

REPUBLIC OF SERBIA

RATEL

REGULATORY AGENCY FOR
ELECTRONIC COMMUNICATIONS
AND POSTAL SERVICES

**ANNUAL WORK
REPORT 2019**



**ANNUAL WORK REPORT OF THE
REGULATORY AGENCY FOR ELECTRONIC
COMMUNICATIONS AND POSTAL SERVICES
FOR THE YEAR 2019**

Belgrade, April 2020

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Dr Vladica Tintor
Director

1. WORD OF DIRECTOR

In 2019, the Regulatory Agency for Electronic Communications and Postal Services, as the national regulatory authority for electronic communications, postal services and information society undertook a number of activities with the aim to improve the conditions for the operators on the telecom and postal markets, foster market competitiveness, enhance the quality of service and ensure a greater degree of end user protec-

tion and, also, to promote information security in the Republic of Serbia.

Proposal of the Rulebook on quality parameters for publicly available electronic communication services, measurement and testing and control of activities of electronic communications operators has been prepared in order to provide regulation that would follow the technologically advanced electronic networks and services, in particular the introduction of 4G electronic communication networks operating since 2015. In the meantime, VoLTE service has been launched on 4G electronic communication networks, while the previous relevant rulebook does not set out quality parameters for this service.

Waiting for the amendments to the Law on Electronic Communications, following the developments that took place in the EU in the field of electronic communications, RATEL drafted the Guidelines on Open Internet, which are not binding, yet they provide guidelines to operators on the conduct in terms of behaviour in the world of open Internet.

The most important developments concerning regulatory activities in 2019 are given below.

The total of 12,419 individual RF spectrum usage permits have been issued (the total number of decisions is 1639) and 4,455 individual RF spectrum usage permits have been revoked (the total number of decisions is 670). During 2019 temporary RF T-DAB broadcasting station permits have been issued (for the following locations: Avala, Crveni Čot, Ovčar, Subotica, Tupižnica, Jastrebac), thereby continuing the test phase of terrestrial digital audio broadcasting implementation in Serbia. In 2019, 5G testing has officially begun in the Republic of Serbia by issuing temporary licences for radio frequency usage in RF band 3400-3800 MHz, which is considered as basic in the current 5G development phase. In June 2019 RATEL issued the first temporary permits for 5G

testing to the operator Telenor and in October 2019 to the operator Telekom Srbija.

During 2019, 1,042 new files were opened related to user complaints (423 of which had a positive outcome for the users), 450 certificates on conformity of R&TT equipment were issued, 40 decisions on assignment, extension or withdrawal of numbering resources were issued, 1 new permit for postal services provision was issued, 4,297 measurement logs were made in the data base, 194 changes were made in the register of electronic communications operators (93 new entries and 101 deletions) and three Special CERTs were registered.

As for RF spectrum use coordination issues with the administrations of the neighbouring and other countries, during 2019 the coordination



involved providing answers to the coordination requests and submitting our own coordination requests. In the area of broadcasting service **484** frequency/location coordinations with the administrations of the neighbouring and other countries were agreed upon; in the area of fixed service, answers were provided to **16** coordination requests (**365** RR links) and **3** coordination





requests were made (91 RR links) according to HCM (Harmonisation Calculation Method) agreement; in the area of fixed satellite service answers were provided to 15 coordination requests; in the area of broadcast satellite service answers were provided to 2 coordination requests; in the area of mobile satellite service 3 answers were provided to coordination requests; and in the area of fixed and mobile service 49 frequency/locations were coordinated with the Hungarian administration, according to HCM agreement.

Upon requests made by town and municipal administrations – spatial planning, urban design and construction departments, for the needs of spatial plan and detailed regulation plan designs, **44** replies were prepared in **2019** defining the conditions for protection of the existing electronic communications networks and accompanying facilities, protection area and the manner of construction works in the vicinity of the electronic communications networks and the accompanying facilities, as well as the conditions concerning radio paths for the geographic areas given in the requests.

In 2019, technical agreements for frequency coordination were signed with the administrations of Bosnia and Herzegovina, Republic of North Macedonia and Montenegro on mobile networks border coordination for non-GSM technology, for four frequency bands (800 MHz, 900 MHz, 1800 MHz and 2100 MHz), thereby improving spectrum utilization in the particular border areas. In October 2019, RATEL signed a WiFi Agreement with Microsoft on the project which involves placing Micro-



soft TVWS equipment (using TV white space band) on a specific location to provide free Internet. The implementation of the agreement is underway. As for the enhancement of the RF monitoring system infrastructure, by the end of 2019, the construction works on sixteen locations have been completed, eleven stations have become operational and the remaining five locations will become operational in the first half of 2020.



The network of sensors used for continuous and long-term measurement of EM level produced by electronic communications networks and equipment - EMF RATEL continues to grow and the portal <https://emf.ratel.rs/eng/index> available to public is updated on a regular basis. Many locations of interest for sensor set-up have been examined throughout Serbia. EMF RATEL project for continuous and long-term measurement of EM level has received an award from the national program "Open Data – Open Possibilities".

In April 2019, an Agreement on reduction of roaming prices in public mobile communications networks in the Western Balkans was signed, aiming to achieve a high level of consumer, competition and transparency protection on the electronic communication market. To that end, RATEL carried out a procedure and reached a decision on prescribing the obligation of reducing the regulated roaming service prices and roaming termination call prices in public mobile communications networks in the Western Balkans, implemented as





of 1 July 2019. Following a transitory period, which will last until 30 June 2021, all additional fees and charges for regulated calls, SMS and data transfer in roaming, charged in accordance with domestic retail price lists, will no longer be applied as of 1 July 2021, thus aligning the roaming prices in the Western Balkans with those applied in the EU, and introducing the “roam like at home” principle.

At the beginning of 2019, changes were made to the Report on analysis of the market for wholesale central access provided at a fixed location for mass-market products and, in July 2019, a decision on designation of operators with significant market power (SMP) on the relevant market was passed. During 2019, RATEL carried out a public consultation procedure and prepared a Proposal on the Rulebook on cost-accounting based on LRIC (long run incremental cost) model for determining the prices for regulated wholesale services offered by the operators with SMP on relevant wholesale markets.

In 2019 RATEL carried out mobile network benchmarking and analysis of QoS parameters for services provided to end-user by mobile network operators for 2G/3G/4G technologies and measurement of QoS parameters for voice and data

transmission and the results are available at <http://benchmark.ratel.rs/en>. The measurements covered 50 towns and 10,000 km of Serbian roads. During the campaign, over 6,000 voice calls, 20,000 data sessions 20,000 web browsing tests 5,000 Youtube video tests were performed on all mobile measures, across all available technologies (2G, 3G, 4G).

During 2019, 156 on-site audits of electronic communications operators were performed, along with duly signed audit reports both by RATEL’s representatives and operators. The experience has shown that the obligations defined by the signed reports are respected, and regular monthly reports indicate the observed irregularities and propose adequate measures and/or procedures.

RATEL continued to contribute to the international community in the endeavour to obtain better results in prevention of and protection from security risks in ICT systems. Amendments to the Law on Information Security, which came into effect on November 2019, further strengthened the position of the National CERT. During 2019, there were 152 incidents reported to the National CERT that handles incidents reported from the territory of the Republic of Serbia and by interna-

tional CERTs. The National CERT of the Republic of Serbia, which is part of RATEL, has been recognized by the international CERT organizations as a unique national hub for incident reporting and a reliable partner for solving of incidents pertaining to cyber security on the territory of the Republic of Serbia.

During 2019, four operators (Telekom, Telenor, VIP and ETV) and another large user - SMATSA have been applying for individual permits for RF usage through e-licence and e-desk applications.

A Protocol on Cooperation was signed with the Security Information Agency, focusing on the mutual interests and needs in the area of information security capacity building.

In order to further enhance the international cooperation in the area of sharing information, experience and documents regarding the latest regulatory developments in electronic communications and postal services, another two Memoranda of Understanding (MoU) in the field of electronic communications and postal services were signed in 2019, in June with the Romanian regulator ANCOM and in October with the Turkish regulator ICTA.

RATEL continued to actively participate in the work of the Body of European Regulators for Electronic Communications – BEREC. During 2019 a representative of RATEL served as a BEREC EWG Co-Chair.

In 2019, RATEL hosted several important international meetings:

- meetings of CERP and PostEurop WGs, held from 20 through 22 March 2019 in Belgrade. This was the biggest gathering of a CERP WG in history, with 60 participants from 25 European countries;
- third regulatory meeting on the topic “Measurements of quality of service (MoQoS)”, held

in June 2019 in Belgrade, where the latest projects and activities in the field of QoS measurement were presented by the experts from Poland, Hungary, Slovakia, Czech Republic, Slovenia and Croatia, and the representatives of RATEL;

- 29th meeting of ENISA’s Article 13a Expert Group. The meeting was attended by the representatives of the EU member countries, Norway, Switzerland, European Commission and RATEL and the topics of discussion were integrity and security breaches in the electronic communication networks and continuity of service provision.

It should be noted that the Committee on Spatial Planning, Transport, Infrastructure and Telecommunications of the National Assembly of the Republic of Serbia discussed the 2018 Annual Work Report of the Republic Agency for Electronic Communications and Postal Services, in its 39th session held on 3 October 2019 and referred to the National Assembly the Proposal of the decision on adoption of the report.

The results made so far and the future plans are rather reassuring when it comes to maintaining the positive development trend of the electronic communications and postal services, market regulation and implementation of rules regulating information security, and, also, RATEL’s internal development.

Director



Dr Vladica Tintor



2. INTRODUCTION

The Regulatory Agency for Electronic Communications and Postal Services (RATEL) was established in 2005, under the name of the Republic Telecommunications Agency, in line with the Law on Telecommunications. As a national regulatory authority, RATEL was tasked to ensure efficient enforcement and enhancement of the telecom policy in the Republic of Serbia, aimed at further development of the telecommunications and creation of conditions for the implementation of information society. Following the entry into force of the Law on Electronic Communications in 2010, RATEL continued to work as the Republic Agency

for Electronic Communications. With amendments to the Law on Electronic Communications and the Law on Postal Services of 2014, the Republic Agency for Postal Services (RAPUS) was merged with the Republic Agency for Electronic Communications, which, in turn, continued to work as the Regulatory Agency for Electronic Communications and Postal Services, keeping the abbreviated name RATEL.

The Law on Information Security (*Official Gazette of RS, nos. 6/16, 94/17 and 77/19*) adopted by the National Assembly of the Republic of Serbia on 26 January 2016, RATEL was entrusted with



the activities of the National Computer Emergency Response Team (CERT) in charge of coordinating the prevention of and protection from the Serbian ICT system security risks at a national level.

RATEL's position in the legal system of the Republic of Serbia is stipulated pursuant to the provision of Article 137, paragraph 3 of the Constitution. In the Law on Electronic Communications (*Official Gazette of RS, nos. 44/10, 60/13-Const. Court Dec. 62/14 and 95/18- other law, hereinafter: LEC*) RATEL is defined as an autonomous organisation, independent of state authorities, organizations and persons performing the activity of electronic communications and separate from the existing state administration structure, in order to ensure a high level of autonomy and independence in performing the entrusted public competencies. The manner of financing is a mechanism ensuring RATEL's financial independence and RATEL's revenues stipulated by the law are not budgetary assets by their legal nature. As RATEL's work is not financed from the budgetary assets, greater level of efficiency in electronic commu-

nications activities and necessary distance from political influence are ensured.

RATEL performs public administrative functions aimed at implementation of the set policies in the domain of electronic communications and postal services, fostering competition on the markets of postal and electronic communications networks and services, improving their capacities and quality, monitoring market development and protecting users' interests. As the national regulatory authority of the Republic of Serbia responsible for the domain of electronic communications and postal services, RATEL's task is to enable successful liberalization in the sector of telecommunications and postal services, radio frequency management and spectrum monitoring (RF spectrum representing a scarce resource of national importance), as well as harmonization of the national legislation with the EU regulatory framework. Also, RATEL performs the tasks of a National Centre for the Prevention of Security Risks in ICT Systems (National CERT), involving coordination of prevention of and protection from



the security risks to ICT systems on a national level.

RATEL's authority in market regulation in the field of electronic communications and postal services involves the following:

- deciding on operators' and users' rights and obligations,
- adopting rulebooks, decisions and other legal acts within its competence,
- establishing available paths for radio relay links and adequate protection zones,
- radio frequency usage planning, RF spectrum management, radio frequency usage licenses issuance, radio frequency usage coordination and monitoring,
- checking operators' fulfilment of obligations regarding interconnection, access and interoperability of networks and services,
- universal service,
- relevant markets analysis, designating oper-

ators with significant market power and their obligations, in order to prevent monopolistic behaviour and foster market development through competition,

- managing the numbering plan and adopting draft Allocation Plan and Allotment Plans,
- monitoring quality parameters set for publicly available services,
- adopting general terms and conditions for the provision of postal services, quality standards in the provision of postal services and monitoring their application,
- resolving user complaints,
- setting detailed terms and conditions for license and authorization issuance and revocation and
- keeping records of issued licenses.

By the Decision of the National Assembly of the Republic of Serbia (*Official Gazette of RS, no.*

20/2016) of 3 March 2016, new members of the Managing Board were appointed:

1. Dragan Kovačević, Chair
2. Petar Stijović, Vice Chair
3. Danka Martić, member
4. Dr Vladimir Krstić, member
5. Prof. Dr Dejan Marković, member

The five-year term of office of the new Managing Board members started on 1 April 2016.

During 2019, the Managing Board held 11 sessions. In the Managing Board sessions, a number of Rulebooks, decisions, reports on relevant market analysis, internal acts, Plan of Activities, Financial Plan and Procurement Plan for 2020 were passed, along with several draft rulebooks to be adopted by line minister. In line with their statutory authority, the members of the Managing Board have made a significant contribution to decision-making so as to enhance the efficiency of the work of Agency.

During 2019, activities within the scope of RATEL's competence were performed in the following organizational units:

- Electronic Communications Department, comprising Radiocommunications Division, Monitoring Division and Networks, Services and Electronic Equipment Division;
- Legal and General Affairs Department, comprising Legal Affairs Division, Human Resources, Procurement and General Affairs Division and Strategy and Planning Section;
- Market Analysis and Economic Affairs Department, comprising Market Analysis and Cost-Accounting Division, Accounting and Finance Division and Fee Management Section;
- Postal Services Department, comprising Postal Regulation Division, Postal Market Regu-



lation and Analysis Division and Registry and Record Office Group;

- Information Security and Technologies Department, comprising Information Security Division and Information Technology Division and
- Cabinet.

The financial assets for RATEL's work are provided from the revenues made from the numbering fees, radio-frequency fees, fees for performing electronic communication activities, annual fees for the provision of postal services and revenues from the provision of services within RATEL's competence (license issuance and extension, equipment conformity assessment, technical inspection). RATEL's annual 2019 Financial Report, which had been audited by an independent chartered auditor, was approved by the Managing Board.

Since 2017 RATEL's books are kept and financial reports prepared, compiled, submitted and



published in line with the Law on Accounting, Rulebook on contents and form of financial reports for companies, cooperatives and entrepreneurs, Rulebook on layout of chart of accounts and the contents of the account in the layout of chart of accounts for companies, cooperatives and entrepreneurs, International accounting standards and/or International financial reporting standards, according to the recommendation of the State Audit Institution. RATEL also submits the financial reports to the Business Registers Agency, since the publishing of 2017 financial reports.

In 2019, RATEL's total revenues amounted to 2 022 577 512 dinars, with the total expenditures of 901 896 455 dinars. Pursuant to Article 27, paragraph 6 of the Law on Electronic Communications, the surplus representing the difference between the revenues and expenditures laid down in RATEL's annual financial report is paid into public revenues account of the Treasury of the Republic of Serbia and the Autonomous Province of Vojvodina. These funds are dedicated to the promotion and development of electronic communications and information society and are managed by the line ministry. Funds paid into

the account of the Treasury of the Autonomous Province of Vojvodina are proportional to the revenues made by the electronic communications network and service operators in the territory of the Autonomous Province of Vojvodina and are managed by the province body responsible for electronic communications.

On 31 December 2019, RATEL had 141 employees: 116 employees (81,56%) with university degree, 3 employees (2.13%) with a college degree and 22 employees (16.31%) with secondary education. Most employees with university degree are graduate electrical engineers, IT engineers, transport engineers, law graduates and economic graduates. Nine employees hold a PhD degree.

Since February 1, 2016, the new RATEL's headquarters are in 2, Palmotićeve Street, in Belgrade. RATEL also performs its activities from two Monitoring Centres located in Dobanovci and Niš. Pursuant to the provision of Article 39 of the Law on Free Access to Information of Public Importance (*Official Gazette of RS nos. 120/04, 54/07, 104/09 and 36/10*) and Instructions for preparing and publishing the report on the work of a state



authority issued by the Commissioner for Information of Public Importance and Personal Data Protection, RATEL prepared the Information on RATEL's Activities for 2019, which is available on RATEL's website.

All relevant information on RATEL's activities, regulations regarding electronic communications, postal services and information security, registries containing database from records kept by RATEL, forms and instructions for operators and users and other information of public interest pertaining to RATEL's business activities are available on the website www.ratel.rs.

In November 2019, RATEL's Managing Board adopted RATEL's Work Plan for 2020, in line with its authority and current trends in the development of telecom and postal services and information security, considering the needs of the operators and end users. The Plan lays down the following eight strategic priorities for 2020:

1. Enhancement of the electronic communications regulatory framework

2. Enhancement of the postal services regulatory framework

3. 5G Roadmap

4. Electronic communications and postal services user protection

5. Improved efficiency of RF spectrum management

6. Enhancement of competition in the electronic communications market

7. Developing the system for coordination and prevention of ICT security risks

8. Enhancement of RATEL's international presence

The overview of the most important activities and results accomplished in 2018 is presented in the following chapters of this report. The overview of the activities presented in the Report is divided according to different areas of work. All RATEL's organizational units participated in the realization of the activities foreseen in the Plan of Activities for 2018.



3. REGULATORY ACTIVITY

As part of its regulatory tasks, in 2019, RATEL passed the Rulebook on content of the form for submitting the data and the manner of submitting the data on the used numbers and addresses from the Numbering Plan (*Official Gazette of RS, no. 34/19*), in force as of 25 May 2019.

Rulebook on minimum content, degree of detail and the manner of publishing standard offers (*Official Gazette of RS, no. 36/19*), in force as of 1 June 2019, was also passed.

Another two bylaws based on LEC have been prepared and submitted to MTTT for the opinion on its conformity with the law and the Constitution, namely, the Rulebook on the calculation of the cost oriented prices on the basis of forward-looking long-run incremental costs and the Rulebook on quality parameters for publicly available electronic communication services and on monitoring of electronic communication activity.

Draft Rulebook amending the Rulebook on the fee calculation for the provision of services

within the competence of the Republic Agency for Electronic Communications was adopted by RATEL's Managing Board on 27 December 2019 and launched for public consultations.

In 2019, RATEL prepared the Proposal of the Radio Frequency Band Allocation Plan, which was forwarded the line ministry in charge of the adoption thereof.

Draft Rulebook amending the Rulebook stipulating Frequency/Location Allotment Plan for terrestrial analogue FM broadcast stations for the territory of the Republic of Serbia was also adopted by RATEL's Managing Board on 27 December 2019 and launched for public consultations.

Proposal of the Rulebook on manner of use of radio stations by radio amateurs was also prepared and, pursuant to the position of the line ministry, the adoption procedure will be completed once the new law regulating electronic communications is adopted. In this regard, the proposal of relevant article of the new law was formulated, regulating the work of radio amateurs and responsibility and authority of RATEL with regard to issuance of CEPT radio amateur station licence and HAREC certificate and the proposal was submitted to the line ministry for further procedure.

As part of the implementation of the Law on Postal Services (*Official Gazette of RS, no. 77/19*), in effect as of 8 November 2019, Draft Rulebook on application forms for granting permit for performing postal services and Draft Rulebook stipulating the amount and manner of payment of the permit issuance tax and the operational cost fee for performing postal services have been prepared. Both bylaws were adopted by RATEL's Managing Board on 27 December 2019 and launched for public consultations.

As part of the implementation of the Law on Information Security, Draft Rulebook on the content of, registration in and keeping of the records on special CERTs and Draft Rulebook on type, form and manner of submitting statistical data on all incidents in ICT systems of special importance, have been prepared. Both bylaws were adopted by RATEL's Managing Board on 27 December 2019 and launched for public consultations.

Decision on amendments to the decision on the manner of keeping registers, records, data bases and other information within the scope of the Regulatory Agency for Electronic Communications and Postal Services and on publishing thereof at the Agency website was prepared and published on RATEL's website.

Also, 2019 was marked by a continuous activity of administrative procedures coordination upon request made by the Public Policy Secretariat of the Republic of Serbia. This activity involves a sequence of steps taken in the process of administrative procedure optimization within RATEL's competence, including the update of recommendations for simplifying administrative procedures from the second phase of e-PAPER project and the update of the list of listed office records and contact persons for the purpose of establishing a Metaregister at the request of the Office for Information Technologies and E-government.

As part of the implementation of its legal responsibilities, RATEL adopted a number of individual acts for the purpose of electronic communication market regulation.



4. RADIOCOMMUNICATIONS

During 2019 RATEL worked on general acts foreseen by the Law on Electronic Communications and on other bylaws from the domain of radiocommunications and undertook activities pertaining to the radio frequency usage.

In January 2019, the Proposal of the Radio Frequency Band Allocation Plan was submitted to the Ministry of Trade, Tourism and Telecommunications. At the initiative of the line ministry, regular consultations and meetings were held,

in order to clarify the solutions of the Radio Frequency Band Allocation Plan. Since the Allocation Plan had not been adopted prior to the World Radiocommunications Conference - WRC19 held from 28 October until 22 November 2019, after the conference RATEL initiated additional meetings and consultations with the line ministry in order to put forward the amendments to the Proposal of the Radio Frequency Band Allocation Plan with the aim of making adjustments to the conference results.

In 2019 the following bylaws have been prepared:

- Draft Rulebook amending the Rulebook stipulating Frequency/Location Allotment Plan for terrestrial analogue FM broadcast stations for the territory of the Republic of Serbia was adopted by RATEL's Managing Board in December 2019 and sent to the line ministry (MTTT) for further procedure (adoption) within their authority.
- Draft Rulebook amending the Rulebook on the fee calculation for the provision of services within the competence of the Republic Agency for Electronic Communications was approved by RATEL's Managing Board in December 2019 and submitted to the line ministry for the opinion on its conformity with the law and the Constitution.

At the end of 2019 another two bylaws were prepared:

- Draft Rulebook stipulating Radio Frequency Allocation Plan in the radio frequency band 2500-2690 MHz and
- Draft Rulebook stipulating Radio Frequency Allocation Plan in the radio frequency band 3400-3800 MHz.

The adoption of these bylaws is particularly important for creating regulatory conditions for the use of relevant bands for the existing technologies and the new 5G mobile radiocommunications technology, that is for ensuring the prerequisites for the sale of these frequency bands through public auction.

The activities in the area of radio frequency spectrum management involved the issuance of individual permits for radio frequency usage, radio frequency coordination and notification and radio frequency spectrum monitoring.

Upon user requests for the issuance and extension of individual permits for the usage of radio frequencies, **12419** individual permits for radio frequencies usage were issued through decisions passed by 31 December 2019 (total number of decisions was **1639**), namely:

- **12085** individual licenses for the usage of radio frequencies based on users' requests, pursuant to Article 86 of the Law on Electronic Communications;
- **44** individual permits for radio frequency usage for radio stations on board an aircraft;
- **42** individual permits for radio frequency usage for radio stations onboard ships and other vessels;
- **81** individual permits for the usage of radio frequencies for diplomatic and consular representative bodies and foreign legal entities, in accordance with Articles 87 and 88 of the Law on Electronic Communications;
- **167** individual permits for the usage of radio frequencies for amateur radio stations.

Electronic applications for radio frequency use in RF bands 2400-2483,5 MHz, 5470-5725 MHz, 5725-5875 MHz и 72-76/82-86 GHz are registered on a regular basis.

For the needs of broadcasting service, in 2019 RATEL issued many individual permits for radio frequency usage, upon user request and based on the decisions of the Council of the Regulatory Body for Electronic Media (REM) on extending the permit validity. Radio modulation signal delivery permits were also issued. The overview of the number of issued permits per user is given in Appendix 1 of the report.

In accordance with provisions of Article 95 of the Law on Electronic Communications, by

31 December 2019, **670** decisions on the withdrawal of rights to use radio frequencies were prepared, whereby **4454** individual permits for radio frequency usage were revoked.

Permit issuance was preceded by the necessary technical analysis, as an integral part for calculation of compatibility between the existing and new users of the radio frequency spectrum.

In the area of radio frequency spectrum usage for broadcasting purposes, analyses of compatibility with the existing (national and international) allotment plans were performed when solving the requests for radio station parameter modifications in order to achieve better quality of service in the service area, in addition to the analyses of requests for removing harmful interference in the service areas, requests for new frequency assignments in view of the existing plans, requests for FM broadcasting transmitter dislocation (the total of 24 broadcasting transmitter dislocations).

A request made by New Skies Satellites Licensee B.V regarding usage of terminal earth stations on aircrafts was processed.

In 2019 temporary permits were issued for radio frequency usage for T-DAB broadcasting station (on the following locations: Avala, Crveni Čot, Ovčar, Subotica, Tupižnica, Jastrebac), whereby test phase of introducing digital terrestrial audio broadcasting in Serbia continued.

In 2019, 5G testing has officially began in the Republic of Serbia by issuing temporary licences for radio frequency usage in RF band 3400-3800 MHz, which is considered as basic in the current 5G development phase. In June 2019, Radio-communications Department issued the first temporary permits for 5G testing to the operator Telenor and in October 2019 to the operator Telekom Srbija.

As for RF spectrum use coordination issues with the administrations of the neighbouring and other countries, during 2019 the coordination involved providing answers to the coordination requests and submitting our own coordination requests, namely:

- In the area of broadcasting service, **484** frequency/location coordination with the administrations of the neighbouring and other countries: through special sections GE06 - **271** coordinations and GE84 - **116** coordinations, through bilateral correspondence GE06 - **11** coordinations, GE84 - **37** coordinations and GE75 - **1** coordination and by email GE06 - **48** coordinations;
- In the area of fixed service, according to HCM (Harmonisation Calculation Method) agreement, answers have been provided to **16** coordination requests (**365** RR links) and **3** coordination requests have been made (**91** RR links);
- In the area of fixed satellite service (*Appendix 30B, CR/C*), answers have been provided to **15** coordination requests;
- In the area of broadcast satellite service (*Appendix 30, 30A*) answers have been provided to 2 coordination requests;
- In the area of mobile satellite service (*CGC – Complementary Ground Component*), **3** answers have been provided to coordination requests;
- In the area of fixed and mobile service 49 frequency/locations have been coordinated with the Hungarian administration, according to HCM agreement, through correspondence and the interference to aeronautical mobile service of the Croatian administration has been successfully resolved.

Upon requests made by town and municipal administrations – spatial planning, urban design and construction departments, for the needs of spatial plan and detailed regulation plan designs, 44 replies were prepared in 2019 defining the conditions for protection of the existing electronic communications networks and accompanying facilities, protection area and the manner of construction works in the vicinity of the electronic communications networks and the accompanying facilities, as well as the conditions concerning radio paths for the geographic areas given in the requests.

As part of the international activities in the area of radiocommunications, cooperation with the ITU Radiocommunication Bureau regarding BR IFIC (International Frequency Information Circular) continued, involving examination of circular notifications on international radio frequency coordination and technical analysis of compatibility with planned assignments of our administrations.

The following technical agreements for frequency coordination have been closed with the neighbouring and other countries:

- **Technical agreement between the National Frequency Management Authorities of Bosnia and Herzegovina, Republic of North Macedonia, Montenegro and Republic of Serbia on border coordination of mobile/fixed communications networks (MFCN) in the frequency bands 791-821MHz and 832-862 MHz was signed in September 2019;**
- **Technical agreement between the National Frequency Management Authorities of Bosnia and Herzegovina, Republic of North Macedonia, Montenegro and Republic of Serbia on border coordination of mobile/fixed communications networks (MFCN) in the frequency bands 880-915 MHz and 925-960 MHz was signed in September 2019;**

- **Technical agreement between the National Frequency Management Authorities of Bosnia and Herzegovina, Republic of North Macedonia, Montenegro and Republic of Serbia on border coordination of mobile/fixed communications networks (MFCN) in the frequency bands 1710-1785 MHz and 1805-1880 MHz was signed in September 2019;**
- **Technical agreement between the National Frequency Management Authorities of Bosnia and Herzegovina, Republic of North Macedonia, Montenegro and Republic of Serbia on border coordination of mobile/fixed communications networks (MFCN) in the frequency bands 1920-1980 MHz and 2110-2170 MHz was signed in September 2019.**

During 2019, four operators (Telekom, Telenor, VIP and ETV) and another large user - SMATSA have been applying for individual permits for RF usage through e-licence and e-desk applications.

Public procurement for ATDI (Advanced Spectrum Software Solutions) software upgrade has been completed in 2019, through extending the existing and procuring new licences (for HTZ Communications and ICS Manager, and one stand-alone dongle with licences for HTZ Communications and ICS Manager), procurement of new tools for ICS Manager – IRF Allocation Editor (to form RF Allocation Plan data base) and procurement of optimized propagation model for mobile radio service (for the territory of the Republic of Serbia). As expected, this has significantly contributed to the enhancement of the RF spectrum planning capacity of RATEL's Radiocommunications Department.

In the first half of 2019 activities began to produce mobile network coverage maps and population/territory coverage calculation model,

per technology, for each mobile operator, in line with RATEL's plan. The purpose of the activity was to produce coverage maps and calculations within RATEL and to publish the quarterly results on the official website. Based on input data referring to Q3 2019, coverage maps and comparative data of territory/population per technology/operator were published for the first time in December 2019, along with the overview of active base stations location and the number of base stations per technology/frequency/operator, created by RATEL.

As part of the analysis of mobile operators' network operation and development during 2019, quarterly data on wireless access network for each operator involving a set of 45 types of quantitative data, have also been published quarterly on RATEL's website.

In October 2019, RATEL signed a WiFi Agreement with Microsoft on the project which involves placing Microsoft TVWS equipment (using TV white space band) on a specific location to provide free Internet. The implementation of the agreement is underway.

As part of the preparations of RATEL's Radiocommunications Department for RF spectrum public bidding procedures for the existing and new 5G technologies, public procurement has been completed for the following documents:

- "Spectrum Cross-Country Analysis", Cullen International OPH;



- Report on "Upcoming and ongoing spectrum awards", Cullen International OPH;
- Report on "5G Telecom Regulatory & Govt Best Practices Guide – Policy Frameworks, NW Planning, Spectrum & Lessons from Telco Trials, Use Cases", Wireless Federation;
- Study on the "Selection of the optimal auction

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-Sheikh, Egypt



model for RF band sale for the existing and new 5G technologies”.

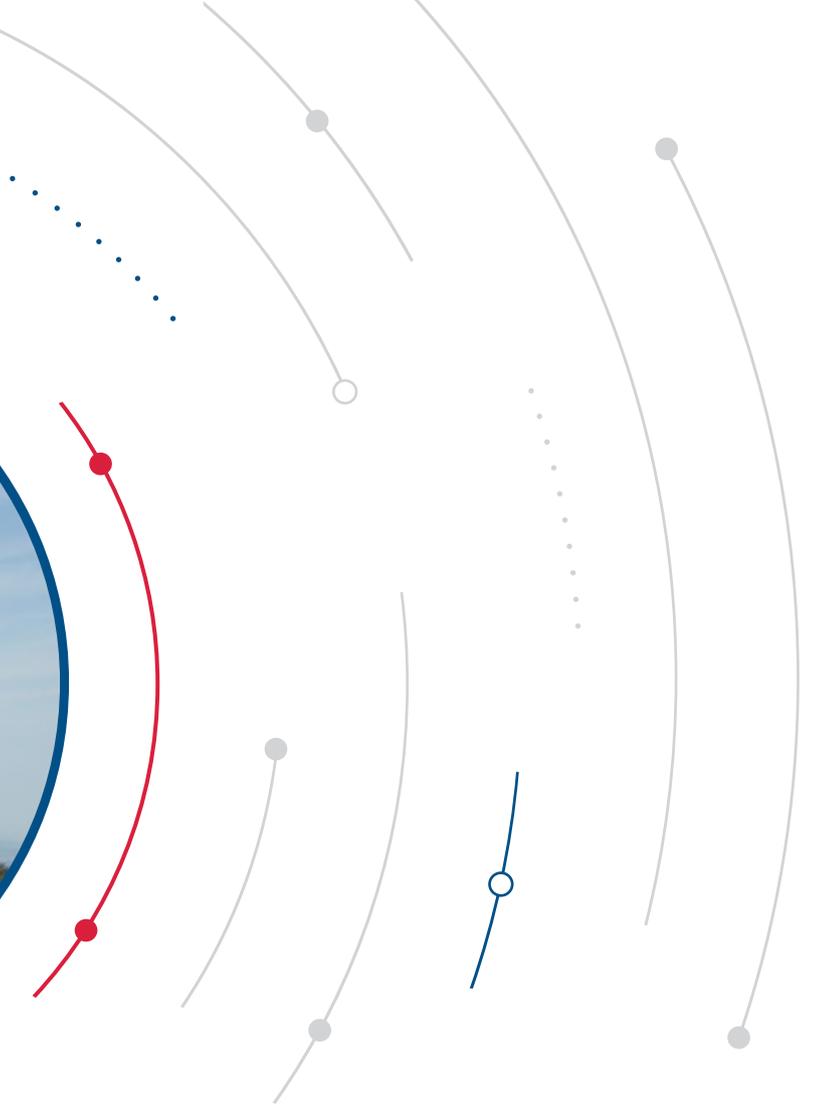
The documents have been used to prepare the employees for the next task which includes preparation for and performing of the public bidding procedure for the issuance of individual licences granting right to use the RF spectrum allocated to 5G mobile network technologies.

Cooperation with the Public Policy Secretariat of the Republic of Serbia took place, for the purpose of simplifying the administrative procedures (ePaper) within the scope of work of the Radiocommunications Department, concerning the procedures for the issuance of individual permits for RF usage.

During 2019, upon the initiative launched by the mobile operators to overcome the barriers encountered in the process of mobile base station construction, an environment protection alliance subgroup which includes RATEL's representatives was initiated.

In 2019, RATEL's representatives participated in the World Radiocommunication Conference 2019 (WRC-19), held in Sharm el-Sheikh, Egypt, as part of Serbian delegation. The preparations for the conference involved agreeing on the starting

points and positions of Serbian administration in view of the European Common Proposal (ECP) for each agenda item, thus establishing the platform for the work of our delegation during the conference. The delegation of the Republic of Serbia signed WRC-19 Final Acts.



5. ELECTRONIC COMMUNICATIONS NETWORKS AND SERVICES

During 2019, RATEL continued with the activities aimed at creating a competitive market, while guaranteeing equal treatment for all participants. In view of the adopted regulations and procedures for the introduction of new technologies

and services completed in the previous period and in order to continue fostering competition in the Serbian market of electronic communications, RATEL undertook many regulatory activities in this area.

A comparative overview of the number of users and penetration level of the public fixed communications network, public mobile communications

network, Internet, media content distribution and bundled services for 2015, 2016, 2017 2018 and 2019 is given in Table 1.

Table 1. Comparative overview of the number of users of the basic electronic communication services in the last 5 years

Year		2015	2016	2017	2018	2019
Service	Indicator					
Fixed - subscribers	mil.	2.60	2.55	2.48	2.43	2.42
Mobile - users	Mobile - users	104.66	102.63	99.74	97.87	97.34
Fixed broadband - subscribers	Per 100 households	9.16	9.09	8.62	8.43	8.45
Fixed - subscribers	Fixed - subscribers	129.38	128.52	122.46	120.42	121.40
Mobile - users	mil.	1.32	1.45	1.48	1.55	1.62
	Per 100 households	53.07	58.30	59.52	62.39	65.27
Media content distribution - subscribers	mil.	1.60	1.66	1.70	1.88	2.00
	Per 100 households	64.15	66.87	68.28	75.55	80.42
Bundled services - subscribers	mil.	0.92	1.03	1.17	1.27	1.42
	Per 100 households	37.1	41.36	46.95	51.23	56.90

RATEL's legal obligation to keep relevant registers, i.e. records of operators is implemented in accordance with the Decision on the manner of keeping registers, records, databases and other information within the scope of the Regulatory Agency for Electronic Communications and Postal

Services and their publication on RATEL's website. A detailed overview is provided in Appendix 3.

In accordance with the Law, at operators' request the total of **40** decisions on assignment, extension or withdrawal of numbering resources were issued.

Table 2. Number of issued decisions for number use

Number category	Number of issued decisions		
	Assignment	Extension	Withdrawal
Geographic	19	-	6
Non-geographic	7	-	4
Short codes	1	-	2
Other codes	-	-	1

3 decisions on assigning prefixes to operators for access to the Central Database of Ported Numbers and 27 notifications on numbering assignment fee were distributed.

RATEL's representatives cooperated with the Ministry of Interior within IPA project entitled "Design of an Efficient 112 System for the Republic of Serbia", by actively participating in the work and in the data collection and analysis.

An analysis on the availability of the "0800" free of charge numbers has been made. Following the complaints from the operators and having gathered the necessary information, RATEL concluded that limited availability of 0800 numbers is unfounded and notified the line ministry about the issue.

The implementation of the number portability on public mobile telecommunications networks, which started in July 2011, continued smoothly during the previous year, pursuant to RATEL's general act regulating number portability and the Protocol on implementation of this Rulebook, whereby the operators agreed upon the procedure

regarding administrative issues that can arise in the process of number porting. During 2019, there were around 108.720 cases of ported numbers on mobile networks, which makes the total of 879.964 ported numbers on mobile networks since this service began to be available.

As of April 1, 2014, fixed telephony users have been able to keep their subscriber number after changing the operator. Number portability procedure is carried out in accordance with the Rulebook on number portability on public telephone networks at a fixed location (*Official Gazette of RS, no. 52/11*) and the Protocol on implementation of this Rulebook, whereby the operators agreed upon the procedure regarding administrative issues that can arise in the process of number portability. During 2019, there were around 41.167 cases of ported numbers on fixed networks, which makes the total of 337.735 ported numbers on fixed networks since the service is available.

Pursuant to the Rulebook on radio equipment and telecommunications terminal equipment (*Official Gazette of RS, no. 11/12, applied as of 1.6.2012*), in the capacity of a body for the

conformity assessment of the radio and telecommunications terminal equipment (R&TT), during 2017 RATEL issued:

- 450 certificates of conformity,
- 141 excerpts from the register of issued certificates.

There were no rejected requests, nor any requests forwarded to the line ministry for further procedure, whereas 54 applicants withdrew their requests.

Compared to the previous year, in 2019 the number of requests for R&TT equipment conformity assessment certificate additionally decreased as a result of the list of imported equipment subject to the conformity assessment certificate being reduced, as defined by the Decision on determining goods where import, export and/or transit is subject to obtaining appropriate documents, Appendix 6 (*Official Gazette of RS, nos. . 92/17, 29/18, 56/18 and 78/18*). The list has been reduced by the Government decision, proposed by the Ministry of Trade, Tourism and Telecommunications, with the purpose of simplifying the import, whereas the obligation to procure the conformity assessment certificate before placing the goods on the market remains in force.

During 2019, a contribution was prepared for the ITU-T K.83 Recommendation on *Monitoring of electromagnetic field levels* which was the basis for the decision adopted at the ITU-T SG5 (*Environment, climate change and circular economy*) plenary meeting in Geneva on recommendation revision so as to include the data on EMF RATEL system for EM field level monitoring in the Republic of Serbia.

RATEL's employees participated in the work of the Council of the Institute for Standardization of Serbia, standard commissions KSNETS and KS N210 and the CENELEC TC 210 technical committee. The work also involved analysis of the requests for new standards supporting the

application of Directive 2014/53/EU, analysis the technical instructions for conformity assessment REDCA (*The Radio Equipment Directive Compliance Association*) TGN for specific types of equipment and exchange of experience and information on regulatory activities of the relevant institutions (European Commission, ADCORED, ETSI, CENELEC, CEPT/CEC) through participation in the annual REDCA meeting held in May 2019 in Sofia, Bulgaria. RATEL's representative was one of the speakers of the seminar organized by the Institute for Standardization of Serbia, entitled: "RTTE – Application of Regulations and Standards"

Cooperation with the Ministry of Trade, Tourism and Telecommunications, the Ministry of Economy and the Institute for Standardization of Serbia involved the issues regarding RATEL's authority and the interpretation of regulations concerning the import, export and usage of satellite phones in the Republic of Serbia, plan for the adoption of Serbian standards in 2020, transposition of the EU regulations in the national legislation, delivery of major projects and the enhancement of the capacities of the Republic of Serbia for the application of the European regulations.

During 2019, on-site audits were carried out to check activities and service provision levels of electronic communications operators. The audits involved newly entered operators (verification of service provision commencement), operators providing service without registering the network they own and use for service provision, operators providing services without authorization, operators without properly registered services area, operators that failed to adequately advertise services on their website, operators that result as not receiving the mail sent by RATEL. The total of 156 audits were performed, along with duly signed audit reports both by RATEL's representatives and operators, committing the operators to timely remove any identified irregularities.



Operators of public electronic communication networks are entitled to require shared use of other operator's or third party's electronic communications infrastructure, when necessary, for the purpose of enabling a more competitive, affordable and efficient provision of electronic communications services. The Rulebook on the manner of collection and publication of the data on type, availability and geographic location of the electronic communications network's capacities (*Official Gazette of RS, no. 66/15*) stipulates record-keeping of electronic communications network capacities which can be subject to shared use, in the form of an aggregated Infra-

structure Database. On 31 December 2019, the database contained data on 1728 antenna masts of the operators Telekom Srbija, Telenor and Vip Mobile, PE ETV, Laser International and W-line, as well as data on 1486 optical cables and more than 200,000 elements of cable ducts of Telekom Srbija. The operators are obligated to update changes in the network infrastructure, at least once every 3 months and, in case of new infrastructure that may be subject to shared use, the data must be provided within 15 days after the beginning of exploitation. The Leased Infrastructure Database is available to all interested operators of electronic communications networks in the form of Web -



GIS application, on RATEL's website. During 2019, there have been over 6100 website visits.

In order to ensure high quality of available electronic communication service provision and user protection, new technologies, services and relevant regulatory experience have been analysed, by drafting expert papers, studies and presentations and by participating in the expert conferences and by cooperation with relevant institutions to further improve capacity building.

In 2019 a work group was formed in charge of drafting the Guidelines for Open Internet in line with the relevant BEREC document on this subject.

The Internet access and services in the Republic of Serbia were analysed and the proposal was launched for public discussion. After receiving the comments from the operators, the final version of the document was prepared and published on RATEL's website.

Following the adoption of the European Electronic Communication Code (EECC), in 2019 the provisions of this act have been analysed and the possibilities for implementing the new regulatory framework in the Republic of Serbia has been discussed. Since the new EU regulatory framework provides for the amendments of the provisions regulating the universal service, in 2019

the analysis of universal service delivery in the Republic of Serbia and the EU Member States has been made. The analysis led to the conclusion that the approach to universal service issues in the Republic of Serbia needs to be improved.

As part of the cooperation with ENISA, RATEL's representatives actively participate in the meetings of Article 13a Expert Group. This Expert Group gathers regulatory bodies for electronic communications with the purpose of ensuring an efficient implementation of the measure pertaining to network security and integrity. In 2019, RATEL began with operators' data collection and data analysis related to network integrity and security risks in the Republic of Serbia. RATEL presented to the members of Article 13a Expert Group a summary on relevant incidents reported by the operators in Serbia in 2019. In November 2019, RATEL hosted the 29th meeting of the Article 13a Expert Group, attended by the representatives from the EU Member States, Norway, Switzerland, European Commission and RATEL. The issues discussed involved risks to network integrity and safety and uninterrupted service provision.

A study on OTT (*Over-The-Top*) services published on RATEL's website provides an overview of experience from different countries with OTT services, examples of regulation and the impact of OTT services on the electronic communications market.

During 2019, data on the number of media content distribution users and Internet access service users in the previous year have been collected and analysed. The data provided by the operators concerning the number of users by inhabited areas/municipalities, sorted by technologies and operators had been analysed and reports were prepared for the purpose of publishing the market overview. The Commission for Protection of Competition, Business Court and the

Ministry of Construction, Traffic and Infrastructure, Urban Planning Bureau and other institutions made several request for data on the number of active operators and the number of users, sorted by years, operators, technologies and inhabited areas.

The intensive cooperation with the Commission for Protection of Competition lasted throughout 2019, to which a detailed analysis was provided regarding the take-up of media content distribution service and Internet access service in more than 40 towns and municipalities in the Republic of Serbia.

For the purpose of establishing, maintaining and updating the financial management and control, i.e. internal control, in line with the financial management and control manual issued by the Ministry of Finance, electronic communications networks and services work processes, along with relevant objectives, descriptions and activities have been listed, mapped and correlated with procedures and legal grounds and, in addition, risk assessment has been made to identify ways of minimizing it.







6. MONITORING OF RADIO FREQUENCY SPECTRUM USAGE AND CONTROL OF QUALITY OF SERVICE

RATEL performs continuous monitoring of radio frequency spectrum usage, control of the quality parameters of the publicly available electronic communications services and networks,

independent technical inspections of radio stations and monitoring of technical inspections performed by other authorized entities. RATEL has also implemented a system for continuous

measurement of the EM field level generated by electronic communication equipment in urban areas.

In 2019, radio frequency spectrum usage monitoring was performed from monitoring and measurement centres (MMCs) and on-site, by using centre-based equipment and equipment installed in remotely controlled fixed monitoring stations, along with mobile and portable monitoring stations. During 2019, eight fixed remotely controlled monitoring and measurement stations have become operational, making up the total of eleven stations. In this way the area covered by the continuous RF monitoring system has been significantly enlarged. The construction of the facilities that will further enlarge the system has continued, to enable a highly efficient RF spectrum usage monitoring on the territory of the Republic of Serbia.

Any broadcast detected by manual measurement is registered by entering the measurement data in the relevant data base. The routine

automatic measurement performed with the equipment available in the monitoring and measurement stations generates significantly more measurement data which is analysed on a regular basis. The number of measurement logs in the data base in 2019 is given in Table 5 below.

Due to efficient detection of illegal broadcasting stations, followed by appropriate measures, the illegal usage of broadcasting spectrum in the band allocated to radio signal broadcasting has been reduced to rare individual cases. Few unlicensed broadcasting stations detected during 2019, have been reported to the inspection of the line ministry, and are shown in Table 6.

The total number of interferences reported to RATEL in 2019 by RF spectrum users was somewhat lower, two years in a row. The same as earlier, most interferences have been reported by mobile operators. Owing to the efforts of RATEL's staff and technical resources of the Monitoring Division, all sources of reported interferences have been located and the interferences removed, whereas

Table 5 Number of monitoring and measurement logs in 2019

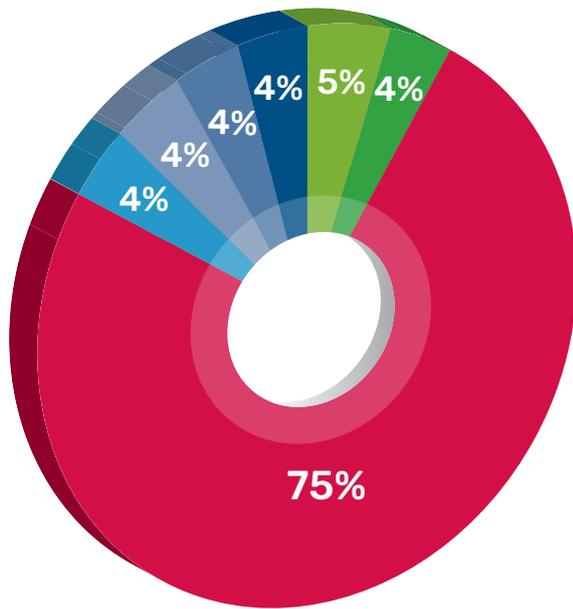
Number of logs made from MMCs	Number of logs made outside of MMCs
1572	2725

Table 6. Overview of unlicensed broadcasting radio-stations whose activities were detected in 2019

Ord. no.	Identification	Frequency (MHz)	Transmitter Location
1.	Radio Zavičaj plus	104.8	Godačica
2.	Radio Enigma	104.3	Bitovik (Prijepolje)
Broadcasting station detected in cooperation with the inspection of the line ministry and no longer operating			
1.	No identification available	102.2	Novi Sad

a number of interferences have been found to had been caused by malfunctional equipment or inadequate installation of equipment in the network of the user who had reported the interference.

The Figures below present the total number of interferences reported to RATEL in the past three years and the share of each broadcasting service in the interferences in 2019.



- Fixed
- Land mobile, professional telecommand and telemetry systems
- Public mobile
- SRD (ERC Rec. 70-03)
- Broadcasting - TV, UHF
- Broadcasting - audio
- Mobile and fixed satellite services (excluding satellite broadcasting)
- Air traffic service (communication, navigation and surveillance)
- Radio amateur service

Figure – Share of each broadcasting service in the total interferences in 2019

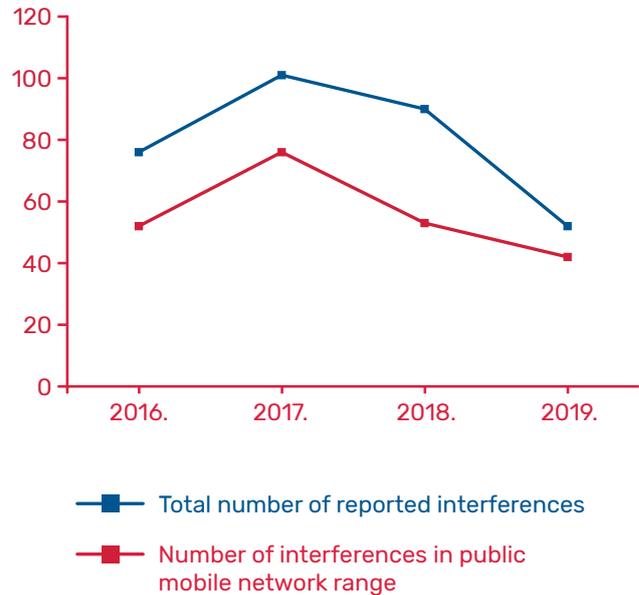


Figure – Number of interferences in the past three years

The same as before, most interferences have been reported by a mobile network operator. Figure 3 below shows the number of interferences reported by each mobile operator in the past four years.

84 technical inspections of radio stations in the digital TV signal broadcast network have been carried out, including both broadcasting transmitters and microwave devices. RATEL performed technical inspections with the assistance of the representative of the Broadcast Network, Public Enterprise (ETV).

9968 performed technical inspections of different types of radio stations have been reported

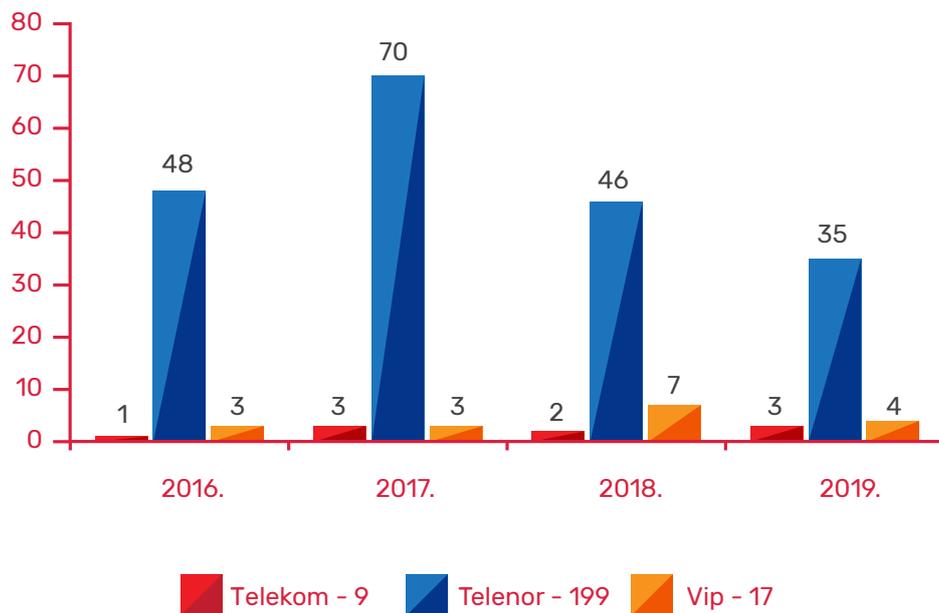


Figure 3 – Number of interferences reported by each mobile operator in the past four years

in 2019. By the end of 2019, RATEL verified and registered the total of 11 158 reports on technical inspections received. Reports on performed radio station technical inspections are registered via web portal, which facilitates database update and

record keeping. Three radio frequency spectrum users with the largest numbers of performed technical inspections in 2019 are listed in Table 7 below.

Table 7. Radio frequency spectrum users with the largest numbers of reported technical inspections in 2019

RF spectrum user	Number of reported technical inspections in 2019
VIP Mobile	2783
Telenor	2483
Telecommunications company "Telekom Srbija", Joint Stock Co.	2141

Control of the Quality Parameters

Control of the quality parameters for publicly available electronic communication networks and services is performed based on the Rulebook on quality parameters for publicly available electronic communication services and monitoring of electronic communication activity (*Official Gazette of RS, nos. 73/11 and 3/14*). In 2019, 200 requests for quality parameters for publicly available electronic communication networks and services have been prepared. Operators

submitted reports on quality parameters for publicly available electronic communication networks and services for the previous year timely, by 15 March 2019.

In 2019, the Monitoring Department solved user complaints on the quality of service of mobile and fixed networks and responded to user inquiries regarding the assessment of the impact of mobile base stations on the environment, which involved both field and administrative work.

Broadband Access QoS Monitoring Application (RATEL NetTest)

Since May 2016, RATEL made available to the users of the Internet access service on public fixed and public mobile communications networks to measure the quality of service of broadband access, via RATEL NetTest application.

Internet connections on public fixed communications networks are tested by using the application available on RATEL's website at <https://nettest.ratel.rs>

Internet connections on public mobile communications networks are tested by using the Android or iOS free application available at Google Play Store and Apple App Store.

During 2018, significant upgrades of the application functionality have been made. The users of the application can access all measurement results – the measurement results made in the past two years are available on NetTest map of Serbia and can be refined by operator, type of

service and period. A new functionality has also been developed, the so-called “zero measurements”, which enables marking the locations where the Internet connection is unavailable due to poor mobile signal coverage. Loop mode is also available to users, enabling a continuous testing of the Internet connection quality in the set period and frequency of measurement.

All measurement results obtained through RATEL NetTest application are publicly available both on NetTest map of the Republic of Serbia and in machine-readable formats (CSV, XML and JSON) at <https://www.nettest.ratel.rs>.

The Monitoring Department has carried out measurement of the quality parameters and net neutrality parameters for data transmission service on mobile and fixed networks, along highways and in urban and rural areas, by using RATEL NetTest application.

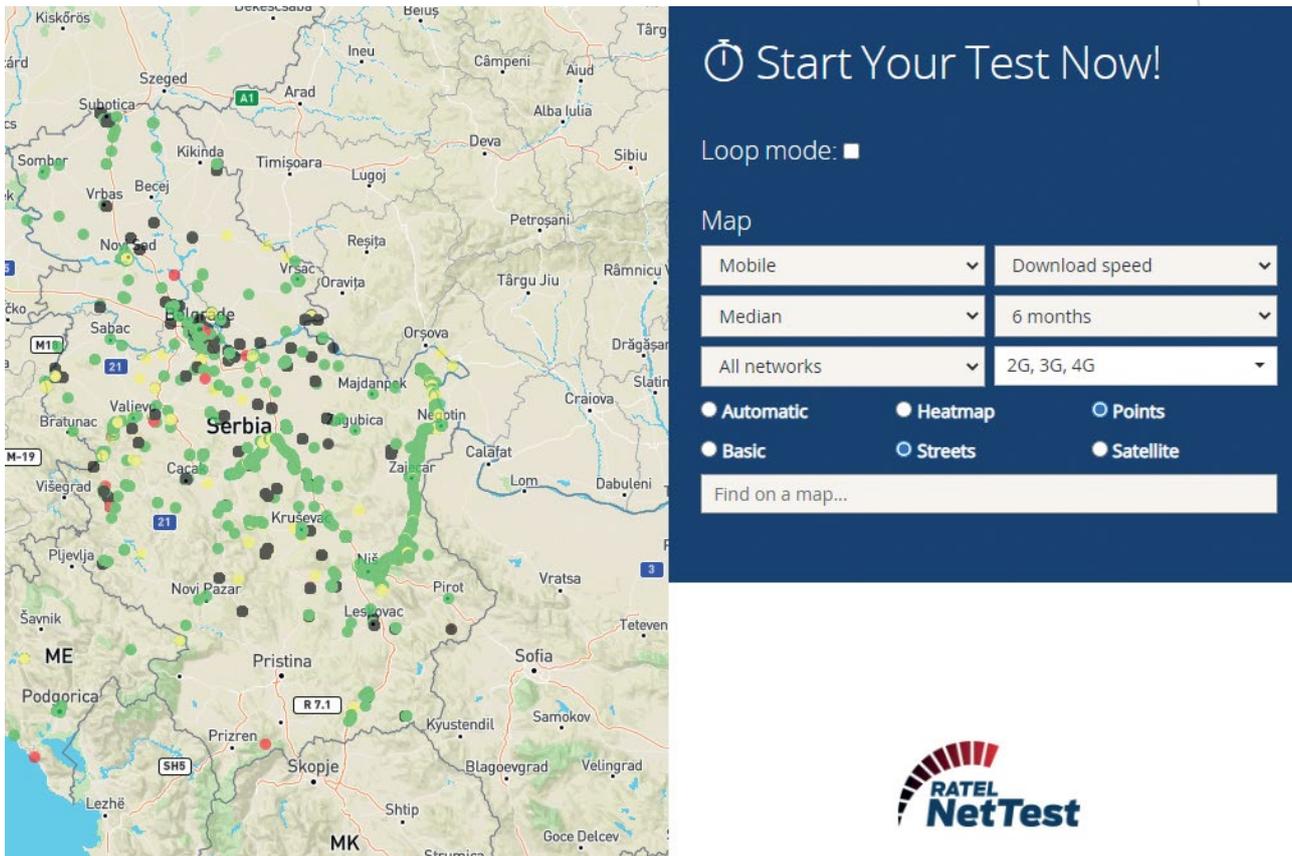


Figure 4. RATEL NetTest map of the Republic of Serbia with measurement results

Benchmarking and QoS parameter analysis of mobile network services available to end users

RATEL's strategy is to encourage further investments and development of telecommunications market by fostering competition, cost-effectiveness and efficiency in the mobile communications, as well as to provide subscribers with fair and unbiased information about the quality of service of mobile networks in the Republic of Serbia. Therefore, in 2017, 2018 and 2019 RATEL carried out the first extensive benchmarking tests and the analysis of QoS parameters for services

provided to end-user by the three mobile network operators: Telekom Srbija, Telenor and Vip mobile.

The purpose of mobile network benchmarking is to compare in an objective fashion the quality of mobile network services reflecting user experience, by measuring relevant QoS parameters. The benchmarking measurements were conducted in October and November 2019 as part of regular activities. Measurements were performed in a

drive test mode, by using two vehicles moving along predefined routes, in walk test mode, at four hot-spot locations in Belgrade and in Novi Sad. The measurements covered 50 towns and 10,000 km of Serbian roads. During the campaign, over 6,000 voice calls, 20,000 data sessions 20,000 web browsing testing and 5,000 Youtube video tests were performed on all mobile measures, across all available technologies (2G, 3G, 4G). The measurement included:

- Measurement of QoS parameters for voice and data transmission,
- Measurement of radio parameters for 2G/3G/4G technologies.

Once the measurement and analysis of mobile network benchmarking results had been completed, interactive portal for mobile network benchmarking has been upgraded. The portal has

been upgraded using the results from the 2019 measurements and by including an additional functionality pertaining to result trend analysis. In the last mobile network benchmarking, the operators scored as follows (100 being the maximum score):

1. Telekom Srbija scored 85.06;
2. Vip mobile scored 76.79;
3. Telenor scored 69.90.

As for the quality of services provided, compared to the operators in Europe where benchmarking was applied in the same way last year, mobile communication network operators made the following placement (Figure 5).

The interactive portal is available to end users in Serbian and English at: <http://benchmark.ratel.rs>. (Figure 6).

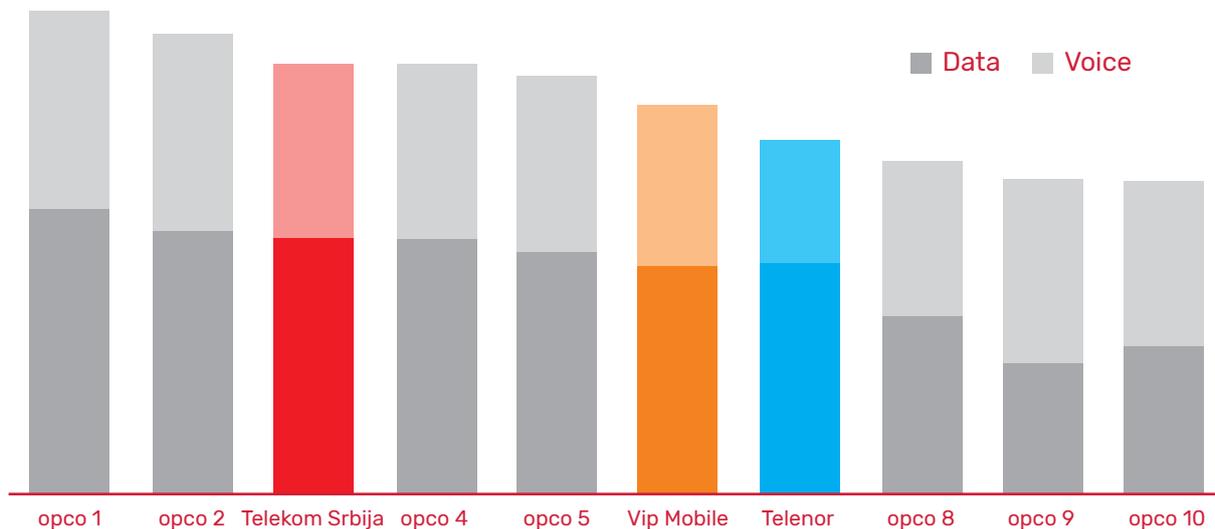


Figure 5. Placement of the national operators compared with the operators in Europe

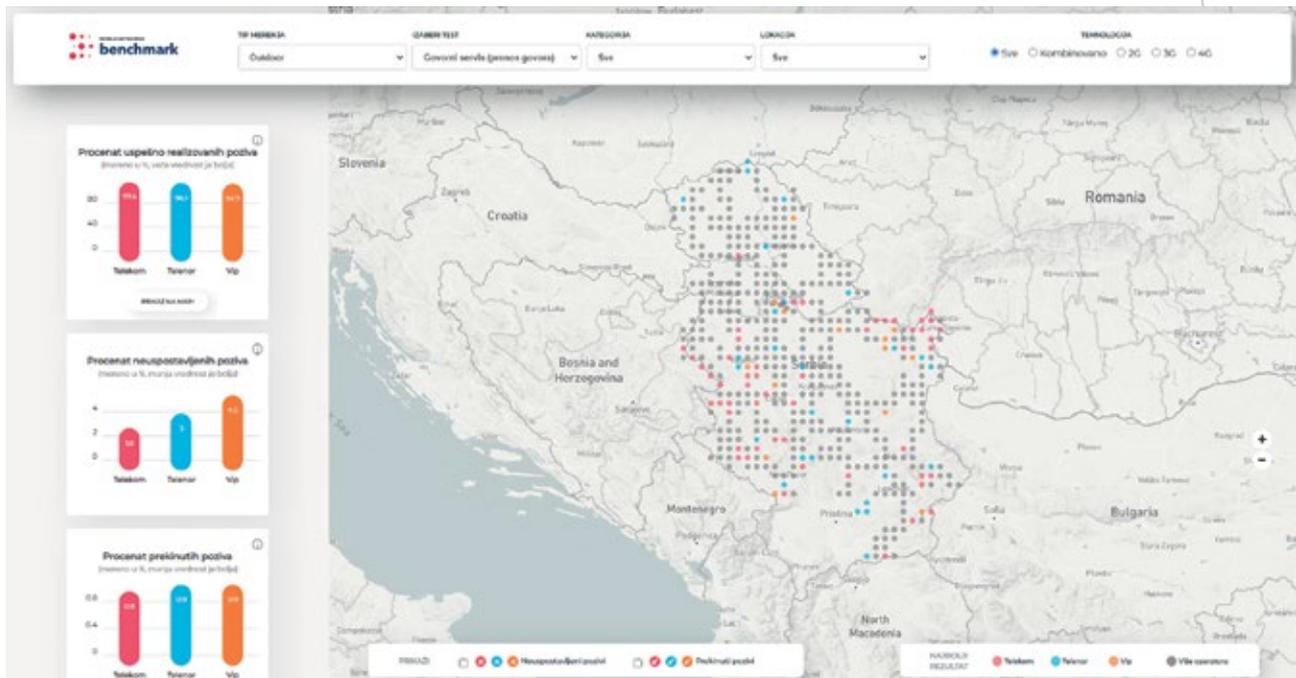


Figure 6. Benchmarking interactive portal

Roll out of the continuous EM field level measurement system on the territory of the Republic of Serbia (EMF RATEL)

For the purpose of the further roll out of the continuous electromagnetic field level measurement on the territory of the Republic of Serbia (EMF RATEL), RATEL continued to visit facilities in the “vulnerable areas” (preschool and school facilities, health institutions) in the cities of the Republic of Serbia for the purpose of EM field measurement and assessment of the technical potential for sensor setup. Visits and test measurements have been made in more than 150 locations of interest.

During 2019, EMF RATEL was the object of cooperation with city administrations of the Republic of Serbia. Institutions in 17 municipalities provided cooperation and necessary support to RATEL’s expert team in the process of acquisition of locations. 21 business and technical agreements were concluded in 2019 for setting up EM measurement sensors on facilities in 17 towns and municipalities of the Republic of Serbia. By mid-2020, 28 sensors are expected to be set up in 18 towns and municipalities. Further search for optimal locations for

sensor setup on relevant facilities will continue in the following years.

Improvements were made to the system for data collection and for display of the sensor network performance results. The measurement results are presented on the portal (Figure 8), available to users in Serbian and English language at the following link: <http://emf.ratel.rs>.

EMFRATEL is the first RATEL's open data project. All continuous EM field measurement results were also produced in machine readable formats (CSV, XML and JSON) and are publicly available on the national Open Data portal managed by the Office for Information Technologies and e-Government of the Republic of Serbia.

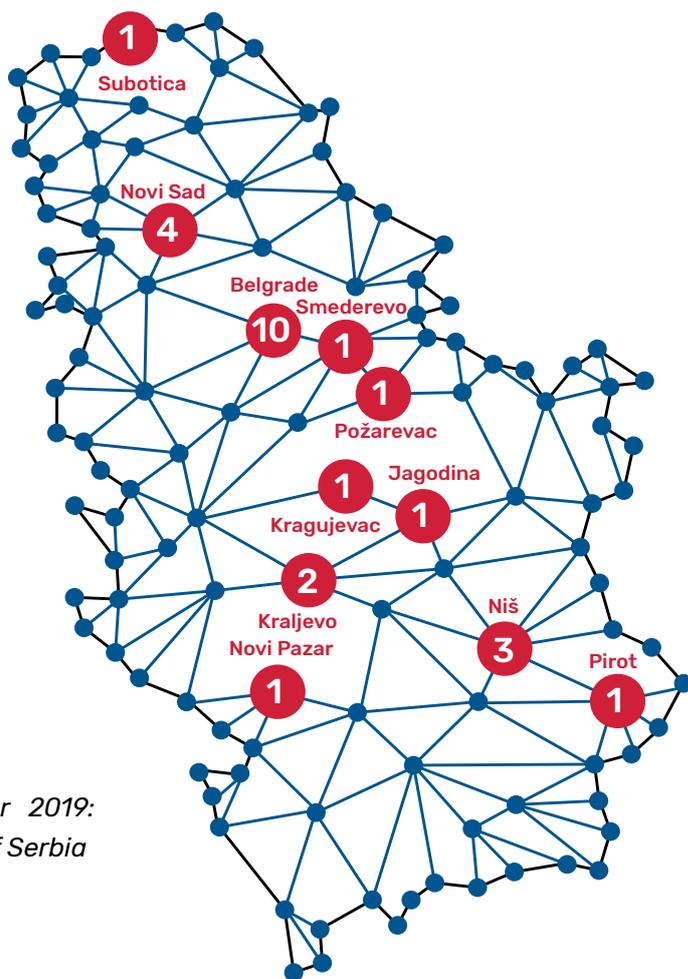


Figure 7. EMF RATEL in December 2019: 26 sensors in 11 towns of the Republic of Serbia

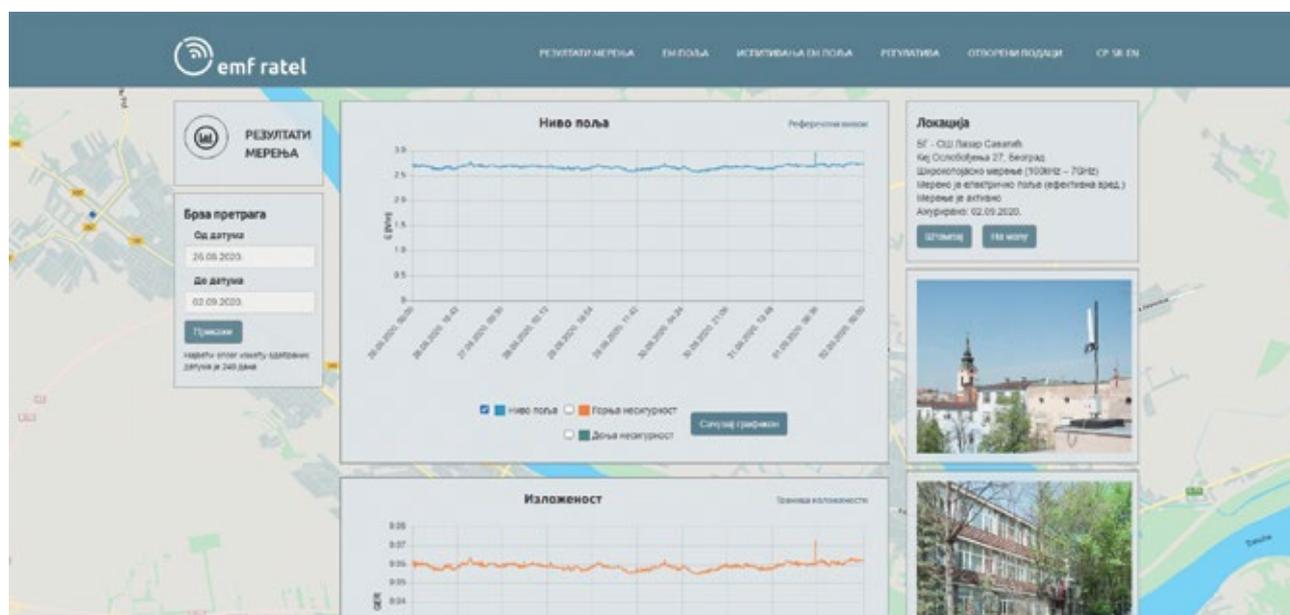


Figure 8. EM field levels for a sensor located at elementary school "Lazar Savatic" in Belgrade

The construction of radio frequency spectrum monitoring system on the territory of the Republic of Serbia

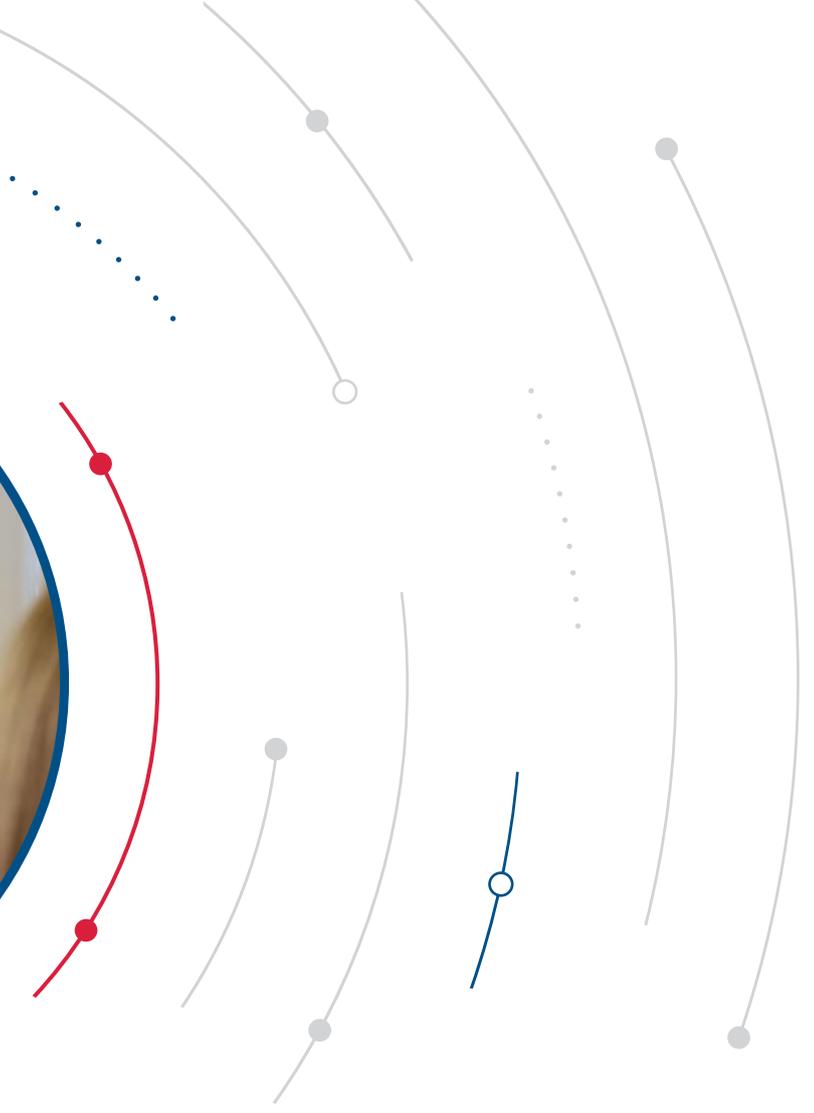
The construction project for fixed remotely controlled network of monitoring and measurement stations, which is the key component of RATEL's RF spectrum monitoring system, was initiated in 2017. By the end of 2019, the construction works on sixteen locations (Stanišić, Vincaid, Vizić, Povlen, Veliki Šenj, Rakobarski Vis, Dubočane, Ragodeš, Stanišinci, Jabuka, Vidojevica, Barelić, Miroč, Jelica, Mučibaba and Golija) have been completed, while eleven stations have become operational. On the remaining five locations (Dubočane, Jabuka, Miroč, Jelica and Mučibaba) the already acquired equipment will be mounted during the first and the second quarters of 2020.

RATEL's objective is to gradually build a monitoring system that will be able not only to timely detect disturbances in the air, but also to identify their source. To this effect, the network needs to be organized in such a manner that radio signal from particular source can be measured from two or more reference points, using necessary signal/noise ratio. Only in this way can the source of broadcasting be identified by means of AOA (angle of arrival), TDOA (time difference of arrival) or hybrid method. For that reason, it is necessary to establish a remotely controlled network of monitoring and measurement stations of satisfactory density on the whole territory of the Republic of Serbia.

Based on the results of software simulations and present experience in the application of remotely controlled network of monitoring and measurement stations, an estimated number of approximately 30 stations of this type is expected to meet the necessary requirements for continuous monitoring of

medium and high power transmitters operation, this being the original design of the system.

By reaching an acceptable share of the territory covered by this system, conditions will be met for further deployment of remotely controlled network of monitoring and measurement station subsystems in urban areas. In this manner, gradual monitoring of low-intensity broadcasting, typical for urban areas mostly, will be established, representing a brand-new layer or natural system upgrade. Each settlement with over 20,000 inhabitants would have a remotely controlled sensor station, while larger cities would have a network of at least three such stations, in order to geolocate the source of broadcasting. By building an integrated hybrid system comprised of fixed stations in rural areas, fixed stations in urban zones and mobile stations alike, an all-encompassing monitoring system enabling full functional coverage of the entire territory of the Republic of Serbia will be achieved.



7. MARKET ANALYSIS AND PRICE CONTROL

In April 2019, the Agreement on the price reduction of the roaming services in public mobile communication networks in the Western Balkans region (hereinafter: Agreement) was signed. This was one of the steps agreed in the Statement of support to the Digital Agenda for the Western Balkans, aiming to achieve a high level of consumer, competition and transparency protection on the electronic communication market. The

Agreement stipulates that the NRAs for electronic communications in the Western Balkans shall be responsible for the application of the Agreement, including the setting of mobile network termination rates for regulated roaming calls originating and terminating in the Western Balkans region. To that end, RATEL carried out a procedure and passed a decision imposing the obligations on the mobile operators to reduce the prices of roaming

services in public mobile communication networks in the Western Balkans region, implemented as of 1 July 2019. Following a transitory period, which is to last until 30 June 2021, as of 1 July 2021 all surcharges will be abolished and regulated calls, SMS and data transfer in roaming will be charged in accordance with the domestic retail pricelists bringing the roaming prices in the Western Balkans region to the price level in line with the “roam like at home” rule applied in the European Union.

RATEL has been collecting quarterly reports and monitoring the effects of roaming prices reduction.

At the beginning of the year, changes were made to the Report on analysis of the wholesale market for central access provided at a fixed location for mass-market products. In July 2019, a decision was adopted on designating the operators with significant market power (SMP) on the relevant market.

For the purpose of implementation of the decision on designating the operators with SMP, a new Rulebook on minimum content, level of detail and manner of publishing reference offers (*“Official Gazette of RS”, No. 36/19*) was adopted, stipulating the minimum content, the level of detail and the manner of publishing the reference offers. By the end of 2019, over 30 reference offers of the operators with SMP have been verified, including one decision stipulating the content of a reference offer. In the process of implementation of the decision on designating the operators with SMP in the wholesale market for call termination on individual public telephone networks provided at a fixed location, and monitoring of the application of the regulatory obligations imposed on the operator with SMP, a decision was adopted, approving price changes in the reference offer for interconnection with a public fixed communication network.

Pursuant to provisions of Article 62, paragraph 4 and Article 68, paragraph 1 of the Law,

RATEL continuously monitors implementation of the obligation of price control and cost-accounting, imposed by a decision on operators with SMP Telekom Srbija and SBB, who provide regulatory reports in accordance with the Rulebook on the application of the cost-accounting principle, separate accounts and reporting by an operator with significant market power in the electronic communications sector (*“Official Gazette of RS, No. 52/11*). In line with provision of Article 68, paragraph 7 of the Law, RATEL has commissioned an independent auditor to verify the compliance of SMP operators’ regulatory reports for 2018 with the prescribed method of the cost-based accounting. Reports of the independent auditor on the mentioned regulatory reports are available at RATEL’s website (<https://www.ratel.rs/cyr/page/cyr-izvestaji-revizora>). RATEL has also closely monitored the pricing of the regulated services offered by the operators with SMP and consistent implementation of the relevant Rulebook.

The third meeting of the Cooperation Forum of Regulators from Serbia, Bosnia and Herzegovina, Montenegro and North Macedonia took place in Sarajevo, where discussions were held about the implementation of the Agreement on reduction of roaming prices in public mobile communications networks in the Western Balkans region and the general situation in the area of telecommunications. The regional cooperation was praised highly, primarily due to its practice of experience sharing, providing the most efficient models in the electronic communications market regulation.

During 2019, RATEL carried out a public consultation procedure and prepared a Proposal of the Rulebook on the cost-based accounting according to the long run incremental costs model (LRIC) for determining the prices of regulated wholesale services offered by the operators with SMP on the relevant wholesale markets. Introduction of the LRIC model is stipulated by Article 5, paragraph 1 of the Rulebook on the application of the cost-ac-



counting principle, separate accounts and reporting by the operator with significant market power in the electronic communications sector (*“Official Gazette of RS”, No. 52/11*) and represents the next step in the implementation of the cost-accounting principle. The importance of this implementation is reflected in the impact that the model will have on the overall electronic communications market,

ensuring a higher accuracy in the pricing of regulated services. Also, it will enhance harmonization with the applicable EU legislation and practice concerning price control on the relevant electronic communications markets. This harmonization is expected to contribute to the promotion of effective and sustainable market competition and a variety of benefits for end-users.





8. USER PROTECTION

The same as in previous years, RATEL continued to provide support to subscribers and users through daily communication by e-mail and telephone, by resolving complaints concerning the work of electronic communication operators and analysing the number of user complaints according to the type of services.

A subscriber or user, whose complaint was rejected or left unanswered by the operator after

15 days, can turn to RATEL for mediation in an out-of-court dispute resolution. During the mediation in an out-of-court dispute resolution, RATEL has no legal authority to conduct administrative procedure during the proceedings but can only serve as a mediator in the attempt of a peaceful out-of-court settlement.

The number of new complaint related cases in 2019 was 1042, 423 of which were resolved with a positive outcome for the subscriber/user. Most complaints concerned the bills for mobile telephony services and the quality of service, especially the Internet. As for the billing complaints, in addition to those concerning standard service charges, many complaints concerned bills for questionable usage of value-added services. When handling user complaints, attention is paid particularly to the protection of the rights of the disabled and the elderly as socially vulnerable groups.

Certain number of complaints are forwarded to the Ministry of Trade, Tourism and Telecommunications (MTTT), i.e. to the inspection service of this ministry or relevant autonomous province bodies responsible for supervision over the application of the Law on Electronic Communications and the Law on Consumer Protection, as well as to the Regulatory Authority for Electronic Media or other bodies and organizations with public authorization.

RATEL gets informed on the general terms and conditions of electronic communications operators through users' complaints or directly from the operators and, where applicable, it takes necessary measures. For the purpose of harmonization of its business activities with the new Law on Personal Data Protection, operator Telekom Srbija a.d. Beograd submitted notification on changed General Terms and Conditions of service

provision in public fixed communications network, General Terms and Conditions of service provision in public mobile communications network, General Terms and Conditions of provision of M:SAT and TV service and amended General Terms and Conditions in public fixed communications network, whereas operator Telenor d.o.o. Beograd submitted General Terms and Conditions of service provision in public mobile communications network and General Terms and Conditions of service provision with Umbrella Agreement for business users. Operators Radijus vektor d.o.o. Beograd and Masko d.o.o. Beograd adopted new General Terms and Conditions of service provision, with explanation that those are aligned with the measures of users's interest protection undertaken toward Radijus vektor by the line Ministry. RATEL notified the inspection service of the line Ministry about non-submittal of changed and amended General Terms and Conditions of service provision by operator SBB d.o.o. Beograd.

Since RATEL's competences regarding the establishing and keeping of database on the prices of public communication networks are defined by the Law, a portal on service prices "Cene usluga" was launched in September as a separate Internet page www.ceneusluga.rs with information about publicly available electronic communications services offered to end-users by the electronic communications operators in the Republic of Serbia. Services are grouped in the following categories: fixed telephony, mobile telephony, Internet, television, bundled services. For each of the services, the information is displayed clearly, in the manner and order which do not favour any of the operators or services offered. The portal lists the details of the operator's service offers along with the prices, while the end-users have the possibility to browse and compare services by several criteria, such as price, number of minutes,

amount and speed of data transfer, number and type of TV channels and similar. The data on the portal are strictly informational and do not represent RATEL's intent to guide, suggest or influence end-users' choice of service in any way. A direct overview of the offers available on the service provider's website is made possible at any given moment.

For educational and assistance purposes dedicated to users, in June, RATEL published guidelines for several areas from its competence: Guidelines for user protection against security risks in ICT systems, Guidelines for an open Internet, Guidelines for postal service users and operators, Guidelines for electronic communications users/subscribers. RATEL also published two documents intended for operators – Guidelines for shared use of mobile network infrastructure and Study on OTT services.



9. POSTAL SERVICES

As part of its postal regulatory activities in 2019, pursuant to the new Law on Postal Services (*“Official Gazette of RS”, No. 77/19*) adopted in October 2019, RATEL prepared the dynamics of adoption of new by-laws to define a new regulatory frame referring, among other, to two additional RATEL’s competences:

- mediation in an out-of-court dispute resolution between users and postal operators, and

- expert monitoring of the postal operators’ activities.

During December 2019, RATEL elaborated two draft rulebooks submitted for public consultations:

- Draft rulebook on the amount and manner of fee payment for permit issuance and operational costs for the provision of postal services; and
- Draft rulebook on application forms for granting of permits for the provision of postal services.

In the second quarter of 2019, in accordance with the Action Plan of the Strategy for the postal service development in the Republic of Serbia 2017-2020, RATEL prepared a study “Analysis of the postal market development in line with the ECOMPRO program.”

The analysis of universal postal service (UPS) provision was performed based on the data provided by the public postal operator (PPO) in its Annual Report on the quality of UPS provision for 2018. The analysis offers a comparative overview of data, including the number of complaints filed by users of the PPO and other postal providers’ services. Based on key indicators from the ERGP (European Regulators Group for Postal Services) Report, a comparative overview of postal markets in the EU was given and an analysis of consumer satisfaction levels was performed, based on the QoS report delivered by the PPO.

In 2019, RATEL issued 1 approval, whereas 5 permits for the provision of postal commercial services were revoked.

In terms of monitoring the postal operators’ business activity and taking measures prescribed by the Law, the following actions were taken:

- quarterly verification of postal operators’ status at the Business Registers Agency,



- cooperation with the line Ministry in connection with elaboration of by-laws,
- monitoring of postal operators' activities as a result of users' complaints and giving instructions as to how exercise the right of compensation and indemnification in relation to the provision of postal services,
- regular cooperation with postal operators.

As a member of CEN – Technical Committee 331 Postal Services, a RATEL's representative continued to participate in the committee activities during 2019.

During 2019, the employees of RATEL continued with their tasks and activities as Chair and members of the Commission for standards and related documents CS A331- Postal Traffic. In December 2019, the Commission approved the

proposition of Serbian standard *Postal Traffic – Terminology*, prSRPS A.L3.002.

For the purpose of an efficient analysis of postal markets in 2019, the postal operators' quarterly reports for all four quarters of 2019 were collected, analysed and integrated, compared to the respective quarters of 2018 and subsequently published on RATEL's website. Data regarding the number and type of complaint procedures and indemnifications by postal operators were gathered via relevant questionnaires.

The Postal Services Department made an extended postal market analysis for 2018, with comprehensive analysis of the data on volume, income by type of service, comparative overview of the EU countries' trends, and for the first time, an analysis of the data on postal items as a result of remote sales in domestic postal traffic.



In 2019, RATEL took an active part in the activity of ERGP working groups, by writing, by means of questionnaires, by participating in meetings and by contributing as drafters (ERGP WG on market indicators). These are the ERGP WGs followed by the Postal Services Department:

- ERGP WG on regulatory framework;
- ERGP WG on cross-border parcel delivery;
- ERGP WG on regulatory accounting;
- ERGP WG on markets indicators;
- ERGP WG access regulation;
- Grow Postal Statistics.

In 2019, like in the previous year, RATEL was a co-organizer of the XXXVII Symposium on the novel technologies in postal and telecommunications traffic, PostTel 2019, held on December 3 and 4, 2019, at the Faculty of Transport and Traffic Engineering in Belgrade. Representatives of the Postal Services Department published and presented papers titled "Future of the postal regulatory framework in the EU" and "Postal quality of service measured through AMQM system."





10. INFORMATION SECURITY

The Law on Information Security designated RATEL as the National Centre for the Prevention of Security Risks in ICT Systems (National CERT) of the Republic of Serbia, to coordinate the prevention of and protection against security risks in ICT systems at the national level. National CERT collects and exchanges information on security risks in ICT systems, including incidents threatening the safety of ICT systems, and informs,

warns and advises the entities managing ICT systems and the general public in the Republic of Serbia thereof. The National CERT is primarily responsible for:

- monitoring the state of incidents on the national level,
- providing early warnings, alerts and announcements, informing relevant entities about incidents and risks,

- responding to reported or otherwise detected incidents in ICT systems of special importance, as well as to reports by individuals and legal entities, by providing advice and recommendations on the basis of available information to persons affected by the incident, and undertaking other necessary measures within its jurisdiction on the basis of the obtained knowledge,



- performing continuous risk and incident analyses,
- raising awareness among citizens, business entities and public authorities about the importance of information security, the risks and protection measures, including the implementation of campaigns aimed at raising this awareness,
- keeping records of special centers for the prevention of security risks in ICT Systems, performing the tasks of prevention and protection against security risks in ICT systems within a legal entity, a group of legal entities, a business area and the like (Special CERTs),
- informing the Ministry of Trade, Tourism and Telecommunications (MTTT) on a quarterly basis about undertaken activities.

Amendments to the Law on Information Security (LIS), which came into effect in November 2019, further strengthened the position of the National CERT, requiring that it:

- be equipped with adequate systems needed for performing the activities within its competence,

- be adequately staffed, so as to ensure availability at all times,
- be equipped with reliable and sustainable infrastructure, or ensure redundant systems and backup working space.

It is also stipulated under the amendments to LIS that the National CERT shall promote the adoption and use of prescribed and standardized procedures for:

- risk and incident management and recovery,
- classification of information on risks and incidents, i.e. according to risk and incident levels.

During 2019, several steps were undertaken aiming to improve the work of the National CERT.

As part of the activities stemming from its legally entrusted competencies, in October, marked worldwide as the cyber security month, the National CERT organized workshops for the media companies and SME employees. In cooperation with NALED, line ministry (MTTT) and the Office for IT and eGovernment, within the project "Empowering local self-governments for the implementation of cyber



security regulation”, two kinds of seminars were carried out. The one-day seminar about elaboration of a Security Act was attended by 143 employees from 79 local self-government units, whereas the two-day technical training for system administrators, conducted on a customized virtual platform for cyber attack simulation, was attended by 56 employees from 42 local self-governments.

To this end, a public procurement was launched and carried out for purchasing the virtual platform for cyber attack simulation, which is one of the crucial steps enabling the improvement of personnel capacities in the state administration.

During 2019, the National CERT handled incidents reported from the territory of the

Republic of Serbia and by international CERTs, in accordance with Article 15 of the Law on Information Security. From 1 January 2019 till December 31, 2019, 152 (hundred and fifty-two) incidents in total were reported to the National CERT.

In 2019, the National CERT added 3 (three) Special CERTs to the Register of Special CERTs, in accordance with Article 15 of the Law on Information Security. Since the adoption of the Law on Information Security in 2016, the total of 9 (nine) Special CERTs have been listed in this Register.

The National CERT was the first national institution to have been subjected to the inspection carried out by the MTTT, as the line ministry tasked with supervision in the related



field. The result of the inspection was a report stating that the National CERT fulfilled all necessary requirements.

By its active participation in international meetings and workshops, RATEL contributes to the activities of the international community in an effort to improve protection against security risks in ICT systems. The National CERT of the Republic of Serbia has been recognized by the international CERT organizations as national single contact point for incident reporting and a reliable partner for solving of incidents pertaining to cyber security on the territory of the Republic of Serbia.

In cooperation with OSCE, the National CERT initiated a project "Raising the National CERTs capacity and visibility."

In order to improve cyber security and RATEL's information system, the employees underwent necessary trainings, whereas additional technical measures were introduced. The employees performing information security tasks under the National CERT's responsibility, completed appropriate specialized TRANSITS courses and seminars designed for implementation and practical use of safety and protective measures in the domain of cyber security and management.



11. COOPERATION WITH OTHER INSTITUTIONS AND ORGANIZATIONS

In carrying out activities from the scope of its responsibility, RATEL cooperates with a number of institutions and organizations, such as:

- Ministry of Trade, Tourism and Telecommunications, line ministry for the activities in the
- Office for Information Technologies and e-Government;
- area of electronic communications, information society, cyber security and postal services;

- Regulatory Authority of Electronic Media;
- Ministry of Interior, Ministry of Defence, Security Information Agency and Serbian Armed Forces;
- Serbian Armed Forces and Serbia and Montenegro Air Traffic Services, regarding radio frequency data used by aircrafts and notifications thereof to the International Telecommunication Union;
- Commission for Protection of Competition;
- Ministry of European Integration;
- National Alliance for Local Economic Development (NALED);
- Association of radio-amateurs of the Republic of Serbia, regarding the issuance of licenses for radio-amateur operators and work licenses for radio-amateur stations;
- Office for the Coordination of Affairs in the Process of Negotiation with the Provisional Institutions of Self-Government in Priština, regarding implementation of the Action Plan for telecommunications;
- Commissioner for Information of Public Importance and Personal Data Protection;
- Republic Geodetic Authority;
- bodies responsible for space planning and environmental protection and
- other bodies and organizations.



RATEL continued to maintain regular contact and consultations with all stakeholders in the telecommunications and postal sectors. Numerous meetings with operators, providers, distributors, manufacturer organizations, scientific and educational institutions and users' associations were held. RATEL's representatives participated in relevant public discussions, panel discussions and round tables, seeking to exchange technical information and expert knowledge on the latest relevant topics.

RATEL presented its Guidelines for shared use of telecommunications infrastructure to the representatives of mobile operators Telekom, Telenor and Vip mobile. The operators were invited to submit their suggestions and ideas regarding this topic and their opinions were taken into account during the elaboration of the final version of the document.

In RATEL's premises, presentation of the Guidelines for an open Internet was made for the representatives of electronic communications operators, who were then invited to provide their comments and suggestions on the topic.

A meeting was also held in RATEL's premises with representatives of postal operators, in order to present quarterly reports and the Guidelines



for postal service users and operators, and to inform the operators about the current and future RATEL's activities. The meeting was attended by the representatives of RATEL's Postal Services Department and representatives of postal providers of express services in domestic and international postal traffic.

In August 2019, RATEL became a full member of the National Alliance for Local Economic Development (NALED), where it participates in the work of two of its branches, E-Government Alliance and Fair Competition Alliance.

During 2019, representatives of RATEL participated in the activities of Expert Council and Assembly, as well as Commissions for standards NETSI, CS N210 and CS A331 working within the Institute for Standardization of Serbia (ISS), but also in the activities of technical committees of the European organizations for standardization ETSI, CENELEC and CEN. Pursuant to the decision of the Government of Serbia on designation of the Chair and members of the Management Board of ISS, RATEL's representative was elected as a

member of the Management Board. The contribution of RATEL's experts in technical committees represents an additional support to the implementation of the EU regulations in the national legislation, realization of important projects and growing reputation of RATEL and the Republic of Serbia in expert circles.

As part of its legislative activities in 2019, RATEL participated in the elaboration of changes and amendments to the Law on Information Security.

RATEL has actively participated in the work of WGs engaged in the negotiation process for the EU accession of the Republic of Serbia, in connection to the following negotiation chapters:

- Chapter 1 – Free Movement of Goods, regarding the regulations pertaining to radio equipment and telecommunications terminal equipment;
- Chapter 3 – Right of Establishment and Freedom to Provide Services, regarding postal services and markets;



- Chapter 8 – Competition, regarding competition in the domain of electronic communications and postal services;
- Chapter 10 – Information Society and Media, regarding the electronic communications and information security regulatory framework.

In 2019, necessary activities related to the National Programme for the Adoption of the Acquis (NPAA) and the accession negotiations within Chapter 1 (Free Movement of Goods) were initiated and carried out, in cooperation with the line Ministry. These activities included preparation of information, participation in the preparatory activities and revision of the NPAA, as well as the provision of data for the annual report on the progress of the Republic of Serbia to the European Commission (EC).

RATEL participated in the elaboration of the Draft Negotiating Position of the Republic of Serbia for the Intergovernmental conference on the accession of the Republic of Serbia to the EU

for Chapter 10 “Information Society and Media”, in the segment related to RATEL’s competence. Also, documents were screened and communication prepared for the purpose of Annual Progress Report – Chapter 10 “Information Society and Media”, as well as the answers to the questions of the European Commission regarding the institutional frame and fulfilment of the obligations stemming from the NPAA, received through the MTTT and the Ministry for European Integration.

During 2019, RATEL’s representatives took part in numerous meetings, where different papers, projects and results were presented.

Working meetings with telecommunications and postal operators were organized, in order to get acquainted with their companies’ organization, new technical solutions, work plans and dealing with challenges. Also, several meetings with telecommunications operators were held, where problems pertaining to the implementation of the Law on Information Security and reporting to RATEL on the type and level of incidents were discussed.



A protocol on cooperation was signed with the Security Information Agency, for the purpose of mutual interests and capacity and resource building in the area of information security.

Along with Serbian Armed Forces, RATEL took an active part in preparation and realization of a military exercise "CyberTesla 2019", in Gornji Milanovac. As of December 2019, RATEL participates as an important partner in realization of the military

exercise „CyberTesla 2020“, which gathers representatives of the private sector as well, and Special CERTs.



As part of the project "Improvement of cyber security management in the Western Balkans" organized by DCAF, several workshops were held during 2019. In cooperation with NALED, MTTT and the Office for Information Technologies and e-Government, the National CERT organized one-day seminars and



two-day technical trainings for the employees in local self-governments.

RATEL's representatives took part in a three-day workshop organized by OSCE Mission to Serbia and Share Foundation, held in June 2019 in Petnica. "The Petnica Group" gathers several government and private institutions with a particular role in promoting and enhancing the cyber security.

An agreement on business and technical cooperation was signed between RATEL and the Faculty of Electronic Engineering of the University in Niš, aiming to develop and improve the functioning, organization and management in the area of electronic communications, in line with the latest global and domestic scientific achievements and expert knowledge.

Regarding the cooperation with business entities, a permanent communication has been established with the Foreign Investors Council

(FIC) Telecommunications Committee in the domain of telecommunications market development, national and the European regulation and presentation of future activity plans.

The traditional meeting between RATEL and FIC was held focusing on the Activity Plan of the Regulatory Agency for Electronic Communications and Postal Services for 2019. At the meeting, nine priority tasks in 2019 were presented by RATEL, where most activities are expected to take place in the area of the improvement of the regulatory framework, user protection and development of the system for coordination and prevention of risks in ICT systems.

RATEL pays particular attention to cooperation with educational, scientific and research institutions, in the course of which, students were given the possibility to visit monitoring and measurement centres in Belgrade and Niš, during 2019.



12. INTERNATIONAL ACTIVITIES

Cooperation with international organizations, regulatory authorities and other expert institutions is maintained to ensure a continuous follow-up of the electronic communications and postal services development, changes in the domain of market regulation and international acts regarding our country, as well as the introduction of new services based on new technolo-

gies. RATEL carries out international cooperation through participation in the work of international institutions, organization of bilateral and multilateral meetings with regulatory authorities from other countries, especially from the region and the European Union.

As national regulatory authority, RATEL takes an active part in the work of the International



Telecommunication Union (ITU), the European Conference of Postal and Telecommunications Administration (CEPT) and the European Telecommunications Standards Institute (ETSI). Within activities of the International Telecommunication Union – ITU, RATEL participated in the work of the following WGs: *ITU-T SG2 – Operational Aspects of Service Provision and Telecommunications Management, ITU-T SG15 – Networks, Technologies and Infrastructures for Transport, Access and Home and ITU-T SG 20 – IoT and its Applications Including Smart Cities and Communities.*

A highly important event in 2019 was the participation of RATEL's representatives, as part of the delegation of the Republic of Serbia, in the World Radiocommunication Conference (WRC-19) held in Sharm El-Sheikh, Egypt, from 28 October to 22 November, 2019, under the auspices of the

ITU. Every three to four years, radiocommunication conferences are organized to review and, if necessary, to revise the Radio Regulations (RR). This is an international document with the objective to enable a balanced access to and rational use of limited natural resources such as the RF spectrum and satellite orbits, and to enable an efficient and effective operation of all radiocommunication services. More than 3400 delegates from 165 member countries took part in the WRC-19 conference, whose result was compiled in the WRC-19 Temporary Final Acts. Based on the WRC-19 Final Acts, the Republic of Serbia, as an ITU member country, is supposed to apply the decisions and conclusions of the WRC-19 in its legal acts and regulations. RATEL's responsibility is to prepare a draft of the new Allocation Plan for RF bands, which should contain the conclusions and results of the WRC-19.



As part of cooperation with the European Conference of Postal and Telecommunications Administrations – CEPT, RATEL participated in the activities of *Electronic Communications Committee – ECC*. During 2019, RATEL's representatives took part in *WGFM 22 - Working Group Frequency Management - Monitoring and Enforcement*, *WG SE -Working Group Spectrum Engineering* and *SE24 - Spectrum Engineering*.

RATEL took part in *Radio Spectrum Policy Group - RSPG*, which is an expert counselling body to the European Commission in developing the RF spectrum management policy. Serbia has an observer status within this group, therefore RATEL is in the position to closely monitor and follow the strategy of the RF spectrum

management in Europe, both in the short and the long run.

RATEL is also a member of REDCA (*Radio Equipment Directive-Compliance Association*), an association gathering organizations dealing with compliance of radio equipment, designated bodies, consulting companies, manufacturers and administrations in the EEA and in countries having a mutual recognition agreement with the EU. The importance of a REDCA membership is reflected in the access to crucial information in the area of radio equipment and in the exchange of experience regarding implementation of the Directive on radio equipment 2014/53/EC.

In 2019, like in previous years, RATEL took an active part in the work of the Independent Regu-



lators Group – IRG, where it has a full member status. RATEL has also been actively involved in the work of and the Body of European Regulators for Electronic Communications – BEREC, where it has been present since March 2012, first with an observer status and as of March 2019 with the status of a participant without voting rights, in accordance with the new regulatory framework for electronic communications and based on the relevant EU decision. RATEL's representatives took part in the activities of BEREC Contact Network (CN) and its expert WGs, while in 2019 a representative of RATEL also co-chaired an EWG. RATEL's delegation participated in BEREC plenary sessions held in March in Budapest, in June in Ghent, in October in Crete and in December in Malta.

On the margins of the second BEREC Plenary in Ghent, on 13 June 2019, a Memorandum of Understanding (MoU) in the field of electronic communications and postal services was signed between the director of RATEL and the director of ANCOM of Romania. This MoU is expected to contribute to the improvement of cooperation between the two regulators in the exchange of information, experiences and documents pertaining to the regulation of electronic communications and postal services. As agreed in the MoU, at the end of November 2019, representatives of RATEL's RF Spectrum Monitoring Division paid a two-day visit to the ANCOM's regional centre of in Timișoara. At the meeting, information and experiences were exchanged with regard to the project of continuous measure-



ment of electromagnetic field levels, EMF RATEL, and regarding similar projects realized by ANCOM.

During the visit of the president of the Republic of Turkey to the Republic of Serbia and the ceremony of signing bilateral documents on 7 October, a Memorandum of Understanding (MoU) in the field of electronic communications and postal services was signed between RATEL and the Turkish regulatory authority – ICTA.

RATEL hosted the third regulatory meeting on the topic “Measurements of Quality of Service (MoQoS)”, held on 6 June 2019 in Belgrade. At the meeting, the latest projects and activities in the field of QoS measurement were presented by the experts from Poland, Hungary, Slovakia, the Czech Republic, Slovenia and Croatia, and the representatives of RATEL. Participants from these countries have been regularly gathering for three

years, to exchange experience and knowledge in the field of MoQoS. The meeting participants shared the findings on the ways and possibilities for further upgrading the QoS measurement methodology applied by the NRAs to monitor the quality of service and protect users, which will help to harmonize their MoQoS methodologies.

In 2019, RATEL continued to successfully cooperate with ENISA (European Union Agency for Cybersecurity), within the expert group for security and integrity of telecom networks and services, focused on harmonized implementation of provisions of Article 13a of the Directive 2009/140/EU of the European Parliament and the Council. Notwithstanding Republic of Serbia is not an EU member country, in November 2019 RATEL hosted the 29th meeting of the Article 13a Expert Group. The meeting was attended by the representatives of the EU member coun-



tries, Norway, Switzerland, European Commission and RATEL, who discussed different challenges related to integrity and security risks in the electronic communication networks and continuity of service provision. RATEL was commended for the organization of the meeting and for the active participation of its representatives.

RATEL's international cooperation in the field of postal services involves active participation in the work of the European Regulators Group for Postal Services (ERGP) and the European Committee for Postal Regulation (CERP).

During 2019, RATEL's representatives took part in the following ERGP meetings: first CN ERGP meeting in May in Zagreb, second CN ERGP meeting in October in Madrid, first ERGP plenary session in June 2019 in Ponta Delgada, including participation in an international internal workshop, and the

second ERGP plenary meeting in November in The Hague, including participation of RATEL's representatives in an international workshop "Data driven regulation of postal markets". During the second plenary's session, the agenda included the plan to discuss the application of the regulator from Priština for membership in an observer status in this organization, however, owing to the efforts of RATEL's representatives, in cooperation with the state bodies of the Republic of Serbia, and thanks to the excellent communication with postal administrations of Spain, Slovakia, Greece, Cyprus and Romania, this topic was removed from the meeting's agenda. RATEL's representatives are praised for their active contribution to this body, despite being only observers. Within ERGP, during 2019 RATEL participated in the activities of Sub-group "Market Indicators", where RATEL's representative serves as a drafter, Sub-group

“Regulatory Accounting” and Sub-group “Regulatory Framework.”

In 2019, RATEL’s representative, in the capacity of CERP Vice-Chair, participated in the activities pertaining to coordination of the position of the European countries in the bodies of the Universal Postal Union (UPU), during the third extraordinary UPU Congress in Geneva. By taking part in a WG for the elaboration of a draft UPU strategic document for the period 2021-2024, the CERP Vice-Chair also extended his activities on the international conferences in Copenhagen, Minsk and Mwanza (Tanzania), as a lecturer. RATEL, was, in addition, organizer of the meetings of CERP and PostEurop WGs, held from 20 through 22 March 2019 in Belgrade. This was the biggest gathering

of a CERP WG ever, with 60 participants from 25 European countries. Representatives of the UPU, EC, PostEurop, Nordic Postal Union and colleagues from the USA attended the CERP WGs meetings as observers.

RATEL has been actively involved in the international cooperation in the area of information security, in particular in coordination, prevention and protection against security risks in ICT systems.

Since 2017, the National CERT has been included in the list of CERT teams of the “Trusted Introducer” international platform supporting the alert centres worldwide dealing with security risks in IT systems. Having fulfilled all necessary requirements, in 2019 the National CERT acquired



accredited status in this organization and the right to actively participate in the decision making, as well as the possibility to attend closed meetings.

In 2019, RATEL's National CERT successfully applied for the *FIRST Suguru Yamaguchi Fellowship Program*, a global organization dealing with security and incident responses (*Forum of Incident Response and Security Teams*), gathering 520 members from 95 countries, founded with the aim to connect the CERT teams throughout the world and establish information exchange channels. Events organized by this body cover all segments of cyber security and are dedicated to all levels of employees, thus providing a permanent and continuous vocational training and professional improvement of its members. The

National CERT is committed to joining this global forum, and in order to obtain a full membership it needs to fulfil defined requirements within the set deadline.

RATEL dedicates special attention to the strengthening of the National CERT's capacity through cooperation with key international organizations and institutions in the field of cyber security. RATEL representatives took part in the following international meetings and trainings pertaining to information security:

- 56th TF-CSIRT conference, Tallinn (Estonia);
- FIRST Fusion training, Skopje (North Macedonia), practice of using program tools for data exchange in relation to incidents and threats in the area of cyber security;
- Study visit to the Kaspersky Lab data centre in Zurich, Switzerland;
- 57th TF-CSIRT conference, Luxembourg;
- ALERT (Applied Learning for Emergency Response Team) cyber exercise, organized as part of an ITU regional initiative for innovation in information and communication systems on the territory of Europe, Bucharest, Romania;
- Annual meeting of international organization FIRST, Edinburgh, UK;
- Regional conference on cyber security, Ohrid, North Macedonia;
- OSCE WG meetings, on the topic of cyber security, organized by the OSCE Section for Transnational Threats, Vienna, Austria;
- Conference "Underground economy and cybercrime" organized by the Council of Europe, Strasbourg, France;



- 58th TF-CSIRT conference, Cyprus;
- FIRST Technical Colloquium training, organized by the National CERT of Slovenia (S1-CERT), FIRST organization, Geneva Centre for Security Sector Governance (DCAF) and the US Government, Ljubljana, Slovenia;
- Regional OSCE training on the role of information and communication technologies in the regional and international security, Skopje, North Macedonia;
- 2019 Southeast Europe Regional Alumni Forum training, upon invitation by George C. Marshall European Center for Cyber Security Studies Center, Garmisch-Partenkirchen, Germany;
- Training within George C. Marshall program on cyber security, by holding a lecture on the topic of “Public awareness in practice”, Garmisch-Partenkirchen, Germany;
- Summer school on digital forensics SuCo-Fo2019, organized as part of the activity CA17124 of the European program for cooperation in the domain of scientific research (European Cooperation in Science and Technology – COST), Lillehammer, Norway.

From 14 to 16 May 2019, RATEL hosted a multi-national command headquarters conference and exercise „Cyber Tesla 2019“, with participation of the Ministry of Defence, Serbian Armed Forces, Ohio (USA) Army National Guard, state bodies of the Republic of Serbia responsible for cyber security, private companies dealing with prevention and protection against security risks in ICT systems and the National CERT of the Republic of Serbia.

RATEL’s management received a delegation of the Federal Antimonopoly Service (FAS) of the



Russian Federation. The objective of the meeting was furthering of bilateral cooperation between the two regulatory bodies, based on an earlier signed Memorandum of Understanding. The topics of the meeting focused on the issues of mutual interest, such as: regulation of tariffs in the field of electronic communications and postal services, creation of environment for the development of competition in the postal market, and provision of equal access to infrastructure.

RATEL’s delegation, consisting of the members of the Management Board, RATEL’s director and associates, visited the Communications Regulatory Agency (RAK) of Bosnia and Herzegovina, where they were received by members of the Council and director general of RAK. The importance of this meeting was in the cooperation between the regulators focused on implemen-



tation of the most efficient models in communications market regulation, especially having in mind the objectives of the Western Balkans Digital Agenda and the implementation of the Roaming Agreement.

RATEL's delegation attended the third meeting of the Forum for cooperation of the regulatory bodies for electronic communications of Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia, hosted on 22 November by the Communications Regulatory Agency (RAK) of Bosnia and Herzegovina. In addition to the general overview of the telecommunications market situation, the main topic of the meeting between the four regulators was the implementation of the agreement on roaming price reduction in the Western Balkan countries.

As part of regional cooperation, the Agency for

Electronic Communications and Postal Services (EKIP) of Montenegro visited RATEL in October. During the two-day meeting, RATEL's current projects and activities were presented, among other the system for radio frequency spectrum monitoring. EKIP's delegation visited the renovated Monitoring Centre in Niš and a remotely controlled monitoring and measurement station at Povlen. During the visit to the representative RATEL's infrastructure facilities, the guests were acquainted in detail with the concept of monitoring system, as well as with specific technical solutions applied in the construction and equipment of the facilities.

In December, RATEL hosted a two-day meeting with representatives of the Agency for Electronic Communications (AEK) of North Macedonia. Through presentations and discussions, the repre-



representatives of the regulatory bodies exchanged professional and expert knowledge and information in the field of electronic communications user protection pertaining to the practice and procedures of the two regulators.

The cooperation with the Regional Cooperation Council (RCC) has continued, with RATEL's representatives being included in the RCC projects and the consultation process regarding the priority areas of the South East Europe 2020 Strategy. Before the Western Balkans Digital Summit held on 4 and 5 April in Belgrade, a meeting, organized by RCC, with regulators of the signatories to the regional agreement on roaming price reduction took place. RCC also hosted another meeting, on the margins of the Summit, gathering representatives of the regional National CERTs, the EC, the

Energy Community from Vienna, DCAF and the Software Engineering Institute of the Carnegie Mellon University. In addition to presentation of the current results and planned activities, there were talks about the ways to improve regional cooperation between the National CERTs, with an initiative to create a common platform for the exchange of information on cyber security incidents. On that occasion, the National CERT of the Republic of Serbia suggested to use MISP (Malware Information Sharing Platform), recommended by the international forum FIRST and by the American Carnegie Mellon University.

Within the "Norway for you - Serbia" project, funded by the Kingdom of Norway and implemented by the United Nations Office for Project Services (UNOPS), a Memorandum of Understand-



ing to delivering project activities was signed. The signatories to the MoU are the Royal Norwegian Embassy, UNOPS in Belgrade, the line Ministry (MTTT) and RATEL. With the purpose of strengthening of cyber security in the Republic of Serbia, as part of this project, equipment for a cyber-attack simulation platform will be provided, for the needs of the National CERT (within RATEL) and other CERTs in the Republic of Serbia,

RATEL has continued with the activities related to the negotiations on Serbia's accession to the EU and to the work of the Subcommittee for Research and Innovation, Information Society and Social Policy, within the Committee for Stabilization and Accession. In accordance with its competences in the area of electronic communication networks and services (information society), RATEL's

director took part in the meeting of the Subcommittee for Research and Innovation, Information Society and Social Policy (EU – Serbia), held on 20 June 2019 in Brussels, as part of the follow-up of the Stabilisation and Association Agreement implementation process.

APPENDIX 1

LIST OF BYLAWS

LIST OF BYLAWS WITHIN RATEL'S COMPETENCE (ELECTRONIC COMMUNICATIONS)

- Rulebook on the manner of collection and publication of the data on type, availability and geographic location of the electronic communications network's capacities (*Official Gazette of RS, no. 66/15*)
- Rulebook on content and manner of notification of international interconnection agreements (*Official Gazette of RS, no. 104/14*)
- Rulebook on number portability for services provided via public mobile communications networks (*Official Gazette of RS, no. 101/14*)
- Rulebook on fee calculation for the provision of services within the competence of the Republic Agency for Electronic Communications (*Official Gazette of RS, no. 34/13*)
- Rulebook on the manner of radio frequency usage under general authorization regime (*Official Gazette of RS, no. 28/13*)
- Rulebook on the terms and conditions for access to and usage of the data from a public directory (*Official Gazette of RS, no. 84/11*)
- Rulebook on obligations of value-added services provider (*Official Gazette of RS, nos. 76/11 and 91/11-corr.*)
- Rulebook on quality parameters for publicly available electronic communication services and monitoring of electronic communication activity (*Official Gazette of RS, nos. 73/11 and 3/14*)
- Rulebook on the minimum content, level of detail and manner of publication of reference offers (*Official Gazette of RS, no. 36/19*)
- Rulebook on the form content for provision of data and manner of data provision on used numbers and addresses from the Numbering Plan (*Official Gazette of RS, no. 34/19*)
- Rulebook on the scope and content of the minimum set of leased lines (*Official Gazette of RS, no. 70/11*)
- Rulebook on the manner of radio stations usage on the national and foreign aircrafts, locomotives, ships and other vessels (*Official Gazette of RS, nos. 60/11 and 68/11-corr.*)
- Rulebook on the manner of monitoring the radio frequency spectrum usage, technical inspection procedure and protection against harmful interference (*Official Gazette of RS, nos. 60/11, 35/13 and 16/15*)
- Decision on designating relevant markets susceptible to ex-ante regulation (*Official Gazette of RS, no. 78/18*)
- Rulebook on manner of amateur radio station usage (*Official Gazette of RS, no. 52/11*)
- Rulebook on the application of the cost-accounting principle, separate accounts and reporting of an operator with significant market power in the electronic communications sector (*Official Gazette of RS, no. 52/11*)
- Rulebook on number portability on public telephone networks at a fixed location (*Official Gazette of RS, no. 52/11*)
- Rulebook on general terms and conditions for performing electronic communication ac-

- activities under general authorization regime (*Official Gazette of RS, no. 58/18*)
- Numbering Plan (*Official Gazette of RS, nos. 32/11, 35/12, 64/13 and 60/16*)
- Rulebook on application form for the issuance of licence for the use of numbering (*Official Gazette of RS, no. 32/11*)
- Rulebook on application forms for the issuance of individual licence for the use of radio frequencies (*Official Gazette of RS, nos. 8/11 and 2/14*)
- Rulebook on fees for the performance of electronic communications activities (*Official Gazette of RS, no. 93/10*)
- Statutes of the Republic Agency for Electronic Communications and Postal Services (*Official Gazette of RS, nos. 125/14 and 30/16*)
- Decision on the dynamics of roaming price reduction (adopted on 25.12.2014 by RATEL's Managing Board, available at www.ratel.rs)
- Decision on the manner of keeping registers, records, data bases and other information within the competence of the Republic Agency for Electronic Communications and Postal Services and publishing thereof on RATEL's website (adopted on 29.9.2017 by RATEL's Managing Board, amended on 29.3.2019, available at www.ratel.rs)

LIST OF BYLAWS WITHIN RATEL'S COMPETENCE (POSTAL SERVICES)

- Rulebook on application form for the issuance of permit for the provision of postal services (*Official Gazette of RS, no. 65/15*)
- Rulebook on quality parameters for the provision of postal services and on the minimum quality standards for the provision of universal postal service (*Official Gazette of RS, nos. 146/14 and 98/17*)
- Rulebook on manner and conditions for the access to the public postal operator's postal network (*Official Gazette of RS, no. 146/14*)
- Rulebook on the methodology of UPS price formation (*Official Gazette of RS, no. 100/11*)
- Rulebook on establishment of tariff categories for UPS (*Official Gazette of RS, nos. 34/10, 58/10, 2/11, 65/11, 21/14, 83/16 and 14/18*)
- Rulebook on requirements for the provision of UPS (*Official Gazette of RS, no. 28/10*)
- Rulebook on general terms and conditions for the provision of postal services (*Official Gazette of RS, nos. 24/10, 58/10, 2/11, 13/11, 65/11, 93/13, 97/15 and 44/18-other law*)
- Rulebook on establishment of costs for permit issuance and annual fee for the provision of postal services (*Official Gazette of RS, no. 89/16*)
- Decision on establishment of limits per weight and per price for the reserved postal services (*Official Gazette of RS, no. 9/11*)
- Technical requirements for residential mailboxes (*Official Gazette of RS, nos. 95/10 and 2/16*)

LIST OF BYLAWS PASSED BY THE LINE MINISTRY AND THE GOVERNMENT OF THE REPUBLIC OF SERBIA AT RATEL'S PROPOSAL PURSUANT TO LAW ON ELECTRONIC COMMUNICATIONS

- Regulation stipulating the Radio Frequency Band Allocation Plan (*Official Gazette of RS, no. 99/12*)
- Rulebook stipulating the radio frequency allotment plan for work in the 1710-1785/1805-1880 MHz frequency bands (*Official Gazette of RS, nos. 112/14 and 125/14*)
- Rulebook stipulating the allotment radio frequency plan for work in frequency bands 791-821/832-862 MHz (*Official Gazette of RS, no. 94/14*)
- Rulebook on analogue to digital TV programme broadcasting switchover and access to multiplex (*Official Gazette of RS, nos. 86/14, 18/15, 30/15 and 50/15*)
- Rulebook stipulating the Radio Frequency Allocation Plan for public electronic communication service provision – broadband wireless access (BWA) systems, mobile/fixed communication networks (MFCN) in the frequency bands 3400-3600 MHz and 3600-3800 MHz (*Official Gazette of RS, no. 10/14*)
- Rulebook stipulating the Frequency/Location/Area Allocation Plan for terrestrial digital TV broadcasting stations in UHF band for the territory of the Republic of Serbia (*Official Gazette of RS, no. 73/13*)
- Rulebook on radio equipment and telecommunications terminal equipment (*Official Gazette of RS, no. 11/12*)
- Rulebook on Universal Service (*Official Gazette of RS, no. 24/12*)
- Rulebook on requirements in terms of staff, equipment and premises of an undertaking, company or other legal entity authorized for measuring and testing the operation of electronic communications networks and services, associated facilities, electronic communications equipment and terminal equipment (*Official Gazette of RS, no. 13/12*)
- Rulebook on stipulating Radio Frequency/Location Allotment Plan for Terrestrial Analogue FM Broadcasting Stations for the Territory of the Republic of Serbia (*Official Gazette of RS, no. 102/16*)
- Rulebook on the manner and conditions for the determination of the zone of the electronic communications infrastructure and associated facilities, protected areas and obligations of investors during the construction of buildings and premises (*Official Gazette of RS, no. 16/12*)
- Rulebook on the technical and other requirements when building associated infrastructure necessary for installing electronic communication network, associated facilities when constructing commercial and residential buildings (*Official Gazette of RS, no. 123/12*)

LIST OF BYLAWS PASSED BY THE GOVERNMENT OF THE REPUBLIC OF SERBIA, PURSUANT TO LAW ON INFORMATION SECURITY

(Official Gazette of RS, nos. 6/16, 94/17 and 77/19)

- Decision on formation of Coordination Body for Information Security Affairs (*Official Gazette of RS, nos. 24/16, 53/17, 79/17, 112/17 and 93/18*)
- Ordinance on children security and protection during use of ICT (*Official Gazette of RS, no. 61/16*)
- Ordinance on detailed content of the special importance IC systems security act, manner of verification and content of reports on special importance IC systems security checks (*Official Gazette of RS, no. 94/16*)
- Ordinance on detailed design of special importance IC systems security measures (*Official Gazette of RS, no. 94/16*)
- Ordinance on establishment of the List of jobs in areas where activities of general interest are carried out and where special importance IC systems are used (*Official Gazette of RS, no. 94/16*)
- Ordinance on provision procedure regarding data, lists, types and importance of incidents and information procedure regarding incidents in special importance IC systems (*Official Gazette of RS, no. 94/16*)
- Ordinance on cryptosecurity and protection against harmful electromagnetic radiation (*Official Gazette of RS, no. 57/19*)

LIST OF BYLAWS PASSED BY THE MINISTRY RESPONSIBLE FOR INFORMATION SECURITY (COMPETENT AUTHORITY), PURSUANT TO LAW ON INFORMATION SECURITY

(Official Gazette of RS, nos. 6/16, 94/17 and 77/19)

- Rulebook on specific requirements for being listed in the Register of autonomous incident handling teams (Special CERTs) (*Official Gazette of RS no. 12/17*)

APPENDIX 2

INDIVIDUAL PERMITS ISSUED FOR RF SPECTRUM USAGE FOR THE PURPOSES OF BROADCASTING SERVICE IN 2019

DIGITAL TV SIGNAL COVERAGE – PUBLIC SERVICE – NATIONAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	JAVNO PREDUZEĆE EMISIONA TEHNIKA I VEZE BEOGRAD (ČUKARICA)	72	72

DIGITAL RADIO SIGNAL COVERAGE – PUBLIC SERVICE – NATIONAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	JAVNO PREDUZEĆE EMISIONA TEHNIKA I VEZE BEOGRAD (ČUKARICA)	6	-

ANALOGUE RADIO SIGNAL COVERAGE – PUBLIC SERVICE – NATIONAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	JAVNO PREDUZEĆE EMISIONA TEHNIKA I VEZE BEOGRAD (ČUKARICA)	9	72

ANALOGUE RADIO SIGNAL COVERAGE – COMMERCIAL SERVICE – NATIONAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	Društvo sa ograničenom odgovornošću za emitovanje radio programa RADIO HIT FM BEOGRAD-Vračar	1	0
2	PRIVREDNO DRUŠTVO ZA PROIZVODNJU I EMITOVANJE RTV PROGRAMA INDEX DOO BEOGRAD	1	0

ANALOGUE RADIO SIGNAL COVERAGE – COMMERCIAL SERVICE – REGIONAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU RADIO SREM SREMSKA MITROVICA - U STEČAJU	1	0
2	ZORAN NIKOLIĆPR, AGENCIJA ZA PROIZVODNJU I RADIO I TELEVIZIJSKIH PROGRAMA STUDIO 101 ZAJEČAR	2	0
3	RTV M DOO KNJAŽEVAC	1	0

ANALOGUE RADIO SIGNAL COVERAGE – COMMERCIAL SERVICE – REGIONAL COVERAGE (BELGRADE)

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	Предузеће за радио-дифузију, маркетинг и услуге “РАДИО ТОП ФМ” ДОО БЕОГРАД	1	0
2	TDI RADIO TELEVIZIJA DOO BEOGRAD	1	0
3	RADIO JAT DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU ZA RADIO DIFUZIJU BEOGRAD (VRAČAR)	1	0

ANALOGUE RADIO SIGNAL COVERAGE – COMMERCIAL SERVICE – LOCAL COVERAGE

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
1	PREDUZEĆE ZA RADIO I TELEVIZIJU, PRODUKCIJU RADIO PULS DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU DESPOTOVAC	1	0
2	PRIVREDNO DRUŠTVO ZA KONSALTING I POSLOVE MENADŽMENTA WIDE SOLUTIONS DOO, Kragujevac	1	0
3	RADIO RUBIN DOO KRUŠEVAC	1	0
4	PRIVREDNO DRUŠTVO ZA RADIO I TELEVIZIJSKE AKTIVNOSTI DUGA-SKY RADIO TELEVIZIJA DUGA DOO, POŽAREVAC	1	0
5	PREDUZEĆE ZA RADIO DIFUZNU DELATNOST TODORVIĆ I DRUGI DOO, LOZOVIK	1	0
6	MILENAVUČETIĆ PR AGENCIJA ZA BEŽIČNE TELEKOMUNIKACIJE PUNDOSAT ARILJE	1	0

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
7	PREDUZEĆE ZA RADIO DIFUZIJU, MARKETING I USLUGE BROADCAST MEDIA GROUP DOO BAJINABAŠTA	1	0
8	PRIVREDNO DRUŠTVO ZA PROIZVODNJU, PROMET I USLUGE DELFIN MARKETING DOO, ZLATIBOR	1	0
9	PREDUZEĆE ZA RADIO-DIFUZIJU RADIO CER DOO, LIPOLIST	1	0
10	RADIO BUBONJA DOO LIPLJE	1	0
11	RTV PRODUKCIJA I MARKETING UB – KOMPANI DOO, BEOGRAD (NOVI BEOGRAD)	1	0
12	INFORMATIVNO PREDUZEĆE RADIO VALJEVO DOO BEOGRAD	1	0
13	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU RADIO 014 VALJEVO	1	0
14	“Ромски Центар за Демократију”	1	0
15	FOX MEDIA DOO PROIZVODNJA, TRGOVINA I USLUGE BEČEJ	1	0
16	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU IMPRES, BAČKA TOPOLA	1	0
17	ZAVIČAJNO UDRUŽENJE FUTOG	1	0
18	RADIO BREG DOO TITEL	1	0
19	ЦЕНТАР ЗА ТРЕНИНГ И ЕДУКАЦИЈУ	1	0
20	UDRUŽENJE GRAĐANA “HELPH”	1	0
21	RADIO-TELEVIZIJA BUJANOVAC D.O.O BUJANOVAC	1	0
22	PRIVREDNO DRUŠTVO RITAM DOO VRANJSK ABANJA	1	0
23	Друштво за услуге пословне активности и трговину “KISS” DOO	1	2
24	ММ PROMENADA 2010 DOOBATOČINA	1	0
25	DRUŠTVO ZA TRGOVINU, UGOSTITELJSTVO I POSLOVNE USLUGE MIG EXTRA DOO SVILAJNAC, BOBOVO	1	0
26	BALTAZAR DOO NIŠ	1	0
27	RADIO-DIFUZNO PREDUZEĆE RADIO MAX FM DOO, JAGODINA	1	0

Ord. no.	Name and seat of the permit owner	Broadcasting station permits	Microwave station permits
28	СРПСКА ПРАВОСЛАВНА ЦРКВА - ЕПАРХИЈА ША-БАЧКА	1	0
29	MEDIJSKI CENTAR KLIK 105 DOO ZRENJANIN	1	0
30	PREDUZEĆE ZA PROIZODNJU, TROVINU I USLUGE REKS DOO KIKINDA	1	0
31	FM&PRESS društvo sa ograničenom odgovornošću Apatin	1	0
32	RADIO IMPULS DOO VAČKAPALANKA	2	0
33	RADIOFANTASIDRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU ZAPRUŽANJE USLUGA VRBAS	1	0
34	ЂАКОВАЧКА И СРЕМСКА БИСКУПИЈА, ВИКАРИЈАТ СРЕМСКИ, УДРУЖЕЊЕ МАРИЈА	1	0
35	PREDUZEĆE ZA INFORMISANJE I TRGOVINU MEGA DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU INĐIJA	1	0
36	УДРУЖЕЊЕ ГРАЂАНА НС ПЛУС	1	0
37	СРПСКА ПРАВОСЛАВНА ЦРКВА - ЕПАРХИЈА СРЕМСКА	1	0
38	EURO ALFA EXPORT-IMPORT DOO SUBOTICA	1	0
39	Фондација "Панонија"	1	0
40	АТОМ-ZONA DOO BEOGRAD (ZEMUN)	1	0
41	ŠTAMPA, RADIO I FILM DOO BOR	1	0
42	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU RADIO HOMOLJE ŽAGUBICA	1	0
43	DOO RADIO 9 KRAGUJEVAC	1	2
44	MILE VLAISAVLJEVIĆ PREDUZETNIK, ZANATSKA RADNJA STOLAR DRVODELJA, KRAGUJEVAC	1	0
45	Привредно друштво RADIO GALAXY 2018 DOO ЛАЗАРЕВАЦ	1	2

APPENDIX 3

OVERVIEW OF REGISTERED OPERATORS

Pursuant to the Law, RATEL is required to keep operator register/records, which is implemented in accordance with the Decision on the manner of keeping registers, records, data bases and

other information within the competence of the Republic Agency for Electronic Communications and Postal Services and publishing thereof on RATEL's website.

Table 1. Number of operators of electronic communications services on 31.12.2019

Service	Registered operators
Public voice service	41
VoIP (Voice Over IP)	26
Internet access and Internet services	192
Media content distribution	73
SMS/MMS transmission	17
VAS (value added service)	39
Data transfer	18
Leased network resources	26
Leased infrastructure	34
Broadcasting and multiplexing	1
Directory	1
Other services	3

Table 2. Number of operators of electronic communications networks on 31.12.2019.

Network	Registered operators
GSM mobile network	3
UMTS mobile network	3
LTE mobile network	3
PSTN (public switched telephone network)	3
CDMA network	2
Cable access network	101
Radio relay transport network	10
Optical transport network	36
Passive infrastructure	50
BFWA (Broadband Fixed Wireless Access)	72
WAS/RLAN (Wireless Local Area Network)	114
SM (satellite network)	1
RR - radio relay (72-76GHz)	1
Other fixed networks	1
Other broadband wireless networks in radio frequency bands under general authorization regime	1

In addition to updating the existing records and creating new ones, there were 194 changes (93 new entries and 101 deletions) made to the register of operators – providers of electronic communications, during 2019:

Services	Number of entries	Number of deletions
Public voice service	5	5
VoIP (Voice Over IP)	1	2
Internet access and Internet services	17	18
Media content distribution	7	16
SMS/MMS transmission	3	2
VAS (value added service)	5	4
Data transfer	2	3
Leased network resources	1	5
Leased infrastructure	5	2
Broadcasting and multiplexing	0	0
Directory	0	0
Other services	0	1
Total	46	58

Networks	Number of entries	Number of deletions
GSM mobile network	0	0
UMTS mobile network	0	0
LTE mobile network	0	0
PSTN (public switched telephone network)	0	0
CDMA network	0	0
Cable access network	17	19
Radio relay transport network	0	0
Optical transport network	7	4
Passive infrastructure	9	3
BFWA (Broadband Fixed Wireless Access)	5	5
WAS/RLAN (Wireless Local Area Network)	9	12
SM (satellite network)	0	0
RR – radio relay (72-76GHz)	0	0
Other fixed networks	0	0
Total	47	43







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REGULATORY AGENCY FOR
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