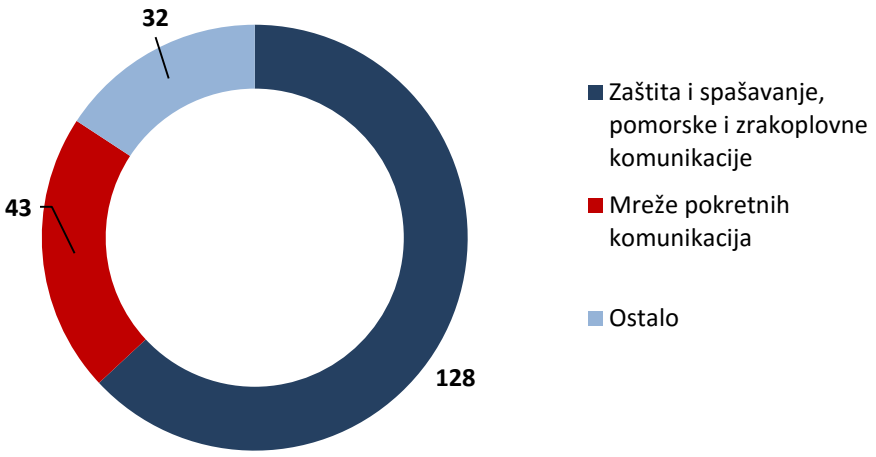
Interferences

The protection from interferences in radio communications is one of HAKOM's most important tasks, including the ensuring of uninterrupted operation of electronic communications systems and the provision of services in the territory of the Republic of Croatia. Special attention is given to 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 operators of electronic communications.

The number of reported and removed domestic interferences or interferences reported by domestic users of the spectrum increased for 20 percent in 2016 as compared to 2015. There was a slight

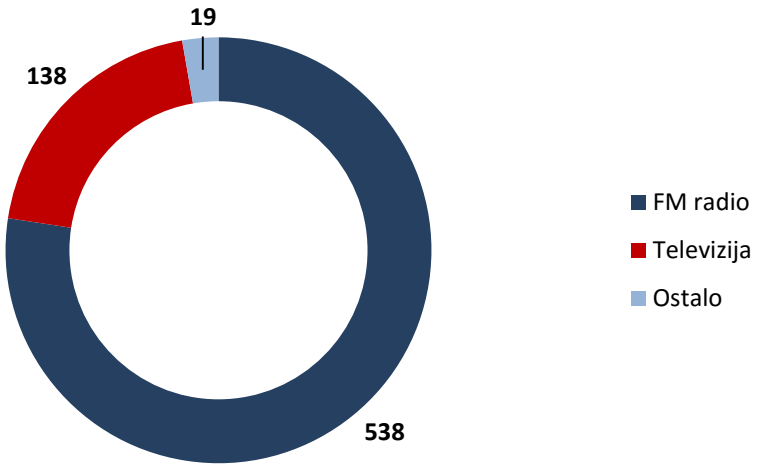
increase of the number of reported interferences in the frequency band of maritime and air traffic services and also in mobile communications networks and a somewhat larger number in other frequency bands as compared to 2015. Within the total number of reported interferences in the area of maritime and air traffic services, the number of interferences is equally distributed among interferences in the air traffic service and the interferences in the maritime service. It may be concluded on the basis of structure of reported interferences in the air traffic service that the largest number of reported interferences is based on airplane reports and a smaller number on interferences with the terrestrial radio station.

Figure 2.4. Domestic interference



In addition to the above-mentioned domestic interferences, HAKOM also worked in 2016 on the detection and identification of domestic interferences through everyday control and monitoring of the spectrum in Croatia and it initiated procedures for their elimination in accordance with international regulations. Figure 2.5. shows a total number of recorded foreign interferences. The number of recorded interferences in 2016 is at the level of interferences in 2015.

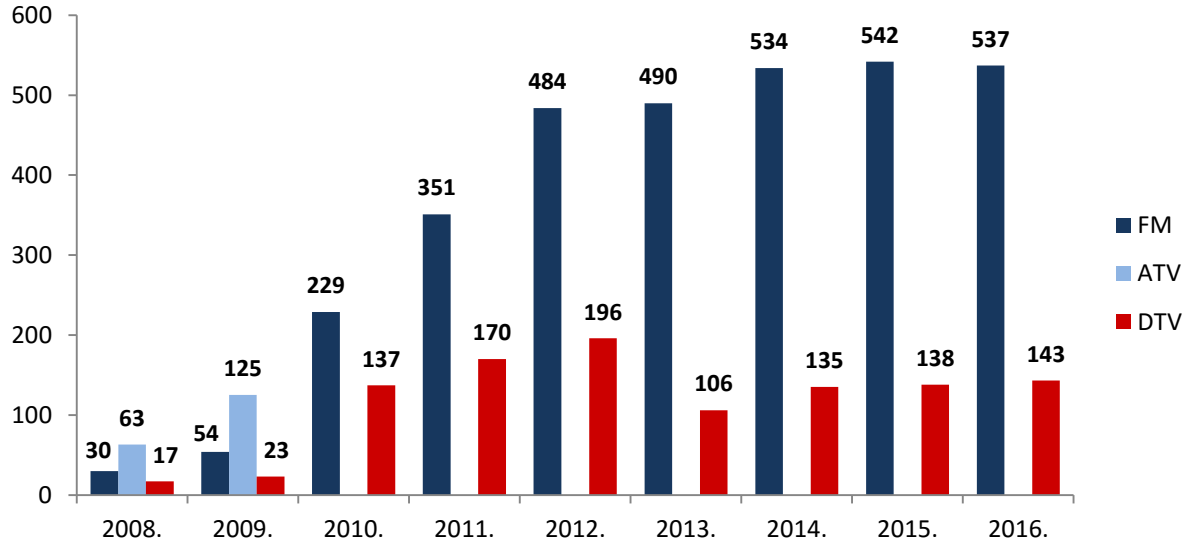
Figure 2.5. Foreign interference



A regular signal measuring campaign for FM radio and TV was carried out during summer months in the coastal area with a view to monitoring the situation and existence of interference at frequencies allocated to Croatia in accordance with international agreements and plans for radio and television

frequencies (GE84 and GE06). Measuring conducted in 2016 showed that significant interferences still originate from Italy which mostly in summer months prevent quality reception of radio and television channels in majority of Istria and along the Croatian coast. The comparison of the number of reported interferences submitted to the Italian Government during 2016 compared to the previous years is illustrated in Figure 2.6. The illustrated data show the stagnation of the number of reported interferences for FM radio and DTV compared to 2015, which confirms the significant number of interferences occurring in the Republic of Croatia for a number of years. However, at the end of the year there were positive advances related to solving the problem of interferences with the reception of television channels in the coastal area of the Republic of Croatia.

Figure 2.6. Italian interferences



Italian interferences with the reception of radio and television programmes in the Republic of Croatia

The problem of interference of Italian, internationally uncoordinated, transmitters with Croatian radio and television programmes along the Adriatic coast has persisted for several decades. The digital switchover in Northern Italy and the beginning of operation of new internationally uncoordinated transmitters in December of 2010 contributed to additional deterioration of reception of digital television in the coastal part of Istria. Following further digitalization in Italy until the end of 2012 interferences spread to the rest of the Croatian coast up to Prevlaka, and the same level of interferences, with slight oscillations, persisted in the recent years.

FM radio interferences from Italy have also increased year after year and every year the level and number of interferences culminate in summer months when it is practically impossible to listen to Croatian FM radio stations in the coastal area.

In 2016, and in the years before, HAKOM invested significant efforts into elimination of the existing interferences with FM radio frequencies and TV channels in the coastal area and into avoidance of further interferences from Italy.

As a result of an extensive media campaign conducted in the coastal area and on the islands with a view to monitoring and identifying interferences from Italy, 680 international interference reports were sent in 2016 to Italian administration, in total 3,900 reports in the last eight years, and ITU, which is responsible for the implementation of international agreements in the electronic communications sector, was informed thereof.

HAKOM also continued its practice of regular reporting on the status of interferences and requested assistance from competent ITU bodies, the Radio Regulations Board (RRB), the Director of the

Radiocommunications Bureau (RB) in the resolution of this issue which is very important for the Republic of Croatia.

However, at the beginning of November 2016 there were first positive developments directed towards solving the long-time interferences with Croatian television channels in Croatian coastal area and on islands. Pursuant to decisions of Italian state administration bodies, Italian broadcasters started at the beginning of November to switch off their internationally uncoordinated transmitters on channels used by the Croatian broadcasters pursuant to the international agreements which have for many years been causing interference with the reception of Croatian TV programme. The switch-off of the interfering transmitters was carried out through a process of voluntary switch-off of transmitters or through a program of transition to other networks on the channels not causing interferences with the Croatian television programme. The first switch-off started in the regions of Friuli Venezia Giulia, Veneto and Puglia, and the process continued in November with the switch-off of transmitters in the regions of Emilia Romagna, Abruzzo and Molise, and was finally completed somewhat later, in January 2017, with the switch-off of transmitters in Marche region, which was struck by an earthquake in 2016. Within the last three years Italy has adopted the regulations and a special law according to which the TV frequency plan has been amended and the frequencies, interfering with the operation of TV networks in the neighbouring countries, have been excluded, the compensation fund has been founded and the switch-off procedure of interfering transmitters has been stipulated.

The end of the procedure of switching off the interfering Italian transmitters represents the removal of interferences with the reception of TV programmes along the Adriatic coast. A better quality of the reception of Croatian TV programmes will be especially felt by the citizens having problems with a poor signal quality caused by interferences in digital regions D5 (Istria County and Primorje-Gorski Kotar County), D7 (Zadar County and Šibenik-Knin County), D8 (Split-Dalmatia County) and D9 (Dubrovnik-Neretva County). In 2017 HAKOM will conduct detailed measurements along the Adriatic coast to confirm the results and the effects of the switch-off procedure as well as to timely inform the public thereof.

The switch-off of Italian interfering transmitters is a consequence of many years of HAKOM's activities, which in addition to numerous measurements and reported interferences, kept pointing out the interference problem and tried to resolve it through international institutions. All the activities were regularly reported to the competent authorities of the International Telecommunications Union (ITU), Radio Regulation Committee (RRB) and to the Director of the Radiocommunication Bureau (BR). Within the international activities, HAKOM has through the bilateral meetings with the Italian administration and the activities in the ITU, and after the accession of the Republic of Croatia to the European Union, through the working group on cross-border coordination in the Advisory Group for the Radio Frequency Spectrum Management Policy of the European Commission, contributed to the adoption of legislative and administrative amendments in Italy which were the preconditions for the resolution of these long-term interferences with TV channels.

2.1.8 R&TT equipment

In 2016 HAKOM actively participated in the work of a working group for the transposition of the *acquis* in the area of electromagnetic compatibility and radio equipment. The working group drafted the proposals of the Ordinance on electromagnetic compatibility and the Ordinance on radio equipment adopted, after conducted public consultation, by the Ministry of the Sea, Transport and Infrastructure. The new ordinances ensure the single market through requirements that must be met by radio equipment so that an increasing number of users would be able to use the devices without interferences. Their aim is to improve the compatibility of equipment on the market through the obligation of traceability of economic entities and through the introduction of instruments for market control, such as the possibility to require the registration of radio equipment of low level of compatibility. Furthermore, the ordinances define more clearly the obligations and responsibilities of economic entities (producers, authorized representatives, importers, distributers) placing the equipment on the market such as clear identification of products in the EU declaration of conformity

or the obligation to provide in the instructions the information related to possible limitations of use. The requirements that must be met by radio equipment include the possibility that mobile phones and other portable devices would have to be compatible with the same charger. Reliable and fast wireless communications are of key importance for the development in industry, services, education, entertainment and other aspects of life. The ordinances entered into force in April i.e. June 2016 and their aim is to ensure that only compliant products are placed on the market.

Electronic communications inspectors carried out 25 inspection supervisions in 2016 concerning the placing of R&TT equipment on the market. The inspections resulted in a prohibition to place on the marked and/or use of two pieces of R&TT equipment because of formal deficiencies which were not removed within the deadline. Continuous cooperation has been established between the electronic communications inspector's office competent for market supervision of R&TT equipment and the Croatian Customs Administration. Inspection supervision is carried out on the basis of a received notification of a temporary suspension of the carrying out of the requested customs clearing of goods within the meaning of the provisions of Regulation (EC) No. 765/2008 of the European Parliament and Council of 9 July 2008. The participation in the work of the Commission for the Coordination between Inspections Competent for the Monitoring of Technical Products placed on the Croatian market resulted in several joint inspection supervisions in cooperation with other national competition protection authorities. Furthermore, there was continuous cooperation with the Customs Administration which includes, on a daily basis, administrative control of import of R&TT equipment originating from outside the EU.

2.2 Management of the addressing and numbering space

One of HAKOM's tasks is to manage the addressing and numbering space in the Republic of Croatia with a view to achieving its more efficient use. For the fulfilment thereof HAKOM undertakes the following activities:

- amendments to the Addressing and Numbering Plan in accordance with market requirements and changes,
- supervision of the use and allocation of addresses and numbers to operators pursuant to the Addressing and Numbering Plan,
- supervision of number porting, supervision of the operation of the central administrative database of ported numbers (CABP), its maintenance, development, testing, upgrading and all the necessary changes to make it functional and in line with market needs.

2.2.1 Addressing and numbering space

An important task of HAKOM is the efficient management of addressing and numbering space in the Republic of Croatia. Transparent, objective, equal and impartial allocation of addresses and numbers to operators at any time enables equal competition at the electronic communications market. Furthermore, in the past years, developments in electronic communications resulted in increased requests for the allocation of E.164 numbers. The lack of numbers in the existing plans or the lack of the free numbering space for new services resulted in the revision of the Numbering Plan by national regulatory authorities (NRA). Because of the growing demand for natural resources of the addressing and numbering space and in order to monitor the development of the market, new services and technologies on the EC market and the application of new manners and systems for the management of the addressing and numbering space, HAKOM has been constantly investing into education and training of the department staff.

2.2.2 Number portability

In accordance with market demands and equal competition, HAKOM introduced the number portability service in 2005 enabling the users to choose the operator that best suits their needs and habits, that is, to transfer into the other operator's network while keeping the current number. Therefore, operators must allow users to keep the same number and the prefix regardless of the destination network. HAKOM is responsible for timely upgrading, implementation of new functionalities and regular maintenance of a central database of ported numbers (CABP) in order to achieve more competition and more attractive retail services for end users, which must be accompanied by the appropriate number portability procedure. In other words, a quality administrative and technical procedure of number portability service is an important factor for achieving end users' satisfaction.

Figure 2.7. Number of ported numbers in fixed networks

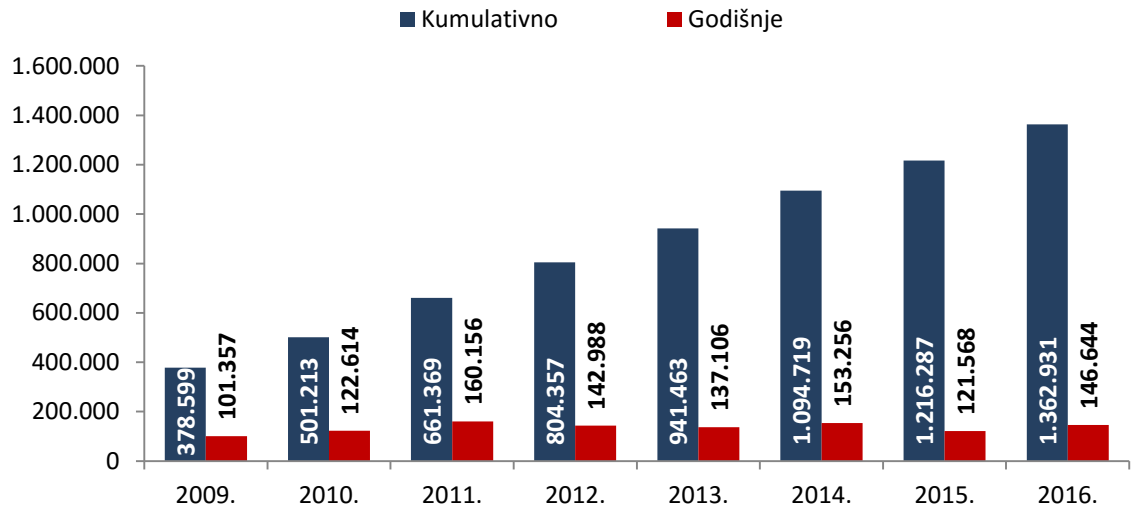
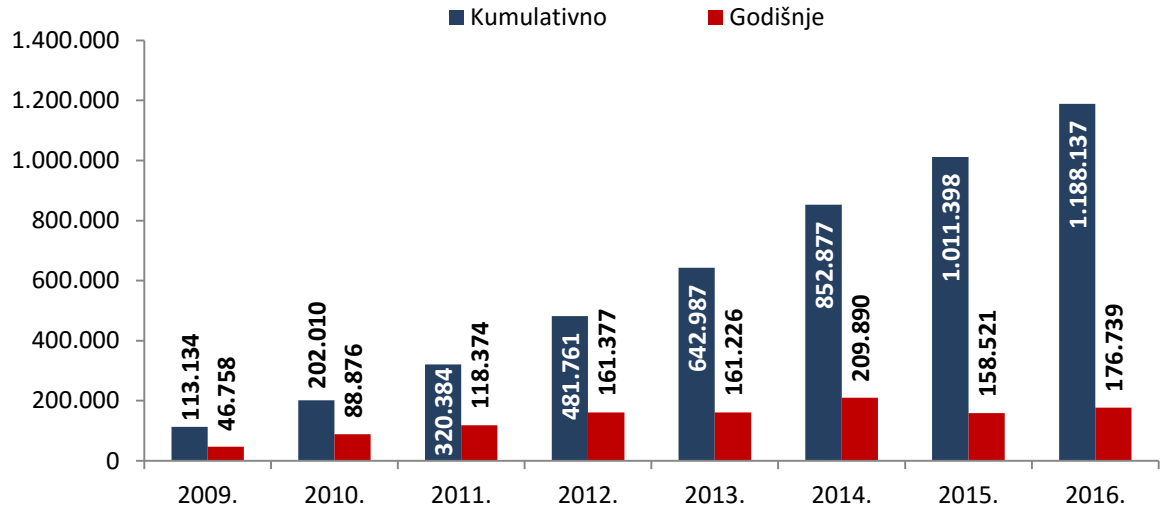


Figure 2.8. Number of ported numbers in mobile networks



Since HAKOM develops its procedures with a view of achieving user satisfaction, HAKOM's web portal contains a very popular e-Portability application allowing the user to follow the status of the number portability procedure and get information about the network in which the number is currently located.

3 POSTAL SERVICES MARKET

Even in today's time of developed and advanced forms of electronic communications, postal services have retained their basic function of connecting people, with a redefined orientation and form of communication. Without them, it is impossible to imagine the normal functioning of a society because they are present in the life of every person, in the business activities of every economic operator, and they present an unavoidable factor of all social processes.

3.1 Overview of the postal services market

The liberalized postal services market in the RoC has been part of the single EU market for years, which means that trends similar to those on the EU market are present on our market as well. However, in the RoC, the positive effects of market liberalization are not as expressed as in other countries of the EU because in the RoC the liberalization of the postal services market was carried out the latest (partly due to the later accession of the RoC to the EU, the strong impact of the economic crisis and the slower recovery of our economy compared to other countries in the EU). Also, the growth and development of the postal services market, both in the EU and in Croatia, are strongly influenced by the unstoppable growth and development of electronic communications, which have replaced the use of traditional written forms of communication, and traditional postal services are under constant pressure of required changes. As a result of the uneven trends of the economy in individual countries of the EU and of the substitution of physical services with electronic ones, a decline in the number of postal items is present. On the other hand, all these market changes also represent a great business challenge and a unique opportunity for growth, primarily the growth conditioned by the provision of new and more innovative services to users. In 2016, on the postal services market in the RoC, as well as on other markets, a decline of the total number of postal services has been recorded, continuing the negative trend, but this decline is not as expressed as in other countries of the EU. This decline is mostly influenced by the decline in the number of postal items and printed matter, whereas in conformity with the trends on the markets of EU member states, the number of sent packages grew as a result of the ever-increasing growth and development in the field of services related to e-commerce, in which postal services are present as an unavoidable link that connects the vendors and the buyers. These trends are expected to continue in the future period, primarily due to the expected further growth of services related to e-commerce, especially in international postal traffic, considering the EC is preparing a Regulation on cross-border delivery of packages that will eliminate certain existing barriers. The reduction in the total number of services did not impact the total revenues from activities of postal services. The total revenues have grown compared to the previous year, continuing the positive trend from the previous period in 2016. This shows that the growth in revenues is conditioned by an increase in added value services, which have a larger price. In this sense, it is expected that postal service providers will use this opportunity and provide a corresponding offering that will allow for their growth. It is realistic to expect that this trend will continue considering the possibilities that are offered and exist within the framework of services related to e-commerce, which have a potential for the maximum growth and development and have not yet been sufficiently exploited in the RoC. Also, as a result of the increasingly sophisticated demands of users, a further restructuring of the market and an increase in the flexibility of providers are expected, along with a continued diversification of the offering and adaption to various demands of users.

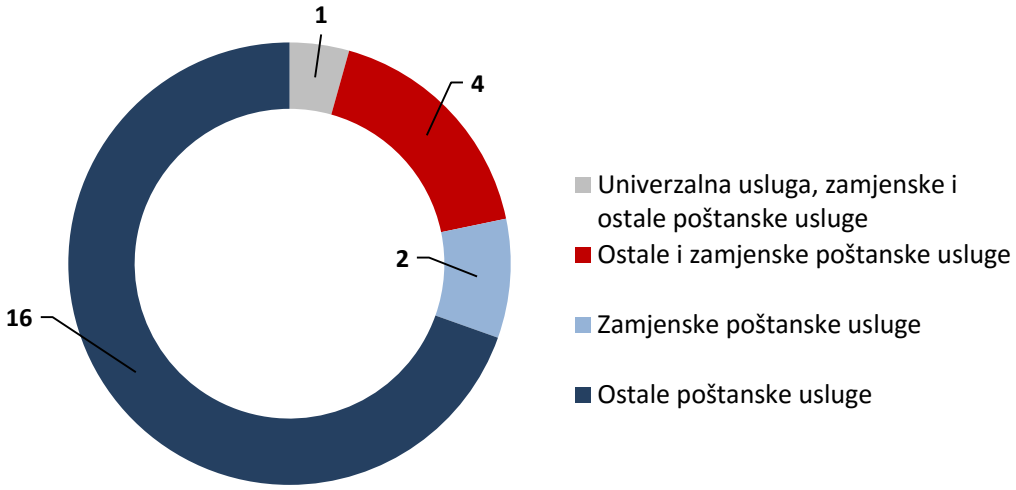
3.1.1 Providers on the postal services market

The liberalized postal services market provides a broad spectrum of possibilities for existing providers, as well as possibilities for the market entry of new providers. This is why in 2016, as in earlier years, there have been certain changes on the market. In early 2016, there were 22 providers, and later in the year, there were 23 providers, whereby the number of providers changed frequently during the year since one provider ceased its operations, and two new ones appeared on the market, one of which is exclusively a postal services provider, whereas the other extended its existing business operations to postal services. The market trends so far show that it can be expected that a certain number of

providers, particularly the smaller ones, will cease with their operations, and that a couple of new providers will enter the postal services market of the RoC. Also, with the goal of widening their business operations during 2016, certain providers decided to cooperate and became partners, particularly in international postal traffic. Namely, individual international postal services companies and providers that operate on the Croatian postal services market decided to connect their business activities and offerings they provide to users. This trend can be expected to continue in the future period. In addition to this, certain providers additionally widened their service offering, allowing their users a greater selection in the use of postal services.

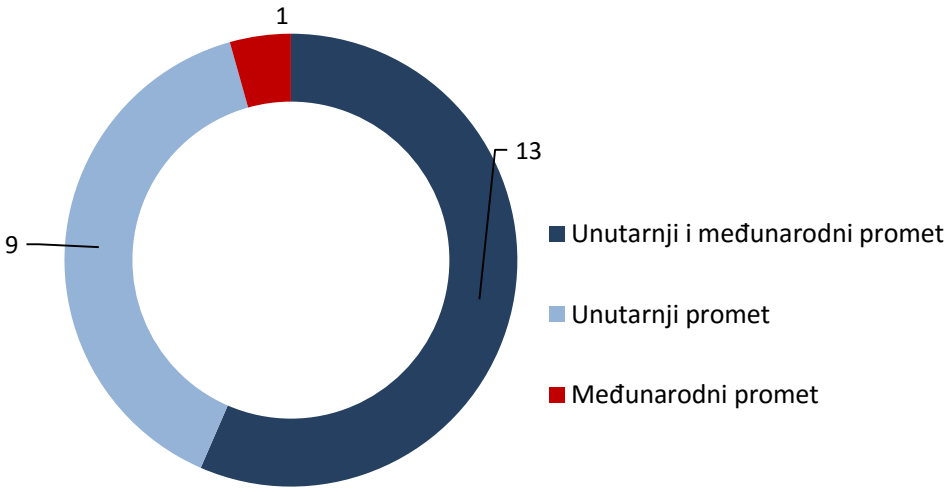
The only provider of the universal service in the RoC is HP, which, based on the PSA, has gained this right and obligation for a period of 15 years. HP is also registered for the provision of interchangeable and other postal services. Out of the other 22 notified providers, 4 of them were notified for the provision of interchangeable and other postal services, 2 provided only interchangeable postal services, whereas 16 providers provided exclusively other postal services (Figure 3.1.).

Figure 3.1. Number of providers according to type of service provided



Certain differences between providers also exist with regard to the territorial area of the services provided. The majority of providers, 13 of them, provided their services in the domestic and international traffic, 9 of them provided their services only in domestic traffic, and only one service provider provided its services exclusively in international traffic (Figure 3.2.).

Figure 3.2. Number of providers according to area of provision of service



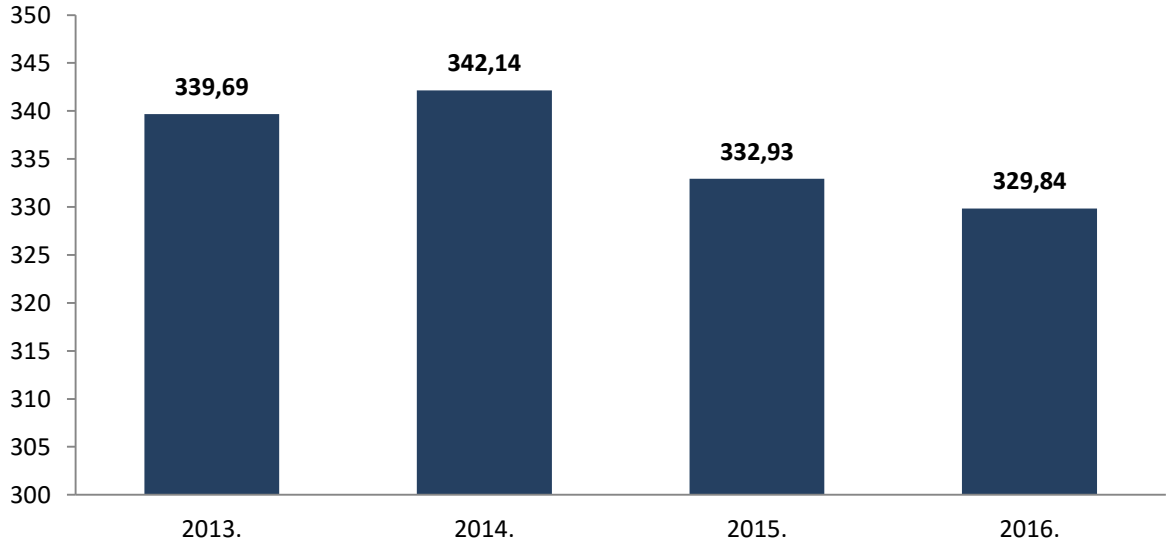
In addition to HP, which is the biggest provider, providers on the postal services market include several providers that also operate on the European and global market of postal services, via their own network or through the network of other providers (DHL, DPD, Fedex, USP, TNT, GLS and others). The list of all authorized postal service providers is available on the HAKOM website[13].

At the end of 2016, postal service providers employed a total of 9,719 employees, which does not represent a significant change compared to 2015. It should be pointed out that there is a noticeable trend of labor force fluctuation - in a smaller part of postal service providers the number of employees was reduced, while in others the number increased. The remaining providers employ approximately one sixth of all employees.

3.1.2 Postal services

In 2016, a total of 329,840,008 services were provided on the postal services market, which is 1 percent less than in the previous year, which represents a continuation of the negative trend. This is in line with trends on the EU market, but it should be pointed out that the decline in the number of services has been slowed down and that the decline is smaller compared to that of the EU (Figure 3.3.).

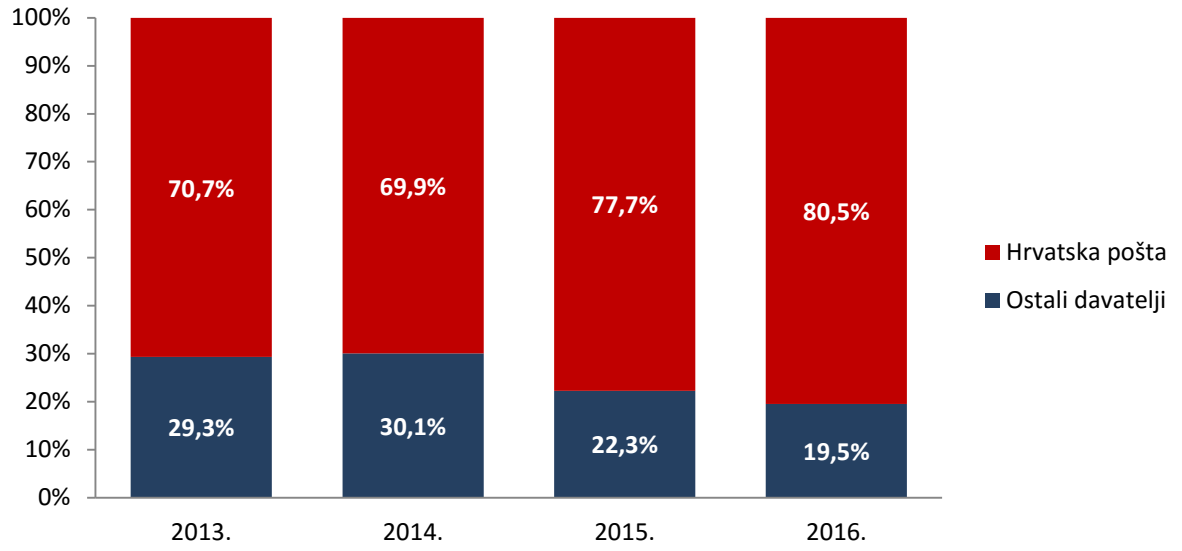
Figure 3.3. Total number of postal services (in millions)



[13] http://www.hakom.hr/default.aspx?id=1144

The leading provider of postal services was HP, which provided 265,482,211 or a total of 80.5 percent of all services on the market, while other providers provided the remaining 64,357,797 services or 19.5 percent of all services on the market (Figure 3.4.).

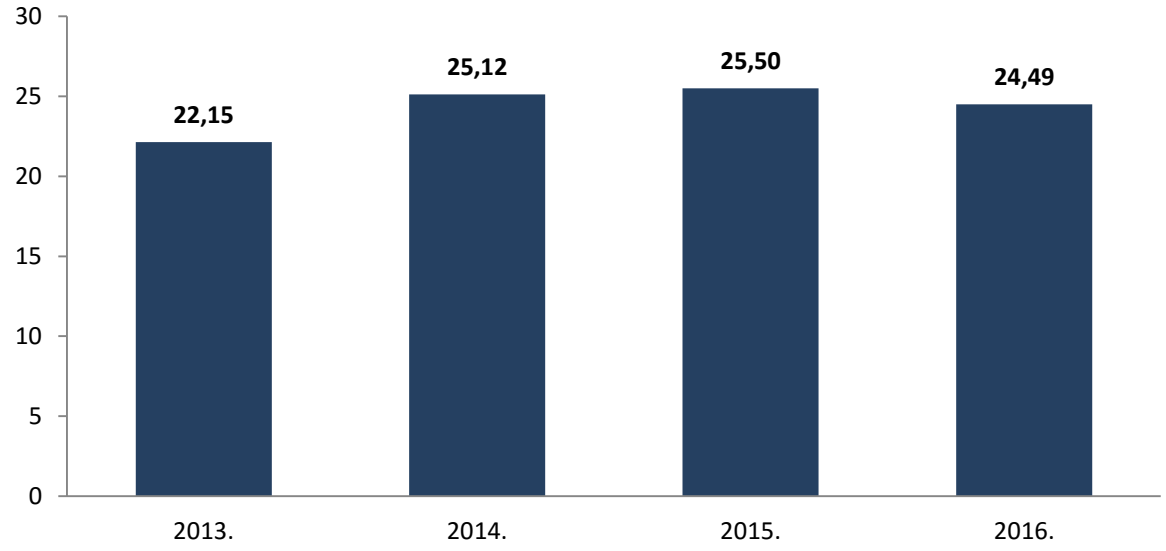
Figure 3.4. Market shares of providers according to number of provided services



It should be pointed out that HP increased its number of services by 2.6 percent compared to the year before, which resulted in the increase of HP's market share in 2016 by approximately 3 percent. At the same time, the remaining providers recorded a 13-percent decline in the number of services provided as a consequence of the reduction in the services of particular providers that provide interchangeable postal services and services of direct mail and printed matter.

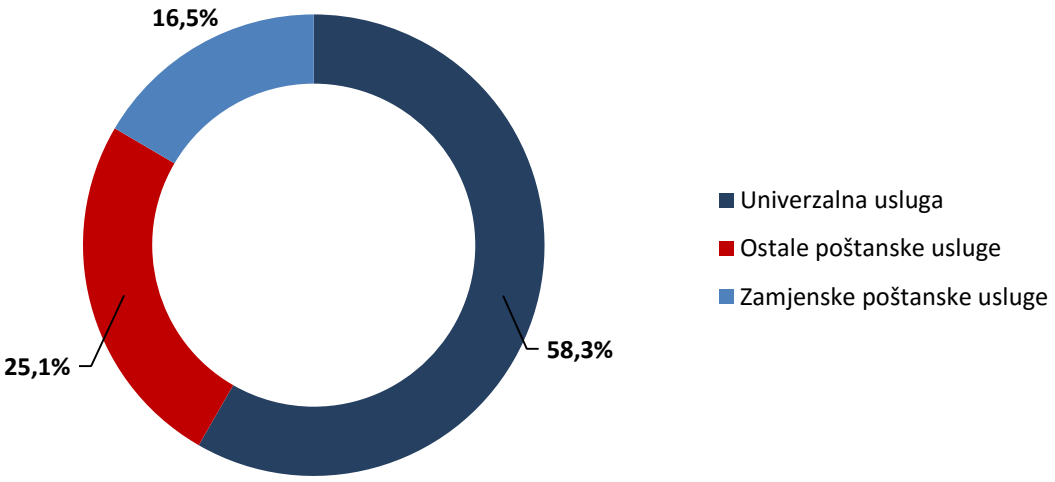
The positive trend in the number of services in international postal traffic since the market liberalization and the entry of the RoC on the EU single postal market was stopped in 2016. Namely, approximately 4 percent less services were provided, and a reduction was also recorded in the outgoing and incoming traffic (Figure 3.5.). However, it is expected that in the future period this trend will change and that the number of services in international traffic will grow due to the announcement that by the end of 2017 the EC will prepare a Regulation on cross-border package delivery, which will eliminate certain existing barriers, particularly regarding services related to e-commerce. The share of international traffic covers a seven percent share on the total market, having grown by approximately two percent since the start of the liberalization. The majority of this traffic is incoming traffic.

Figure 3.5. Total number of postal services in international traffic (in millions)



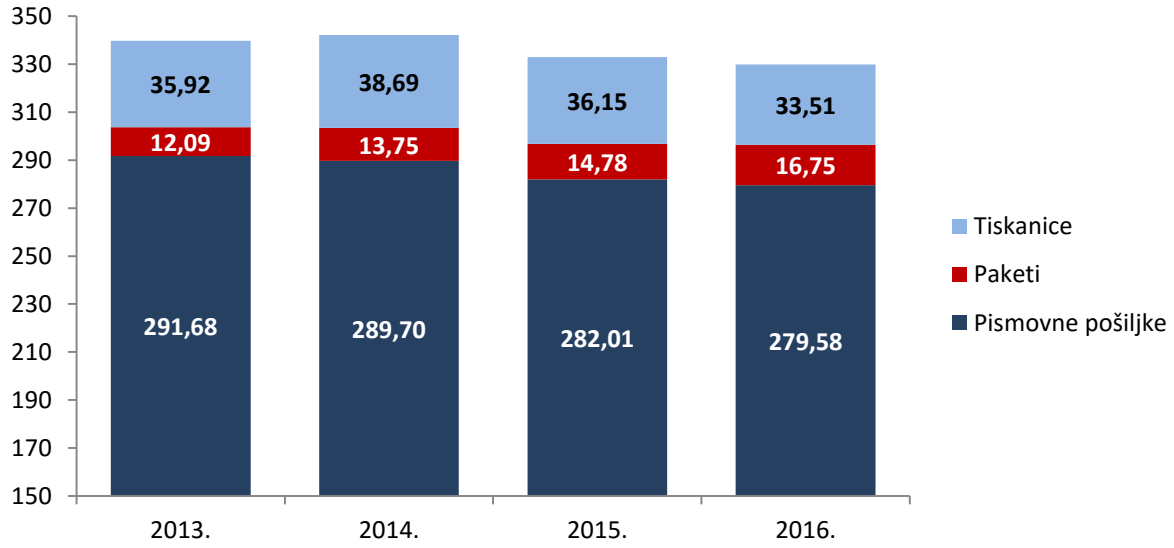
With a share of approximately 58 percent, the universal service has the largest share in the total postal services in 2016, followed by other postal services with 25 percent. Interchangeable postal services cover the smallest share (Figure 3.6.).

Figure 3.6. Shares of types of postal services



In accordance with expectations and trends on the EU postal services market, our market also recorded a reduction in letter parcels [14] and printed matter and an increase in packages (Figure 3.7.). In 2016, the number of letter parcels declined by one percent compared to the previous year, whereas the number of packages increased by 13 percent. Package services are increasing steadily for the third consecutive year and the number of packages has increased by 38 percent since the beginning of the liberalization of the market. This trend is expected to continue in the future since mail communication is increasingly replaced by new forms of communication (electronic communication). On the other hand, the physical transfer of goods currently cannot be replaced, which is why an increase in the number of package services is expected with regard to the volume increase of e-commerce, in which delivery is one of the most important links in the connection between vendors and buyers. The increase of these services will also certainly be affected by the predicted further growth of the Croatian economy since economic activities generally generate a demand for this type of service.

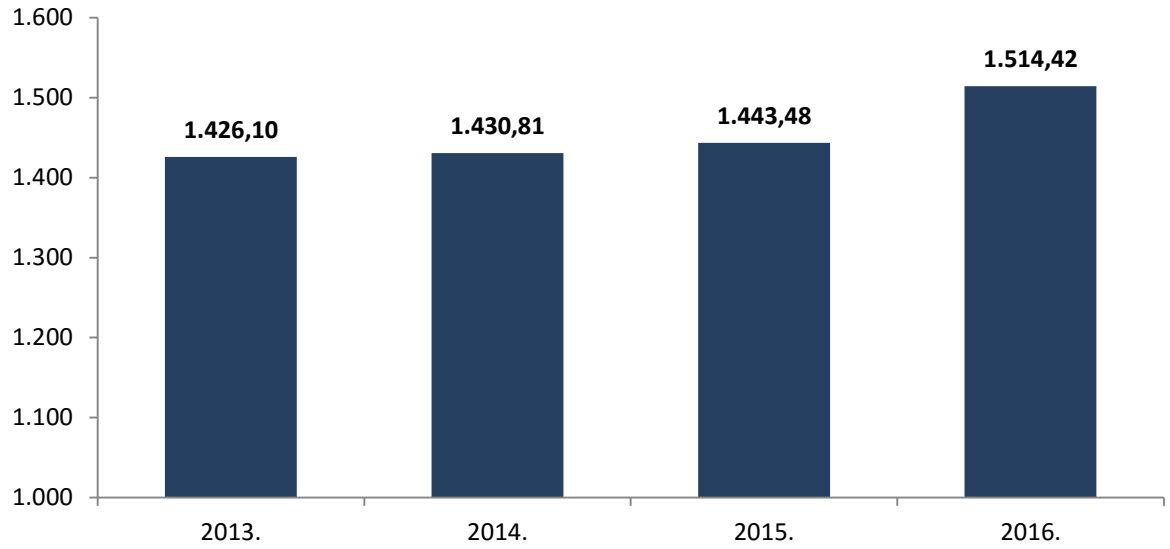
Figure 3.7. Number of postal consignments by type (in millions)



[14] letters + registered mail + declared value items + cecograms + direct mail

The positive trend present for several years regarding the revenues from postal services has been continued in 2016. The revenues, notwithstanding the reduction in the total number of services, have increased by about five percent compared to the previous year. In 2016, postal services providers earned a total of 1,514,417,869 HRK in revenues from performing postal services (Figure 3.8.), and the increase in the total amount of revenues was mostly influenced by a greater number of package services, that is, services with an added value).

Figure 3.8. Total revenues from postal services (in millions of HRK)



HP and other providers also increased their revenues compared to the previous year, whereby HP increased its revenues by 4 percent, and the other providers by 7 percent. These results did not have a significant impact on the shares of the total revenues on the market, and these shares remained the same as in the previous year (HP about 70 percent, and the other providers about 30 percent). As opposed to HP, which realized the majority of its revenues from the provision of "traditional" services within the framework of universal services, the other providers realized the majority of their revenues from performing "high-value" services within the framework of other postal services present on the free market. It seems certain that the situation will be similar in the future as well, except that the ratio of revenues realized from performing the indicated services will change - the revenues from performing "traditional" services will decline, and the revenues from performing "high-value" services will increase. In other words, it is expected that revenues from these services will equalize in the future. This is further corroborated by data indicating the continued future growth of e-commerce, which inevitability includes "high-value" postal services.

3.1.2.1 Universal service

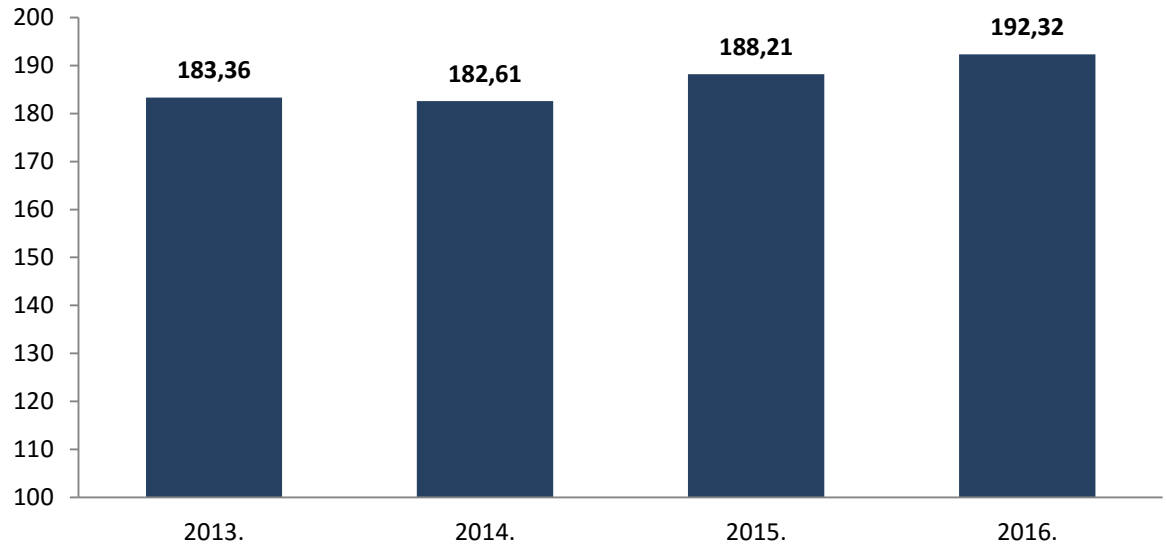
The universal service is a set of postal services[15] that are available to all users of postal services on the entire territory of the Republic of Croatia at an affordable price, and include services in both domestic and international traffic. The universal service provider must ensure the quality of provision of the universal service laid down in the PSA by means of its postal network.

HP is the only universal service provider in the Republic of Croatia and in 2016 it provided 192,317,562 services within the framework of universal services, which is a 2-percent increase compared to the previous year (Figure 3.9.). The increase in the number of these services is a result of the reduction in the number of interchangeable postal services, that is of the "spill-over" of interchangeable services to the universal service considering the services are very similar. The trends of these services in Croatia

[15] 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 packages up to 20 kilograms in international incoming traffic.

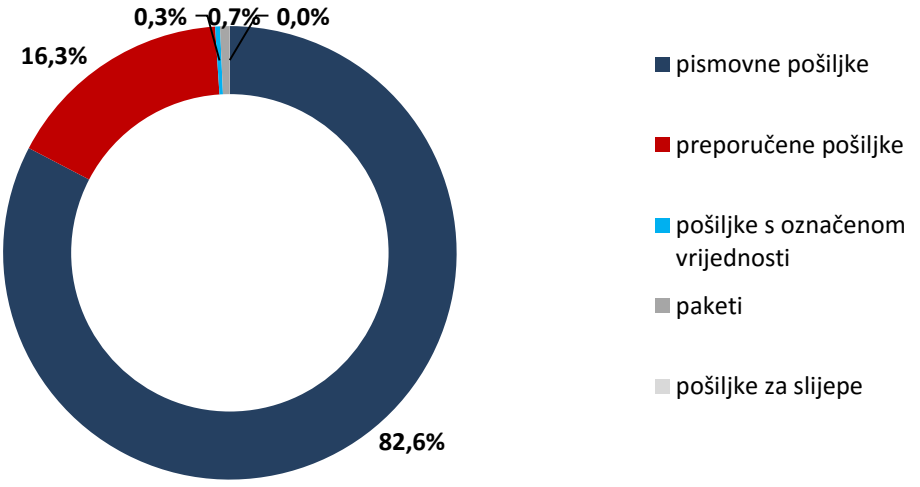
are not in line with the trends on the EU market, where the number of these services is declining, which demonstrates that changes in the methods of communication are still somewhat slower here than abroad. As a result of the increase in the number of services within the framework of the universal service, the share of the universal service in total services also increased by 2 percent compared to the previous year. Consequently, the revenues from the performance of the universal service also increased, amounting to 834.96 million HRK in 2016, which represents an increase of about 2 percent compared to 2015.

Figure 3.9. Total number of services covered by universal service (in millions)



It is realistic to expect that the universal service will retain its role in communication in the future considering its affordability in terms of price and satisfactory quality level. However, it is expected this role will diminish in the future, since these services are substitutable with modern forms of communication. With a share of 83 percent, letter items have the largest share in the universal service, followed by registered mail. There have been no significant changes in the shares with respect to the previous year (Figure 3.10.).

Figure 3.10. Shares of provided services covered by universal service, according to type

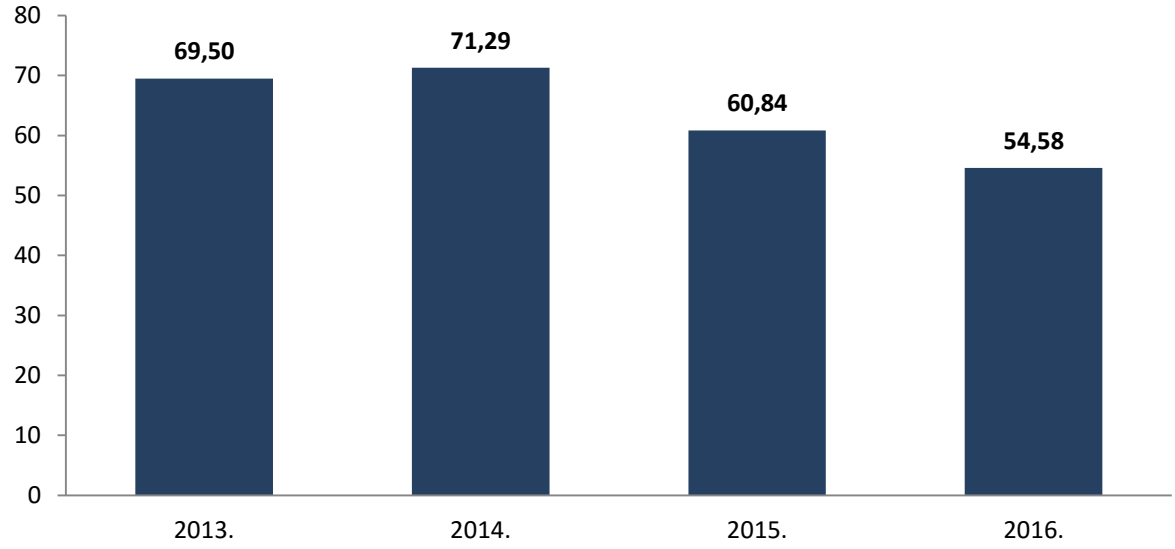


3.1.2.2 Interchangable postal services

Interchangeable postal services are postal services under the scope of the universal service, but which can deviate from the conditions of universal services and can be provided by other providers. In 2016, interchangeable services were provided by 7 providers, which realized a total of 54,584,596 services, which represents a 10-percent decline compared to the previous year, continuing a negative trend

(Figure 3.11.). As indicated above, the decline in the number of services is a consequence of the consolidation on the market of postal services and the "spill-over" of interchangeable postal services to the universal service, considering these services are similar and that the total number of both types of services has not changed significantly with respect to the previous year. The reduction in the number of services also affected the realized revenues, which decreased by about 11 percent (about 100 million HRK) compared to the previous year. On the total postal services market, interchangeable postal services covered a share of 17 percent in 2016, 2 percent less than in 2015.

Figure 3.11. Total number of interchangeable postal services (in millions)



No substantial changes are expected in the future period when it comes to these services. A continuation of the market consolidation and negative trend of these services is predicted, but the decline should be somewhat slighter.

3.1.2.3 Other postal services

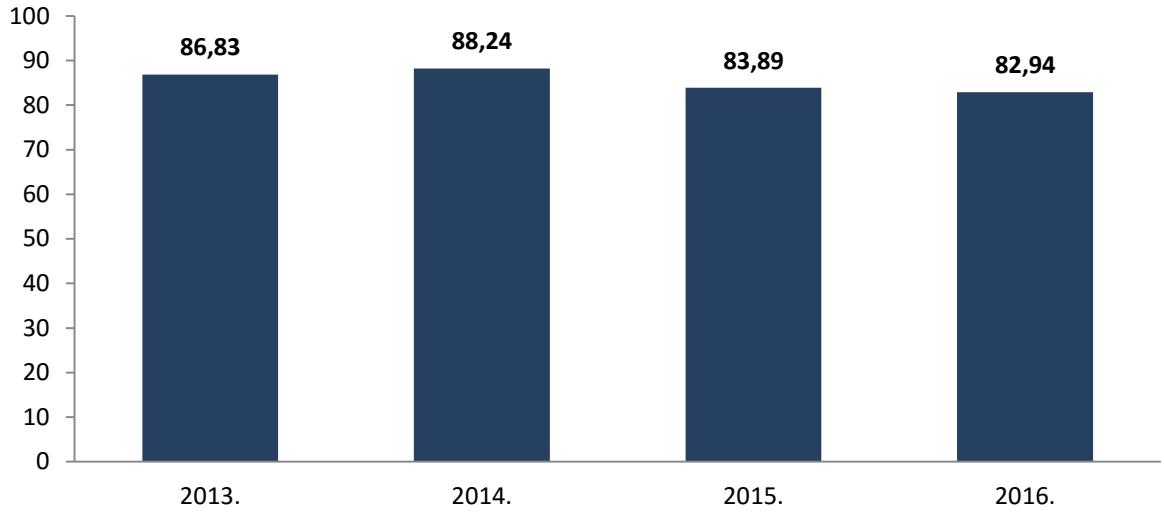
Other postal services comprise all postal services that are not included in the universal service or interchangeable postal services. These are basic postal services (letters and packages) which have an added value[16], as well as express packages, printed matter and direct mail[17].

Competition is the greatest in this segment considering that almost all notified providers perform these services, whereby the majority of providers provide only other postal services. Also, providers of other postal services have the possibility of providing new and more innovative services in order to adjust their offering to new needs and demands of users, thereby increasing their revenues. This primarily concerns other postal services that are based on value added services related to e-commerce since these are services with a greater potential for growth and development in the future. This is confirmed by the fact that high-value services recorded a 7-percent growth in 2016, even though the total number of services within the framework of other postal service decreased (Figure 3.12.).

Figure 3.12. Total number of other postal services (in millions)

[16] Added value includes parcel pick-up ordering by users, possibility of tracking, scheduled delivery time etc.

[17] 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.



The market share of other postal services on the total postal services market amounts to about 25 percent, and has continued to decline, although this decline has slowed down. Among those services printed matter has the greatest share of 40 percent, followed by direct mail with 35 percent and value added services, that is express packages. It should be mentioned that, with respect to the previous year, the share of added value services increased by two percent, continuing a constant increase of several years.

Although other postal services make up a quarter of the total postal services, they realized a total of 579.1 million HRK in revenues or over 38 percent of the total revenues, which represents a 13-percent increase in revenues compared to the previous year. This only confirms that within other postal services revenues can be increased with a lower number of services, primarily via added value services. This is corroborated by the fact that these services make up only six percent of the postal services market, but generate 32 percent of the total revenues. Compared to the previous year, the share of revenues of high-value services in the total revenues increased by 2 percent. This is why postal service providers need to utilize the possibilities provided by such services in order to ensure their continued growth, primarily with regard to the potential of services related to e-commerce since this is a segment with a continuous growth. Namely, e-commerce is inconceivable without the physical delivery of ordered goods, and postal service providers, with their offering of services, represent a link between the vendors and buyers. Seeing as in the RoC e-commerce has not yet developed to its full potential as it has in other EU member states and it is expected to grow in the future period, it is realistic to expect further growth in this segment of the postal services, both in terms of volume and revenues.

3.2 Overview of regulatory measures on the postal services market

In 2016, HAKOM continued its proactive and corrective activities on the postal services market which were aimed at stimulating competition and investing in the postal sector, the protection of users of all postal services and ensuring the efficient provision of the universal service of a guaranteed quality and availability on the entire territory of the Republic of Croatia. Activities were focused on all stakeholders on the postal services market, the informing of postal service users and the protection of their rights, the supervision of postal service providers, in particular of the universal service provider in relation to the quality of the provision of the universal service, accounting separation, and the net cost and prices of the universal service provision.

3.2.1 Regulatory activities in the postal services sector

HAKOM's regulatory activities are provided on the basis of two basic principles:

1. proactive – by undertaking various initiatives with a view to further stimulate the development of the postal services market in compliance with the current market demands.
2. corrective – by undertaking adequate reaction to obsrved situations and development trends on the postal services market.

As part of the proactive component, HAKOM collects and publishes data, notifications and documents related to the state and development of the postal services market. Last year HAKOM strengthened its position of an independent regulator by means of frequent contact and cooperation with all postal system stakeholders. What must be mentioned is the intense and continuous cooperation with all postal service providers with a view to achieve further development of a market by means of investments of providers in new technologies, thus creating an offer of new and inventive postal services adjusted to user demands. HAKOM organized two round tables of postal service stakeholders in 2016 which included discussions on topics and issues which are common to all market stakeholders.

A significant part of HAKOM's activities was focused on the harmonization of notifications and the general terms and conditions of postal service providers, including the existing providers who are changing their business activities. HAKOM also focused its activities on ensuring the sustainability of provision of the universal services with a special emphasis on maintaining its quality, accessibility and affordability for all users on the entire territory of the Republic of Croatia so that all users could have equal rights and possibilities to use this basic postal service.

For the third year in a row, every day HAKOM provided services to users on its helpline by answering queries related to the provision of postal services and other issues related to the postal activity. Last year users of postal services also submitted various queries and requests for information concerning the manner of the provision of individual types of postal services, the notification procedures for the provision of postal services, services of individual providers, the possibilities to file complaints against the provision of postal services. Frequently questions were not directly under HAKOM's competence but were related to the provision of postal services (public procurement of postal services, customs procedures in postal traffic, general level of rights and protection of users, etc.). Natural persons asked more questions than legal persons. HAKOM provided concrete answers to all questions, that is, it advised users where they could find detailed explanations. The majority of users were satisfied with the provided information. In 2016, HAKOM carried out a survey on the satisfaction of users of postal services (natural persons), their familiarity with and use of postal services and their replaceability with services of electronic communications. The results of the survey were published and are available on the website of HAKOM. The results were also used as a basis for the preparation and distribution of HAKOM's informative brochure with advice to users of postal services regarding their rights and obligations in postal traffic.

Under the corrective component of its activities, HAKOM took appropriate measures to direct the development of the postal services market in compliance with the PSA with a view to ensure the protection of rights of users of postal services, efficient provision of the universal service and elimination of systematic problems on the market that might distort competition.

In 2016, HAKOM's postal inspector carried out 63 inspections concerning the provision of the universal service and interchangeable and other postal services prescribed by the PSA over 14 of the total of 23 providers of postal services in the RoC: HP-Hrvatska pošta d.d., Zagreb, WEBER ESCAL d.o.o., Hrvatski Leskovac, TISAK d.d., Zagreb, LIDER EXPRESS d.o.o., Zagreb, SCHENKER d.o.o., Zagreb, Orbis Express j.d.o.o., Zagreb, INTEREUROPA d.o.o., Zagreb, LAGERMAX AED Croatia d.o.o., Zagreb, PROMO 21, Karlovac, GLS Croatia d.o.o., Sesvete, NADA, Zagreb, POŠTA EXPRESS j.d.o.o., Vinkovci, OVERSEAS TRADE Co LTD d.o.o., Hrvatski Leskovac and RHEA d.o.o., Zagreb.

The postal inspector adopted a total of 8 decisions in order to eliminate irregularities, deficiencies and oversights in the operation of providers and to harmonize the performance of activities of postal services providers with the provisions of the PSA.

The postal service provider General Logistics Systems Croatia d.o.o. from Sesvete was ordered to deal with the complaints of users of postal services in a non-discriminatory and transparent way.

The provider of interchangeable postal services LIDER EXPRESS d.o.o. from Zagreb was ordered to stamp all postal items with the date and the name or mark that would differentiate it from other postal service providers.

The provider of other postal services TISAK d.d. from Zagreb was ordered to ensure the availability of applicable general terms to users of postal services in its commercial premises.

The provider of postal services WEBER ESCAL d.o.o. from Hrvatski Leskovac was ordered to perform interchangeable postal services of the receipt, direction, transmission and delivery of postal items independently or via another authorized postal service provider. The same provider was ordered to deal with the complaints of users of postal services in a transparent and objective way and to submit to users of postal services written responses with clear instructions on the legal remedy.

The inspections carried out over the postal service providers Orbis Express j.d.o.o., Zagreb, INTEREUROPA d.o.o., Zagreb and LAGERMAX AED Croatia d.o.o., Zagreb resulted with the foundation of a consumer protection commission. This is why in 2016, in accordance with earlier carried out inspections, it was achieved that all postal service providers in the RoC meet the provisions of the PSA, which prescribes the manner in which the complaints of users of postal services need to be dealt with (three-stage procedure).

The postal inspector also carried out a detailed inspection of HP–Hrvatska Pošta d.d. as the universal service provider regarding its performance of the universal service in the domestic postal traffic, which included the provision of services, that is the timely delivery in hilly and mountainous areas, the use of the postmark as well as the packing, transfer mode and delivery of postal items. HP was ordered to transfer and deliver postal items – both letters and registered mail – in the condition in which it receives them.

All complaints of natural persons (5) in connection with the reported violations of the provisions of the PSA by postal service providers were dealt with within the statutory term.

3.2.2 Accounting separation (Regulatory accounting)

As part of its regulatory activity of supervising the accounting separation obligation, just like in earlier years, HAKOM carried out the independent audit procedure of the regulatory financial report and cost model of the universal service provider.

Namely, the Instructions for Accounting Separation and Cost Accounting (hereinafter: the Instructions) – contain a detailed description of the manner of accounting separation, lay down a framework of necessary information for the regulatory report and the frequency of submission of the report, that is, all provisions that must be applied with a view to fulfill the regulatory obligations.

In accordance with the instructions, in June of 2016 HP, as the universal service provider, submitted to HAKOM documentation on the cost model and its regulatory financial report for 2015. In accordance with the PSA, HAKOM initiated the audit procedure of the regulatory financial report and cost model of HP, for which it tasked the independent audit company BDO Hrvatska d.d. (hereinafter: BDO), in

order to verify the compliance of HP's 2015 regulatory report and cost model with the provisions of the Instructions. Therefore, HAKOM and the independent audit company BDO carried out the independent audit procedure of the regulatory financial report and cost model of HP for 2015.

As a result of the carried out procedure, the independent audit company BDO submitted to HAKOM its final report on the audit procedure in which it confirms that the regulatory report and cost model of HP for 2015 were prepared, in all significant aspects, in accordance with the provisions of the Instructions and in accordance with the accounting documentation.

After the carried out independent audit procedure, in September of 2016, HAKOM adopted a compliance statement confirming that the form, content and methodology used in HP's 2015 regulatory financial report are in compliance with the requirements laid down in the Instructions.

3.2.3 Net cost of the universal service provider

In compliance with the PSA, in July of 2016, HP as the universal service provider, submitted to HAKOM an application for the compensation of the costs of the universal service that represented an unfair financial burden in 2015 with the associated annual financial report and the report of the independent auditor for 2015 and the calculation of the real net cost in the amount of 90,213,220 HRK.

HAKOM tasked the independent audit company BDO with verifying the grounds of the calculation of the net cost submitted in enclosure to the application of HP. Also, HAKOM requested the opinion of the independent audit company BDO on the Commercial scenario submitted by HP. In addition to that, HAKOM held a series of workshops with representatives of the independent audit company and HP, at which individual elements of the calculation of net cost were discussed. On the basis of the delivered data and the organized workshops, the independent auditor submitted a report on the Commercial scenario and calculation of HP's net cost for 2015. It may be concluded from the submitted report that HP's calculation is incorrect in certain elements, that is the independent auditor found that instead of the 90,213,220 HRK, as the net cost was presented in the enclosed Commercial scenario and calculation of the net cost for 2015, the net cost actually amounts to 79,062,286 HRK, in other words that its amount is lower by 11,150,934 HRK.

After the amount of the net cost of the universal service was determined, in October of 2016 HAKOM adopted its Decision determining that the amount of 79,062,286 HRK represents the unfair financial burden for the provider of the universal service, HP, in 2015.

3.2.4 Supervision and regulation of the universal service prices

One of the significant regulatory activities of HAKOM is the supervision and regulation of the price of the universal service, aimed at making sure that the universal service is in accordance with the provisions of the PSA, meaning the prices are affordable, cost oriented and stimulative for the efficient performance of the universal service. Namely, HAKOM can, in accordance with the PSA, amend the prices of the universal service fully or partially or annul them before or after their publication if it determines that they are inconsistent with the provisions of the PSA.

This is why at the beginning of 2016, HAKOM began the project of the preparation and introduction of a methodology for the regulation of the prices of the universal service for the purpose of the supervision and regulation of the prices of the universal service, that is to verify whether the prices of the universal service are cost oriented and accessible to end users of the service. During 2016, HAKOM held a series of workshops with HP at which the price cap method was presented, which will be used to regulate the prices of the universal service.

Based on the carried out workshops, HAKOM prepared a consultation document entitled "Preparation and introduction of the methodology for the regulation of the prices of the universal service for the 2017-2019 period" (hereinafter: Consultation document) in order to determine the rules and implementation for the application of the methodology for the regulation of the prices of the universal service. The Consultation document was subject to a public discussion, which took place from 27 October to 10 November 2016.

In November of 2016, HAKOM adopted a document entitled "Preparation and introduction of the methodology for the regulation of the prices of the universal service for the 2017-2019 period" (hereinafter: Methodology).

Based on the application of the Methodology for the regulation of the prices of the universal service, HAKOM determined that from the aspect of the prescribed affordability and cost orientation, the current prices of the universal service of HP meet the requirements in accordance with the PSA. Furthermore, HAKOM determined that, primarily due to the long investment cycle of HP and the negative trend of the volume of the services, HP has the possibility to increase the prices by a certain amount for the observed period.

Therefore, in November HAKOM adopted the decision determining that HP, as the provider of the universal service, is allowed an average weighted price increase of 4.44 % for the service package under the scope of the universal service, which comprises letters up to 50 grams in domestic and international traffic and items of registered mail up to 50 grams in domestic and international traffic for the period from 1 January 2017 to 31 December 2019.

3.2.5 Quality of the provision of the universal service

As in earlier years, in 2016 HAKOM directed its regulatory activities in the field of postal services to, among other things, the supervision and monitoring of the quality of the performance of universal services with regard to the significance this quality has. Namely, quality represents one of the more important elements of user satisfaction, and achieving the prescribed quality criteria represents an objective to which all members of the EU strive within the single market of postal services, and the RoC is no exception. The quality criteria for the performance of the universal service in domestic and international traffic that the provider of the universal service must meet as well as the measurement method are prescribed by the PSA and the Ordinance on the performance of the universal service (hereinafter: Ordinance). These prescribe that the provider of the universal service in domestic traffic must ensure the delivery of 85 percent of postal items of the fastest category (priority items) within the period of one working day, or 95 percent within two work days, and for all other items - 95 percent within three working days. In international traffic with EU member states, only criteria for postal items of the fastest category are prescribed. They prescribe that 85 percent of these items must be delivered within three working days or 97 percent within five working days. Furthermore, the PSA prescribes that the universal service provider is obliged to submit to HAKOM a report on the quality of the universal service provision for the previous year including the measurement results.

In late March of 2017, HP, as the universal service provider, submitted to HAKOM a Report on the quality of the universal service for 2016 from which it is evident that during 2016 several different measurements of quality have been carried out for the domestic and the international traffic.

The conducted measurements of the carriage of priority postal items in international postal traffic between the RoC and EU member states showed a certain improvement with respect to the previous year, but also that not all prescribed quality criteria have been met given that only 63.9 percent of items have been delivered within D+3 days and that 90.6 percent of items have been delivered within D+5 days. HP indicated that one of the reasons for the failure to meet the prescribed criteria was the (lack of handling) by other postal administrations in the manipulation of the postal items, which is something it cannot influence.

The quality of the performance of the universal service in domestic traffic was measured through the carriage of priority and non-priority items, and the obtained results show that all prescribed criteria have been met and that certain results are better than in the previous year. The measurement shows that 85.2 percent of priority items have been delivered within the period of D+1 days, that 96.9 percent have been delivered within the period of D+2 days, and that 96.4 percent of non-priority items have been delivered within the period of D+3 days.

Based on the prescribed standard, the provider of the universal service also carried out measurements of the number of complaints and compensations of damages regarding the performance of the universal service. According to the data submitted, during 2016 HP received a total of 42,119

complaints from users, the largest part of which referred to complaints in domestic traffic (74 percent). Over 96 percent of complaints were solved in the statutory term, and the most common reason for the submission of complaints was the loss of an item, followed by the incorrect delivery and failure to meet the prescribed time period for the delivery of an item.

According to the indicated results, the quality of the performance of the universal service is at a satisfactory level, and in some segments better than prescribed.

3.2.6 Postal network of the universal service providers (postal offices, postal boxes)

HP, as the universal service provider, must establish, maintain and develop a postal network, which includes an organization system and all types of resources mutually connected into a unified technical and technological whole, so as to ensure the provision of postal services on the entire territory of the Republic of Croatia in the manner prescribed by the PSA and the Ordinance. The Ordinance prescribes the density of the access points network and lays down that the postal offices network must be established in such a manner that one postal office covers a maximum of 80 km2, that is, a total of 6,000 inhabitants, and that there must be a minimum of 700 regular postal offices.

In 2016, the network of HP post offices did not change with respect to the previous year, which means that HP has not closed any post offices during the year. In late 2016, it had total of 1,016 post offices distributed throughout the entire territory of Croatia. The above-mentioned number of offices is significantly above the prescribed minimum (700). This shows HP's social sensibility since the closing of non-profitable post offices would cause a deterioration in the quality of life in certain areas, in particular in less inhabited areas such as the islands or mountain areas. This is corroborated by the fact that on the islands, which cover about 5 percent of the territory of the RoC, over 10 percent of the total number of post offices are located, with one office covering more than 1,000 inhabitants resulting in a greater density of post offices than prescribed. In order to rationalize its business activities regarding its post offices, HP did not decide to close individual post offices but it focused on finding busier locations, moving several post offices to shopping malls in 2016. In doing so, HP not only retained the existing quality of the universal service, but also improved the availability of post offices given that these locations have a greater frequency of people and potential users of postal services. It is realistic to expect that the new location will contribute to better business operations through an increase of the volume of services, and therefore an increase in revenues.

As in earlier years, in 2016 in a specific number of post offices there have been changes of the working hours in order to adjust to organizational changes, needs of users, but also in order to additionally rationalize the business activities. The largest part of the changes refers to the shortening of the working hours, whereby the quality of the performance of the universal service has not been significantly disrupted.

The universal service provider is also obliged to ensure access to its postal network to postal service providers, consolidators and user of postal services covered by the provision of interchangeable postal services. In 2016, only one provider used access to the HP postal network, who also used it in earlier years, and there have been no new applications.

3.2.7 Monitoring of the situation and the development of the postal services market

Within its competence regarding the monitoring of the situation and development of the postal services market, HAKOM continued in 2016 with the collection of statistical and other data from postal service providers. The coverage of the market was harmonized with the PSA, and data was collected for each quarter and on an annual basis. Based on the collected and processed data, HAKOM constantly monitored the situation and trends on the market of postal services in the RoC, and the obtained data were, in addition to the needs of HAKOM, also used for different demands made by European bodies (EC, ERGP) for the purpose of monitoring the situation and analyzing the market of postal services in the EU. The data and indicators were submitted to the CBS, which used them for the preparation of its analyses and reports.

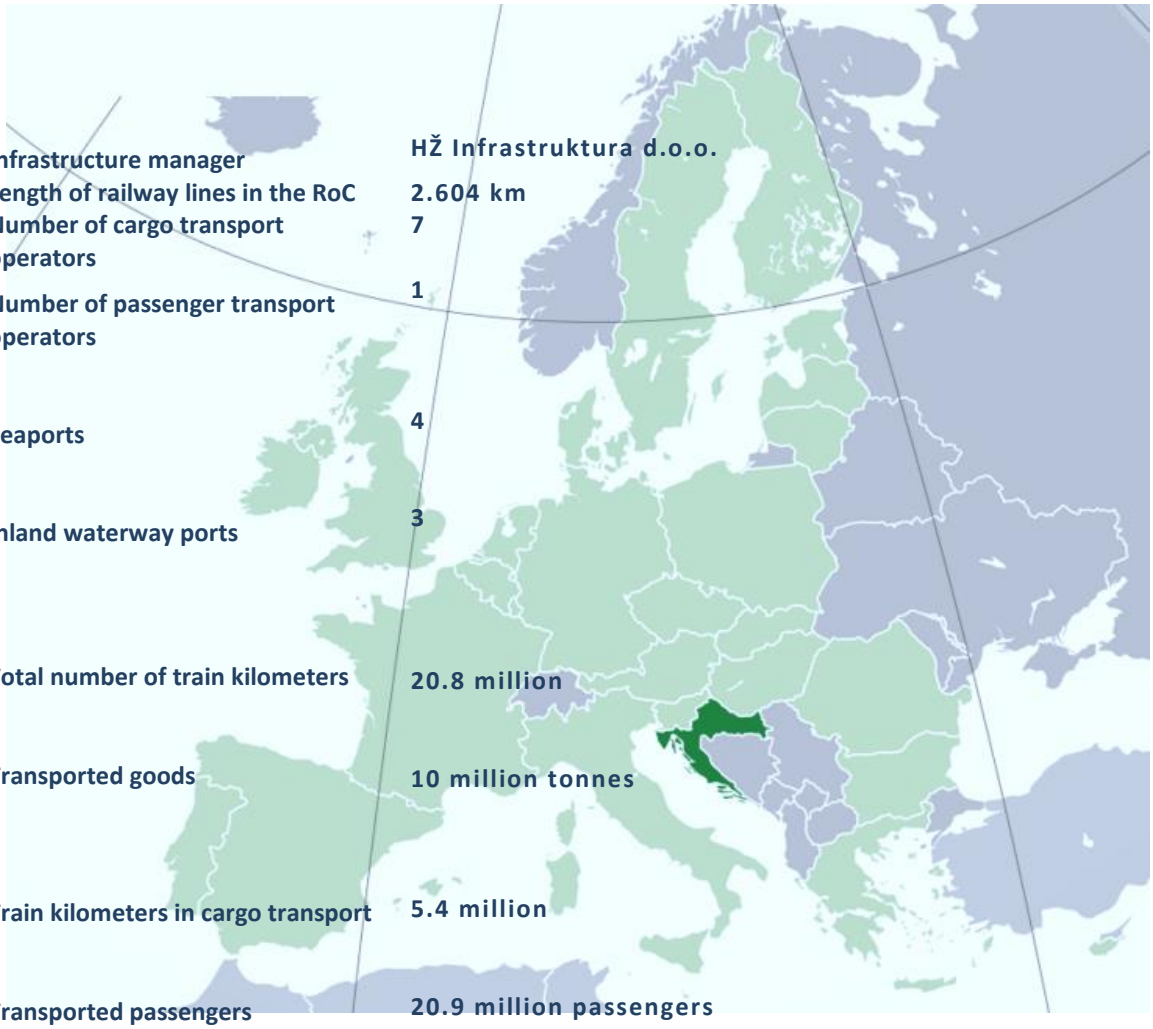
HAKOM continuously published on its website data on the situation on the postal services market for each quarter and on an annual basis, and presented quarterly data and indicators to the public and in press releases. On its website, HAKOM also regularly published and updated its list of postal services providers.

4 RAIL SERVICES MARKET

The rail services market is a significant industry branch, and in a modern society it represents one of the columns of development and progress.

4.1 Overview of the market

Figure 4.1. RoC – basic information on the rail services market



Infrastructure manager	HŽ Infrastruktura d.o.o.
Length of railway lines in the RoC	2.604 km
Number of cargo transport operators	7
Number of passenger transport operators	1
Seaports	4
Inland waterway ports	3
Total number of train kilometers	20.8 million
Transported goods	10 million tonnes
Train kilometers in cargo transport	5.4 million
Transported passengers	20.9 million passengers
Train kilometers in passenger transport	15.4 million

At the end of 2016, there were seven cargo railway carriers, six of which are active, and one passenger railway carrier. Three cargo carriers were registered in the RoC, and the other four were registered in EU member states.

4.1.1 Infrastructure and investments

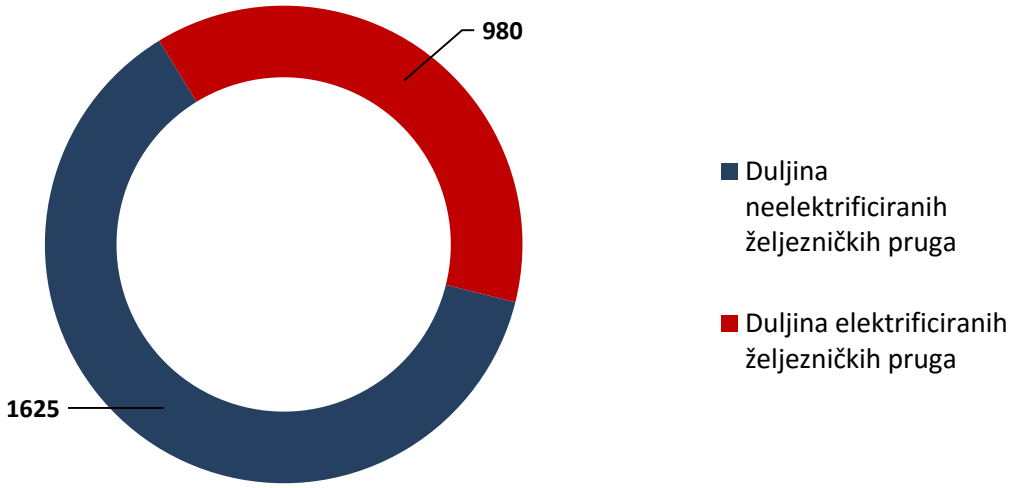
Infrastructure within the meaning of the Railway Act (OG No. 74/14; hereinafter: RA) comprises the railway infrastructure and industrial tracks, including industrial tracks in seaports and ports of inland waterways. The rail infrastructure is a public good in public use[18] and owned by the RoC, and it is managed by the infrastructure manager. The only infrastructure manager in the RoC is HŽ Infrastruktura d.o.o. (hereinafter: HŽI) which must ensure, under equal, transparent and non-discriminatory conditions, to all interested railway carriers the use of the railway infrastructure.

HŽ manages railway lines in the RoC in the total length of 2,604 km. On the rail network, HŽI maintains 542 railway stations and stops, 1,512 road and railway crossings, 109 tunnels and 548 bridges. HŽI is responsible for the organization and the regulation of the railway traffic, the reconstruction, maintenance and construction of the rail infrastructure. On average, the rail network is daily used by 630 passenger and 115 cargo trains.

The railway infrastructure, that is railway lines and tracks on the territory of the RoC have standard gauge tracks[19]. Of the overall length of railway lines, 2,351 kilometers or 90.25 percent are single-track lines, and 254 kilometers 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 2015.

The electric traction system remains unchanged with respect to 2015, and neither has the overall length of the electrification, whereby only 980 kilometers of railway lines are electrified with an alternating current system of electrification, 25 kilovolts at a frequency of 50 Hertz (Figure 4.2.), which represents 37.62 percent of the overall length of railway infrastructure.

Figure 4.2. Length of electrified and non-electrified railway lines in the RoC (km)



HAKOM is a member of a group of independent rail regulatory bodies - IRG- Rail (Independent Regulators' Group – Rail). In 2016, the members of IRG-Rail were Austria, Belgium, Bulgaria, Denmark, Estonia, Finland, Macedonia, France, Germany, Greece, Croatia, Hungary, Ireland, Italy, Kosovo, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and Great Britain.

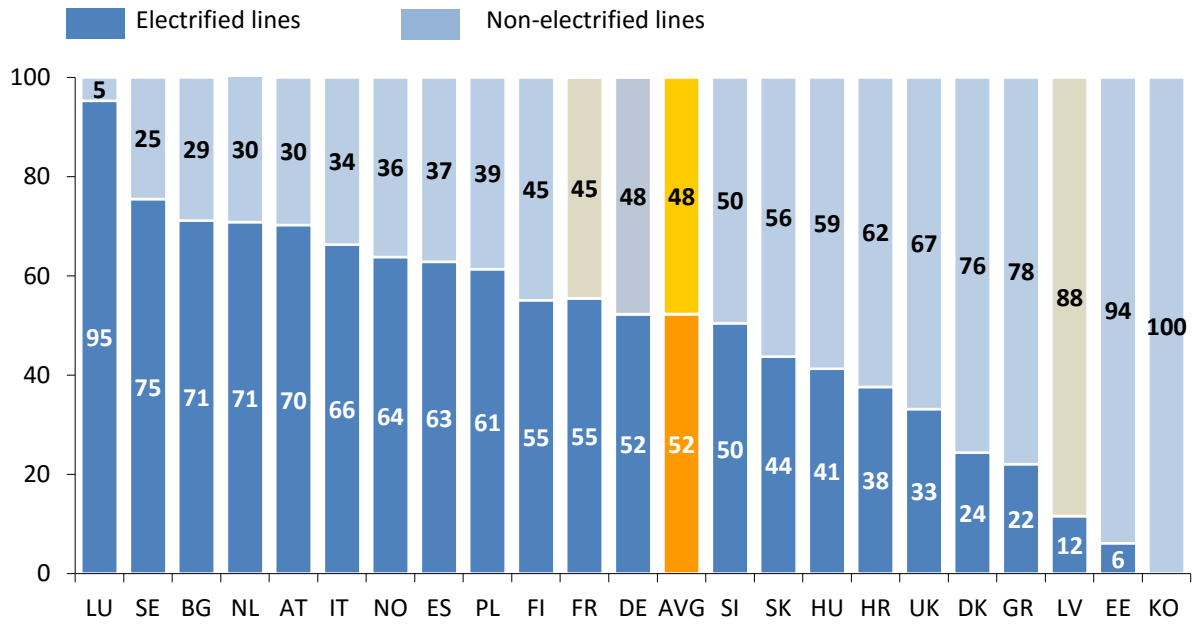
Through various working groups and activities, IRG-Rail works on the exchange of best practices among its members, and one of the activities is the collection of data on the state of the rail services market. The report on the state of the market was published in March of 2017 for data from 2015. All members of IRG-Rail do not submit the requested data, for various reasons, but mostly due to the inability to

[18] Railway infrastructure is a public good used for public purposes, owned by the Republic of Croatia, which can be used by all interested railway undertakings, under equal conditions, in the manner prescribed by Railway Act
[19] Standard gauge track - track with a 1435 width

obtain the data from infrastructure managers and transport operators in their countries, because these fail to deliver the data since the submission of such data is not obligatory.

The largest percentage of electrified lines out of the IRG-Rail member states is in Luxembourg, with almost 90 percents, whereas Kosovo has 100 percent of non-electrified lines. The RoC is below average (52 percent), and there is a need for further electrification and modernization of electric traction power supply systems, which represents the need of a contemporary transport market.

Figure 4.3. Share of electrified lines in the overall length of railway lines in members of IRG Rail



Source: http://www.irg-rail.eu/public-documents/2017/

During 2016 333732.000 HRK[20] was invested in the reconstruction and modernization of railway lines in the RoC, of which the largest part was invested in the construction of new lines and tracks, almost 180 million Kuna, which is a considerably higher amount than in earlier years. Works on the construction of a new single-track railway line between Gradec and Sveti Ivan Žabno began in December of 2015 and have been actively continued during 2016. Works are performed on several locations on the route of the future line. The works contractor, together with subcontractors, completed 90 percent of the earthworks, completing 11 km of the 12.2 km route. Also, works on seven large facilities have been completed or continued, with four finished facilities (HŽ subway crossings, Paromlinska and Mali Gaj and the Glogovnica Bridge). The final completion of the works is expected in late 2017. The goal of the project is to shorten the journey between Zagreb and Bjelovar.

The works on the largest project of HŽI, co-financed from EU funds (the European Regional Development Fund), the reconstruction of the existing and construction of a second track on the Dugo Selo – Križevci railway section, valued at 1 billion and 500 million HRK has started on 25 July 2016.

Currently, works are carried out on several locations between Vrbovec and Križevci. On three locations of the new railway line embankments are constructed, and on one of these locations foundations for the contact network, columns for the contact network and reinforced concrete pilots are constructed, which will serve as foundations for the noise protection wall. Also, an embankment with two new tracks in the Vrbovec railway station is currently being constructed, as well as five overpasses and one subway crossing. In 2017, an additional intensification of works is expected, especially on parts of the

[20] Data of HŽ Infrastruktura for the preparation of the HŽ Infrastruktura d.o.o. 2016 Business Report (the deadline for the publication of the report I s 30 June 2017)

railway line in the zone in which railway traffic takes place. The works should be completed in early 2020.

The reconstruction of the Vinkovci – Tovarnik – state border section is complete, which was the first project in the RoC financed from EU pre-accession funds and the first project for which EU funds were used for the co-financing of investments in railway infrastructure. This is also the largest infrastructure project financed with a model of pre-accession assistance in a financial and physical sense.

As much as 53.26 percent of the total investments of HŽI represented investments in the construction of new lines and tracks. The largest part of the remaining investments, 32.19 percent was invested in the reconstruction and modernization of railway lines for international transport.

During 2016, the implementation of several projects began, and the preparation of documentation for other projects, the most significant being the following:

- reconstruction of the existing and construction of the second track of the railway line on the Dugo Selo – Križevci section,
- construction of a new railway line on the Gradec – Sveti Ivan Žabno section,
- overhaul and reconstruction of the line on the Okučani – Novska section,
- reconstruction of the existing and construction of a second track on the Križevci – Koprivnica – state border section section,
- development of a multimodal platform in the Rijeka Port and connection with the Jadranska vrata container terminal, which includes the reconstruction of the Rijeka Brajdica railway station and the construction of the Brajdica intermodal container terminal and the reconstruction of the Rijeka-Zagrebačka obala railway station.

In order to provide more data on the state of the rail services market and the condition of the railway infrastructure, Figure 4.4. shows the status of all projects initiated by HŽI, which are financed from EU funds.

Figure 4.4. Projects carried out by HŽ Infrastruktura d.o.o.

Source: HŽ Infrastruktura d.o.o. (www.hzinfra.hr)

The most significant factor for the quality of transport is the commercial speed of trains. During 2016, a mild increase in the average commercial speed of trains was recorded, both for passenger and cargo trains.

Table 4.1. Average commercial speed of trains (km/h)

Train speed in km/h	2011	2012	2013	2014	2015	2016
Average commercial speed of trains	36,1	33,43	32,76	33,53	34,7	35,33
passenger trains	46,54	44,81	44,35	46,36	47,82	47,97
cargo trains	21,44	21,04	21,17	20,67	21,57	22,69

Source: HŽ Infrastruktura d.o.o.

4.1.2 Rail services and revenues

According to the Railway Act, the rail services market comprises relations between infrastructure managers, service facility operators and applicants for infrastructure capacity, who are mostly railway undertakings. HŽI, as the only railway infrastructure manager, is obliged to provide rail services to everyone fulfilling the requirements for requesting the provision of those services, under equal conditions.

The RA defines rail services in the following way:

1. minimum access package
2. access to service facilities and services provided in those facilities, including rail access to service facilities
3. additional services
4. accompanying services.

A minimum access package consists of the following:

processing of requests for infrastructure capacity, rights of use of allocated infrastructure capacity, use of infrastructure (including railroad crossovers and hubs), train 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 ways granted. The only provider of the minimum access service is HŽI.

Service facilities include the following:

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 maneuvering facilities, stabling tracks, maintenance 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.

Additional services may include the following:

power necessary for train traction, preheating and pre-cooling of passenger cars, special contracts on the following: supervision during transport of hazardous substances and assistance in running trains with emergency parcels,

Auxiliary services may include:

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

Table 4.2. shows the use of rail services in 2016. During 2016 almost all cargo transport operators who have a permit for the performance of railway transport services and a safety certificate were active in the use of railway services provided by HŽI, except for the cargo transport operator RTS, which did not conclude a contract on the access to the 2015/2016 timetable, which is why it did not run on regular routes, for which a concluded access contract is necessary, and it did not run on ad-hoc route for which such a contract is not necessary. Therefore, during 2016 six cargo transport operators were active on the rail infrastructure managed by HŽI.

Table 4.2. Use of rail services in the RoC provided by HŽ Infrastruktura d.o.o.

Use of rail services	Total 2013	Total 2014	Total 2015	Total 2016
Minimum access package				
travelled tkm	21,019,458	20,320,062	20,378,684	20,798,904
Use of service facilities				
number of services used in service facilities	9,850,913	7,238,516	12,773,660	15,285,034
use of passenger terminals (number of stops)	0	136,335	2,933,973	3,030,773
number of assembly/disassembly of trains	1,193,010	946,617	2,047,847	1,883,940
garage services [vehicle*hours]	8,643,663	6,146,501	7,784,000	10,362,590
amount of weighted cars	14,240	8,334	7,411	6,627
realized gross tone kilometers of supplied power for train haulage	74,182,396	75,940,622	77,388,751	75,096,902
transport of extraordinary postal items (number of trains)	890	729	429	1,104

The number of realized passenger and cargo train kilometers[21] (hereinafter: tkm) in 2016 shows an increase compared to the previous year, and the use of almost all rail services has recorded an increase as well. Namely, during 2016 only services of track scales and shunting during weighing, and services of the formation/deformation of trains recorded a decrease. During 2015, changes in the methodology of providing services of the formation/deformation of trains were introduced, so that only with the comparison of data from 2015 and 2016 the same type of service can be compared, and it recorded a decrease during 2016, primarily because the cargo carrier HŽ cargo d.o.o. began to provide this service to itself in railway stations where it had the possibility to do so. Nevertheless, since this is a service for which a special facility exists, the shunting yard in Zagreb, HŽ Infrastruktura d.o.o., in its 2nd Amendments to the 2017 Network Statement prescribed the facilities in which this service can be carried out. With these amendments, the number of railway stations in which HŽ cargo d.o.o. could perform this service for its own needs was decreased because these railway stations are not suitable for the performance of such a service as they are located near town centers and lack the technical equipment for the performance of such a service.

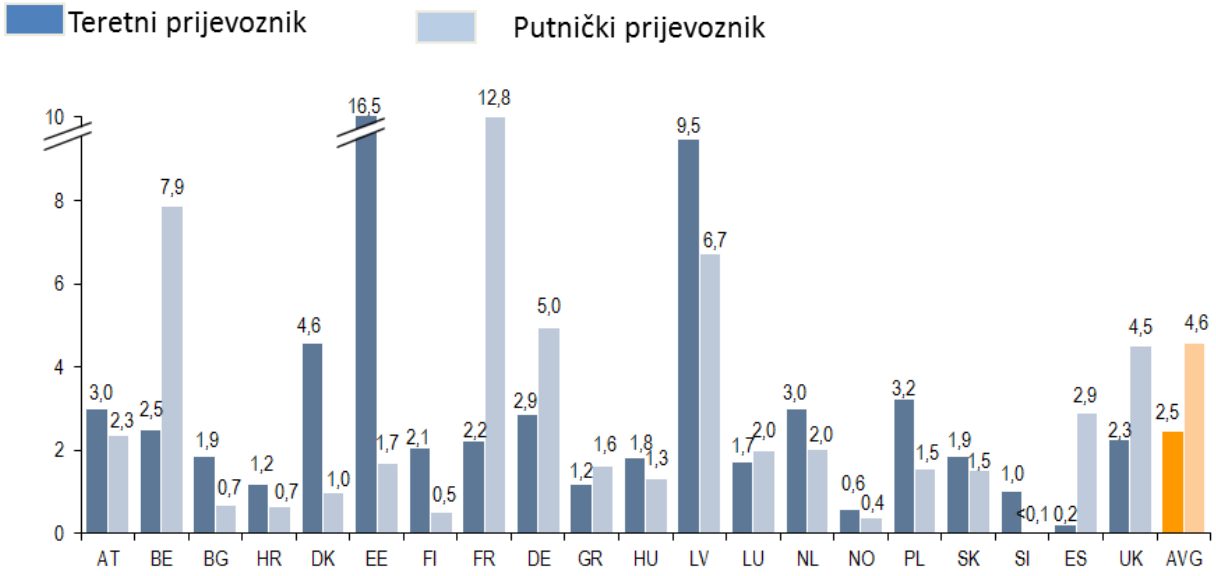
The service of the use of passenger stations was separated from the minimum access package only with the start of the 2014/2015 timetable, which entered into force on 14 December 2014, so that data from 2016 can be compared with data from 2015 because they represent data for the entire year on the use of this service and have recorded a growth of 3 percent.

[21] Train kilometers (tkm) is a measure expressing the movement of one train at the distance of one kilometer

Of the total number of realized train kilometers, 74 percent were realized by passenger carriers, and 26 percent by cargo carriers.

The data indicated in Figure 4.5. represent data on the average prices for the minimum access package, for both cargo and passenger transport, the infrastructure managers of IRG-Rail member states for 2015. From the figure, it is evident that the average price for the minimum access package in the RoC is much lower than the average of IRG-Rail member states.

Figure 4.5. Average prices for the minimum access package (€/tkm)

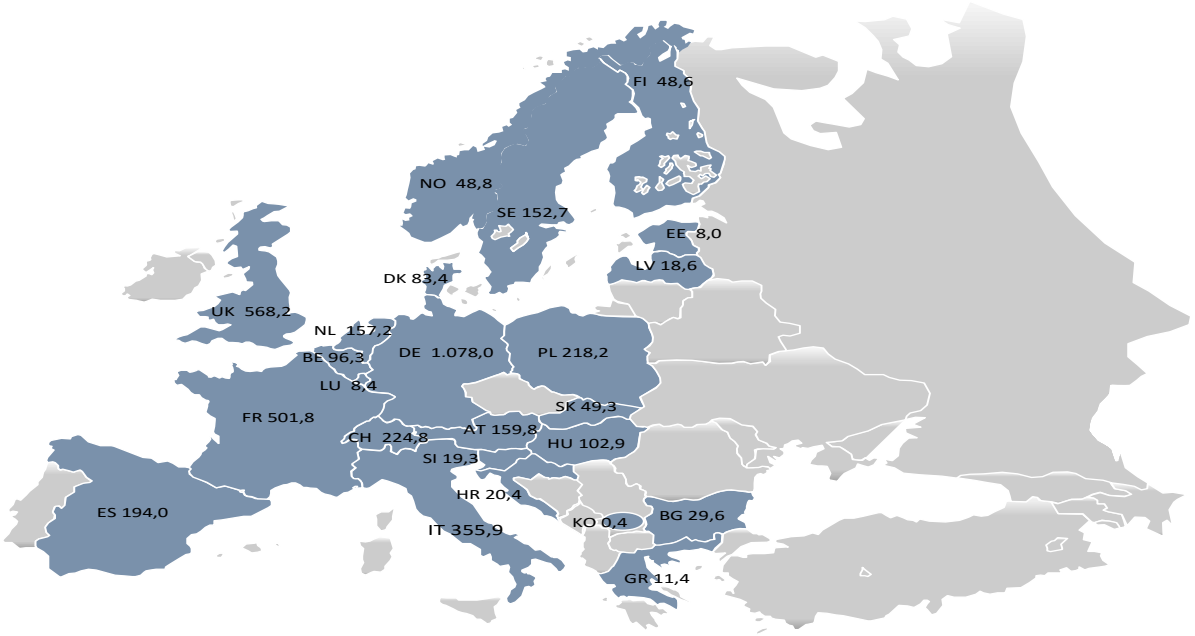


Source: http://www.irg-rail.eu/public-documents/2017/

The minimum access package fee includes the fee for passenger stops in Belgium, Estonia, Finland and Latvia.

The relative size of the railway traffic markets in IRG-Rail member states compared to the realized train kilometers are presented in Figure 4.6. The Figure shows that Germany has the largest railway market with over one billion train kilometers realized in 2015, whereas Kosovo has the smallest market with less than half a million of train kilometers. In 2015, Croatia realized about 20 million train kilometers, and in 2016 it realized a somewhat higher number of train kilometers, 20.8 million train kilometers.

Figure 4.6. Use of infrastructure (mil/tkm)



Source: http://www.irg-rail.eu/public-documents/2017/

HŽI realized revenues from the provision of rail services in the amount of 144,570,868.23 HRK. Besides revenues from the provision of rail services, HŽ generates revenues, inter alia, from the State Budget. In 2016, 1,073,796,000.00 HRK were earmarked from the State Budget for the purposes of HŽI[22].

The only railway infrastructure manager on the market of rail services, HŽI, is also the largest operator of service facilities. Rail services are also provided by railway operators (e.g. shunting, technical inspection of carriages, braking trials, etc.), as well as other legal persons whose primary activity is not railway transport (e.g. washing and cleaning of passenger carriages and motor trains, rolling stock maintenance, etc.) which contributes to the complexity of this specific market. With the increase in the number of railway undertakings, the needs for the development of the railway services market is more evident in the sense of providing additional services required for auxiliary activities and the preparation of trains.

Users of rail services are mostly railway operators, but an application for the use of the infrastructure capacity (train paths) can also be submitted by international groups or other natural or legal persons, such as authorized bodies prescribed by Regulation (EC) No. 1370/2007 on services of public railway and road transport of passengers and ship operators, forwarding agents and combined transport operators, who have an interest in the provision of public services or a business interest for the allocation of infrastructure capacities, which are jointly named applicants for the allocation of infrastructure capacity.

If the applicant is not a railway operator, it is obliged to indicate in its application for the allocation of infrastructure capacity a railway operator with which it will conclude an access contract with the infrastructure manager. The applicant who is not a railway undertaking concludes with the infrastructure manager a contract that regulates the use of the railway infrastructure. The applicant can, with the prior consent of the infrastructure manager, hire another railway operator.

In 2016, the Croatian railway network was used by the following railway undertakings:

- HŽ Cargo d.o.o.
- PPD TRANSPORT d.o.o., Zagreb
- RTS

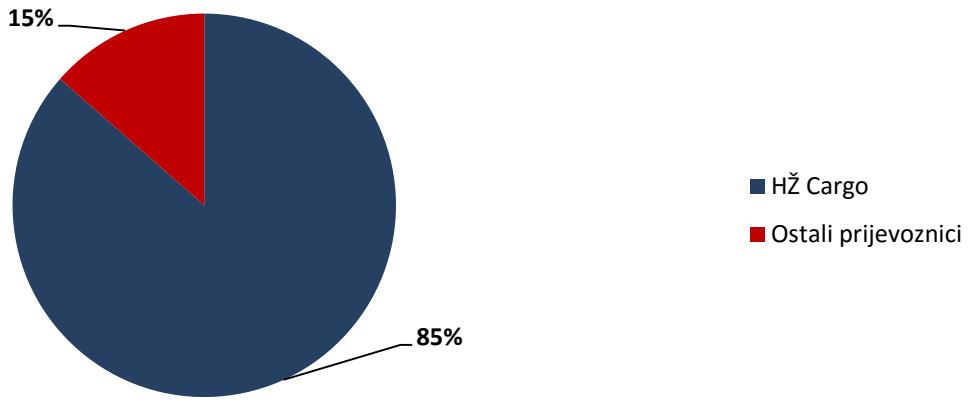
[22] Funds for the maintenance of railway infrastructure and the regulation of transport, for the modernization and construction of railway infrastructure, fees in the fuel price for HŽ Infrastruktura and funds for EU Funds.

- Rail Cargo Carrier Croatia d.o.o. (RCC Croatia), Zagreb
- TRAIN HUNGARY MAGÁNVASÚT IPARI, KERESKEDELMI ÉS SZOLGÁLTATÓ KORLÁTOLT FELELŐSSÉGŰ TÁRSASÁAG- Zagreb Branch Office (THM), Budapest
- SŽ TOVORNI PROMET d.o.o., Ljubljana
- Rail & Sea d.o.o., Zagreb.

The cargo carrier Rail Transport Services (RTS), Graz, did not conclude an access contract for the for 2015//2016 timetable and so did not run on regular routes or ad hoc routes during the 2015/2016 timetable, although it met all preconditions for this.

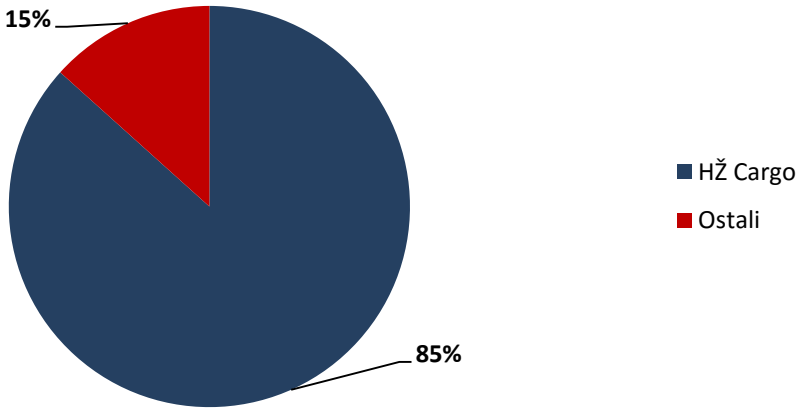
The share on the railway transport market in realized train kilometers is presented in Figure 4.7., whereas the market share in transported goods is presented in Figure 4.8.

Figure 4.7. Use of infrastructure by cargo transport operators in train kilometers



Source: Data collected by HAKOM

Figure 4.8. Market share in transported goods



Source: Data collected by HAKOM

From the figures, it is evident that new cargo transport operators brought changes to the railway transport market, and that the historical carrier reduced its market share.

4.2 Overview of regulatory measures and related activities

In 2016, HAKOM held five procedures regarding complaints of railway operators. The first procedure referred to the conditions of the access to the Istočni matičnjak industrial track in the Zagreb Žitnjak railway station, and the complaint was submitted against the owner of the track. No discrimination against the complainant or any other user of the track concerned was determined in the procedure since the conditions and price of the use were publicly announced and equal for all. This is why a Decision was adopted dismissing the complaint as ill-founded.

The second procedure referred to the 2017 Network Statement[23] and to the complaint of a cargo railway operator. The complaint referred to the parts of the Statement in which the fees for the reservation of capacities and the utilization levels of routes, the garaging services, the train list services, the "T" route equivalent for collecting, circular and industrial trains and the shunting services during the weighing are prescribed, against which the cargo railway operator submitted a complaint. After the conducted procedure, no irregularities or discrimination have been determined and a decision was adopted dismissing the complaint as ill-founded.

The third procedure was held regarding the complaint of a cargo railway operator against Article 23 of the General Terms of the contract on the access to the railway infrastructure, in which the operator contested the provision that a transport operator whose traction vehicle is used for the traction or pushing of a faulty traction vehicle on the railway line is not entitled to a compensation of the costs of the provision of such assistance. It considered this an interference on the part of HŽI with the commercial relations of railway operators. HAKOM completely dismissed the complaint as ill-founded since Article 23 paragraph 1 of the General Terms of HŽI regulates in a transparent and non-discriminatory way the resolution of such situations.

The fourth procedure was held regarding the complaint of a railway operator against the 1st amendments to the 2017 Network Statement, which indicate the railway stations in which shunting is allowed. The amendments to the 2017 Network Statement are based on the 6th Amendments to the HŽI-40 Instructions, based on which the Decision on the list of railway stations in which shunting is allowed was adopted (UI-101-9/16 of 19 May 2016), and the HŽI-40 Instruction was amended so that a new Article (44.a) was added, in which HŽI defines shunting and determines that it allowed only in railway stations that provide with the required technical and technological conditions for it. The list of the indicated railway stations is published in the Network Statement. The list of railway stations in which shunting is allowed comprises a total of thirteen railway stations, for which it certainly cannot be claimed that they are the railway stations that provide with the required technical and technological conditions for this purpose. The list of railway stations does not include the Zagreb West Railway Station (hereinafter: Zagreb WRS) and some other railway stations (Sisak Caprag, Zagreb Žitnjak, Kutina Škrljevo, Rijeka Brajdica, Virovitica…) as stated by the transport operator, who points out that it is not clear what criteria HŽI used when preparing the list of railway stations. In the procedure, it was determined that the complaint is substantiated and Paragraph 3 of the Decision on the amendments to the 2017 Network Statement 2017 was annulled. HŽI was ordered to amend Paragraph 3.6.3. of the 2017 Network Statements so that it completely prescribes and explains the criteria based on which railway stations in which shunting is allowed are determined.

After the complaint to the 1st amendments to the 2017 Network Statement, HAKOM has held the fifth procedure regarding the complaint of a railway operator against the 2nd amendments to the 2017 Network Statement and the 7th amendments to the HŽI- 40 Instruction. The railway operator indicated that the traffic and technological conditions for shunting prescribed by the Instruction HŽI-40 (Art. 44.a) have no expert basis, and have been determined exclusively with the intention of forcing transport operators to use those railway stations for shunting in which services are performed by HŽI. HAKOM determined that HŽI, in accordance with the prescribed technical, traffic and technological conditions, was justified in deciding that in the Zagreb junction, the shunting of cargo trains only be allowed in the Zagreb shunting yard as a service facility with a specific purpose, whereby it has taken

[23] The validity period of the 2017 Network Statement is related to the annual timetable and applies to the 2016/2017 timetable.

into consideration the population density around the indicated railway station, which is also prescribed as a condition by the Instruction HŽI-40, which preceded the 2nd amendments to the 2017 Network Statement. HAKOM completely dismissed the complaint as ill-founded.

Furthermore, with a view to eliminate the challenges on the rail services market in the Republic of Croatia, HAKOM has, through its proactive activities, successfully organized two round tables in 2016, gathering all market stakeholders The first round table in 2016 was actually the fourth round table in a series of round tables organized by HAKOM since the beginning of 2015.

The fourth round table was organized by HAKOM in cooperation with the Faculty of Transport and Traffic Sciences, with the goal of stimulating the mutual communication of stakeholders of the railway services market through a synergy of a scientific approach and practical experience.

The fourth round table gathered almost one hundred representatives of stakeholders of the railway services market. Representatives of the Croatian Chamber of Commerce (hereinafter: CCC), the then Ministry of Maritime Affairs, Transport and Infrastructure, the Faculty of Law, all railway operators and infrastructure managers, representatives of managers of service facilities (ports and cargo terminals), representatives of the designated body established in the RoC (Centre for Rail Systems) as well as representatives of the Railway Safety Agency participated in the round table discussion. The goal of the round table was to familiarize the academic community with the specific challenges of stakeholders on the rail services market and vice versa - to familiarize the rail services market with the academic and scientific approach, and thus to prompt mutual communication between stakeholders, with the goal of discussing common subjects and adopting conclusions. For this purpose, professors of the Faculty of Transport and Traffic Sciences have given their contribution through presentations on subjects of the safety and interoperability of the Croatian railway system, the fees of railway services and the railway services market in intermodal transport during the liberalization of the rail services market.

Also, the Centre for Rail Systems (CTS), a company that deals with the testing and certification of all parts of rail systems, rail vehicles and track structures, presented an overview of the state regarding the issued safety certificates for operators of service facilities by the Railway Safety Agency. One of the presentations at the round table discussion was the Presentation of the Railway Association on the subject of industrial tracks as the generator of transport demand.

On 31 March 2016, a workshop on the subject of "Challenges connecting logistics centers in the Danube region" was held in the organization of the Railway Association in cooperation with the CCC and the participation of HAKOM, at which challenges related to the access to logistics centers were discussed.

On 29 June 2016, HAKOM held a meeting with the representatives of the CCC, Rijeka Port Authority, Rijeka Port d.d., the Association for intermodal transport and logistics and Jadranska vrata d.d. At the meeting, HAKOM presented activities through the organization of round tables with the stakeholders on the rail services market. The conclusions from the 4th round table and conclusions from the meeting held in the organization of the Zagreb CCC in March of 2016 were presented. The conclusions from both gatherings are similar and refer to the incompatibility of the working hours of institutions that are key for the process of the organization and realization of transport, such as customs, phythosanitary and veterinary inspection. HAKOM initiated the resolution of the indicated problems by submitting official letters to the Ministry of Agriculture, which is competent for phytosanitary and veterinary inspections, the Ministry of Health, which is competent for sanitary inspections, the Ministry of Finance, which is competent for the customs administration, and the Ministry of Administration, which is competent for civil servants and employees (in connection with overtime or shift work, and the potential employment of new employees), with clearly indicated issues and proposals for their resolution.

Finally, HAKOM, in cooperation with the CCC, organized the 5th round table on the subject of the "Rijeka Transport Route". The need for holding the 5th round table as a thematic meeting occurred after the 4th round table and meeting with the representatives of the CCC, the Rijeka Port Authority,

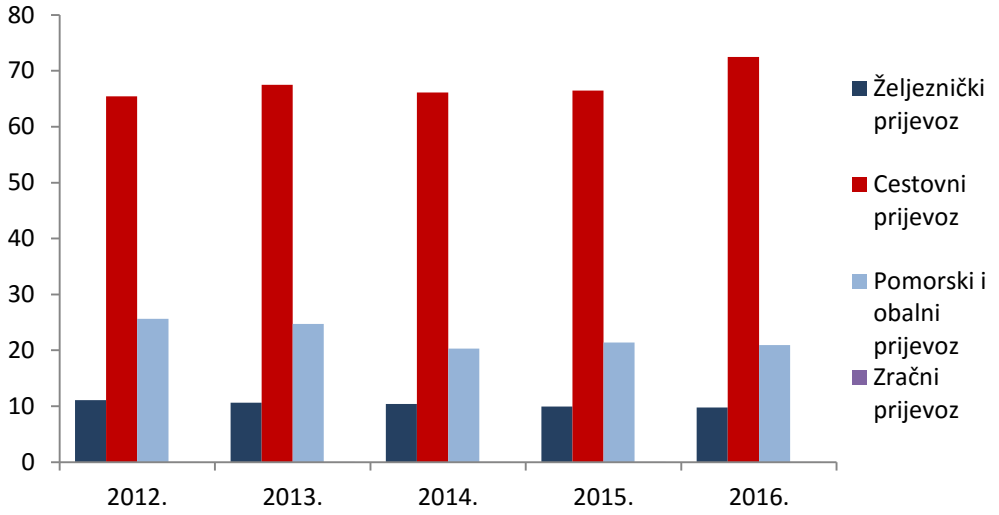
Rijeka Port d.d., the Association for intermodal transport and logistics and Jadranska vrata d.d. in June of 2016. The 5th round table gathered representatives of the CCC, today's Ministry of Maritime Affairs, Transport and Infrastructure, the Ministry of Agriculture, Ministry of Health, Faculty of Transport and Traffic Sciences, Rijeka Port d.d., Rijeka Port Authority, Jadranska vrata d.d. and the Association for intermodal transport and logistics at the CCC.

The goal of the round table was to coordinate the actions of all stakeholders on the market of rail services. Specifically, the round table referred to the adjustment of working hours of all institutions that operate in the Port of Rijeka, with the goal of strengthening the competitiveness of the Port of Rijeka, and thereby strengthening its role in railway cargo transport.

4.3 Transport

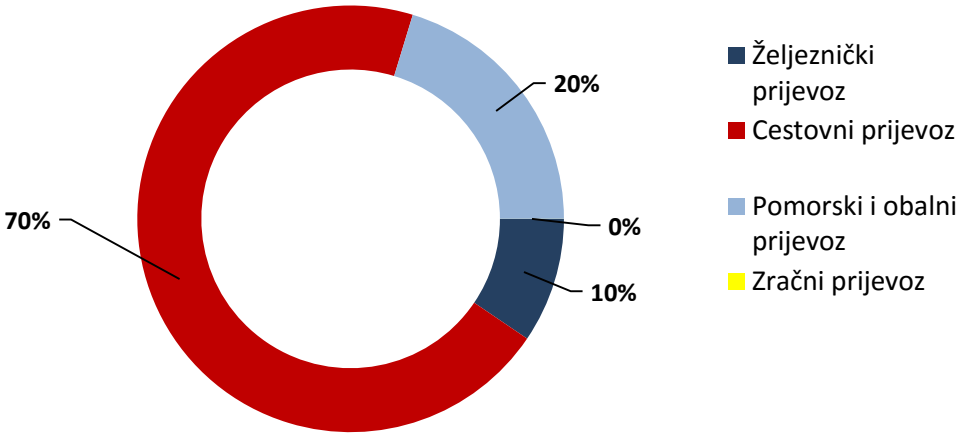
As part of its activities of collecting data on the market, HAKOM also collects data on the number of transported passengers and the amount of transported goods, since these are indicators of the state of the railway transport market, which is dependent on and related to the railway services market. The appearance of competition on the rail services market in 2016 does not point to significant changes on the market, nor has it increased competition on the rail transport market compared to other modes of transport, which is illustrated by data published by the Croatian Bureau of Statistics and data collected by HAKOM. The transport data indicate the dominance of road transport (Figures 4.9. to 4.11.).

Figure 4.9. Amount of transported goods according to type of transport (millions of tonnes)



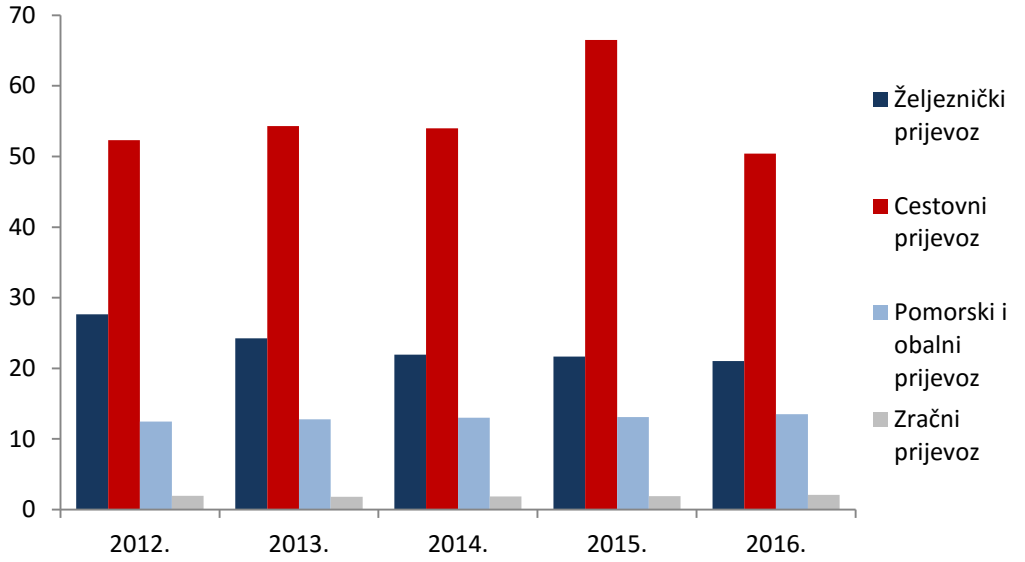
Source: www.dzs.hr

Figure 4.10. Share of transported goods, according to type of transport for 2016



Source: www.dzs.hr

Figure 4.11. Number of transported passengers according to type of transport (millions of passengers)



Source: www.dzs.hr

Railway passenger transport has recorded a reduction in the number of transported passengers of three percent compared to the previous year. In 2016, 20,741,949 passengers were transported, who realized 835,564,350 passenger kilometers (Pkm)[24]. The number of transported passengers[25] in 2016 includes the number of transported migrants and refugees, of whom 100,982 were transported in the first quarter of 2016.

One of the reasons for this reduction in the number of transported passengers are the numerous overhauls of railway lines, which were continued in 2016. Due to these, transport on parts of railway lines was substituted with buses, making the transport route longer. Yet, over the long term, the overhauls will lead to the improvement of the quality of the infrastructure, which will lead to the improvement of the transport service.

On the other hand, the increase of the quality of the transport service will certainly be significantly impacted by the opening for traffic of ten new low-floor passenger trains, with which HŽ Putnički prijevoz d.o.o. has made a step forward in raising the quality of its offering for passengers. The modern interior attractive to users, air-conditioning units for cooling during the summer, heating systems for winter days, noise reduction in the passenger rooms, information systems that provide passengers with information on the journey, and aids for persons with disabilities are only part of the novelties. Some of the advantages that will influence the reduction of operating expenses with the introduction of the new trains are the possibility of a fast and simple connection of up to three sets of trains (a set comprises a self-powered carriage firmly connected with other carriages) into a train, the low consumption of electrical power due to the modern electromotors, the possibility of recovering electric energy (recovery of electric energy produced during braking into the electricity supply network), greater resistance to extreme weather conditions and a simpler maintenance.

It is important to point out the modernization of the offering of HŽ Putnički prijevoz d.o.o. and a greater orientation to the end users, which is evident in the introduction of the sale of tickets online/on smartphone applications, which is part of the integrated system of the reservation and sales of tickets of HŽ Putnički prijevoz d.o.o. The new and modernized methods of selling tickets have been introduced

[24] Passenger kilometer (Pkm) is a measure expressing the movement of one passenger at the distance of one kilometer.
[25] Out of the total number of carried passengers two percent were international passengers who covered four percent of passenger kilometers (Pkm).

in mid August of 2016. The physical purchase of tickets from the ticket collector in the train has been replaced by mobile terminals, and the sale of tickets on ticket counters has also been modernized.

With the introduction of the sale of tickets via ticket machines at seven railway stations, stage 1 of the implementation of the integrated system of the sale and reservation of tickets is complete. The tickets are bought at the machines by using card payment; four machines have been set up at the Zagreb Main Station, and one machine at the railway stations in Osijek, Slavonski Brod, Vinkovci, Varaždin, Rijeka and Split. Of the total number of sold tickets, in 2016, 7,609 tickets were sold by the machines, mostly at the Zagreb Main Station (6,538) and at the Osijek railway station (511).

With the introduction of the integral system of the sale and reservation of tickets, HŽ Putnički prijevoz d.o.o. changed its visual identity and presented it on the new train and its website.

5 USER PROTECTION

User protection is one of pillars of regulation, and the user benefit is ensured through the application of principles of objectivity, transparency, non-discrimination and proportionality in the protection of competition. A special emphasis was placed on ensuring a high level of protection of users of services in their relations with operators/service providers/carriers, in particular by making available simple and inexpensive dispute resolution procedures.

5.1 Protection of users of electronic communications services

The field of electronic communications is one of the most dynamic Croatian markets with various services that are frequently used by almost all citizens in the Republic of Croatia. As a reminder, there are over 4.4 million users of mobile communications networks in Croatia, around 1.3 million phone connections in the fixed public communications networks, almost 4.2 million connections for broadband internet access, and over 800 thousand of households that watch TV programs over cable networks, IPTV or satellite. The electronic communications market has the biggest user or consumer base in the Republic of Croatia and the dynamics of market changes, from new products to technological progress, also represent a challenge for the protection of user rights. Furthermore, users of electronic communications are often more familiar with the protection of their rights than consumers on other network service markets. Considering the nature of the service, all operator mistakes will be easily noticed by users.

The existing legislative framework is optimal, it is aligned with the acquis and enables satisfactory protection of such a large number of users of all electronic communication services.

5.1.1 User complaints, objections and disputes

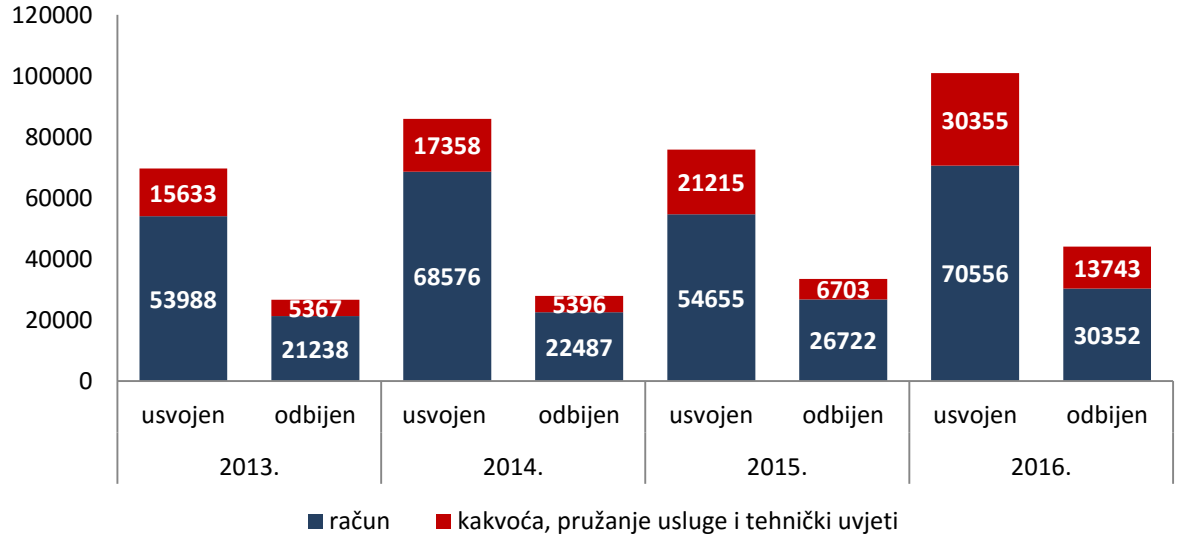
The rights of end users of electronic communications to file complaints in case of unsatisfactory service provision are regulated by the ECA as an out-of-court proceedings of three instances. If the user is unsatisfied with the amount of the bill, with the quality of the provided service, with the service or with the violation of the provisions of the subscription contract, he or she must submit a written objection to the operator within 30 days. If the user did not receive a satisfactory reply from the operator, the user may file a complaint to operator's Consumer Protection Commission. If the user is not satisfied with the Commission's reply, he or she may initiate dispute resolution proceedings before HAKOM aimed at examining all the available facts and adopting a binding decision. An administrative claim may be filed against HAKOM's decision.

This manner of out-of-court or alternative dispute resolution procedure between users and operators appears to be an efficient manner of protecting users' rights because it is much shorter than a regular court proceeding and does not incur costs for the user.

Complaints to operators

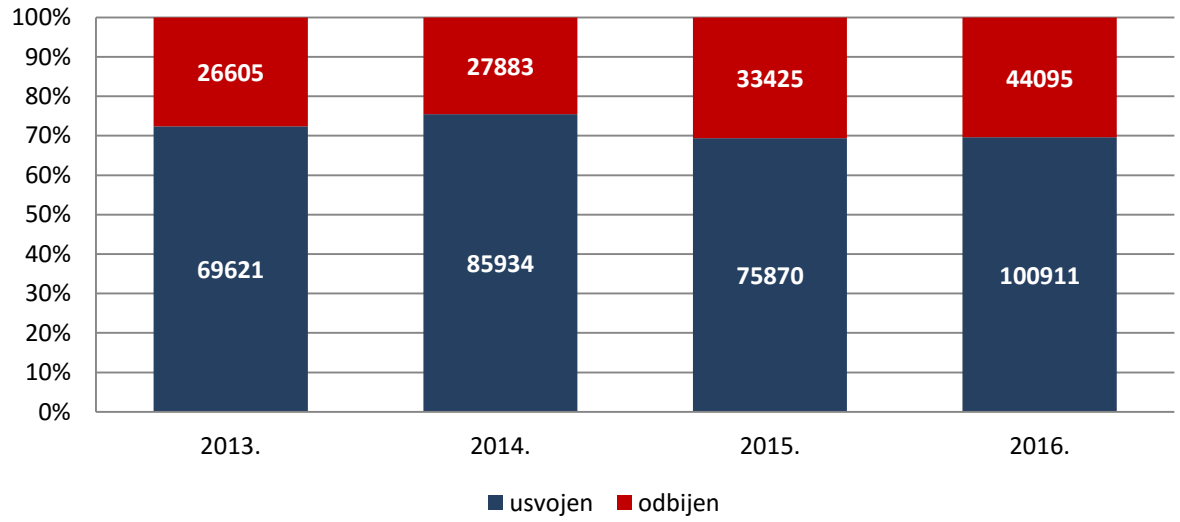
Complaints are the first instance in the procedure for the resolution of complaints submitted by users. Figure 5.1. shows data on complaints collected by the operators, and the total number of adopted and dismissed complaints submitted to operators by users, according to type of complaint. The ratio of adopted and dismissed complaints in the first instance is still larger than 2: 1 despite the increase in the number of complaints, clearly shown by Figure 5.2.

Figure 5.1. Number of adopted and dismissed complaints (1st instance)



Although the number of complaints in the first instance is still very high, if it is standardized to a total number of services contracted in the RoC, users submit a complaint against every seventy fifth service per year.

Figure 5.2. Ratio of adopted and dismissed complaints

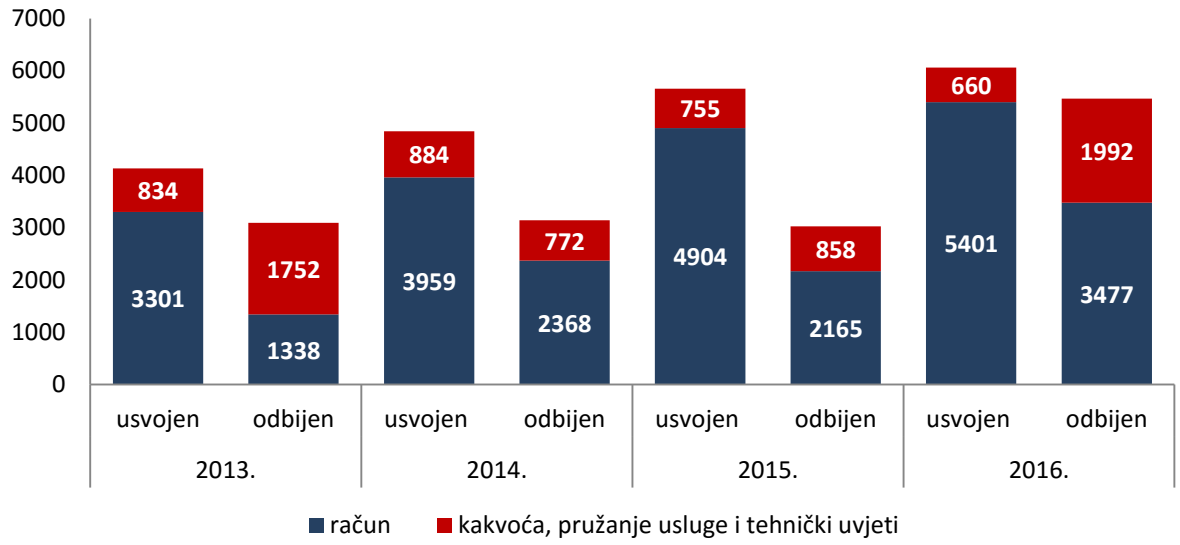


Claims to operators

If the user's complaint was rejected by the operator, the user continues his or her complaint resolution procedure by submitting a claim to the operator's Consumer Complaint Commission, which comprises, in addition to representatives of the operator, representatives of consumer protection associations. Although it would be expected that almost all users continue with the complaint procedure after their complaints are dismissed in the first instance, this is done by only about one third of users. The number of users that fail to continue with their complaint procedure within the statutory term is decreasing

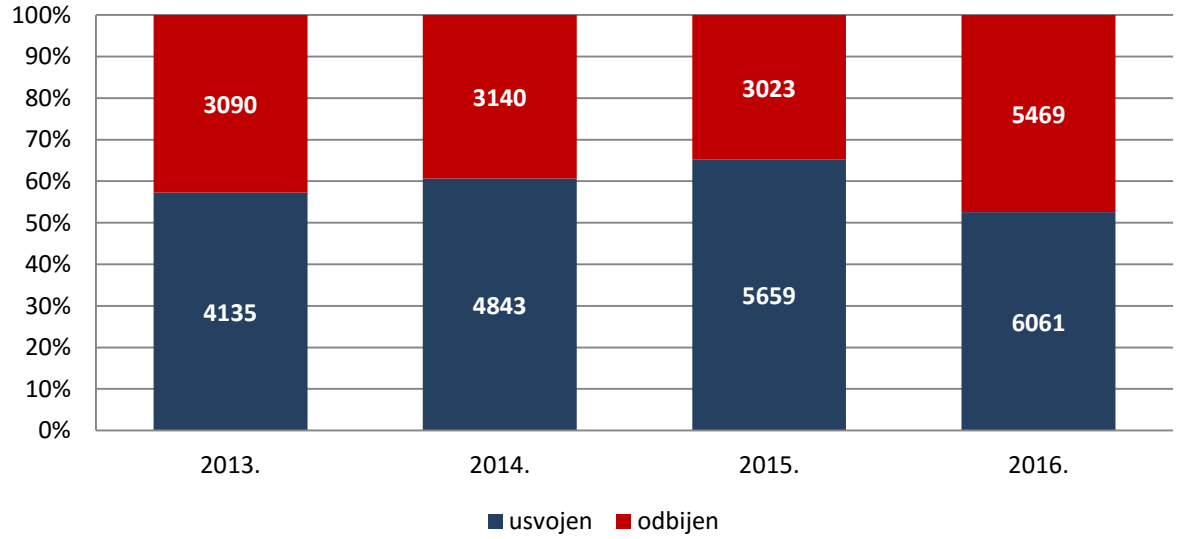
with every year, which points to the fact that users are better informed and are more aware of the fact that they need to respect statutory terms if they want their case considered.

Figure 5.3. Ratio of adopted and dismissed complaints (2nd instance)



The share of adopted complaints in the 2nd instance is lower than that of adopted complaints in the 1st instance. This is to be expected as it indicates that the operators' services have done good work in the first instance.

Figure 5.4. Ratio of adopted and dismissed complaints



Currently, the probability that a user will have to submit a complaint against a service within a year is lower than 1 per mil.

Disputes before HAKOM

By filing a complaint and a claim to its operator, the user fulfils a legal requirement for initiating a dispute before HAKOM. The dispute is the third and last instance in the complaint resolution procedure. If the user filed a complaint followed by a claim within the deadline because he or she is unsatisfied with the amount of the bill, quality, service or due to the violation of the subscription contract, and believes that his or her rights have been violated, the case may be brought before HAKOM by submitting a dispute resolution request. If it is established that all the legal preconditions for the dispute resolution have been fulfilled, the case is examined and a binding decision is adopted. HAKOM's Consumer Protection Commission participates in the adoption of rulings and decisions of

suspension or rejection with its proposal for proceedings. The Commission is composed of HAKOM's experts and representatives of the Union of Consumer Protection Associations. The dispute does not represent a direct expense for the user since it is free of charge and it may be initiated electronically by using HAKOM's web application e-complaints[26].

Table 5.1. Analysis of disputes solved by the Consumer Protection Commission

Disputes	Positive	Negative	Suspension/Subsequently positive[27]	Dismissal
1415	477	530	225	183

Table 5.1. presents an analysis of the resolution of dispute resolution requests at sessions of HAKOM's Consumer Protection Commission. It is clear that the ratio between positively and negatively solved disputes is below 30 percent, which is by about 5 percent lower than in the previous year. This shows that operators have been more frequently adopting adequate decisions in complaint proceedings. 225 disputes were solved positively without the need to adopt a decision. During the procedure when the subject of the dispute is presented, when HAKOM underlines the mistake, operators often change the original opinion themselves and accept user's complaint. In this manner the procedure is quickly terminated by adopting a satisfactory decision for the user. 183 disputes had to be dismissed for not meeting procedural conditions. Although one of the reasons for the dismissal of such a high number of disputes is because users are unfamiliar with the regulations, that is, with the prescribed statutory terms for the submission of complaints, objections or for the initiation of dispute resolution procedures, the number of such cases is decreasing with every year. In 2015, there were 194 such cases, and the year before there was 248. The decreasing number of dismissed disputes is proof that consumers are more aware of the statutory terms and are better informed about the proceedings.

Table 5.2. Analysis of disputes resolved with the adoption of a decision, per operator

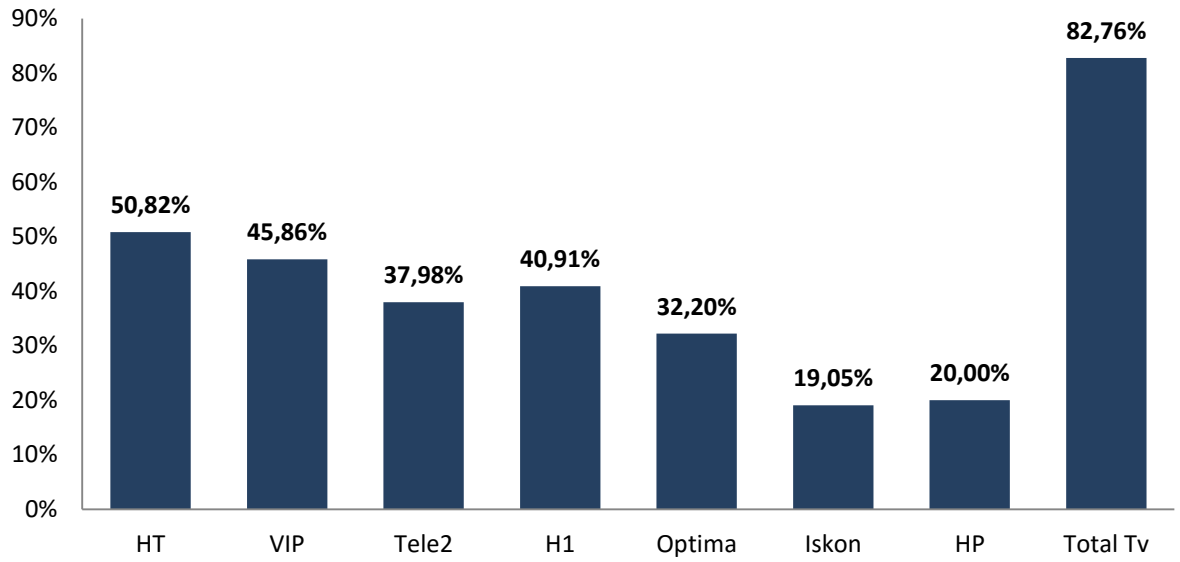
Operator	Number of disputes			Shares of operators in disputes [%]			Share of disputes compared to the number of users [%]			↗ ↘
	2014	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	
HT	218	386	488	31,78	42,89	**48,46**	**<0,01**	**0,01**	**0,017**	↗
VIP	150	200	266	21,87	22,22	**26,42**	**<0,01**	**0,01**	**0,014**	↗
Tele2	156	105	58	22,74	11,67	**5,76**	**0,02**	**0,01**	**0,007**	↘
H1	86	83	66	12,54	9,22	**6,55**	**0,09**	**0,09**	**0,077**	↘
Optima	34	51	59	4,96	5,67	**5,86**	**0,02**	**0,03**	**0,039**	↗
Iskon	22	26	21	3,21	2,89	**2,08**	**0,02**	**0,03**	**0,022**	↘
HP	-	-	10	-	-	**1,00**	**-**	**-**	**0,017**	↗
Total TV	-	31	29	-	3,44	**2,88**	**-**	**0,09**	**0,082**	↘
Others[28]	19	18	10	2,8	2,00	1,00	**-**	**-**	-	

The analysis of initiated disputes per operator, which were resolved with the adoption of a binding decision, is shown in Table 5.2. HT still has the biggest share in disputes which is to be expected because it has the largest user base but it is not sufficient to present this data separately. Therefore, the share of disputes in relation to the user base of individual operators has also been shown as a measure of frequency of requests for the protection of rights submitted to HAKOM. It is obvious that this number varies depending on the operator. For instance, with Tele2 only 7 out of 100,000 users initiate a dispute that is resolved with the adoption of a decision, whereas with Total Tv this ratio is slightly under one out of 1,000 users!

[26] https://www.hakom.hr/default.aspx?id=61
[27] Disputes were positively solved by the operator in the dispute resolution procedure, that is, the operator accepted the user's complaint before adopting HAKOM's binding decision.
[28] Operators who had up to 10 disputes during the year.

An interesting measure that can be used for comparing and evaluating the work of the operator's complaint service is illustrated in Figure 5.5.

Figure 5.5. Shares of operator's decisions that that have not been confirmed by HAKOM in disputes



In the 3rd instance of the user complaint resolution procedure, that is, in the dispute resolution procedure, HAKOM receives only cases dismissed by operators as unfounded complaints and objections. If user protection services of operators, and their commissions, acted in the same way as HAKOM would act in an individual case, then HAKOM's decision is negative for the user. It is obvious that the percentage of negative decisions is more than 50 percent on average (the lower the number of such decisions, the better the work of such commissions), but it is still clear that there is room for every operator to improve this ratio at the satisfaction of the users. The structure of resolved disputes is shown in Table 5.3. It can be noticed that the total number of disputes has remained steady over the last three years.

Table 5.3. Structure of resolved disputes at the meetings of HAKOM's Commission, per year

Structure of resolution of disputes	2012	2013	2014	2015	2016
Positive	279	306	202	429	477
Subsequently positive	407	589	417	244	225
Suspension of proceedings	502	393	248	194	183
Negative	421	408	483	471	530
Total	**1609**	**1696**	**1350**	**1338**	**1415**

5.1.2 Complaints and queries submitted to HAKOM

Dispute resolution requests alone are not a representative sample for detecting and preventing certain market issues since they are part of prescribed proceedings and the third instance in the resolution of the user's complaint. For that reason, some market occurrences may go unnoticed or their importance not revealed if the analysis does not include all of HAKOM's contacts with users.

In the analysis of complaints and queries submitted to HAKOM, data from all user cases in HAKOM's business system e-complaints are used. The basic division is illustrated in Table 5.4. and represents types of complaints/queries addressed to HAKOM in the last 5 years. The number of complaints/queries in 2016 in which users directly contacted HAKOM amounted to 2,871. The number of complaints regarding the amount of bills is comparable to previous years, while the number of complaints regarding business practices increased, and the number of complaints regarding quality decreased.

Table 5.4. Types of complaints

Type of complaint	2012	2013	2014	2015	2016
Bill complaints	1392	1217	1267	1118	1161
Quality complaints	224	229	233	324	306
Complaints against carrier pre-selection	32	34	43	18	17
Complaint against number porting	205	199	177	111	92
Business practice complaint	383	475	619	916	1156
General questions by users	78	137	147	155	139
Total complaints	**2314**	**2291**	**2486**	**2642**	**2871**

The increase in the number of complaints regarding the business practices of operators is mostly due to the dynamics of the market on which users change operators/services more frequently than they used to. Many users then contest the fees or amounts of fees payable for the early termination of their contracts.

Bill complaints

Complaints regarding issued bills are the most frequent category of complaints and their share in the total number of complaints decreased to just below 50 percent.

Table 5.5. Structure and number of bill complaints

Type of complaint	2012	2013	2014	2015	2016
Basic services [29]	1013	939	1073	1002	1017
Other debts [30]	38	45	54	36	23
Internet traffic	283	199	116	59	92
Special tariff services	36	24	17	10	14
Special tariff SMS services	23	10	1	1	2
Total	**1392**	**1217**	**1267**	**1118**	**1161**

Quality complaints

Table 5.6. Structure and number of quality complaints

Subject of complaint	2012	2013	2014	2015	2016
Internet access speed	22	18	10	14	31
Availability	14	26	34	37	24
IPTV	7	20	8	1	2
user line	35	23	28	6	5
Other technical problems	106	103	141	250	235
Interferences, crosstalk, signal interruption,	33	31	5	6	1
Other	7	8	7	10	8
Total	**224**	**229**	**233**	**324**	**306**

The number of quality complaints has decreased compared to 2015.

Analysis of complaints against operator's business practices

[29] Monthly fees, tariffs, packages and contracts.
[30] Dunning letter, interests rates and past due payments.

In order to prevent possible omissions in the conduct of operators, HAKOM dedicates special attention to complaints against business practices of operators because these may indicate systematic or intentional issues. These categories include the operators' advertising, that is, failures that lead users to draw wrong conclusions, operator preselection and number portability.

Table 5.7. Complaints against operators' business practices

Type of complaint	2012	2013	2014	2015	2016
Operator's advertising	44	136	156	100	41
Operator preselection	32	32	40	18	16
Number portability	205	181	163	107	84

Complaints in all categories have decreased compared to the previous periods, and the category most important to users – the possibility of changing operators with retaining the same telephone number has for the first time decreased below 100 cases. Operators have had to pay penalties to users if they are late with the porting of the number, which is why the number of such cases is decreasing. Issues regarding operator preselection are also less and less frequent.

5.1.3 Preventive activities in user protection

HAKOM pays special attention to the prevention of noticed problems in relations between users and operators. The first type of prevention is the adoption of sectoral regulations that define certain market segments more clearly. Distance sales and sales outside of the business premises in electronic communications have been identified as one of the most problematic areas, which are regulated by the Consumer Protection Act (hereinafter: CPA), which is under the competence of the Ministry of the Economy. The latest amendments to the CPA from October of 2015 particularly regulate sales via means of remote communication and outside of business premises of vendors, which includes operators. This is why HAKOM additionally regulated these sales of services, in order to make them clearer to users of electronic communications. Also, the procedures of all operators who deal with these types of sales of their services have been harmonized and must contain all required information and notifications for the avoidance of situations in which clients are not sufficiently informed when making decisions regarding the selection of particular services. The sectoral regulation regulates in more detail the entire process of the contracting, from the sale to the additional confirmation that the operator is obliged to submit to the home address of the user. Furthermore, in order to avoid cases of fraud and identity theft in the conclusion of subscription contracts to a maximum degree, in which the goal of fraudsters is primarily to get hold of expensive devices, but to "leave" the subscription to the user whose identity was stolen, the delivery of the device is permitted only at the address of the user and with the necessary identification of the person that has taken over the device. Of the other user rights and operator obligations that have been additionally regulated by sectoral regulations, the obligation to clearly point out the general terms and conditions and price lists on the websites of the operator should be pointed out. Also, if the operator allows for the conclusion of the contract online, it must clearly specify the method of terminating the contract, which must include online termination or termination by electronic means. In cases of reported and determined malfunctions that last longer than 24 hours, operators must always offer the client a reduction of the bill or other forms of compensation, without the need to file a complaint for the amount of the bill on the part of the client. Regarding malfunctions, HAKOM has noticed many cases in which the elimination of the malfunction takes too long, especially when this is in the domain of the responsibility of the operator providing the service to the client. This is why the following obligation of the operator and right of the user has been prescribed: all malfunctions of the equipment that the operator provided to the client for use or leased to the client for the period of the contract duration (e.g. modem) must be eliminated within 5 days. Otherwise, the user is entitled to terminate the contract without paying a fee for the early termination, and has the right to a reduction of the bill for the month concerned, as it is not reasonable for the user to be without Internet access or TV access only because the operator cannot deliver operational equipment or replace the malfunctioning one within a reasonable time.

It must be mentioned that HAKOM and the Ministry of the Economy jointly closely cooperate on the "Do not call" public register. In 2016, the preparation of the register was completed, and its testing began in November. The register began operating at the end of January of 2017

Below is an overview of other preventative activities used by HAKOM in 2016 to protect or inform users:

- control and harmonization of operators' bylaws (general business terms and conditions, conditions of use and price lists) defining their business operations and special obligations related to the protection of users of electronic communications; the general business terms and conditions have been reviewed, aligned and approved with the new sectoral regulations
- changes of price lists and operators' promotional offer have been examined and checked
- operators' queries concerning the interpretation of regulations and expert opinions have been processed
- queries of the media and consumer protection associations concerning user protection have been processed
- informing users via the website and the "Ask us" section of the website; HAKOM replied to 784 queries in the area of user protection within the shortest possible time;
- informing users through Facebook: publication of rights of users and obligations of operators and replies to users' queries;
- preparation and distribution of leaflets for users; more than 349,000 leaflets[31] with useful information have been inserted into the national editions of daily newspapers
- a direct telephone line for contacting HAKOM's experts during regular business hours for information about specific cases, that is, assistance and instructions on what and how to act in case of problems encountered by users when using services
- a direct telephone line for helplines for consumers so that employees in help centers could obtain information from HAKOM quicker and easier
- HAKOM's experts provide advice and instructions on protection and notifications of user rights: they regularly they participate in TV and radio shows on user and consumer protection
- active participation in the work of other state institutions on projects concerning user/consumer protection.

5.2 Protection of users of postal services

Pursuant to the Postal Service Act, HAKOM is competent for the protection of users of postal services and the resolution of disputes between users and postal service providers. The procedure for the resolution of complaints made by users of postal services is a three-instance procedure harmonized with the procedure for the protection of rights of end users of public communications services in disputes with operators 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.

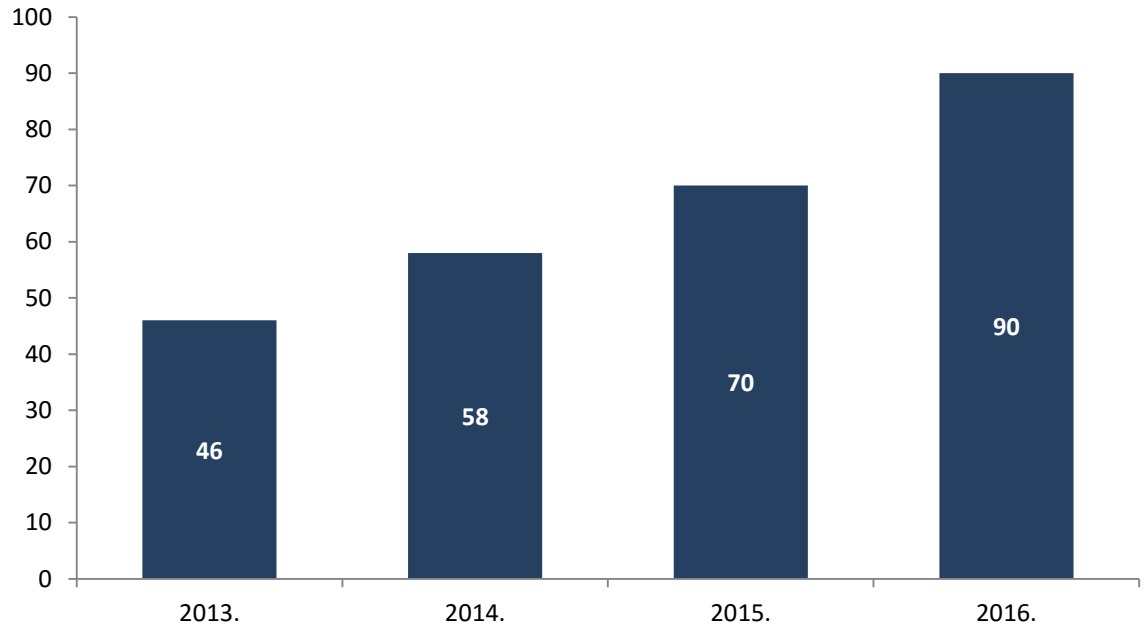
HAKOM resolves disputes by adopting a decision, on the basis of the opinion of the Consumer Complaints Commission, an advisory body established with HAKOM, in accordance with act regulating

[31] The leaflet is available to all citizens in the pdf format at http://www.hakom.hr/default.aspx?id=1504

consumer protection. 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.

The annual number of received requests has been growing since 2010 when HAKOM started resolving disputes between users and providers of postal services. In 2016, HAKOM received 90 requests for the resolution of disputes between users and providers of postal services, which is a significant increase (28 percent), compared to the 70 requests received in the previous year but this was the expected outcome of the efforts that are invested into familiarizing users with their rights. The number of disputes is not significant if taken into account that more than 330 million services were provided in 2016. Out of the total number of requests, 84 refer to disputes with universal service provider, HP, and 6 to other postal service providers.

Figure 5.6. Dispute resolution requests, per year



Based on the submitted requests of users during 2016, a total of 83 disputes were resolved, 58 of which were received in 2016, and 25 of which have been carried over from 2015. 63 disputes referred to domestic and 20 to international postal traffic.

Of the total number of resolved disputes, 12 requests were dismissed as inadmissible, mostly because they were submitted by unauthorized persons. Other conducted proceedings were completed with adopted decisions. Only 21 user requests were dismissed as unfounded and 50 were adopted or partially adopted. Concerning the types of complaints, 18 requests referred to unfulfilled contractual obligations, that is, to obligations that were not fulfilled in their entirety, 15 of which regarded registered mail. A total of 14 disputes were initiated due to loss of postal items, 7 disputes referred to non-compliance with deadlines for delivery, and 36 disputes were initiated because of the damage or loss of contents of a postal item.

5 administrative disputes were initiated against HAKOM’s decisions in 2016.

5.3 Passenger protection and inspections in the field of passenger protection in railway transport

Pursuant to the provisions of the Act on the Regulation of the Rail Services Market (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 ARRSM, a passenger may submit a written complaint to the railway undertaking for the protection of his or her rights prescribed by the Regulation, the AARSM, the general terms and conditions for passenger transport, the law regulating the railway traffic area and other regulations regulating passenger rights. Pursuant to the CPA and the

AARSM, a passenger may submit a claim to the Consumer Complaints Commission of the railway undertaking and HAKOM within 15 days from the date of receipt of the railway undertaking's decision. HAKOM will act upon the passenger's complaint only after the passenger has exhausted all the remedies offered by the railway undertaking.

HAKOM resolves disputes by adopting a decision, on the basis of the opinion of the Consumer Complaints Commission, an advisory body established with HAKOM, in accordance with the CPA. HAKOM's decisions in disputes between passengers and railway undertakings are final and may not be appealed but an administrative dispute may be initiated.

In 2016, HAKOM resolved 7 passenger complaints. The majority of passenger complaints referred to the payment of an additional 500.00 HRK for riding without a valid ticket, which is paid regardless of the route and class of train. However, in most cases HAKOM dismissed the complaints for procedural reasons since the passengers failed to submit the complaint to the commission of the railway undertaking and HAKOM within the statutory term or completely failed to submit the complaint to the commission. Compared to the 2,437 complaints submitted to the railway undertaking as the first-instance body, the number of complaints resolved by HAKOM has increased somewhat compared to the previous year.

It should be pointed out that HAKOM, in accordance with the Regulation and the AARSM, for the first time prepared a brochure on the rights and obligations of passengers in railway passenger transport in June of 2016. The brochure indicates key information that passengers need to know when deciding to travel by train. It is particularly pointed out that by purchasing a train ticket, the passenger concludes a Contract on the transport and thus accepts the general terms and conditions of the transport contract, which are published on the websites of HŽ Putnički prijevoz d.o.o. and are available at the request of the passenger at the ticket counters. The brochure puts particular emphasis on assistance to persons with disabilities and persons with reduced mobility, the description of procedures related to submission of complaints (when, how and to whom to submit the complaint), and on the role of HAKOM in the procedure of the protection of passenger rights. The brochures are available at the ticket counters of most railway stations, in trains, and on the website of HAKOM (www. hakom.hr), HŽ Putnički prijevoz (www.hzpp.hr) and the consumer protection association Potrošač (www.potrosac.hr).

Inspections in the field of the protection of rights of passengers in railway transport during 2016 were focused on the protection of passenger rights in railway transport. Pursuant to Article 28 of the AARSM, HAKOM conducted inspections in the field of the protection of passenger rights in railway transport, particularly for the implementation of Regulation (EC) No 1371/2007 of the European Parliament and of the Council on rail passengers' rights and obligations (hereinafter: Regulation).

During 2016, HAKOM continued conducting inspections over the company HŽ Putnički prijevoz d.o.o. it began in 2015, in order to monitor the implementation of the Regulation, the AARSM, the Act on Transportation Contracts in Railway Traffic (OG No. 87/96, hereinafter: ATCRT), the General Terms and Conditions of Carriage (Tariff 101, the Tariff for the transport of passengers in domestic traffic, Carriage conditions, benefits and transport of hand luggage, hereinafter: Tariff 101), and the Ordinance on the preparation and publication of the train schedule in railway traffic (OG No. 128/09, 56/12, 82/13 and 94/13).

In the inspection procedure, HAKOM determined that HŽ Putnički prijevoz d.o.o failed to eliminate the irregularities determined with the Decision of 09 November 2015, and on 12 July 2016 it again ordered the undertaking to carry out the measures indicated in the decision of HAKOM's inspector for the protection of the rights passenger in railway transport. Namely, the Decision ordered the transport operator to provide passengers with information before the start of the journey, such as the timetable, information on the purchase of the ticket and, at the request of the passengers, information on the general terms and conditions of the transport contract. The monitoring of the implementation of the Decision was continued with continuous inspections of official facilities for the admittance and dispatch of passengers (railway stations and stops) for the purpose of making sure that information is

available to passengers before the journey and in order to increase the quality of the transport service in this sense.

Also, HAKOM conducted inspections over HŽ Putnički prijevoz d.o.o. with the purpose of determining factual findings regarding non-discriminatory rules on the availability of transport to persons with special needs and persons with reduced mobility, all in cooperation with the manager of the railway station and with the active participation of organizations that represent persons with special needs and persons with reduced mobility, under Article 19 paragraph 1 of the Regulation. In this regard, HAKOM held meetings with the Ombudswoman for Persons with Disabilities and non-governmental organizations representing persons with disabilities, HŽ Putnički prijevoz d.o.o. and HŽI because HŽ Putnički prijevoz d.o.o has no established non-discriminatory rules on the availability of transport to the persons with special needs and persons with reduced mobility, which was determined with the inspection conducted by HAKOM. Non-discriminatory rules on the availability of transports to persons with special needs and persons with reduced mobility need to be established in cooperation with the manager of the railway station and with the active participation of organizations representing persons with special needs and persons with reduced mobility. The manager of the railway station, HŽI, was ordered to establish such rules.

In addition to the above inspections, HAKOM also conducted inspections of the manager of the railway station, HŽI, in connection with meeting the provisions of the Regulation. In the inspections irregularities were determined concerning the implementation of the Regulation, which is why HŽI was ordered to establish non-discriminatory rules on the availability of transport to persons with special needs and persons with reduced mobility in cooperation with the transport operator, and with the active participation of organizations that represent persons with special needs and persons with reduced mobility, to adequately inform at the railway stations passengers on their rights and obligations pursuant to the Regulation and to inform the passengers about the contact information of the body responsible for the implementation of the Regulation.

HAKOM was actively involved in the implementation of the Decision to establish non-discriminatory rules under Article 19 paragraph 1 of the Regulation. For this purpose, meetings were held with HŽ Putnički prijevoz d.o.o., and the Ombudswoman for persons with disabilities.

5.4 Protection of children

Since children are also users of electronic communication services, HAKOM dedicates particular attention to them, with an understanding that they represents the most vulnerable user group. It is therefore HAKOM's goal to direct part of its activities to raising the awareness and knowledge of children and their parents about responsible behavior in the use of electronic communication services. In 2016, it should be noted that HAKOM marked the world Safer Internet Day during which, in cooperation with the Ministry of Social Policy and Youth, the Faculty of Law of the University of Split, CARNet, the Polyclinic for the Protection of Children of the City of Zagreb and the non-governmental organization "Hrabri telefon", it held a number of lectures and workshops, dedicated primarily to school-age children, their teachers and parents, aimed at educating them and promoting the responsible and safe use of the Internet and mobile devices. The workshops gathered pupils of Split primary schools and their teachers. On this occasion, HAKOM presented its brochure entitled "How to protect your child in the world of the Internet, network technologies and mobile phones". The brochure contains practical and useful advice regarding dangers and safety on the Internet, protection of privacy and personal information, ways of conduct on and use of social networks. The brochure represents a continuation of the cooperation with the Ministry of Education and Science and a program that could allow for the distribution of a sufficient number of brochures to the entire generation of every school year. The goal of the program is to assist the systematic education of primary-school children, and to provide the required information to their parents at a time when children begin to use communication services independently unattended by adults. Each year, the brochure will be adapted to the current development stage of network technologies and will offer important information of Internet safety, the rules of responsible (and nice) behavior and the prevention of cyberbullying.

The program is aimed at all 5th grade pupils in the RoC, and the Ministry of Science and Education and HAKOM presented it to the public at the end of November of 2016, after which the required number of brochures was sent to all primary schools in the RoC.

5.5 Protection of persons with disabilities

Based on its competence prescribed by the ECA and the implementing regulation - the Ordinance on the manner and conditions for the provision of electronic communications networks and services, HAKOM promotes market competition in such a way that it ensures service users, including persons with disabilities, the most favorable conditions with respect to the selection of prices and quality of services. Pursuant to this competence, HAKOM requested from operators of public communication services in 2016 observations on their business relations with persons with disabilities. Taking into consideration the received observations of the operators, persons with disabilities are ensured an equal opportunity in accessing public communication services. This includes the cooperation with associations representing persons with disabilities, the equal use of services (placement of ramps for wheel-chairs in sales premises, etc.), and some operators have established business procedures for persons with disabilities. In the list of equipment that meets the specific needs of persons with disabilities, operators point out certain models of communication devices for mobile and fixed networks of electronic communications adapted to user needs. Furthermore, operators point out that the they can adjust the font size on printed invoices and notifications, and some operators even provide contracts in the Braille alphabet, and certain operators enable the delivery of invoices and subscription contract forms in a way that allows persons with vision impairments easy reading, for example delivery in an electronic format, etc. Users with disabilities are enabled access to customer services, and in accordance with the Regulation on the unique European number for emergency services, since mid 2016 operators must ensure to persons with disabilities access to the 112 number on a way that is equal to the access provided to all other end users of the service (via short text messages (SMS), fax or in the other suitable ways). Operators offer to persons with hearing impairments at least two-way text communication instead of speech communication. Operators generally point out voice and electronic communication; chat, fax and SMS messages.

With the goal of raising the awareness of users, HAKOM published on its website the application "Kviz", developed in cooperation with the Faculty of Electrical Engineering and Computing (FER) of the University of Zagreb as part of research project “Looking to the Future 2020". The primary purpose of the application is to inform consumers, especially persons with disabilities, about their consumer rights and to raise awareness on obstacles with which persons with disabilities are faced when using services. Particular emphasis is placed on the achievement of favorable conditions with respect to the selection of prices and quality of services. "Kviz" is also intended for application developers and designers in order to raise their awareness about the obstacles that persons with disabilities face and to offer them ways of reducing such obstacles.

Once a year, HAKOM distributes via the daily press an informative leaflet for users of public electronic communication services in order to familiarize Croatia citizens with user rights and obligations. The 2016 leaflet placed particular emphasis on the rights of persons with disabilities and the link www.pristupačnost.hakom.hr so that users could find additional information on the rights of persons with disabilities and the obligations of operators when providing electronic communication services.

6 PUBLICITY OF HAKOM'S OPERATIONS

HAKOM' operations must be public pursuant to Article 14 of the ECA and Article 9 of the PSA and Article 8 of the ARRSM. The obligation of publicity also arises from the Right of Access to Information Act, General Administrative Procedure Act and Public Procurement Act.

Restrictions in relation to public access to HAKOM's work exist only to the extent to which this obligation refers to the obligation to respect confidentiality of certain data and to protect personal data.

In 2016, HAKOM maintained the basic structure of its website that is simple to navigate and provides a clear overview of data. The published documents are structured in such a manner that HAKOM's decisions and rulings are separated from rulings and decisions adopted in relation to HAKOM's decisions. In addition to all subordinate legislation under HAKOM's competence, unofficial consolidated versions were also published.

The following was regularly published on the website:

a) 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,
b) 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,
c) available databases on registers were regularly updated and made available,
d) statistical data on markets of electronic communications, postal and rail services were published regularly.

Furthermore, HAKOM publishes news releases about important decisions, judgments and regulations on the electronic communications and postal services markets and activities that HAKOM focuses on. Last year it published 322 such news releases.

HAKOM's representatives participate in radio and TV shows intended for informing the public about important issues in the electronic communications, postal and rail services markets. The majority of public appearances referred to user protection. The largest part of such public appearances was related to consumer protection issues.

As a special form of publicity, HAKOM replies to all queries received through the "Ask us" application on its website. It received a total of 1,230 queries in 2016.

HAKOM continued using its Facebook page with a view to inform the users and the public about user rights and activities carried out by HAKOM.

In 2016, HAKOM received 24 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 received a report on the implementation of the Act on the Right of Access to Information for 2016.

7 COURT PROCEEDINGS

Court proceedings covered by this report include administrative disputes initiated against HAKOM's final decisions, misdemeanor proceedings initiated by HAKOM against natural or legal persons due to violations of laws under HAKOM's competence and enforcement proceedings against legal and natural persons for non-payment of frees 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.

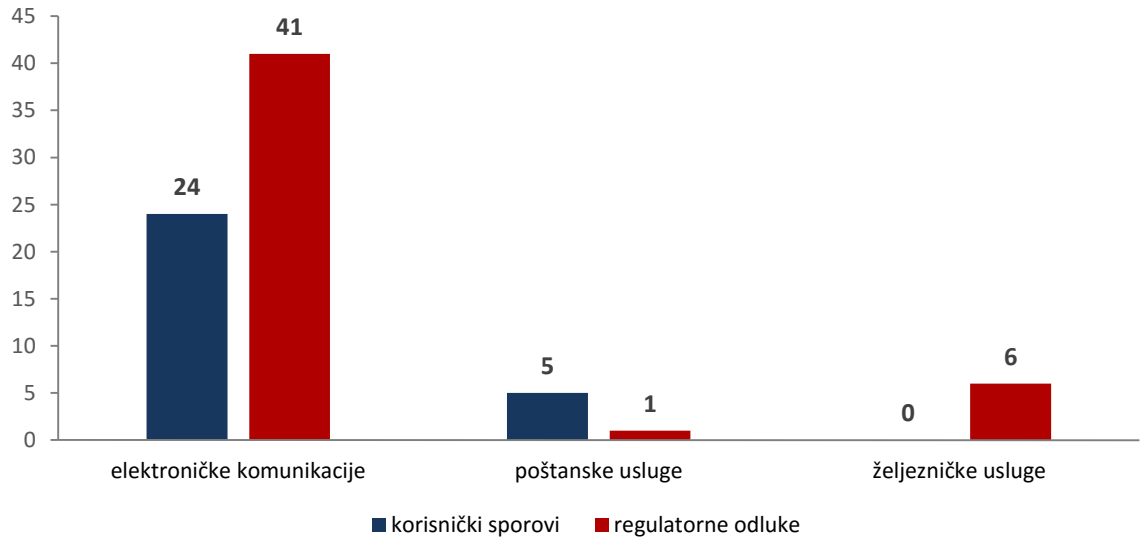
Jurisdiction is divided in the following manner:

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 first instance Administrative Court (Split, Osijek, Rijeka and Zagreb) 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.

A total of 77 administrative complaints were submitted in 2016 against 1,415 of HAKOM's adopted decisions, 29 in user disputes and 41 against regulatory decisions. Of the total number of complaints in user disputes, 24 referred to the electronic communications sector and 5 to the postal services sector. Of the 48 complaints against regulatory decisions, 41 referred to the electronic communication sector, 1 to the postal services sector and 6 to the rail services sector (Figure 7.1).

Figure 7.1. Analysis of administrative complaints, according to type of decision

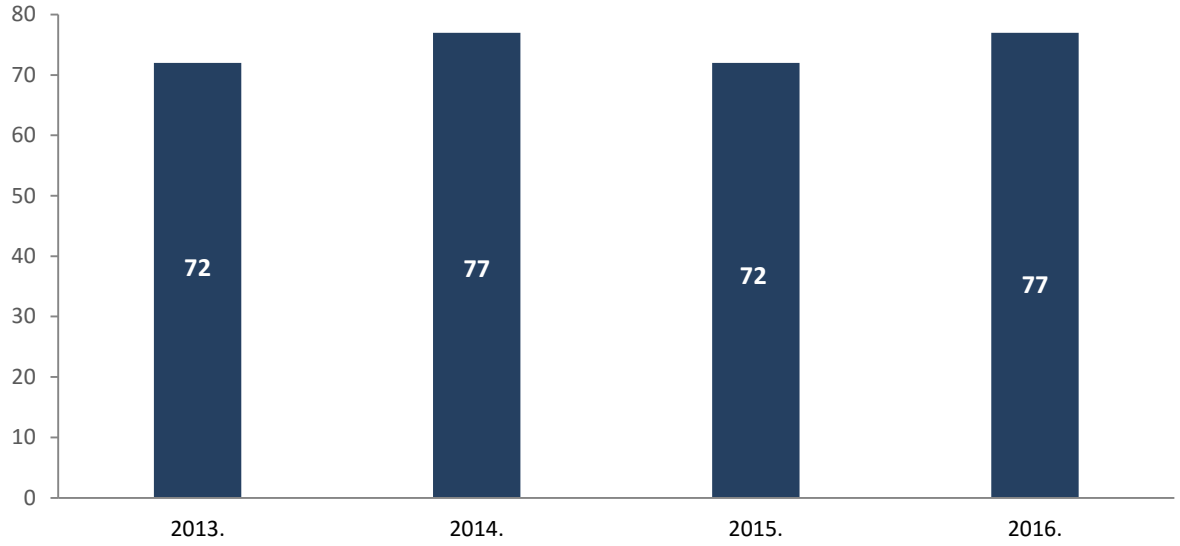


In 2016, the High Administrative Court of the Republic of Croatia adopted 37 judgments out of which 28 confirmed HAKOM's decisions and 9 annulled them. In 9 judgments the High Administrative Court of the Republic of Croatia confirmed the judgments of the first-instance administrative courts.

During 2016, first-instance administrative courts adopted a total of 46 judgments, of which 25 confirmed HAKOM's decision and 11 of which annulled them.

Considering that 77 disputes have been initiated until the end of 2016 against HAKOM's decisions before administrative courts and the High Administrative Court of the Republic of Croatia, there was a slight increase in the number of submitted administrative complaints compared to the previous period (Figure 7.2).

Figure 7.2. Number of filed administrative complaints 2012-2016



Misdemeanor proceedings

In compliance with its legal competence, HAKOM initiated in 2016 a total of 5 misdemeanor proceedings in the field of electronic communications.

Between 2009 and 2016, a total of 41 final judgments were adopted out of which 15 by the High Misdemeanor Court of the Republic of Croatia. In this period, 21 cases initiated by HAKOM are still pending before the first-instance court, while 15 appeal cases are still pending before the High Misdemeanor Court of the Republic of Croatia.

A total of 9 judgments were adopted in 2016, out of which 4 were first-instance court judgments and 5 judgments of the High Misdemeanor Court, 2 confirming the first-instance judgment, 2 amending the first-instance judgment regarding the amount of the penalty, and one dismissing the claim due to statutory limitation.

In one of the two above-mentioned final judgments confirming the first-instance decisions, a fine in the amount of HRK 2,000,000.00 was imposed, which is the biggest confirmed individual fine imposed on a legal person for the violation of regulatory obligations in the electronic communications sector.

In the period between 2013 and 2016 three such final judgments were adopted fining legal persons/operators with the amount of 2,000,000.00 HRK and 1,700,000.00 HRK.

Enforcement proceedings

A total of 33 enforcement proposals were submitted in 2016 against various companies and a total of HRK 503.741,12 was claimed, of which HRK 218.330.37 was collected by 31 December 2016.

8 COOPERATION

8.1 International cooperation

European Union (European Commission, Council)

In 2016 HAKOM actively participated in the work of the Council of the EU at the expert level where it represented the views of the RoC at the meetings of the Working Group for Telecommunications and Information Society discussing the proposal of the European Parliament and Council of the amendments to the Regulation (EU) 531/2012 regarding the rules on the wholesale roaming market. the issues of roaming and network neutrality. The adoption of this Regulation is a necessary precondition for the total removal of additional retail charges for the roaming service, what should be in force in June 2017.

In 2016, HAKOM participated in the work of the RS Committee (RSC - *Radio Spectrum Committee*) which helps the EC to develop decisions for technical implementation ensuring harmonized conditions for the availability and efficient use of the RF spectrum in the EU. RSC also deals with the measures ensuring accurate and timely delivery of information about the spectrum use. By participating in the work of this body national regulators were able to discuss with the EC their proposals before the implementation in order to ensure the optimization of measures depending on various situations in different countries.

HAKOM has also participated in the work of the working group of the EC regarding the RF spectrum management policy (RSPG - *Radio Spectrum Policy Group*) which is a high-level advisory group assisting the EC in the development of the RF spectrum policy, in particular in relation to the alignment with its approach, harmonized availability conditions and efficiency of use of the RF spectrum, and the establishment and functioning of the internal market. RSPG adopts opinions, views and reports, and advises the EC at the strategic level.

Since the EC's decisions refer directly to the RoC which is obliged to implement them, the participation in the RSC and RSPG is of key importance to enable timely influence on the final decision, depending on the national situation for 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. The ones that should be pointed out are the documents regarding the analysis and establishment of oligopoly markets and machine-to-machine communication (M2M), and in drafting the guidelines for the implementation of the TSM regulation regarding the network neutrality.

The aim of the working group in charge of the international roaming sector, whose active member is HAKOM, was to define the ways of implementing the new regulatory framework, which will eventually lead to the abolishment of additional retail roaming charges and which should come into force on 15 June 2017.

In accordance with the BEREC's working plan within the International Roaming/Mobile EWG working group, a subgroup will be established and it will be dealing exclusively with the spectrum issues. Moreover, it will be working on three separate projects: analysing the mobile networks coverage, enabling the mobile networks coverage in the areas of special interest, and spectrum available to encourage innovations within Europe.

ITU

HAKOM is one of the RoC representatives at ITU, and HAKOM's experts regularly participate in the work of the working groups.

In 2016 HAKOM participated in the activities of the working group ITU-R WP1C (Spectrum monitoring) which deals with the current topics in the field of spectrum control and supervision analysing and establishing methods and techniques for the control of the RF spectrum, radio stations control, identification and location of the source of interferences. The results of the working group's activities are relevant to ITU-R recommendations in the filed of control and supervision of the RF spectrum, and Spectrum Monitoring Handbook.

The World Radiocommunication Conference (WRC-15) was held in Geneva from 2 to 27 November 2015 and it was attended by HAKOM's expert. WRC is the most important international gathering in the area of radiocommunications where amendments to ITU Radio Regulations are adopted and the international Spectrum Allocation Table is established which is very important because of global coordination of the RF spectrum. More information about the WRC is provided in the part on the spectrum management.

HAKOM's experts participated in the work of the World Radiocommunication Conference (WRC-16) held in Geneva from 12 to 16 December 2016. Topics related to the use of RF spectrum and satellite orbits and implementation of the provisions of the ITU Radio Regulations were discussed at the seminars, and 110th anniversary of signing the first International Radio-Telegraphy Convention was celebrated, the predecessor of today's ITU Radio Regulations, which at the global level regulate the use of the RF spectrum and represent the base for a successful development of the radio-communication technologies and services used by billions of people worldwide

HAKOM also participated at the ITU-EC Regional Conference for Europe entitled "Broadband Services and Infrastructure Mapping" where HAKOM's project was presented regarding mapping of the areas of availability and use of broadband speeds. The conference in the organisation of ITU, European Commission and UKE was held between 11th and 12th April 2016, and along with HAKOM numerous representatives of other regulators, ministries, industry and other stakeholders from different European countries participated too. Along with the presentations of the national initiatives for broadband services and infrastructure mapping, different tools for measuring the quality of the broadband services were presented at the conference as well as the European Commission's project "Broadband Services Mapping" and ITU0s "ITU Interactive Transmission Maps".

On 14 December 2016 in Brussels in the organization of the European Commission (EC) and DG CONNECT (Directorate General for Communications Networks, Content and Technology of the European Commission) a second workshop was held regarding the consultations on the project "Mapping of Broadband Services in Europe" (SMART 2014/0016) and HAKOM participated in it too. At this workshop functionalities of a unique EU platform for displaying broadband services and infrastructure mapping at the European level were presented. Therefore, through the broadband services mapping in Europe the EC wishes to establish a single platform containing information on the infrastructure and services within the EU, which will facilitate the initiation of investments and consumer rights protection through the transparency of publishing the quality of the services provided. Public disclosure of data through the broadband platform is expected to take place in 2017.

CEPT

CEPT's umbrella institution which manages the work of other working groups within CEPT is the Electronic Communication Committee (ECC). HAKOM actively participated in the work of ECC in 2016. ECC is in charge of the development of the strategy and of the regulation in electronic communications in 48 European countries.

In 2016 too HAKOM actively participated in the work of the ECC's Working Group Frequency Management (WGFM), and continued to follow the development of the use of the spectrum and its harmonization in order to align the Croatian legislation with the legislation of the CEPT Member States.

In 2016 HAKOM continued with its participation in the work of the project team FM44 dealing with the issues of satellite links, particularly because of the possible impact of new satellite systems on the existing microwave links in the Republic of Croatia.

HAKOM also participated in the work of the Working Group Spectrum Engineering (WGSE), and the vice-president of the working group is HAKOM's representative, Krunoslav Bejuk MSc. WGSE is one of ECC's working subgroups in charge of technical issues concerning the spectrum management, which in the first place refers to the analysis of possibilities for mutual sharing of this limited natural resource between various radiocommunications services, including mobile, fixed, satellite and short-range devices.

In 2016 HAKOM continued to follow 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 significant topics of these two expert groups are related to the regulatory frameworks for DD2 (694-790 MHz), the additional spectrum for broadband Internet access and further development of regulations for the Internet of Things (IoT) and Machine-To-Machine Communications (M2M).

In 2016 HAKOM continued its participation in the work of the working group for short range devices SRD/MG (Short Range Devices / Maintenance Group). The working group deals with mass-production devices which use the RF spectrum without the need for individual licences (e.g. alarms, medical implants, RFID, transport systems and communications equipment, such as WiFi). In accordance with the economic potential of short-range devices, the industry has shown significant interest for the frequency options which may be used by short range devices. The working group is working on enabling new applications, technologies and coordination of the use of spectrum for those devices.

Also in 2016 HAKOM was following and actively participating in the work of CEPT/ECC working group WG NaN (Numbering and Networks). HAKOM's representatives continued participating in the work on the topics regarding the numbering and EC networks, and IoT/M2M. The most important topics are the evolution in the use of E.212 codes for mobile networks (MNC), extraterritorial use of E.164 numbers, permanent roaming, guidelines on the fundamental changes of the national numbering plans, the use of data on ported numbers by third person (company), checking of incorrect EU/EEA numbers, eCalls and numbers for providing OTT (Over The Top) services, OTA (Over The Air) change of operator with the help of eSIM / eUICC. Moreover, HAKOM actively participated in making a draft of the report by drafting certain chapters of the ECC report on the PSTN/ISDN migration on IP based networks.

In March 2016 HAKOM's representatives attended a workshop on M2M communications organized by CEPT. The issues regarding the allocation and use of the RF spectrum and addressing and numbering space needed for the harmonization of the existing and future M2M applications were discussed at the workshop. As a result of the workshop activities regarding the RF spectrum issues an overview of the frequency areas used for the M2M applications was given taking into consideration a possible new identification for the M2M applications.

In November 2016 HAKOM's employees attended a workshop on 5G mobile communications organized by CEPT. The requests for additional RF spectrum needed for the implementation of 5G technologies were discussed as well as the use of 5G technology in the existing harmonized bands for mobile networks, challenges expected in the further development of the regulatory framework, and issues of quality and availability of new services to be defined by the requests of other industry branches as users of 5G technology such as health care, energy or traffic.

During the course of last year reports of other working groups were monitored as well, at the level of analysing the output documents.

HCM

Based on the work of the ITU and the CEPT, the HCM (*Harmonized Calculation Method*) Agreement represents a separate body in the area of international cooperation in charge of cross-border coordination of the spectrum. The main objective of the Agreement is the establishment of common criteria and methods for international coordination of radiocommunications services. The Agreement describes in detail the issue of electromagnetic radiation and defines the procedures of the

coordination process, including the format of the forms for the exchange of data between the signatory countries. Furthermore, bilateral or multilateral agreements with neighbouring countries concerning coordination of the RF spectrum use are based on the HCM Agreement. As a signatory of the agreement, the Republic of Croatia coordinates private mobile networks and microwave links with the neighbouring countries exclusively on the basis of this agreement.

In 2016 HAKOM participated in a meeting of HCM-MS. The main topics of the meeting were mobile networks in the frequency bands of 400 Mhz, propagation models for the frequencies above 3000 MHz, introduction of the new version of the HCM programme for calculating the strength of the electromagnetic field and the revision of Recommendation ECC/REC/(15)01.

EMERG

EMERG (Euro-Mediterranean Regulators Group) is a body gathering regulatory authorities from the Mediterranean European countries and African Countries from the Mediterranean pool and its activities are an attempt at applying BEREC's manner of work to the broader Mediterranean region. Since March of 2015 HAKOM is a full member of EMERG and has actively participated in the plenary sessions, workshops and gatherings organized by EMERG.

In June of 2015 EMERG organized a workshop aimed at creating a nucleus of a future EMERG working group that will deal with data collection authorities of regulatory bodies starting from the manner, type and frequency of data collection to the exchange of experiences in the carrying out of inspection supervision due to the rejection of the operator or failure to comply with the data submission obligation. HAKOM's representative held a presentation about HAKOM's experiences in the application of regulatory body's data collection authority.

With the aim of exchanging experience regarding the roaming regulation evolution in the European Union from the beginning of he regulation implementation and all the way to complete lifting of the additional roaming charges a joint workshop of BEREC and EMRG was held in Brussels on 5th and 6th December where the challenges in the international roaming were discussed.

ERGP

The European Regulators Group for Postal Services (ERGP) through a number of working groups resolves the issues concerning the universal service, regulatory accounting, postal services prices, situation on the postal services market, quality of services, user satisfaction, cross-border parcels traffic and other. HAKOM's expert actively participated in 2016 too in the development of documents for postal market regulation. One of the key issues discussed in 2016 was related to the e-commerce and its related postal services on the EU digital single market. HAKOM's experts, who participated in the discussion on the proposal for the Regulation by the EC on cross-border delivery of parcels, were actively representing the views and interests of the RoC taking into consideration the specific nature of postal services market in the RoC. The objective of the proposal for the Regulation by the EC on cross-border delivery of parcels is the amendment of the regulatory framework for postal services with the intention to eliminate cross-border barriers in parcel traffic and the development of e-commerce services.

CERP

HAKOM' experts continued to actively participate in the work of the European Committee for Postal Regulation (CERP), and in 2016 they participated in the work of the CERP working groups as well as of the 51st CERP Plenary Meeting in Tbilisi.

UPU

In Istanbul in the period from 20 September until 7 October 2016 the 26th Congress of the Universal Postal Union (UPU) was held, and the representatives and delegates from 192 member countries of this specialised international agency of the United Nations participated in its activities. The Congress as the highest body of UPU is in principle held every 4 years. With the aim of successful and efficient development of the postal sector under new conditions, the Congress adopted a number of

professional technical-technological regulations, acts and documents, and the ones to be singled out are; a new system of terminal charges for letters and small parcels and new Istanbul World Postal Strategy for the period 2017-2020.

HAKOM'S experts attended the 26th Congress as a part of the delegation of the RoC which is an active member of UPU.

IRG Rail

HAKOM actively participated in the activities of working groups of IRG-Rail, the independent regulators group for railway services. The issues covered by the working group for fees during 2016 were related to the methodology analysis and compliance with the Regulation 2015/909 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service. The activities of the working group focused on monitoring the situation on the rail service market were focused on aligning the questionnaire for the monitoring of the rail market with the Regulation 2015/1100 on the reporting obligations of the Member States in the framework of rail market monitoring. The working group dealing with the legal framework aimed to define new legislative procedures and to define the IV Rail Package adopted in the European Parliament in December 2016. The aim of the working group for access to service facilities was to draft documents providing an overview of practices for the principles of the calculation of the fees for passenger stops in Europe. HAKOM's experts participated in the activities of all working groups, and in drafting of different documents that were adopted by representatives of regulatory authorities from all member states, including HAKOM, at IRG Rail's plenary sessions.

ENRRB (European Network of Rail Regulatory Bodies)

ENRRB 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 ENRRB's work, all regulatory authorities for rail have to fill out a questionnaire used for reporting on the market situation and their work, meaning procedures conducted on the basis of complaints or *ex officio*. The meetings are used to present only important issues covered by the work of the regulatory bodies and to answer questions asked by colleagues from other regulatory authorities with a view to exchanging experiences and creating good practice in the area of regulation of the rail services market. The singled out positive examples in the presentations are used to report on cases which are important for the practice of regulatory authorities with a view of harmonizing the decision-making practice and the establishment of a unified regulatory practice in the entire EU.

In 2016 HAKOM actively participated in all the meetings of ENRRB, and at the 9th meeting it held a presentation on the topic «Report on the Service Facility Operators' Network». As the RoC is among the first countries to implement in its national legislation the Directive 2012/34/EU of the European Parliament and Council of 21 November 2012 on establishing a single European railway area, so-called *Recast,* and HAKOM is the first regulatory authority monitoring the implementation of those regulations. Considering that the content of the Report has not been stipulated in details under *Recast,* nor under the Railway Act (RA), HAKOM, with the aim of achieving a harmonized conduct, defined a template for the Report on the Service Facility Operators' Network comprising basic data, technical data, data on rail service providers and prices. All the operators of service facilities at ports and fright terminals have on their web pages a published Report on Service Facility Operators' Network. The Commission representatives were more than satisfied with the created template and they suggested to all the ENRRB participants to use HAKOM's template to publish the Report on Service Facility Operators' Network in their countries.

At the 11th meeting of ENRRB HAKOM, as an example of good practice, held a presentation on the topic of the «Agreement on Cooperation with the Body Competent for the Railway Traffic Safety». *Recast* stipulates that the cooperation of a regulatory body with a national body in charge of the railway traffic safety is mandatory through the development of a mutual framework for data exchange and cooperation with the aim of preventing negative effects on the market competition or safety on the rail services market. This framework comprises mechanisms to be used by the regulatory bodies to give recommendations to national bodies in charge of safety and licence issuing regarding the issues that could affect the market competition and vice versa, and the mechanism itself had been defined by the signatories of the stated Agreement.

BCON

Since 2016 HAKOM has been a member of the Broadband Competence Offices Network (BCON) with its headquarters in Brussels. In November 2016 HAKOM's employees represented Croatia at the first meeting of BCON EU Member States where the initiative WiFi4EU was presented and the issues of broadband development in individual Member States were discussed. Moreover, they were working on the BCON activity plan for the future period and defining the priorities.

Other

HAKOM participated at the 132nd international conference on optical technologies, Fiber Week, which took place in Supetar (Island of Brač) from 26 to 28 April 2016. Fiber Week is the leading conference on the latest research, investments into the development and implementation of optical technologies. HAKOM's representative held a lecture at the conference on regulatory activities aimed at stimulating investments into broadband access infrastructure, particularly with the efficient use of free space in infrastructures and with decreasing of costs for the construction of broadband access networks.

Within the framework of the 33rd international conference «Planning and Designing» P&P 2016 held in Zagreb from 10th to 11th November 2016 in the organisation of the electrotechnical association Zagreb HAKOM presented its experience in the implementation of the Ordinance on Manner and Conditions of Access and Shared Use of Electronic Communications Infrastructure and Associated Facilities, as well as the basic characteristics of the Ordinance on Facilities particularly from the view of infrastructure operator and operator user.

In Zagreb on 18 May 2016 the 3rd regional conference «Back to the Future 3» was held. Leading international experts and companies presented at the conference the RFID technology, the areas of application and challenges and benefits of the RFID technology.

HAKOM's employees participated in the 39th International ICT gathering MIPRO 2016 held from 30 May to 2 June in Opatija as authors of papers, participants in round tables and forums, chairpersons of plenary meetings and reviewers. At the occasion HAKOM organized a round table entitled «Financing the Construction of Broadband Access Networks Where There is No Commercial Interest from the European Structural and Investment Funds». At the round table the processes and procedures necessary for submitting the project application for the construction of broadband infrastructure were discussed, and instructions were given to the local and regional self-governments who to turn to and how to ask for support and receive clarifications regarding their projects. The current situation was presented regarding the fulfilment of the preconditions for the withdrawal of financing from the EU funds. Their experiences related to the development projects of broadband infrastructure will be presented by representatives of the Republic of Slovenia.

Additionally, HAKOM also organized «3rd Forum on the Future of the UHF band – digital terrestrial television and other digital agenda» where HAKOM's experts explained the strategic definitions and key decisions within the framework of the Strategy for switching the digital terrestrial television to the DVB-T2 system and the allocation of the frequency band of 700 MHz. The interested audience was also informed about the planned and current activities. Moreover, a discussion was initiated about the potential for the mobile communications networks. Within MIPRO the 2nd Croatian forum on Internet management (CRO-IGF) was held too. The mission of the Forum on Internet management is to connect all the interested stakeholders of the Internet chain regarding the issues concerning the Internet management and regulation. The Forum is an open platform for discussing and analysing problems from different perspectives of all stakeholders. The Forum has neither negotiation nor decision-making mandate, but it can contribute to the process of shaping attitudes and proposals of the solutions adopted at other adequate bodies and organizations.

During the 24th international symposium SoftCOM, which took place in Split between 22 and 24 September, HAKOM organized and moderated a round table on "Financing the Construction of Broadband Access Networks Where There is No Commercial Interest by Using the European Structural and Investment Funds (ESI)". The round table organised within the framework of the project "Looking to the Future 2020", which is implemented by HAKOM together with the faculties of the University of Split, University of Zagreb and University of Osijek and network operators and companies from the telecommunications industry. The goal of the round table was to provide information to all the subjects included into the process of development and construction of the broadband infrastructure and to provide guidelines to the potential users of the means from the EU funds regarding the steps necessary for the successful implementation of projects.

HAKOM's experts participated in the work of the 58th “ELMAR-2016” international conference held in Zadar between 12 and 14 September, where they presented their papers on the advantages of using the H.265/HEVC coding system in the future DVB-T2 network in Croatia and the activities regarding the transition of the digital terrestrial television to the DVB-T2 system as well as social and economic aspects of the overall process of the transition of the digital terrestrial television to the DVB-T2 system and the expected benefits of freeing and allocating the frequency band 700 MHz (the second digital agenda) for mobile communications networks.

HAKOM's representatives participated in the XIV International Conference INFOFEST- 23rd Festival of ICT achievements in Budva held on 26 and 27 September entitled "Regulatory Activities in the Electronic Communications Sector" – "Electronic Communications Market Regulation" organized by the Montenegrin Agency for Electronic Communications and Postal Activity (EKIP) and ITU. The representatives of the Croatian Regulatory Authority for Network Industries held at the conference four lectures regarding the single digital market, directive on reducing costs of the next generation networks construction, new roaming regulation and experience in the implementation of the broadband mapping project.

A regional conference in the organization of the European Bank for Reconstruction and Development was held in Athens on 20 and 21 October on the topic of the importance of investing into the high speeds broadband network, meaning into networks that enable speeds of 30 Mbit/s and more. The emphasis was also put on the importance and necessity of having a strategy for the development of broadband Internet access and on setting clear national goals in the construction of high speed networks. Within this conference the Croatian Strategy for the Development of Broadband Internet Access for the period 2016-2020 was also presented.

Following the invitation of the international organization WorldDAB Forum, which takes care of the implementation and promotion of DAB (Digital Audio Broadcasting), HAKOM's experts participated in the general conference held on 9 and 10 November in Vienna. The conference gathered more than 200 experts from the fields of economics, radio fusion and radio industry, and the focus of the conference was the implementation and development of digital radio.

At the conference on electronic communications technologies and standards in computing – KOM 2016, held from 28 to 29 November in Zagreb, HAKOM's employees held several expert lectures on the topics "Possibilities and Challenges of the RoC on the Single Electronic Communications Market of the European Union", "Mapping the Areas of Broadband Access Availability and Electronic Communications Infrastructure", "Regulation of the Internet of Things Services in Smart Cities", "Future Development Plans – the EC Legislative Activities within the Topic of Single Digital Market", " Roam Like at Home (RLAH): a Step Towards the Single Telecom Market". HAKOM's employees also participated in the round table with the topic "What is Too Expensive Regarding Broadband Networks".

8.2 Domestic cooperation

In 2016, HAKOM cooperated on a daily basis with stakeholders on electronic communications, postal services and rail services markets by resolving their requests, by organising public consultations on decisions which are important for the markets development, joint meetings, working groups and seminars.

Regarding the cooperation with the state bodies and ministries on joint activities a particular emphasis must be placed on the cooperation with:

- Ministry of the Sea, Transport and Infrastructure
- Ministry of Construction and Physical Planning
- Ministry of the Economy
- Ministry of Foreign Affairs and European Affairs
- Ministry of Defence
- Ministry of Culture
- Ministry of Public Administration
- Ministry of the Interior
- Ministry of Regional Development and EU Funds
- Ministry of Science and Education
- Ministry of Health
- Croatian Railway Safety Agency
- Electronic Media Agency
- Croatian Competition Agency
- Agency for Investments and Competitiveness
- Croatian Institute for Health Insurance
- Croatian Standards Institute
- Croatian Red Cross
- Croatian Fire fighting Association
- Croatia Control
- Croatian Academic and Research Network, CARNET
- Croatian Bureau of Statistics
- Croatian Chamber of Electrical Engineers
- Zagreb Electrotechnical Society
- State Geodetic Administration.

HAKOM cooperates with the Ministry of the Economy in the area of consumer protection and it has its representative in the National Consumer Protection Council. The activities in the area of consumer protection were focused on the work on the "Do not call" Register, which was completed and tested at the end of 2016. It started operating at the end of 2017. In addition to the Ministry of the Economy, HAKOM also cooperates with other consumer protection associations. You can find more information about the Register in chapter 5.1.3.

The cooperation with the Ministry of Science and Education was reflected in the joint programme for distribution of brochures on the topic of responsible and safe behaviour on the Internet to elementary school generation of fifth graders. The brochures were presented to the public at the end of November 2016, and afterwards they were distributed in the sufficient amount to all the elementary schools in the RoC, for all the pupils enrolled into the fifth grade. The programme is described under chapter 5.4.

HAKOM intensively cooperated with the Ministry of Physical Planning and Construction and with the local and regional self-government bodies within a view of promoting investments into broadband access and building of an integrated infrastructure.

The Act on the National Infrastructure of Spatial Data (hereinafter: NISD) defined the State Geodetic Administration (hereinafter: SGA) as the National Contact Point for NISD. Under the stated Act the

alignment of the EU acquis in the area of establishment of spatial data infrastructure is carried out. The same or similar spatial data is often collected and kept at several different addresses in the state administration system and local self-administration units (hereinafter: LSU) preventing their transparent use with a direct negative impact on the State Budget. Centralized searching of spatial data under the competence of NISD subjects enables simpler browsing and downloading of data. The development of the same or similar set of spatial data will not be financed by several institutions but only by one institution which will share data with other institutions thanks to the establishment, maintenance and supervision of the operation of the NISD geoportal. The main objectives of the Croatian NISD include the support to the national economic development and the improvement of good management.

HAKOM is the National Infrastructure of Spatial Data subject and its spatial data sources belong to the NISD "Group III" topic - "Utilities and public services". HAKOM became an NIPD subject on the basis of its legal competence (Article 12 paragraph 19 of the Electronic Communications Act) and the fact that it possesses and updates spatial data on antenna systems (GIS system of transmitter list – GSPO), and in connection to that it has established the WMS and WFS network services with the NISD geo portal. Moreover, in the working group for spatial data and the NISD working group on joint use of spatial data, HAKOM is actively included in providing support to NISD subjects for documenting metadata, interoperability of spatial data and alignment of national and INSPIRE data models.

HAKOM's employees participate in the work of the technical board for electromagnetic fields in human environment of the Croatian Standards Institute. The technical board is in chare of accepting the standards that provides the method of evaluating the compliance of the equipment with the requirements regarding the limits of human exposure to electromagnetic fields.

The cooperation with the academic community was mostly noticeable in the work on the "Looking to the Future" multidisciplinary project[32] and the interdisciplinary post-graduate course RTEK[33]. In Opatija in the period from 30 May to 3 June the 39th International ICT gathering MIPRO was held bringing together numerous domestic and foreign experts in the field of applying information and communication technology and related high technologies in economy, education, science and administration. HAKOM, as one of the sponsors of this manifestation, organized «3rd Forum on the Future of the UHF band (the second digital dividend and digital terrestrial television)» where the strategic definitions and key decisions within the framework of the Strategy for switching the digital terrestrial television to the DVB-T2 system and the allocation of the frequency band of 700 MHz were discussed, and the view of technical and economic effects of switching to DVB-T2 and the allocation of the second digital dividend was provided. HAKOM was also the organizer of the round table on the topic of «Financing the construction of the broadband networks where there is no commercial interest to use the European structural and investment funds (ESI)», where the processes and procedures necessary for applying the projects for the construction of the broadband infrastructure were explained, and the current situation presented regarding the fulfilment of the pre-conditions for withdrawing the means from the EU funds.

The 9th Days of Electronic Media were held in Opatija from 22nd to 24th November 2016, as well as 22nd Days of the Radio, 9th Days of the Television and 9th Days of the Internet in the co-organization of the Croatian Radio and Newspaper Association, National Television Association, the Agency for Electronic Media and HAKOM. HAKOM's representatives actively participated at the opening ceremony as well as in the programme itself, in the panel discussions on digital radio and the second digital dividend.

In celebration of the World Television Day in Zagreb, from 21st to 23rd November 2016 a conference and a fair «Digital Age 2» were held in the organization of the associations NetCro and Sat-Multimedia&IT portal. Besides the experts from Croatia and abroad HAKOM's representatives

[32] Looking to the Future is discussed in Chapter 9.3.2.
[33] The Interdisciplinary course RTEK is discussed in Chapter 9.3.1.

participated as well in the conference programme particularly in the discussions on the topics of digital radio and the second digital dividend.

HAKOM's experts participated in the presentation of the "Guide with useful advice 2" that along the topic of sustainable management of the municipal waste also covers the topic of electronic communications installations in buildings and it is intended for all the citizens of the Republic of Croatia. The "Guide with useful advice 2" is the project of the Croatian Tenants' Association and the Croatian Association of Cities in the Republic of Croatia, and HAKOM co-financed it and covered the topic of electronic communication installations in buildings.

In cooperation with the Faculty of Transport and Traffic Science of the University of Zagreb a round table was organized in February bringing together the stakeholders of the market of postal services in the RoC. A special focus of the round table was on the topics of mutual interest of all the stakeholders, and the ones emphasized were the current topics regarding e-commerce, protection of rights of the users of postal services and the present trends on the postal services market.

9 HAKOM

9.1 Aid Programme

In 2016, HAKOM continued with the activities of monitoring the realization of the contractual obligations concerning the allocation of state aid for high-speed broadband networks development in the areas of special state concern, hilly and mountainous areas and on the islands (hereinafter: state aid). Activities are carried out pursuant to HAKOM's Programme for the Internet and Broadband Development in Areas of Special State Concern, Hilly and Mountainous Areas and Islands and in accordance with Measure 3 of the *Implementation Programme for the Strategy for Broadband Development in the Republic of Croatia 2014 - 2015*[34]. The broadband ecosystem comprises the entire chain of broadband Internet access, which includes infrastructure for broadband access, broadband-based applications, or services, and the necessary equipment for the realization of services and for the use of Internet access. The aid programme was divided into three projects: access, equipment and services.

The objective and purpose of the aid is the balancing of regional development, faster development of broadband, and the connection of target groups such as school and health and public institutions to the broadband network as a broadband ecosystem.

In the second half of 2016 a supervision and inspection was carried out regarding the implementation of the connection of the target users to the broadband access of the minimal speed of 30 Mbit/s. On the basis of the contracts on granting the state aid to the companies, within the period of six months, have to ensure the basic conditions for the connection of end users to the broadband network in order to fulfil the requirements for the state aid. For the tenders carried out from the second half of 2013 until the end of 2014 (tender rounds 3rd – 7th) the companies that were granted the state aid to connect the target users to the broadband network should have ensured the increase of the access speed to minimum 30 Mbit/s by 31 August 2016. Table 9.1. provides an overview of the areas and companies where the increase of the access speed for target users was checked in 2016.

Table 9.1. Overview of the access speed control in 2016

Tenderer	County
Hrvatski Telekom d.d	Dubrovnik-Neretva part I
	Lika-Senj
	Islands
	Flooded areas
	Požega-Slavonija
	Zagreb
Pro-Ping d.o.o	Brod-Posavina
VIPnet d.o.o	Bjelovar-Bilogora
	Dubrovnik-Neretva part II
	Krapina-Zagorje
	Osjek-Baranja
	Sisak-Moslavina
	Varaždin
	Zadar

The inspections showed that at the addresses of the target users the requested Internet access speed of 30 Mbit/s was ensured pursuant to the contractual obligations.

[34] http://www.mppi.hr/UserDocsImages/Provedbeni_program_BBstrategija2014-2015_doneseno_na_VRH.pdf

9.2 e-Agency

Through its e-Agency program, HAKOM intends to provide the best possible public service to all participants of the postal and electronic communications markets by using contemporary IT tools and information systems. The e-Agency program is based on the ICT strategy of the RoC and is part of the activities of the Croatian e-business development strategy. The implementation of the e-Agency allows all citizens, companies and organizations to cooperate with the regulator in an easy and quick way, with a reduction of costs. The e-Agency has been intensely developed since 2010 and is recognized by the users of HAKOM's services. Although it has become an indispensable part of all main processes, its further development is required in order to advance electronic forms of the Agency's operations with citizens, business entities, and state administration and public services. E-business increases the accessibility of the regulator and makes public services more efficient and more attractive.

In 2016, HAKOM implemented a series of publicly available applications. For the purpose of increasing the level of the Agency's services and the satisfactions of users, the following applications should be particularly pointed out: the "DO NOT CALL" Register, the Register of postal service providers, e-Right of way, integration for the purposes of working with electronic invoices and the HAKOMetar plus application solution. The routine maintenance and quarterly updating of the Interactive GIS portal with data on the availability and utilization of the speeds of broadband access has been continued. The primary goal and purpose of the Interactive GIS portal is to assist local self-government units in the analysis of the availability and utilization of the speeds of broadband access in their area. This allows the monitoring of the fulfillment of the objectives of the Digital Agenda at the level of cities and municipalities in Croatia or city districts of the City of Zagreb and will identify the success rate of the utilization of state aid and aid from EU funds. In 2016, it is precisely because of the monitoring of the fulfillment of the goals of the Digital Agenda that HAKOM drafted the plan to upgrade the Interactive GIS portal with data on the percentage coverage of broadband access speeds. However, since the Croatian Bureau of Statistics did not have at its disposal the official data on the number of households at the level of addresses, this was not possible.

The e-Agency is a well noticeable, simple and contemporary portal with numerous e-services and accessible applications implemented for the purpose of increasing the efficiency and accessibility of HAKOM's services from any location at any time. All e-applications are based on the principle of a single application with an instantaneous activation via user account parameters. As part of HAKOM's Internet portal, the following e-applications have been developed:

- e-Conditions – the application enables the electronic submission of applications for the issuing of special construction conditions for the needs of the preparation of the main project. This has significantly accelerated the process from the submission of the application to the issuing of the construction conditions.
- e-Guidelines – the application enables the electronic submission of applications for the issuing of guidelines in processes of the preparation of physical plans or their amendments. This contributes to the considerable optimization and transparency of the entire business process and ultimately the faster issuing of guidelines for the preparation of physical plans.
- e-Vessels – the process of the electronic submission of applications and issuing of licenses for devices that use the RF spectrum on vessels. The Internet oriented application integrates the functionality of a portal, a resource management system and a document management system.
- License Overview – overview of the issued general and individual licenses for the use of the RF spectrum as well as licenses for the approved radio and telecommunications equipment with a search possibility according to several criteria.
- e-Procurement – an overview of all subjects of procurement of HAKOM with the possibility of downloading documents for applying to public tenders.
- e-Complaints – an application allowing users to submit complaints via electronic means after registering and to monitor the status of the resolution of the complaint. In 2012, the

application was integrated with the DMS and CRM system, which ensured the automatic filing of complaints, the entry of data in the CRM and instantaneous notification of users.

- e-Certificates – a solution within the document management system that automatizes the process of issuing certificates on the right of way to infrastructure operators. The solution includes the submission of applications, the preparation of permits and the presentation on the portal.
- e-Portability – until now, the most used application via which users monitor the status of the transmission of their number between operators, and obtain information in which network their number is currently located, all in real time, synchronized with the central base of transferred numbers.
- e-Market – an application that enables the collection of data on the state of the market. The collection is done electronically with the user authorization from a remote location by using an Internet service or Internet portal. The application also enables the analysis of market trends.
- e-Operator – an application that supports the management of data on operators of electronic communications. A central register of operators was established and a base of the address and numbering space, an interface for the entry of required data by operators and employees of HAKOM and an automated process of data processing through a program integration with other business systems used in the process.
- e-Broadcasting – an application intended for radio publishers and operators who offer the service of radio broadcasting via an earth network of transmitters. It enables a simpler and faster submission and resolution of applications for the issuing of licenses for the use of the radio frequency spectrum. The procedure of submitting the application and issuing the license is on average twice as fast than the classic procedure done via paper documentation.
- e-Microwave – implemented application that significantly accelerates the business process of submitting applications and issuing of licenses or authorizations for the use of the radio frequency spectrum in a microwave link.
- Cost Estimator – an application that estimates the total monthly costs of all active tariffs and operators, without included discounts. Based on the data that the user enters himself, the application shows the most favorable tariffs, one per each operator, from the cheapest to the most expensive.
- DO NOT CALL Register – the "Do not call" register is a free public register of telephone numbers of consumers who do not want vendors to contact them by telephone or SMS and MMS messages for the purposes of marketing and sales, and is regulated by the Consumer Protection Act.
- Register of postal service providers - in accordance with the provisions of the Postal Services Act, postal service providers must inform HAKOM on the commencement, changes and completion/termination of the performance of notified postal services. The right to perform interchangeable and other postal services is acquired by submitting a properly filled out application to HAKOM, and the electronic register contains the list of all approved postal service providers.
- e-Invoice – an application used to receive and send electronic invoices in accordance with the specifications of the Financial Agency (FINA).
- e-Right of way – a web-application that enables the electronic submission of applications for the issuing of certificates on the right of way, making it easier for users to fill out and submit the application. The application also allows the infrastructure operator to exchange electronically the required documentation with HAKOM, which significantly accelerates the procedure of issuing certificates on the right of way.
- HAKOMetar plus – the application solution for informing users on the current quality of wireless Internet connections (upload, download, PING, signal strength). Also, it allows access to the statistical data of all previously completed measurements as well as the display of these data on a geographic map.

9.3 Competence development

With the development of new technologies and new markets, the connection of communication and exchange of information world-wide are increasing, which contributes to increasingly larger, faster and more unexpected changes of markets, conditions and requirements. These changes also lead to the need for changing the organizational structure and processes, which is why it is necessary for organizations to be flexible and ready for quick and effective changes. In order to be prepared for adjustments to new demands of the market, HAKOM recognized that constant investments in the competence of employees are necessary because people and their competences, talents, abilities and commitment are the most important factor of every organization. With the goal of achieving its mission and vision, HAKOM encourages an environment of lifelong learning because the employees are the crucial initiators of every process of an organization. It is the employees that represent the organization in relations with operators, users, Croatian and international bodies and organizations. This is why HAKOM undertakes all required activities in order to train its employees and keep them motivated so they can carry out their job assignments and represent the organization in external contacts as good as possible.

Investments in the development of employees and in the development of knowledge, expertise and competences are the basic values and a key factor for the creation and stimulation of a desirable work atmosphere and the advancement of the operation of HAKOM. We, therefore, recognize as our priority investments in human resources because it is only with systematic and continuous investments in our employees that the level of the quality of the services we provide can be constantly increased, resulting in a positive feedback of users, but also in the satisfaction of the employees and all interested parties.

During 2016, employees of HAKOM have undergone training and professional development programs in numerous fields, both in Croatia and abroad, via cooperations with educational institutions, international bodies, by attending undergraduate and postgraduate study programs, by participating in research projects, seminars, conferences, workshops and courses. Also, our employees attended numerous meetings and training programs organized through a cooperation of working groups in EU bodies with the goal of reinforcing their knowledge with respect to the exchange of professional knowledge and other skills indispensable for the raising of the level of competences.

The most significant programs in 2016 were aimed, just like in previous years, at increasing the organizational and individual regulatory abilities and the strengthening of expert knowledge. Our employees participated in expert programs regarding the markets regulated by HAKOM and programs aimed at acquiring knowledge from the field of EU funds. In addition to the above, the strengthening of the competences and abilities of our employees was carried out through an interdisciplinary postgraduate study program, the project "Looking to the Future" and foreign language courses.

9.3.1 Interdisciplinary postgraduate study program

HAKOM initiated the university interdisciplinary postgraduate specialist study program "Regulation of the electronic communications market" in cooperation with the Faculty of Electrical Engineering and Computing (FER), Faculty of Economics and the Faculty of Law at the University of Zagreb. The study program lasts one academic year (two semesters), and in the program, the students acquire knowledge and competences from economic, legal and technological aspects of the regulation of markets and the ability to apply the regulatory framework and solve regulatory issues. With the completion of the study program, the students obtain the title "Specialist of the regulation of the electronic communications market". In 2016, the seventh generation of the employees of HAKOM enrolled in this study program. With this seventh generation, a total of 54 (fifty four) employees of HAKOM enrolled in the program, 7 in the most recent generation, who met the criteria to enroll in the program, and who proposed their final theses in the fields relevant to the operation of HAKOM.

9.3.2 "Looking to the Future" Project

Activities within the multidisciplinary research project "Looking to the Future 2020" have been continued during 2016. With this, HAKOM continued its very successful longtime cooperation with the academic community, FER, the Faculty of Law and the Faculty of Economics at the University of Zagreb, as well as the Faculty of Electrical Engineering, Mechanical Engineering and Shipbuilding at the University of Split and the Faculty of Electrical Engineering in Osijek. The project is a continuation of the successful three-year multidisciplinary project "Looking to the Future", and includes subjects relevant to the regulation of the electronic communications market. In addition to the academic community representatives and HAKOM, the project also actively involves operators and representatives of the sector. By initiating the multidisciplinary research project "Looking to the Future" HAKOM has aligned itself with leading countries in the region, but has also become one of the first institutions in Europe to successfully gather representatives of the industry, science and legislation in one project of wider social significance.

The "Looking to the Future" project explores issues regarding the regulation of the market in the upcoming years, and comprises general and specific subjects, with an emphasis on the future development of technology, new regulatory issues created by new technology, their impact on the development of the electronic communications market and the economic and legal aspects of a proactive, neutral and transparent regulation of the market, incentive measures for investments and innovations and fair conditions of market competition.
Of the issues that the project dealt with during 2016, the following should be pointed out: the continuation of the development of the "Privacy Calculator" application that was developed as a result of the research activities of the "Looking to the Future" project. The "Privacy Calculator" is an application that shows real frauds that can happen in everyday life. The primary purpose of this application is to inform and educate end users of electronic communications, primarily users of Internet access services, on potential dangers that can occur as a result of disclosing personal information online. The application is published on the website of HAKOM and is available to everyone. In addition to this application, which has a significant role in user protection, the project also deals with the development of a service for persons with complex communication needs, which is of great social significance. In accordance with the above, the application "Kviz" (Quiz) was designed and published on HAKOM's webpage. The primary goal of the application is to inform consumers, particularly persons with disabilities, on their consumer rights in the world of network technologies and to raise awareness on obstacles that persons with disabilities face when using these services. The application is also intended for developers and designers of applications with the goal of raising awareness on obstacles that persons with disabilities face and on ways in which these obstacles can be reduced in the design. Accessibility is a way of ensuring access to and use of web contents to all users, irrespective of their disability. Accessible design allows all users, particularly older persons and persons with disabilities to view, understand, manage and interactively use web contents. Also, activities related to the preparation for the transition of digital terrestrial television to the DVB-T2 system and the DD2 allocation should be pointed out. During 2016, activities were continued related to the determination of measures regarding the access to the open Internet in accordance with the Regulation (EU) No. 531/2012 (defining the method of applying the obligation of transparency of operators and of the monitoring of the traffic management).
In addition to these, during 2015 the project comprised other specific issues: the Internet of Things (IoT) - the state of the technology and challenges of interoperability, the provision of complex services based on the IoT within the single European market of electronic communications, the 2020 Digital Agenda in the RoC, investment models and procedures for the analysis of the profitability of network investments, the relation between Internet access providers and OTT service providers, challenges of the regulatory framework for data protection in the field of new services and technologies, convergence in communication and e-privacy: legal and regulatory challenges towards a single digital market, the quality of services provided by operators of mobile communications in the RoC, differentiated management of network traffic for the purpose of implementing the EU Regulation on net neutrality, the dominant position of operators on the market of electronic communications and

their misuse in the context of the diversification of service portfolios, broadband Internet access and services in rural areas as well as the broadband ecosystem of islands and coastal areas.
Besides HAKOM's website, a part of the project results for 2016 were presented at special sessions at the Softcom conference, which was held in Split, and as part of ELMAR in Zadar.

9.3.3 Foreign languages

The need for the constant improvement of foreign language skills is part of the need for continuous training in the field of foreign languages required in the achievement of the goals and policies of HAKOM. HAKOM employees continuously follow various European regulations, directives and other legal acts from the field of HAKOM's operations, which is why a good knowledge of English in their everyday work represents a condition for their high-quality work. The employees of HAKOM actively participate in the work of international regulatory organizations and various international conferences and working meetings in EU bodies. The advancement of foreign language skills is a condition without which it would be impossible to follow trends on the quickly developing markets regulated by HAKOM. This is why being able to follow references in foreign languages is a constant source of new knowledge. With the goal of achieving its mission and vision, HAKOM continued with the organization of English language training programs in 2016, in which a total of 9 employees took part.

9.4 EU Funds

With the Decision of the Government of the Republic of Croatia of 13 July 2016 (OG 68/2016) the Framework National Program for the development of the infrastructure of broadband access in areas in which there is no sufficient commercial interest for investments was adopted (hereinafter: FNP). With this Decision, HAKOM was declared the Designated Competent Authority for the FNP (hereinafter: DCA). The FNP is an implementation program aimed at the achievement of national strategic objectives specified by the Strategy of the development of broadband access in the Republic of Croatia in the 2016-2020 period, 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 basic roles of HAKOM as the DCA are the coordination of the implementation of the FNP on the national level and the verification of the compatibility of individual plans of the development of broadband infrastructure (hereinafter: PDBA) with the FNP, a consulting role in relation to the project designated competent authorities, and the approval of the PDBAs and other activities prescribed by the FNP. The designated competent authorities for the implementation of individual projects from the FNP are public authorities on the local and/or regional levels (municipalities, cities and counties).

As the DCA, HAKOM, with the goal of ensuring the transparency of the implementation of individual projects within the framework of the FNP, established the central web site https://nop.hakom.hr in 2016. In order to provide the project designated competent authorities with support in the preparation of the documents and in order to enable an efficient monitoring of the implementation of individual projects, HAKOM prepared Guidelines for the preparation of the plans for the development of broadband infrastructure and Guidelines regarding the principles of wholesale access and for the determination of wholesale fees published on the web site of the DCA.

In 2016, since HAKOM was declared the DCA, the project designated competent authorities submitted 34 PDBAs, which comprise over 220 local and regional self-government units from all parts of the RoC. Preliminarily, 33 PDBAs have been analyzed and reviewed.

For the purpose of an efficient implementation of the obligations from the FNP, HAKOM carried out a training program of its employees so they can analyze and assess individual PDBAs, report, and guide project designated competent authorities, and provide information to all interested members of the

public on relevant issues from the field of the development of broadband infrastructure in the Republic of Croatia and participate in plans concerning the development of broadband access at the level of the European Union on an equal footing.

During 2016, HAKOM, as the DCA, regularly participated in expert conferences and international conferences on the subject of the development of broadband infrastructure, and informed the public on this. In cooperation with the Ministry of Maritime Affairs, Transport and Infrastructure and the Ministry of Regional Development and EU Funds, HAKOM participated in the preparation of the criteria for the selection of operations and methodologies within the investment priority 2a/specific objective 2a1 of the Operational Programme Competitiveness and Cohesion 2014 – 2020.

The employees of HAKOM are members of the Monitoring Committee of the Operational Programme Competitiveness and Cohesion 2014 – 2020, in whose operation they actively participate.

Since June of 2016, HAKOM represents the RoC as a member of the network of expert offices for broadband access at the EU level - the Broadband Competence Offices Network.

9.5 Staff

HAKOM consists of the Council and of the administrative service. HAKOM is managed by the Council of HAKOM which consisted of five members at the end of 2016, 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 2016, HAKOM employed 173.

Figure 9.1. Structure of employees according to the level education and title

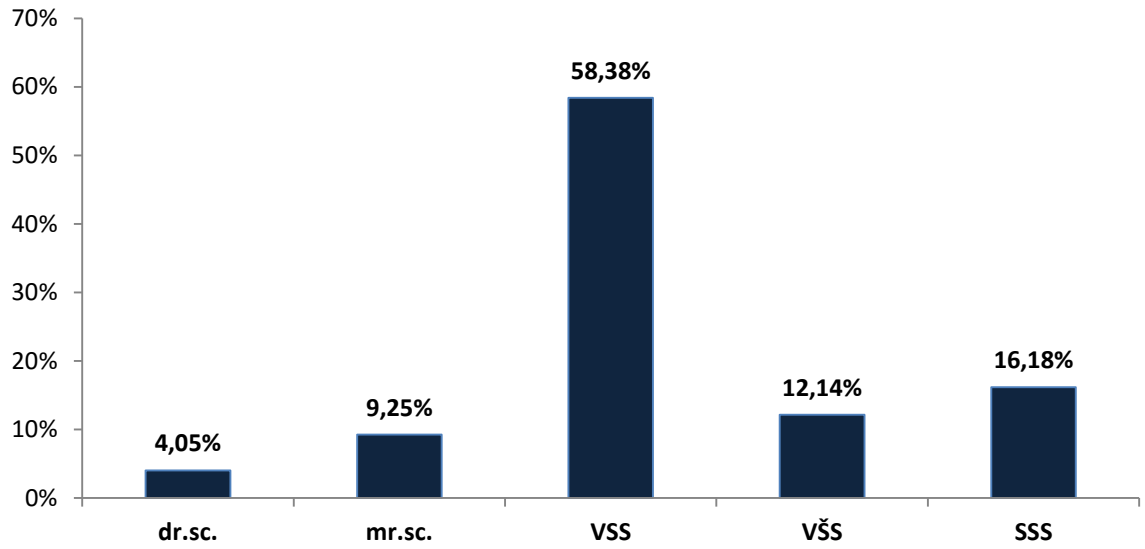


Figure 9.1. shows that the majority of HAKOM's employees are highly educated. A total of 13 percent of employees have completed post-graduate studies in electrical, transport, legal or economic sciences (PhD or MSc), as many as 71 % of employees have university education, while only 16 % of employees have secondary school qualifications.

Figure 9.2. Structure of employees according to profession

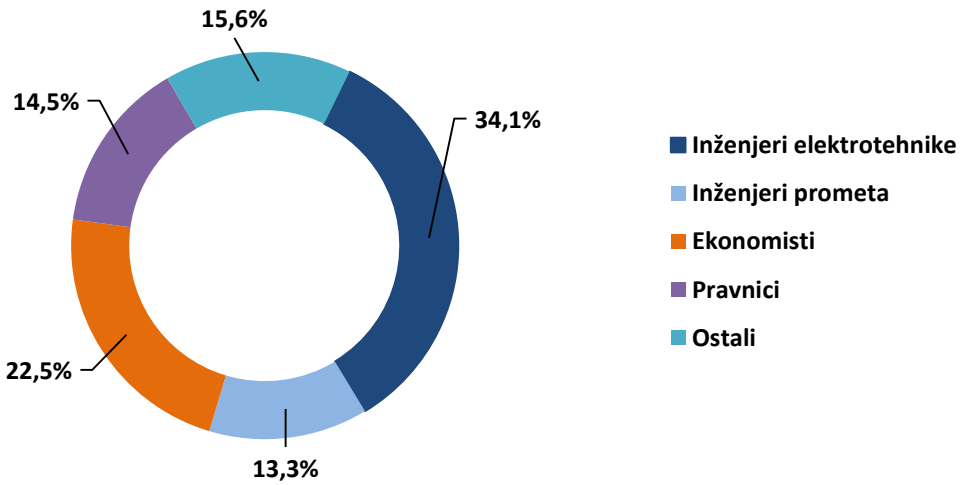


Figure 9.2. shows the structure of employees according to their profession. Since HAKOM's main activity is the regulation of the electronic communications, rail and postal services market, and that requires primarily engineering knowledge its employees are in the first place electrical and traffic engineers making up 47 percent of the employees, and they are followed by graduate economists

which make 22 percent of the employees, followed by lawyers who make 15 percent of the employees while 16 percent are the employees from other professions.

Figure 9.3. Structure of employees according to gender

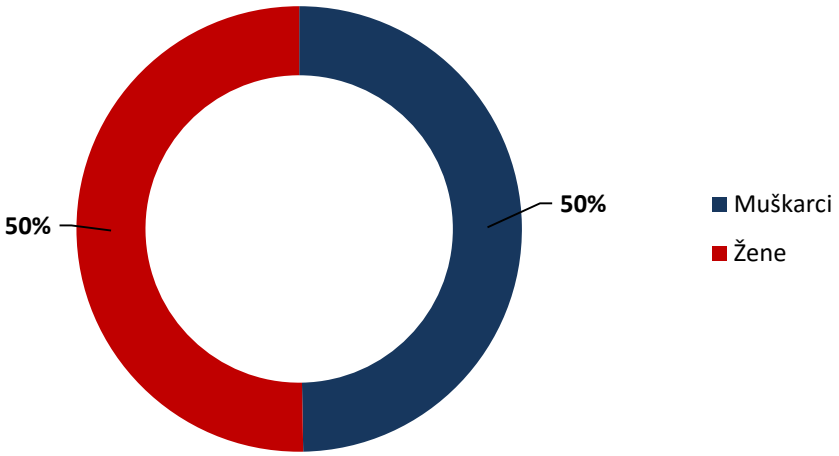


Figure 9.3. shows the percentage of employees according to gender showing that HAKOM pays special attention to non-discrimination in the employment procedures on all grounds. In 2016 the percentage of men and women was the same, that is, HAKOM's employees consisted of 50 percent of women and 50 percent of men.

Figure 9.4. Structure of employees according to age

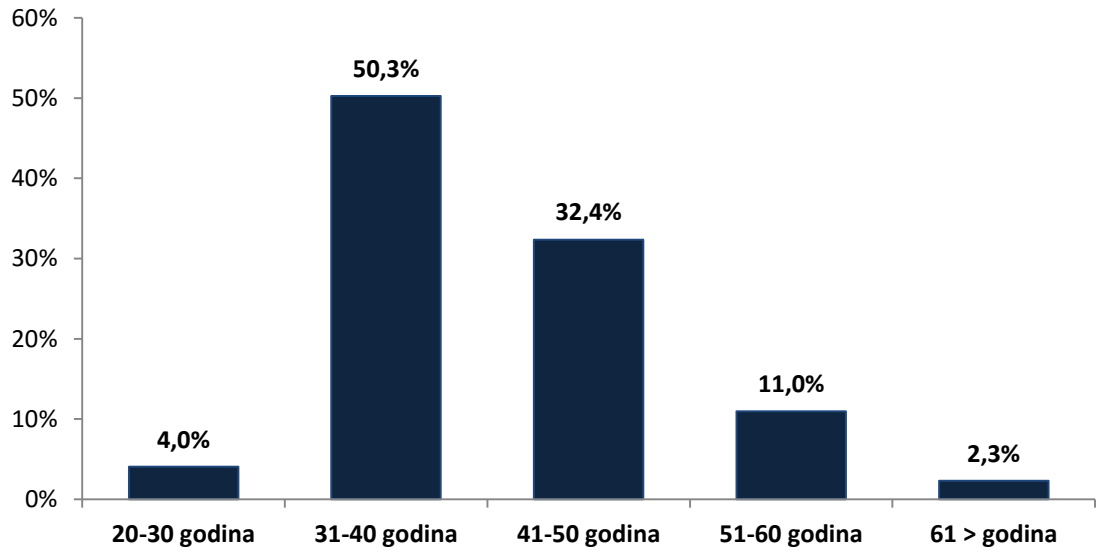
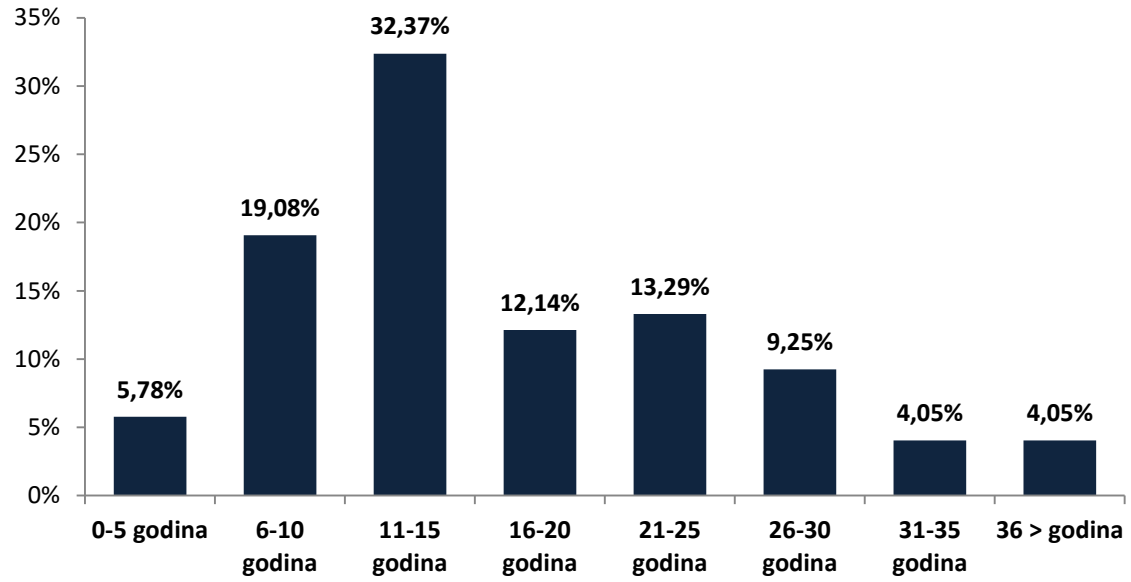


Figure 9.5. Structure of employees according to the length of service



Figures 9.4. and 9.5. clearly show that 50 percent of the employees are younger than 40, while 32 percent have between 11 and 15 years of length of service. This shows that HAKOM's employees are mostly young people experienced in the areas under HAKOM's competence.

HAKOM employs a significant number of Homeland War volunteers, veterans or members of veteran families. The employee turnover in HAKOM has been low for many years, and in 2016 it amounted to 0.6 percent. In 2016 a 1 female employee left HAKOM and there were no new people employed.

In 2016 HAKOM initiated one labour dispute which ended amicably, and two labour disputes and one misdemeanour proceedings were initiated against HAKOM.

The Municipal Labour Court in Zagreb in 2016 adopted seven decisions not yet legally effective in labour disputes out of which five decisions were in HAKOM favour. The two decisions concerning the calculation of a salary amounting to several thousand HRK were adopted against HAKOM.

The Magistrate Court in Zagreb and the Magistrate Court in Novi Zagreb in 2016 adopted two non-final judgements out of which one was in favour of HAKOM, and one against HAKOM.

In 2016 two labour disputes were finalized with legal effect out of which one dispute was finalized in favour of HAKOM, and one labour dispute was finalized against HAKOM, all concerning the calculation of salary amounting to several thousand HRK.

In 2016 on criminal proceeding was ended amicably, through the employee's apology to HAKOM.

The interests of HAKOM's employees are also represented by the Works Council. The cooperation between the management and the Works Council was deemed excellent by both parties. The satisfaction of employees with the working conditions and labour rights is very high at HAKOM.

10 FINANCIAL AND FINAL STATEMENT

10.1 Summary of significant accounting policies

HAKOM's accounting policies are established in accordance with the Croatian accounting regulations which are based on the Act on Financial Operations and Accounting of Non-Profit Organizations. HAKOM keeps separate double-entry accounting in accordance with the schedule of accounts from the accounting plan for non-profit organizations.

The revenue is recognized on the basis of the principle of accounting events, which means the following:

- reciprocal revenue (revenue on the basis of delivered goods and services) is recognized in the reporting period to which it refers under the condition that they can be measured regardless of the payment;
- non-reciprocal revenue (revenue pursuant to special regulations, donations, membership fees, aid, contributions and other similar revenue) is recognized in the period to which it refers under the condition that it is available (collected) in the reporting period, and may be recognized in the reporting period if it has been collected at the latest before the moment of submitting the financial reports for that same period;
- donations related to the performance of the contracted programmes (projects and activities) are recognized in the balance sheet as deferred income in the reporting period in proportion with the implementation costs of the contracted programmes (projects and activities);
- donations related to non-financial assets that is depreciated are recognized in the balance sheet as deferred revenue together with recognizing the revenue of the reporting period in proportion with the costs of using the non-financial asset in the period of use.

The expenditure is recognized on the basis of the principle of accounting events, which means the following:

- expenditure is recognized in the reporting period to which it refers regardless of the payment;
- expenditure for the cost of short-term non-financial assets is recognized at the moment of occurrence of the actual cost;
- purchasing cost of the long-term assets are capitalized and recognized under expenditure during their useful life.

The assets are initially entered according to the purchase cost (purchase value), that is, according to the estimated value.

The long-term assets are financial and non-financial assets whose useful life is longer than a year and which maintain the same form of appearance for more than a year.

Investments prolonging the useful life, increasing capacity, changing the use or significantly improving functional properties such as, for example, investments into renovation, reconstruction or increase of long-term non-financial assets, which do not have to be conditioned by the state of the assets, are entered as increased value of assets that were the subject of investments.

Additional expenditure related to the recognized long-term non-financial assets are capitalized as an increased property value when it is probable that the additional expenditure will bring additional future economic benefits, and when that expenditure increases the value of assets above the initially recognized value. All other additional costs are recognized as expenditure in the period in which they occurred.

Earnings and losses from the alienation of long-term non-financial assets are recognized in the profit and loss account.

The value of an individual object belonging to long-term non-financial assets is depreciated, that is, corrected by a linear method during its useful life starting from the first day of the month after the month in which the assets were put in use. The value of land, renewable natural resources, books, works of art and other valuable exhibits and of precious metals and other values are not depreciated, meaning not corrected.

The basis for the correction of the value of long-term assets is its nominal or revalorized purchase cost (purchase value), that is, its estimated value.

When calculating depreciation legally prescribed depreciation rates apply according to the groups of long-term assets and estimated useful life of the long-term assets.

Short-term non-financial assets are assets intended for the performance of activities or further sale within a period shorter than one year. Purchase cost (purchase value) of non-financial assets is the purchase price increased by customs duties, non-refundable taxes, transportation costs and other costs that may be directly added to the costs of purchase and preparation for use.

Receivables for business revenue include receivables: for revenue according to special regulations, for revenue from assets and other revenue not mentioned elsewhere.

Deferred expenditure and outstanding collection of revenue (active time delimitation) contain the following:

- pre-paid expenditure not referring to the reporting period
- revenue belonging to a certain accounting period but which has not been collected in that period or invoices could not have been issued.

Liabilities are outstanding debts resulting from previous events that are expected to be covered by the outflow of resources. They are expressed on the basis of the accounting events principle.

Postponed payment of expenditure and deferred revenue (passive time delimitation) contain the following:

- expenditure that has not been invoiced and refers to the current period
- revenue that has been collected or charged in the current period referring to the following accounting period.

Own resources are the remaining values of assets after the deduction of all liabilities.

The result is established at the end of the reporting period as a difference between the established revenue and expenditure in a certain period. The difference on the side of revenue represents a realized revenue surplus, and the opposite represents revenue deficit. The surplus/deficit carried over is added to the above-mentioned revenue surplus/deficit, and together they make up the surplus available in the following period or the deficit to be covered in the following period.

The situation established and expressed in the financial report for a business year is distributed in the following business year pursuant to a Decision on the Distribution of Results.

The off-balance entries record the revenue of the Croatian state budget expressed as receivables from the users with a simultaneous entry of liabilities towards the State Budget of the Republic of Croatia. HAKOM only invoices these fees for the benefit of the State Budget, and the amounts of the fees are paid directly into the State Budget. The off-balance records are entered analytically per buyers and issued invoices for the benefit of the State Budget.

10.2 Statement of revenues and expenditure

Name of position	2015 HRK	2016 HRK
REVENUE		
Revenue pursuant to special legislation from other sources	77.842.060	75.639.770
Revenue pursuant to special legislation	**77.842.060**	**75.639.770**
Revenue from financial assets	1.097.279	617.562
Revenue from assets	**1.097.279**	**617.562**
Revenue from damages and refunds	826.546	595.498
Revenue from sales of long-term assets	8.410	1.870
Other revenue	238.388	238.421
Other revenue	**1.073.344**	**835.789**
EXPENDITURE		
Salaries	30.993.966	31.261.686
Other employee expenses	1.412.696	2.063.675
Contributions on salaries	5.339.936	6.423.672
Employee expenses	**37.746.598**	**39.749.033**
Compensations of costs to employees	2.957.907	3.041.916
Compensations to members of executive and similar bodies	33.784	53.773
Compensations for other unemployed persons	53.365	14.337
Expenditure for services	20.963.114	22.694.624
Expenditures for materials and energy	2.239.101	2.126.764
Other unmentioned material expenditure	1.089.146	1.173.942
Material expenditure	**27.336.417**	**29.105.356**
Depreciation expenditure	**14.824.040**	**12.430.713**
Financial expenditure	**100.641**	**107.492**
Current donations	74.989	75.000
Capital donations	32.662.298	307.363
Donations	**32.737.287**	**382.363**
Other expenditure	**1.008.471**	**560.798**
TOTAL REVENUE	**80.012.683**	**77.093.121**
TOTAL EXPENDITURE	**113.753.454**	**82.335.755**
SURPLUS (DEFICIT) OF REVENUE	**-33.740.771**	**-5.242.634**
Surplus revenue (revenue deficit) - carried over	91.905.065	58.164.294
Profit tax liabilities per calculation	-	-
REVENUE SURPLUS AVAILABLE IN THE FOLLOWING PERIOD	**58.164.294**	**52.921.660**

HAKOM's revenue is ensured on the basis of HAKOM's annual financial plan in compliance with the ECA, Postal Services Act and Act on the Regulation of the Rail Services Market.

The means needed for the performance of HAKOM's activities are ensured from the following sources:

1. from the fees for the radio frequency spectrum management
2. from the fees for the addressing and numbering space management
3. from the fees for the performance of other activities in the percentage of the annual gross revenue of the service providers

The calculation and amount of fees and the manner of payment of fees for the financing of HAKOM's work are laid down in the Ordinance on the Payment of Fees for the Performance of HAKOM's Activities adopted by HAKOM's Council. 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.

The total revenue of HAKOM in 2016 was HRK 77.093.121, and it is lower for about HRK 2.9 million in comparison to the previous year. In material sense the most significant decrease is the one regarding the revenue from the fees for performing other HAKOM's activities out of the total annual gross revenue realized by the operators in the previous year when performing the activities of electronic communication networks and services on the market.

The fees for the use of the RF spectrum are significantly decreased in comparison to the previous year.

Table 10.1. Fee for the public mobile network per allocated MHz

Year		
1.	2010	241.809 HRK /MHz
2.	2011	200.000 HRK/MHz
3.	2012	180.000 HRK/MHz
4.	2013	144.000 HRK/MHz
5.	2014	100.000 HRK/MHz

The fee in the terrestrial radiofusion in 2015 was abolished for the coverage of the population >= 300.000 inhabitants, and for the coverage of above 300.000 was reduced by 50 percent.

The fees for the carrying out of other HAKOM's activities in the field of electronic communication networks and services on the market were reduced from 0.29 percent to 0.20 percent.

The fees for the carrying out of other HAKOM's activities in the field of postal services market regulation were reduced from 0.29 percent to 0.20 percent.

The fee for point-to-point links was HRK 2.100 per link in 2011, and now it is HRK 1.000 per link.

Payment of the fee for performing other HAKOM's activities expressed in the percentage of the total annual gross revenue was abolished for all operators and postal services providers, who realized gross revenue less than HRK 1.000.000 in the previous calendar year.

Table 10.2. Earned revenue in 2016 compared to the annual financial plan (in HRK)

DESCRIPTION		2016 Plan	Realised in 2016	Index
1.	Revenue from frequency fees	44.000.000	44.147.311	100
2.	Revenue from fees for the carrying out of other HAKOM's activities	21.300.000	20.322.570	95
3.	Revenue from fees for use of addresses and numbers	6.700.000	6.739.866	101
4.	Revenue from annual fees for performing activities in the postal services sector	2.450.000	2.885.140	118
5.	Revenue from annual fees for performing activities in the rail services sector	1.450.000	1.544.883	107

6.	Other revenue	2.000.000	1.453.351	73
TOTAL		**TOTAL**	**77.093.121**	**99**

Figure 10.1. Diagram of Table 10.2. Revenue earned in 2016

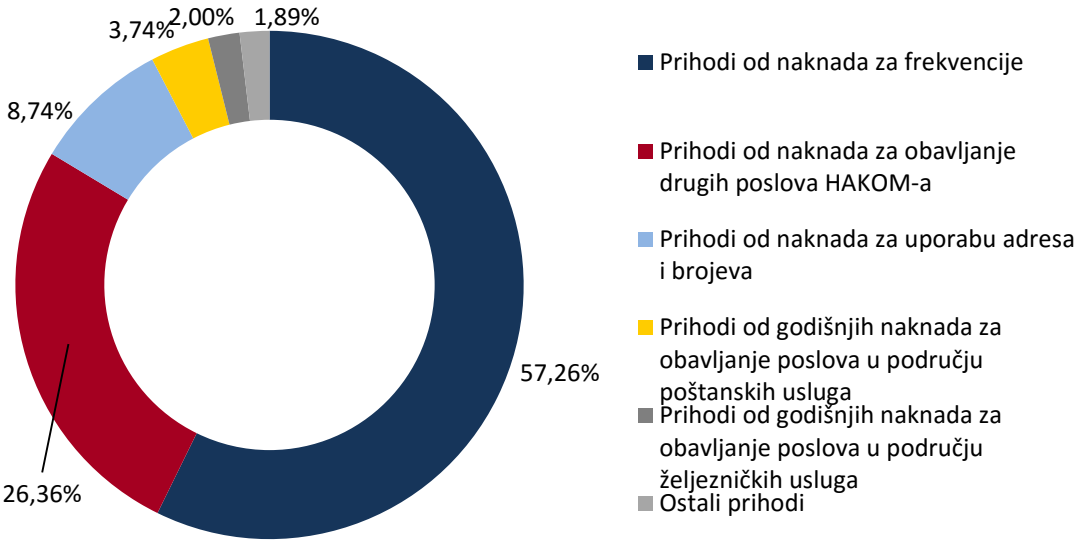


Table 10.3. Comparison of the revenue amount in the three-year period (in HRK)

DESCRIPTION		Realised in 2014	Realised in 2015	Realised in 2016
1.	Revenue from frequency fees	52.461.251	45.150.637	44.147.311
	Index	86%	86%	98%
2.	Revenue from fees for the carrying out of other HAKOM's activities	21.300.429	20.709.935	20.322.570
	Index	71%	97%	98%
3.	Revenue from fees for use of addresses and numbers	6.733.834	6.761.423	6.739.866
	Index	100%	100%	100%
4.	Revenue from annual fees for performing activities in the postal services sector	2.854.067	2.860.626	2.885.140
	Index	78%	100%	101%
5.	Revenue from annual fees for performing activities in the rail services sector	0	2.335.639	1.544.883
	Index	0%	0%	66%
6.	Other revenue	3.985.619	2.194.423	1.453.351
	Index	91%	55%	66%
7.	Total revenue	87.335.200	80.012.683	77.093.121
	Index	82 %	92%	96%

HAKOM's expenditure in 2016 amounted to HRK 82.335.755.

HAKOM's total expenditure consists of the following: expenditure for the electronic communications sector, expenditure for the postal services sector, expenditure for the regulation of rail services market and expenditure for capital donations. HAKOM's expenditure in 2016 is significantly lower than in 2015 when they amounted to HRK 113.753.454. In 2014 HAKOM's expenditure amounted to HRK 119.822.415.

HAKOM's expenditure in 2016 is lower than the approved expenditure in the Financial Plan of HAKOM. In the expenditure structure only the expenditure of the rail services sector exceed the planned amount of expenditure by 4 percent due to the increased employees expenses.

The expenditure in the postal services sector in 2016 is lower than the expenditure in 2015 when they amounted to HRK 2.281.695 , while the expenditure in the rail services sector is higher than the expenditure in 2015 when they amounted to HRK 1.131.975.

The amount of capital donations planned for 2016 was not realized, mostly because HAKOM when planning the allocation procedures still depends on the previous delivery of necessary documentation by the selected target users. As there was no delivery of the necessary documentation, the formal and legal conditions for the allocation were not fulfilled.

Table 10.4. HAKOM's expenditure - realization in relation to the Annual Financial Plan (in HRK)

DESCRIPTION	2016 Plan	Realised in 2016	Index
Expenditure for the electronic communications sector	93.585.000	78.481.910	84
Expenditure for the postal services sector	2.759.000	2.029.572	74
Revenue in the rail services sector	1.456.000	1.516.910	104
Expenditure for capital donations	5.823.000	307.363	5
Total	**103.623.000**	**82.335.755**	**79**

Table 10.5. HAKOM's realized expenditure in 2016 compared to the annual financial plan (in HRK)

Class	Sub group	Section	NAME	2016 Plan	Realisation 2016	Index
41			**Employee expenses**	**42.034.300**	**39.749.033**	**95**
	411		Salaries	33.590.000	31.261.686	93
		4111	Payments for regular work	33.050.000	30.820.270	93
		4112	Payments in kind	530.000	441.416	83
		4113	Payments for overtime work	10.000	0	0
		4114	Salaries for special work conditions	0	0	0
	412		Other employee expenses	1.440.900	2.063.675	143
		4121	Other employee expenses	1.440.900	2.063.675	143
	413		Contributions on salaries	7.003.400	6.423.672	92
		4131	Contributions for health insurance	5.343.200	4.833.232	90
		4132	Contributions for employment	580.200	529.976	91
		4133	Contributions for pension insurance paid by employer	1.080.000	1.038.000	96
		4134	Special contributions for stimulating the employment of disabled persons	0	22.464	0
42			**Material expenditure**	**35.125.700**	**29.105.356**	**83**
	421		Compensations of costs to employees	3.800.000	3.041.916	80
		4211	Business trips	2.300.000	1.725.189	75
		4212	Compensation for transportation, field work and separation from family	700.000	601.511	86
		4213	Professional training of employees	800.000	715.216	89
	422		Compensations to members of representative and executive bodies, commissions and the similar	20.000	53.773	269
		4221	Compensations to members of representative and executive bodies, commissions and the similar	20.000	47.899	239
		4222	Compensation of business travel expenses	0	5.874	0
	424		Compensations for other unemployed persons	52.500	14.337	27
		4241	Payment for performing an activity	52.500	10.513	20
		4242	Compensation for business trips costs	0	3.824	0
	425		Expenditure for services	26.468.500	22.694.624	86
		4251	Telephone, post and transportation services	1.180.300	1.140.089	97
		4252	Current and investment maintenance services	2.216.900	1.497.417	68
		4253	Promotion and information services	782.000	747.048	96
		4254	Utilities services	1.343.200	1.371.573	102
		4255	Lease and rent expenditure	10.586.400	10.179.804	96
		4256	Health and veterinary services	428.800	415.200	97
		4257	Intellectual and personal services	3.218.300	2.512.232	78
		4258	Computer services	4.859.800	3.915.196	81
		4259	Other services	1.852.800	916.065	49
	426		Expenditures for materials and energy	3.219.000	2.126.764	66
		4261	Office material and other material expenditure	695.200	504.135	73
		4263	Energy	2.423.800	1.558.163	64
		4264	Small inventory and tyres	100.000	64.466	64
	429		Other unmentioned material expenditure	1.565.700	1.173.942	75
		4291	Insurance premiums	960.000	735.743	77
		4292	Entertainment	258.800	190.087	73
		4293	Membership fees	186.700	115.193	62
		4294	Participation fees	132.700	124.784	94
		4295	Other unmentioned material expenditure	27.500	8.135	30

Class	Sub group	Section	NAME	2016 Plan	Realisation 2016	Index
43			Depreciation expenditure	**18.800.000**	**12.430.713**	**66**
	431		Depreciation	18.800.000	12.430.713	66
		4311	Depreciation	18.800.000	12.430.713	66
44			**Financial expenditure**	**155.000**	**107.492**	**69**
	443		Other financial expenditure	155.000	107.492	69
		4431	Banking and payment services	85.000	64.025	75
		4432	Negative currency exchange difference and the currency clause	44.000	34.401	78
		4433	Penalty interest rate	6.000	577	10
		4434	Other unmentioned financial expenditure	20.000	8.489	42
45			**Donations**	**5.898.000**	**382.363**	**6**
	451		Current donations	75.000	75.000	100
		4511	Current donations	75.000	75.000	100
	452		Capital donations	5.823.000	307.363	5
		4521	Capital donations	5.823.000	307.363	5
46			**Other expenditure**	**1.610.000**	**560.798**	**35**
	461		Fines, penalties and compensation for damage	440.000	12.772	3
		4611	Compensation of damage to legal and natural persons	200.000	0	0
		4612	Penalties, storage charges and other	30.000	2.796	9
		4613	Compensation of damages to employees	200.000	9.976	5
		4614	Contractual fine and other compensations for damage	10.000	0	0
	462		Other unmentioned expenditure	1.170.000	548.026	47
		4621	Not written-off value and other expenditure from confiscated and depreciated long-term assets	100.000	56.594	57
		4622	Written-off receivables	1.000.000	473.411	47
		4623	Expenditure for other tax obligations	60.000	18.021	30
		4624	Other unmentioned expenditure	10.000	0	0
TOTAL				**103.623.000**	**82.335.755**	**79**

Employee expenditure

The decision on the amount of the base for the calculation of salaries of civil servants of 17 December 2014 established a lower base for the calculation of civil servants' salaries. Salaries for the members of HAKOM's Council are established on the basis of this decision and they have been reduced since January 2015. The base salary of HAKOM's employees is a product of the number of points and point value established on the basis of a decision adopted by the President of the Council of HAKOM. In October 2014 the value of the point was reduced by a decision on the point value.

In 2016 there was no change in the amount of the base for the calculation of civil servants' salaries nor there was a change in the point value based on which the base salary is calculated for HAKOM's employees.

Other employee expenditure comprise other material rights of HAKOM's employees and they are different every year depending on the events occurred. Since the accession of the Republic of Croatia to the European Union of 1 July 2013 HAKOM exercises the right of travel costs reimbursement for the experts who participate in the work of the European Council, EU Council, European Commission, BEREC, COCOM, ENRRB, RSPG, ERGP, RSC, FIF and other. Depending on the rules for the travel costs reimbursement of a certain organizations the costs of tickets for airplane flights, travelling by train and hotel accommodation costs are reimbursed. Around 20 percent of the total business trip expenses of HAKOM are reimbursed.

Table 10.6. Business trips expenditure

	Year	Business trips costs (in HRK)	Revenues from the bus. trips costs refund (in HRK)	Index
1	2016	1.725.189	370.359	21.47

Compensations for transportation, field work and separation from family refer only to compensations for transportation.

Professional training for employees is carried out through: undergraduate, graduate and postgraduate studies, seminars and consultations, courses and expert examinations. In 2016 HAKOM's employees attended education courses in the field of EU funds, professional trainings for carrying out evaluation of employees' performance, seminars and consultations in the field of finances and accounting, public procurement, university interdisciplinary postgraduate study in the "Regulation of the electronic communications market", university postgraduate study, course Advanced Communications Technology, specialist graduate study Finances Management, foreign languages course. Through the professional training of the employees investments are made into the growth and development of professional competencies of the employees and development of the performance management system and internal controls system.

Compensations to members of representative and executive bodies refer to the expenditure for the members of Consumer Protection Commission. The members of the Consumer Protection Commission are appointed pursuant to Article 19 of the ECA, Article 12 of the Postal Services Act and Article 28 of the Act on the Regulation of the Rail Services Market, and Article 2 of the Ordinance on the Work of the Consumer Protection Commission. The compensation for the business trips expenses depend on the residence of the members of the Commission.

Compensations for other unemployed persons refer to the services of proofreading of official documents and services of participating in the work of the Occupational Safety Committee.

Current and investment maintenance services comprise the services of current and investment maintenance of construction facilities in the amount of HRK 18.042, the services of current and investment maintenance of facilities and equipment in the amount of HRK 1.278.670 and the services of current and investment maintenance of means of transport in the amount of HRK 200.705. The services of current and investment maintenance of facilities and equipment comprise maintenance of measuring control devices used to manage and control the radiofrequency spectrum, and for the performance of measuring, testing and determining interferences.

Promotion and information services comprise the services of production and postproduction of the corporate animated film "HAKOM 2016", the services of making and broadcasting of a coverage about the EU funds and possibilities of withdrawing EU funds for the development of electronic communications, the services of making and printing leaflets that were inserted into the printed materials for informing the users of electronic communications and users of postal services. Promotional materials with HAKOM's logo were procured too. Pursuant to Article 33, paragraph 1 of the Electronic Media Act 15 percent of the annual amount intended for promotion of its activities was spent on advertising in the audio-visual and radio programmes of the regional and local broadcasters, television and/or radio.

Utilities services refer to the services of cleaning the business premises, security guards – property safe guarding, the services of maintaining the anti-theft system, the services of maintenance and attestations of fire protection, water supply, collection of municipal waste and similar.

Table 10.7. Utility services (in HRK)

Class	NAME	Realized in 2015	Realized in 2016	Index
1.	Waste collection and disposal	27.307	25.338	93
2.	Water supply	110.183	104.262	95
3.	Cleaning, laundering and similar services	765.354	760.745	99
4.	Property and people safe guarding services	344.731	377.655	110
5.	Other utility services	99.928	103.573	104

Lease and rent expenditure refers to the lease of the business premises in Zagreb, and the storage premises for antennas and measuring equipment in Zagreb, on Sljeme, Labinštica, Vidova gora, Lončarski vis and in Ćilipi.

Intellectual services mostly refer to the consultancy services (HRK 1.790.369). The consultancy services comprise; the project "Looking to the Future", expenditure for Cullen that enables timely information about the developments on the electronic communications market and postal services market, consultancy services of reviewing the regulatory financial report of the universal postal service providers, consultancy services of controlling the accuracy of calculation of the net cost of the universal service providers, services of creating the methodology for the regulation of prices of the universal service providers, services of archiving, audit services regarding the performed measuring of the quality of transportation of letter-post items in the internal traffic of the RoC.

Other intellectual services refer to the services of agencies, translations, audit services and lawyer and legal consultant's services.

In 2016 HRK 240.414 was spent on lawyer's services. The lawyer's services are used for disputes that are not connected to the scope of work of HAKOM, like labour disputes or individual disputes for the compensation of damage and in case when replacement is needed for the representation at the hearings outside HAKOM's headquarters, when that is justified because of the small claims. Additionally, in case of labour disputes it is justified to employ external lawyers too in order to avoid a possibility of conflict of interests of lawyers employed at HAKOM, who can appear at such hearings as witnesses. Regarding labour disputes for which external lawyers were employed, all valid decisions were in favour of HAKOM, and the litigation fees (lawyer's services) have been compensated. The costs of court proceedings after valid judgements in favour of HAKOM significantly exceed the initial expense for law firms representing HAKOM.

Computing services comprise various computing services. Materially most significant ones are maintenance of and support for ChirPlus, maintenance of and support for the Central Administrative Base of Portability, Microsoft licence and GIS licence in the total amount of HRK 1.4 million.

Furthermore, there is maintenance of and support for Centrix that encompasses the overall coverage of business processes in the registry office and dispatching covering everything from dispatching of post or final archiving of cases, maintenance of and support for the ERP information system for planning and managing resources, maintenance of and support for the Web portal, maintenance of and support for the information system for human resources and salary calculation, maintenance of and support for the Market Analysis System, maintenance of and support for the e-Operator System, MS platforms, Intranet, virtualization platform. Moreover, there is also the consolidation of the data centre, firewall system, vulnerability control and maintenance of the data loss prevention system.

Other services comprise expenditure for the costs of joint spending of the business premises of the headquarters, costs for registration of business vehicles, graphic and printing services, fees for the use of the RF spectrum, HRT fees, services of keeping and archiving documents and other unmentioned services. Other services were realized below the planned value as the preconditions for the realization were not fulfilled for some of them, and HAKOM cannot directly influence them. Those are the

services of disassembling and assembling new control and measuring station and services of arranging and fixing the access road to the control and measuring stations.

Insurance premiums refer to insurance of HAKOM's employee, business vehicles and property (construction facilities, microwave digital communication networks, measuring equipment in facilities and measuring vehicles).

Depreciation expenditure was lower than planned because of completely depreciated software in 2014 (Software Argus 5.4 TIP C MMS - purchased by funds from the EU pre-accession instrument - Project IPA 2007).

Capital donations for the Programme for the Internet and Broadband Development in Areas of Special State Concern, Hilly and Mountainous Areas and Islands and to the Project for the removal of interferences and improvement of reception for TV viewers have been approved under the Financial Plan of HAKOM for 2016.

Capital donations are not expenditure for the performance of regular HAKOM's activities and they are not financed from the regular revenue of HAKOM, but from the carried over surplus of revenue from previous periods.

The Programme for the Internet Development is divided into three projects: connection to broadband Internet access, installation of selected applications and installations of the appropriate computer equipment.

In 2016 the amount of HRK 6.250 was spend for the conceptual design of the software application "Sound System for the Central State Portal", and HRK 185.614 was spent on the software for the needs of the Croatian Health Insurance Institute. In 2016 the total of HRK 191.864 was spent for the Internet Development Programme that ended in August. In 2016 the total of HRK 56.194 was spent on the Project for the removal of interferences and improvement of reception for TV viewers.

The amount HRK 59.305 was registered on the account of capital donations in 2016 and it refers to the donation of the water supply pipeline, pipeline for the drainage of waste waters and water connection from the street pipe to the connection shaft to the company Vodovod i kanalizacija d.o.o. Split, all in connection to the construction of business facility in Split, what has been regulated under the contract between HAKOM and Vodovod i kanalizacije d.o.o. Split.

Written-off receivables were registered in the total amount of HRK 473.411, and they comprise the receivables resulting from pre-bankruptcy settlements amounting to HRK 15.441 , receivables entered into the insolvency estate of the companies that were in the end liquidated and erased in the amount of HRK 37.160, and the remaining amount of HRK 420.810 refers to claimed, uncollected, or time-barred receivables.

The financial result is established as a difference of total revenue and total expenditure on all bases in the reporting period. The revenue deficit is covered by the carried-over surplus from the previous years.

Revenue surplus available in the following period amounted to HRK 52.921.660.

Surplus revenue available in the following period may be used for regular activity, for investments or for reserves. Surplus revenue available in the following period realized in the postal services and rail services sectors will be used for regular activities in the sector where the revenue surplus occurred.

The Table below shows expenditure realized compared to the financial plan separately for the electronic communications sector, the postal services sector and for the rail services market regulation sector.

Table 10.8. HAKOM's expenditure realized in the electronic communications sector in 2016 together with capital donations compared to the Annual Financial Plan (in HRK)

Class	Sub group	NAME	2015 Plan	Realisation 2015	Index
41		**Employee expenses**	**40.030.400**	**37.694.700**	**94**
	411	Salaries	32.048.900	29.610.417	92
	412	Other employee expenses	1.309.000	1.999.584	153
	413	Contributions on salaries	6.672.500	6.084.699	91
42		**Material expenditure**	**33.222.900**	**27.617.567**	**83**
	421	Compensations of costs to employees	3.547.000	2.884.845	81
	422	Compensations to members of representative and executive bodies, commissions and the similar	20.000	53.772	269
	424	Compensations for other unemployed persons	52.500	14.337	27
	425	Expenditure for services	24.954.100	21.466.983	86
	426	Expenditures for materials and energy	3.151.000	2.064.533	66
	429	Other unmentioned material expenditure	1.498.300	1.133.097	76
43		**Depreciation expenditure**	**18.800.000**	**12.430.713**	**66**
	431	Depreciation	18.800.000	12.430.713	66
44		**Financial expenditure**	**150.000**	**103.132**	**69**
	443	Other financial expenditure	150.000	103.132	69
45		**Donations**	**5.898.000**	**382.363**	**6**
	451	Current donations	75.0000	75.000	100
	452	Capital donations	5.823.000	307.363	5
46		**Other expenditure**	**1.306.700**	**560.798**	**43**
	461	Fines, penalties and compensation for damage	438.500	12.772	3
	462	Other unmentioned expenditure	868.200	548.026	63
TOTAL			**99.408.000**	**78.789.273**	**79**

Table 10.9. HAKOM's expenditure realized in the postal services sector in 2016 compared to the Annual Financial Plan (in HRK)

Class	Sub group	NAME	2016 Plan	Realisation 2016	Index
41		**Employee expenses**	**1.102.300**	**1.013.671**	**92**
	411	Salaries	837.000	811.039	97
	412	Other employee expenses	85.100	32.647	38
	413	Contributions on salaries	180.200	169.985	94
42		**Material expenditure**	**1.350.600**	**1.013.433**	**75**
	421	Compensations of costs to employees	121.000	69.451	57
	425	Expenditure for services	1.161.400	895.403	77
	426	Expenditures for materials and energy	36.000	31.620	88
	429	Other unmentioned material expenditure	32.200	16.959	53
43		**Depreciation expenditure**	**0**	**0**	**0**
	431	Depreciation	0	0	0
44		**Financial expenditure**	**3.400**	**2.468**	**73**
	443	Other financial expenditure	3.400	2.468	73
45		**Donations**	**0**	**0**	**0**
46		**Other expenditure**	**302.700**	**0**	**0**
	461	Fines, penalties and compensation for damage	900	0	0
	462	Other unmentioned expenditure	301.800	0	0
TOTAL			**2.759.000**	**2.029.572**	**74**

Table 10.10. Expenditure realized from HAKOM's regulation of the rail services market in 2016 compared to the Annual Financial Plan (in HRK)

Class	Sub group	NAME	2016 Plan	Realisation 2016	Index
41		**Employee expenses**	**901.600**	**1.040.662**	**115**
	411	Salaries	704.100	840.230	119
	412	Other employee expenses	46.800	31.444	67
	413	Contributions on salaries	150.700	168.988	112
42		**Material expenditure**	**552.200**	**474.356**	**86**
	421	Compensations of costs to employees	132.000	87.619	66
	425	Expenditure for services	353.000	332.238	94
	426	Expenditures for materials and energy	32.000	30.612	96
	429	Other unmentioned material expenditure	35.200	23.887	68
43		**Depreciation expenditure**	**0**	**0**	**0**
44		**Financial expenditure**	**1.600**	**1.892**	**118**
	443	Other financial expenditure	1.600	1.892	118
45		**Donations**	**0**	**0**	**0**
46		**Other expenditure**	**600**	**0**	**0**
	461	Fines, penalties and compensation for damage	600	0	0
	462	Other unmentioned expenditure	0	0	0
TOTAL			**1.456.000**	**1.516.910**	**104**

The following table shows HAKOM's realized expenditure in 2016 compared to 2015.

Table 10.11. HAKOM's expenditure realized in 2016 compared to the previous year (in HRK)

Class	Sub group	NAME	Realisation 2015	Realisation 2016	Index
41		**Employee expenses**	**37.746.598**	**39.749.033**	**105**
	411	Salaries	30.993.966	31.261.686	101
	412	Other employee expenses	1.412.696	2.063.675	146
	413	Contributions on salaries	5.339.936	6.423.672	120
42		**Material expenditure**	**27.336.417**	**29.105.356**	**106**
	421	Compensations of costs to employees	2.957.907	3.041.916	103
	422	Compensations to members of representative and executive bodies, commissions and the similar	33.784	53.773	159
	424	Compensations for other unemployed persons	53.365	14.337	27
	425	Expenditure for services	20.963.114	22.694.624	108
	426	Expenditures for materials and energy	2.239.101	2.126.764	95
	429	Other unmentioned material expenditure	1.089.146	1.173.942	108
43		**Depreciation expenditure**	**14.842.040**	**12.430.713**	**84**
	431	Depreciation	14.824.040	12.430.713	84
44		**Financial expenditure**	**100.641**	**107.492**	**107**
	443	Other financial expenditure	100.641	107.492	107
45		**Donations**	**32.737.287**	**382.363**	**1**
	451	Current donations	74.989	75.000	100
	452	Capital donations	32.662.298	307.363	1
46		**Other expenditure**	**1.008.471**	**560.798**	**56**
	461	Fines, penalties and compensation for damage	11.417	12.772	112
	462	Other unmentioned expenditure	997.054	548.026	55
TOTAL			**113.753.454**	**82.335.755**	**72**

10.3 Balance Sheet

Name of position	31 December 2015 HRK	31 December 2016 HRK
ASSETS		
Material assets – natural resources	1.168.592	1.168.592
Non-material assets	23.932.753	23.012.557
Correction of value of non-produced long-term assets	-20.864.540	-20.958.247
Non-produced long-term assets	**4.236.805**	**3.222.902**
Construction facilities	12.168.891	17.797.778
Installations and equipment	153.800.846	158.242.049
Means of transportation	23.361.524	23.361.524
Books, works of art and other	28.174	28.174
Non-material produced assets	32.349.862	36.023.563
Value correction of produced long-term assets	-184.526.061	-195.239.708
Produced long-term assets	**37.183.236**	**40.213.380**
Small inventory in use	484.875	495.396
Value correction of small inventory	-484.875	-495.396
Small inventory	**-**	**-**
Non-financial assets in preparation	**1.064.939**	**351.630**
NON-FINANCIAL ASSETS	**42.484.980**	**43.787.912**
Cash in bank and petty cash	**39.232.158**	**34.516.421**
Deposits in banks and other financial institutions	-	-
Guarantee deposits	2.476.174	2.451.117
Receivables from employees	40	209
Receivables for excess taxes and contributions	64	136
Other receivables	89.413	100.394
Deposits, guarantees, receivables from employees and from the state	**2.565.691**	**2.551.856**
Receivables for revenue pursuant to special legislation	15.257.764	14.264.312
Receivables for revenue from assets	344.717	392.328
Receivables for revenue	**15.602.481**	**14.656.640**
Deferred revenue and outstanding collection of revenue	**1.448.768**	**830.544**
FINANCIAL ASSETS	**58.849.098**	**52.555.461**
TOTAL ASSETS	**101.334.078**	**96.343.373**
OFF-BALANCE SHEET ENTRIES	**171.407.010**	**167.783.422**

Name of position	31 December 2015 HRK	31 December 2016 HRK
LIABILITIES AND OWN SOURCES		
Employee liabilities	2.969.385	2.929.557
Liabilities for material expenditure	1.577.345	2.255.470
Liabilities for collected aid funds	51.431	-
Other liabilities	45.713	-
Liabilities for expenditure	**4.643.874**	**5.185.027**
Postponed payment of expenditure	**-**	**-**
Collected deferred expenditure	33.811.270	33.859.889
Delayed expenditure payments and future revenue	**33.811.270**	**33.859.889**
Own sources	4.714.640	4.376.797
Surplus revenue	58.164.294	52.921.660
Revenue deficit	-	-
Own sources	**62.878.934**	**57.298.457**
TOTAL LIABILITIES AND OWN SOURCES	**101.334.078**	**96.343.373**
OFF-BALANCE SHEET ENTRIES	**171.407.010**	**167.783.422**

There were no changes on the material assets position in 2016. Material assets comprise four plots of construction land: construction land Otok (HRK 72,800), Ravna Gora (HRK 6,814), Kostrena - Rijeka (HRK 13,783) and Split (HRK 1,075,195). Other non-material assets were decreased in 2016 because of the expenditure and write-off of the local network procured in 2002 and which is not used any more.

Construction facilities consist of branch offices and control and measuring stations (hereinafter: CMS). They comprise branch offices in Rijeka in the value of HRK 2,160,393, Osijek in the value of HRK 3,529,586, Split in the value of HRK 5.628.887 and the Veliki Bokolj CMS in the value of HRK 2,107,236, Ozljak CMS in the value of HRK 356,448, mobile CMS located in Ćilipi in the value of HRK 658,420, Otok CMS in the value of HRK 656,466, Ravna Gora CMS in the value of HRK 2,335,240 and the Degman CMS the value of which is HRK 365,102.

The construction of the business facility of the branch office in Split started in 2016 on the land bought in 2014 from the State Office for State Property Management 2015. The construction of the branch office in Split was finished in 2016.

In 2016 no transport vehicles were procured.

Non-material produced assets was increased by investments into software in 2016 carried out for the purpose of modernizing the software through the e-Agency project and for the needs of controlling the radio frequency spectrum. The following was procured: control software Argus 5.4.2, control software R&S Romes, software support for the vectorization techniques in the network with more DSLAMs, protection system for WEB applications, software solution OLAP, implementation of e-Invoice, Protected Numbers Register, Postal Services Providers Register and other.

Financial assets – guarantee deposits, refer to the collaterized payments of monthly rent, costs individual spending and regular maintenance of business premises. The guarantee deposit is declared according to the middle exchange rate of the CNB on the date of the balance sheet.

Receivables for revenue pursuant to special regulations refer to the fees for the use of radio frequencies, fees out of the total annual gross revenue earned in the previous year from the provision

of telecommunications services and activities by concessionaires and telecommunications services providers, fees for allocated addresses and numbers, receivables from special authorization, technical checks and fee from the providers of postal and rail services. In 2016 in comparison to 2015 the amount of the fees was not changed.

Receivables for revenue from financial assets refer to the receivables from interests on late payments.

Employee liabilities refer to the calculated salary for December 2016.

Liabilities towards domestic suppliers are expressed according to accounting events principle. All invoices received in 2017 for the events in 2016 were entered in 2016. Liabilities towards suppliers are paid at the latest by the due date. There are no due outstanding liabilities.

Liabilities for collected aid funds refer to liabilities towards the State Budget. On 31 December 2016 there were no liabilities towards the State Budget.

Deferred revenue occurs because HAKOM issues invoices for the fees (based on the ECA) for the periods that are not identical to the business calendar year, and the proportionate part of the receivables is expressed as deferred revenue.

Own resources are the remaining value of assets after the deduction of all liabilities. In 2016 the correction of values for the produced long-term assets procured by 1 January 2008 in the amount of HRK 337.843 was allocated to the resources.

The surplus revenue on 31 December 2016 amounted to HRK 52.921.660. HAKOM's Financial Plan defined the use of a part of the surplus revenue from previous years. Materially most significant items that were realized and approved for financing from surplus revenue from previous periods are the following:

- Programme for the development of the Internet and broadband access in the areas of special state concern, hilly and mountainous areas and on islands,
- Project for the removal of interferences and improvement of reception for TV viewers,
- Construction of a branch office in Split,
- Procurement of computers and computer equipment,
- Procurement of control and measuring devices,
- Investments into software

Revenue of the State Budget of the Republic of Croatia were entered into the off-balance records.

10.4 Investments

Table 10.12. Realized investments in 2016 compared to the Annual Financial Plan (in HRK)

DESCRIPTION		Plan 2016	Realisation 2016	Index
I	Licenses	0	117.417	0
II	Other right - investments on the property of others for the purpose of the right of use	3.062.500	0	0
III	Other non-material assets - expenditure for development projects and studies	0	0	0
IV	Business facilities	6.158.750	5.628.887	91
V	Computers and hardware	3.662.500	3.281.016	90
VI	Other office equipment	87.500	51.125	58
VII	Office furniture	112.500	111.551	99
VIII	Communications equipment	325.000	98.900	30
IX	Maintenance and protection equipment	75.000	8.000	11
X	Measuring and control devices	5.410.000	1.870.795	35
XI	Machine and equipment for other use	0	0	-
XII	Means of transportation - other vehicles	0	0	-
XIII	Means of transportation - utility vehicles	0	0	-
XIV	Investments into software	3.865.000	3.673.700	95
TOTAL		**22.758.750**	**14.841.391**	**65**

In 2016 out of the surplus of transferred revenue the investment into GIS ECI base was planned amounting to HRK 2,500,000 as an investment into unowned property for the purposes of the right of use. The State Geodetic Administration would be the owner of the base, and HAKOM would have the right of use. The project was not implemented in 2016.

In 2015 the construction of a business facility of the Branch office in Split on the land bought in 2014 from the State Office for State Property Management started. The location of the branch office that used to be in the building of Hrvatska pošta d.d. did not meet neither measuring nor location conditions for the accommodation of the employees and equipment. After many years of searching for a suitable location HAKOM determined that the most efficient solution would be to build a new Branch Office on the location in Split, street Vrh Visoke, which meets the measuring (position of the land, height of the neighbouring buildings) and business conditions for storage of equipment and accommodation of employees. After finding the adequate location, preparing and obtaining necessary documents and permits, and contracting construction works in 2015 HAKOM started building the business premises of the Branch Office that was completed in 2016. The new Branch Office in Split ensures better quality and more efficient work of HAKOM on the territory of Dalmatia.

In 2016 the procurement of the control and measuring station Osorščica was planned together with the necessary measuring equipment. Concerning that HAKOM still has not received a reply from DUUDI following the request for the establishment of the right of construction – consent for the plot of land in the ownership of the Republic of Croatia on the location Osorščica, Mali Lošinj, the necessary documents for the procurement and installation of the control and measuring station has not been obtained, and therefore the procurement of CMS Osorščica has not been carried out. Therefore, the realization of the items referring to business premises and measuring and control devices is lower than planned.

In 2016 computers and computer equipment were procured: network switches, scanners, network equipment – firewall, disaster recovery infrastructure of the Central Administrative Base of Portability

(CABP), advanced malicious code prevention system, distant location disaster recovery system, hardware equipment for the Register of Protected Numbers, computers, computer equipment and photocopiers.

Office furniture was procured for the Branch Office in Split.

Regarding the item of the maintenance and protection equipment investments were planned for the access control and video surveillance. The stated was not realized in 2016.

Investments into computer programmes in 2016 were carried out for the purpose of modernizing the programmes through the e-Agency project and for the needs of the RF spectrum control. The following was procured: control software Argus 5.4.2, control software R&S Romes, software support for the vectorization techniques in the network with more DSLAMs, protection system for WEB applications, software solution OLAP, implementation of e-Invoice, Protected Numbers Register, Postal Services Providers Register and other.

10.5 State Budget revenue

The off-balance records follow unowned assets. It records revenue of the State Budget of the RoC expressed as receivables from users with simultaneous entry of liabilities towards the State Budget of the Republic of Croatia. HAKOM only invoices these fees for the benefit of the State Budget and the amounts of the fees are paid directly into the State Budget. Off-balance records are entered analytically per buyers and issued invoices for the benefit of the State Budget.

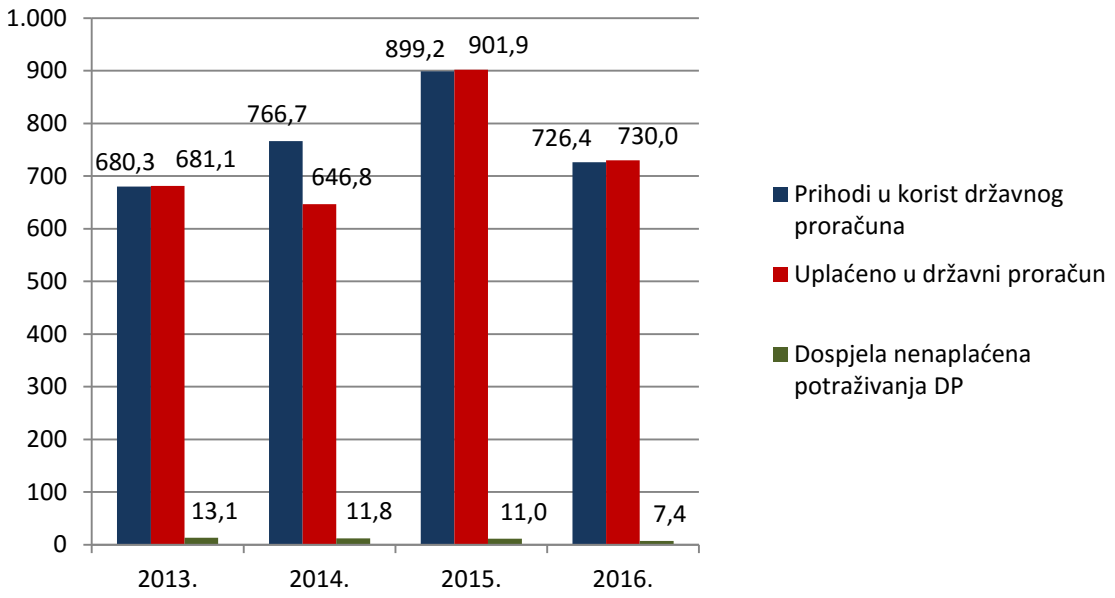
A total of HRK 726.353.697 was in voiced in 2016 for the benefit of the State Budget. Out of the total invoiced amount, HRK 703.377.702 (97 percent) refers to the fees for the use of the radio frequency spectrum. Other refers to the fees for addresses and numbers and default interests.

According to our records, a total of HRK 729.977.285 was paid into the State Budget in 2016. The State Budget funds paid by the users into HAKOM's giro account by mistake HAKOM transferred by into the State Budget.

Table 10.13. State Budget revenue, payments and receivables per years (in HRK)

DESCRIPTION	2013	2014	2015	2016
State Budget revenue	680.304.775	766.717.109	899.164.545	726.353.697
Paid into the State Budget	681.057.926	646.793.875	901.875.318	729.977.285
Mature outstanding receivables (Statement as of 31/12)	13.066.723	11.796.203	11.043.940	7.386.072

Figure 10.2. State Budget revenue, payments and receivables per years (in HRK million)



A total of 33 enforcements were initiated in 2016 for all receivables that were not paid even 30 days after the issued dunning letter. The recovery of HRK 339.997,26 for the benefit of the state Budget was achieved in court and HRK 161.856,51 were collected by the day of writing this report.

10.6 Independent audit report (summary)

An independent audit company audited HAKOM' financial statements including the Balance Sheet as of 31 December 2016, the Statement of Revenue and Expenditure for the period between 1 January and 31 December 2016, and Notes supplementing the data from the Balance Sheet and Statement of Revenue and Expenditure.

HAKOM's annual financial statements for the year ending on 31 December 2016 were prepared in the prescribed form on the basis of the Ordinance on Reporting in Non-Profit Accounting and Register of Non-Profit Organizations (OG No. 31/15), and in accordance with other regulations governing HAKOM's business operations.

In accordance with the opinion of the audit firm, the financial reports are a realistic and objective presentation, in all significant elements, of HAKOM's financial positions on 31 December 2016, as well as the results of its business operations for the year ending on that date, in accordance with the Act on Financial Performance and Accounting of Non-Profit Organizations. 121/14).

Report on the audit of HAKOM's annual financial statements for 2016 and HAKOM's Final Statement for 2016 (Balance Sheet, Revenue and E. (Balance sheet, Statement of Revenue and Expenditure and Notes to Financial Statements) were published on HAKOM's website[35].

[35] http://www.hakom.hr/default.aspx?id=512

Annexes

A. List of abbreviations

ADSL – Asymmetric Digital Subscriber Line
AM – Access network
ARCEP – Autorité de Régulation des Communications Electroniques et des Postes
ARGUS – software
ARRSM - Act on the Regulation of the Rail Services Market
BEREC – Body of European Regulators for Electronic Communications
BDO – auditing company
BRIFIC – Bureau Radio International Frequency Information Circular
CABP – Central Administrative Base of Portability
CARNET – Croatian Academic and Research Network
CBS – Croatian Bureau of Statistics
CEPT – European Conference of Postal and Telecommunications Administrations
CERP – European Committee for Postal Regulation
COCOM – Communications Committee
CA – Competition Agency
CPA – Consumer Protection Act
CPS – Carrier Pre-Selection
CRM – Customer Relationship Management
DAB – Digital Audio Broadcasting
DMS - Document Management System
DTV – Digital television
DVB-T - Digital Video Broadcasting – Terrestrial
ECA – Electronic Communications Act
ECC – Electronic Communications Committee
ECI – Electronic communications infrastructure
EKIP – Montenegrin Agency for Electronic Communication and Postal Activity
ELMAR – International scientific symposium “Electronic in Marine"
EMA – Electronic Media Agency
EMERG Euro-Mediterranean Regulators Group
EMP - electromagnetic field
ENRRB - European Network of Rail Regulatory Bodies
ERGP - European Regulators Group for Postal Services
ETFOS – Faculty of Electrical Engineering in Osijek
EU - European Union
FEEC – Faculty of Electrical Engineering and Computing
FM – Frequency Modulation
FTTC – Fiber To The Curb, that is to cabinets on the outside of buildings
GSM - Global System for Mobile Communications
HAKOM – Croatian Post and Electronic Communications Agency
HCM – Harmonised Calculation Method – International agreement for the harmonisation of frequencies for mobile and fixed terrestrial systems
HEP – Croatian power company
HKIE – Croatian Chamber of Electrical Engineers
HLIG - High Level Internet Group
HP - Croatian Post
HRT – Croatian radio-television
HT - Hrvatski Telekom d.d. (Croatian Telecom)
HŽ – Croatian Railways

ICT - Information and Communication technologies
IoT - Internet of Things
IP - Internet Protocol - Network protocol for data transfer which is used for source and destination computers for data communication over computer network
IPTV - Internet Protocol Television
IRG - Independent Regulators Group
IRG R - Independent Regulators Group - Rail
ITU – International Telecommunication Union
LSU – Local self-government unit
CMS - Control and measuring station
CMC - Control and measuring centre
LLU - Local Loop Unbundling
LTE - Long-Term Evolution - A technology which enables high transfer speed over 4th generation mobile communications systems
MCPP – Ministry of Construction and Physical Planning
ME – Ministry of Economy
MSTI – Ministry of the Sea, Transport and Infrastructure
MD - Ministry of Defence
MPEG -Moving Picture Experts Group – Group of standards for coding audio and video signal
MI - Ministry of the Interior
MCMS - Mobile control and measuring station
MUX - Multiplex a stream of digital signals containing several radio or television programmes and/or other data simultaneously transferred via one radio frequency channel;
MFEA - Ministry of Foreign and European Affairs
M2M - Machine to Machine, communication between machines
NGN - Next Generation Network
NIPP – National Infrastructure of Spatial Data
NRA – National regulatory authorities
OG – Official Gazette
OiV – Odašiljači i veze
OTT – Over-the-top service
PAY-TV - Television programmes with payment
PSA – Postal Services Act
PMR - Private Mobile Radio
RA – Railways Act
RF - radiofrequency
RRB - Radio Regulations Board
RSC - Radio Spectrum Committee
RSPG - Radio Spectrum Policy Group
RoC – Republic of Croatia
R&TT – Radio and telecommunications terminal equipment
SAT TV - Satellite television
SEDDIF – South European Digital Dividend Implementation Forum
SGA – State Geodetic Administration
SMS - Short Message Service
SRD – Short Range Devices
T- DAB – Terrestrial Digital Audio Broadcasting
TSM – Telecom Single Market
TV - Television
UHF - Ultra High Frequency: radiofrequency band between 30 MHz and 300 MHz
UMTS – Universal Mobile telecommunications System (mobile network 3rd generation)
UPU – Universal Postal Union
VDSL – Very-high-bit-rate Digital Subscriber Line

VLKM - train kilometres
ZEA – Zagreb Electrotechnical Association
WGFM - Working Group Frequency Management
WGSE – Working Group Spectrum Engineering
WG NaN – Working Group Numbering and Networks
WIFI – Local wireless network in the 2.5/5 GHz frequency band
WRC- World Radiocommunication Conference
WLR -Wholesale Line Rental
xDSL - x Digital Subscriber Line

B. List of figures

C. List of tables