



SPECTRUM MANAGEMENT IN MONTENEGRO

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Content

Spectrum management in Montenegro:

- I Regulatory frame and mechanisms**
- II Spectrum monitoring**
- III Cross-border frequency coordination**
- IV Spectrum assignement related activities**



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▶ **RF spectrum management - principles and responsibilities of the Agency**

- Law on Electronic Communications ("Official Gazette" no. 40/2013)
- The management and use of RF spectrum as a limited resource based on the principles of **objectivity, transparency, non-discrimination and proportionality**.
- Management of RF spectrum includes **planning, allocation, coordination, monitoring and control of the use** of the RF spectrum.
- RF spectrum is managed by the Agency in accordance with international agreements (ITU Radio Regulations) and the Law .
- The Agency cooperates with international organizations and competent authorities of other countries carrying out the tasks of managing RF spectrum, either independently or through the competent authorities.
- ICS Manager and ICS Telecom software.



▶ **RF spectrum planning – Allocation Plan and Allotment Plans**

- The Plan of allocation of radio frequency bands defines radio frequency bands for individual radio communications services, and basic terms of use of radio frequency spectrum, in accordance with international acts in the field of radio communications.
- The Radio Frequency Allocation Plan is adopted by the Government at the Agency's proposal.
- The Radio Frequency Allotment Plan contains more detailed terms and manner of use of individual radio frequencies pertaining to particular radio communications services within particular radio frequency bands, in accordance with the Radio Frequency Allocation Plan.
- The Radio Frequency Allotment Plan is adopted by the Agency, taking into account the needs and requirements of users, after the completion of the process of public consultation, taking into account the needs of national and public security and defense systems, systems for protection against natural and other disasters, as well as the needs of the emergency and rescue services.



▶ **RF spectrum assignments – right to use radio-frequency**

- Natural and legal persons may use radio-frequencies based on approval issued by the Agency – EKIP.
- Radio-frequencies that may be used without approval under certain condition (general approval), as well as radio-frequencies that may be used without approval but must be notified to the Agency, are determined by the Ministry.
- The exemption is made with institutional body in charge of country defence system, which can use RF without approval, but those that are allocated by the national Plan of allocation for military use, with the obligation to provide information about the use of radio - frequency to the Agency, at its request.
- A transfer of rights to use RF is possible, under certain conditions, with the consent of the Agency



▶ **RF spectrum assignments- issuing approvals for the use of RF**

- Approval for the use of RF upon request is issued for a period of 5 years, or 15 years in the case of the exclusive use
- Approval for the use of RF bands for which in the corresponding adopted allotment plan is determined that these RFs are to be awarded on an exclusive basis on the entire territory of Montenegro for the implementation of electronic communication public networks, or in the case of the use of RFs from the bands where is provided to be limited number of approvals, or where the expressed interest is greater than the available RF resources, are issued on the basis of a public tender.
- Approval for the use of RF for terrestrial broadcasting is issued on the basis of the request, with prior approval for broadcasting of radio and/or television program issued by the regulatory authority responsible for the area of AVM services.



▶ **RF spectrum planning – most important activities**

- Radio-frequency spectrum allocation plan "Off. Gazette of Montenegro", no. 28/14
- Band allocation complies with Article 5 of the ITU Radio Regulation
- Usage of the band harmonized with the European Common Allocation Table
- Technology neutrality intended in bands for mobile EC networks
- Anticipated compliance with the T/R 25-08 for PMR systems in the bands 146-174 MHz and 440-470 MHz, until the expiry of the existing authorization
- Provided harmonisation of channel arrangements for bands 7125-7425 MHz, 7425-7725 MHz and 7725-8275 MHz with the corresponding CEPT/ECC recommendations until 2020 (previously arrangements based on the relevant ITU-R Recommendations were used).



- ▶ **RF spectrum planning – most important activities (cont'd)**
- ▶ The adopted allotment plans for multiple RF bands (in conformity with the relevant CEPT documents):
 - Plan for digital terrestrial broadcasting (T - DAB and DTT in the band 174-230 MHz and DTT in the band 470-862 MHz);
 - Allotment Plan of RF intended for amateur radio service;
 - Allotment Plan of RF from the VHF band (156.00 -162.05 MHz) intended for maritime mobile radio service;
 - Allotment Plan of RF in the band 410-430 MHz for PMR / PAMR systems;
 - Allotment Plan of RF in the band 3410-3600 MHz for BWA systems;
 - Allotment Plan of RF in the band 3600-3800 MHz for BWA systems;
 - Allotment Plan of RF in the band 790-862 MHz for TRA - ECS systems;
 - Allotment Plan of RF in the band 880-915/925-960 MHz for GSM and TRA-ECS systems;



▶ **RF spectrum planning – most important activities (cont'd)**

- Allotment Plan of RF in the band 1710-1785/1805-1880 MHz for GSM/DSC1800 and TRA-ECS systems;
- Allotment Plan of RF in the band 2500-2690 MHz for TRA-ECS systems;
- Allotment Plan of RF in the band 1900-1920 MHz, 1920-1980-2110-2170 MHz and 2010-2025 MHz for TRA-ECS systems;
- Allotment Plan of RF in the band 5925-6425 MHz for fixed service systems;
- Allotment Plan of RF in the band 6425-7125 MHz for fixed service systems;
- Allotment Plan of RF in the band 10,700-11,700 GHz for fixed service systems;
- Allotment Plan of RF in the band 12,750-13,250 GHz for fixed service systems;
- Allotment Plan of RF in the band 14,500-15,350 GHz for fixed service systems;
- Allotment Plan of RF in the band 17,700-19,700 GHz for fixed service systems;
- Allotment Plan of RF in the band 22,000-23,600 GHz for fixed service systems;
- Allotment Plan of RF in the band 24,500-26,500 GHz for fixed service systems;
- Allotment Plan of RF in the band 37,000-38,500 GHz for fixed service systems;



▶ **RF spectrum fees**

- Holder of the approval for use of radio-frequencies pays to the Agency the annual fee for use of radio-frequencies used solely for covering the costs of radio-frequency spectrum management and supervision.
- Methodology and manner of the calculation of the fee is prescribed by the Ministry in Rulebook on the methodology and the method of calculation of annual fees for the use of radio-frequencies. The fees are expressed in points.
- By adopting the financial plan of the Agency, the Parliament approves the amount of total annual costs in management, control and monitoring RF spectrum for the subsequent calendar year, based on which the Agency determines the value of a point in EUROS for each year.

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▶ **RF spectrum fees (cont'd)**

- The holder of the approval for use of radio-frequencies pays to the Government the annual fee for covering the costs for administration of radio-frequency spectrum, which may not exceed 10% of the annual fee for usage of RF.
- In the case of public tender procedures and auctions, the bidders must bid for the spectrum, and the minimal amount of the lump sum fee and the amount of tender guarantee is determined by the Ministry.
- The amount of lump sum fee generated in the public tender procedure is paid to the budget of Montenegro.



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▶ **Control and monitoring of RF spectrum - the competence of the Agency**

- Control and monitoring of the RF spectrum by the Agency, in accordance with the ECA and the relevant international agreements.
- The Agency is in charge to plan, develop and improve the system of control and monitoring of RF spectrum.
- In the process of the control and monitoring of RF spectrum, Agency in particular:
 - Perform the measurement of parameters of respective radio emissions to determine occupancy of individual RF band, according to the ECA and the relevant international agreements;
 - Determine the origin, location and identify illegal radio emissions and sources of harmful interference
 - Perform adequate measurements of radio emission parameters to control the fulfillment of conditions specified in the approval for the use of RF.



▶ **Control and monitoring of RF spectrum – most important activities**

- Provision of MKMS (*Mobile Control-Measurement Station*) in 2006, construction and commissioning of GKMC (*Main Control-Measurement Center*) Dajbabska gora in Podgorica in the end of 2011, RKMC (*Regional Control-Measurement Center*) Crni rt, in Bar in end of 2008 and DUKMS (*Remotely Managed Control-Measurement Station*) in Crljenice in Pljevlja (mid-2010). Agency continued the development of the system by building two more DUKMS one in Bijela Crkva, Rozaje in 2013 and Trojica, Kotor 2014.
- System and equipment which the Agency possesses allows basic monitoring of the RF spectrum to be performed in the range of 9 kHz to 3 GHz - R&S Argus v5.4.1 software.
- The purchase of DMKMS (*Digital Mobile Control-Measurement Station*) mid-2011 provided the possibility to measure the parameters of quality of service and coverage of GSM/UMTS networks, as well as the measurement of the parameters of the TV signal (analog and now DVB – T2). In 2013, the mobile operators agreed measurement route, the parameters of interest and manner of publication of results and the first measurements were made.



- ▶ **Control and monitoring of RF spectrum – most important activities (cont'd)**
- ▶ Voice parameters: Radio Network Unavailability, Telephony Service Non-accessibility, Telephony Setup Time and Telephony Cut-off Call Ratio
- ▶ Data parameters: PDP Context Activation Failure Ratio, FTP Data Success Rate download, FTP Data Success Rate upload, HTTP download data Success Rate, FTP Mean Data Rate download, FTP Mean Data Rate upload, HTTP download Mean Data Rate
- ▶ **The latest measurement** of the parameters of quality of service and coverage of GSM/UMTS/LTE networks was performed in end of 2015 and showed that all mobile operators in Montenegro meet recommended values prescribed in the Rulebook on on the quality of public electronic communication services ("Official Gazette of Montenegro", no. 33/14).



▶ **Control and monitoring of RF spectrum – issue**

- The Agency for Electronic Communications and Postal Services, Ekip has identified extensive use of wireless phones and cameras for video surveillance, as well as baby monitors and alarms that do not work in accordance with the regulations in force in Montenegro and Europe.
- In Montenegro and Europe it is allowed to use DECT standard devices, which operate exclusively in the radio frequency band 1800 - 1900 MHz;
- However, DECT 6.0 standard devices, which is intended to be distributed on the North American market, cordless phones, baby monitors, alarms and wireless cameras operating in the frequency range 1920 MHz - 1930 MHz;
- 1920-1935 MHz - UMTS UL band of one mobile operator in Montenegro.



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▶ **RF coordination – most important activities**

- Signed agreements on RF coordination for FM radio with administrations of Italy, Bosnia and Herzegovina, Serbia and Croatia
- Technical agreement between the national frequency management authorities of Serbia and Montenegro on border coordination of IMT/UMTS systems in GSM bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz;
- Technical agreement between the national frequency management authorities of Serbia and Montenegro on border coordination of IMT/UMTS systems in UMTS bands 1900-1980/2010-2025/2110-2170 MHz;



▶ **RF coordination – most important activities (cont'd)**

- Technical agreement between the national frequency management authorities of Montenegro and Republic of Kosovo on border coordination of GSM/DCS1800 systems in the frequency bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz;
- Technical agreement between the national frequency management authorities of Montenegro and Republic of Albania on border coordination of GSM/DCS1800 systems in the frequency bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz;
- Technical agreement between the national frequency management authorities of Montenegro, Croatia and Bosnia and Herzegovina on border coordination of GSM/DCS1800 systems in the frequency bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz;



▶ **RF coordination – planned activities**

- During next period it is planned to initiate, depending on the willingness of the administrations of neighboring countries, preparation and signing of an agreement on the coordination of RFs in the bands 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz for IMT -2000/UMTS/LTE systems.
- Launching the initiative , and depending on the readiness of RATEL, the preparation and signing of an agreement on the coordination of RF range from 900 MHz and 1800 MHz for GSM / DCS1800 system between MNE and SRB.
- Important aspect of cross-border cooperation



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▶ **RF spectrum assignments – the most important activities**

- Created the entire legal and technical framework for the authorization of the use the RF: ECA (regulations, decisions, approvals forms and decisions).
- In early 2012, after the completion of a public tender procedure (model of closed bids) the remaining spectrum in the bands 900 MHz (blocks of the width 2x5,4 MHz), 1800 MHz (blocks of the width 2x14,4 MHz) and 2100 MHz (blocks of the width of 2x15 MHz) was assigned.
- In order to preserve the competitiveness of the market, **conditional assignment model** was imposed - existing operator who was the winner of the public tender was required to offer to the other two mobile operators in Montenegro the 1/3 of gained spectrum for the 1/3 of the price offered (Telenor, which was ranked first gave over to the Crnogorski Telekom 1/3 of gained spectrum, while MTEL was not interested in the assignment of spectrum under achieved conditions).



- ▶ **RF spectrum assignments – the most important activities (cont'd)**
 - Employing the principle of technological neutrality, and the principle of imposing least restrictive technical conditions (LRTC) in the usage of assigned RF spectrum for mobile EC networks at the request of mobile operators Agency allowed refarming of the spectrum in the bands 900 MHz and 1800 MHz. On the proposal of the Agency, in the bands 900 MHz and 1800 MHz the connection of separate blocks into one continuous block for each operator was performed.
 - As a result of this flexible approach, with the mentioned additional allocation in early 2012, the favorable environment was created for accelerating the development of mobile networks and services in Montenegro.
 - At the moment strong interest in LTE in the band 800 MHz to cover rural and sparsely populated areas.

▶ **RF spectrum usage – current situation**

Band 800 MHz - 2x30 MHz (FDD) – **free**

Band 900 MHz

MTEL: 2 x 9,8 MHz – until April 2022

Telenor: 2 x 13,2 MHz – **until January 2017**

Crnogorski Telekom: 2 x 11,4 MHz – **until January 2017**

Band 1800 MHz

Telenor: 2 x 29,6 MHz - **until January 2017**

MTEL: 2 x 20,0 MHz - until April 2022

Crnogorski Telekom: 2 x 24,8 MHz - **until January 2017**

Band 2100 MHz

MTEL, CT, Telenor: 2 x 15 + 5 MHz - until April 2022

Telenor: 2 x 10 MHz **until January 2017**

Crnogorski Telekom: 2 x 5 MHz - **until January 2017**

20 MHz (TDD) - **free**

Opseg 2600 MHz - 2 x 70 MHz (FDD) + 50 MHz (TDD) - **free**



▶ **RF spectrum MULTIBAND AUCTION**

- The most significant activity in 2015/2016 - **PREPARATION OF THE PUBLIC BIDDING PROCEDURE** for the awarding approvals for the use of available radio-frequencies in the bands 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2.6 GHz for the implementation of a public mobile electronic communication networks – AUCTION in CCA format
- INFORMATION DOCUMENT ON THE PROCEDURE OF AWARDING RADIO-FREQUENCIES IN THE 800 MHz, 900 MHz, 1800 MHz, 2 GHz AND 2.6 GHz BANDS FOR THE IMPLEMENTATION OF PUBLIC MOBILE ELECTRONIC COMMUNICATIONS NETWORKS
- Preauction and main auction phase
- In the preauction phase – some reserved part of the spectrum for existing mobile operators in 900 MHz, 1800 MHz and 2 MHz, and eventually for the new comers to the market in 800 MHz and 2,6 GHz.



▶ **RF spectrum MULTIBAND AUCTION - schedule of activities**

Phase description	Provisional date
Completion of the public consultation process	28 March 2016
Issuance of the Decision on the initiation of the public bidding procedure	First half of April 2016
Deadline for the submission of applications for participation in the spectrum auction	Mid May 2016
Issuance of the Decision on qualified bidders	End of May 2016
Training and MOCK auction	Beginning of June 2016
Start of the auction	Mid June 2016
Issuance of the Decision on the selection of bidders	30 days after the auction completion
Issuance of the approval for the use of radio-frequencies	45 days from the date of the issuance of the Decision on the selection of bidders

- Bids will be submitted using the Electronic Auction System (EAS) provided by the Agency
- Prior to the beginning of the spectrum auction procedure, the Agency will organize a trial (MOCK) auction for the qualified bidders which will allow them to familiarise with the EAS and test their own systems and procedures



▶ **Summary**

The regulatory framework for the management of the RF spectrum in Montenegro is harmonized with EU regulations. Allocation and use of RF is compliant with the relevant ITU-R and CEPT/ECC documents;

- A flexible approach in SM for mobile EC network, through the application of the principles of technological neutrality and the imposition of least restrictive technical conditions (LRTC) contributed in accelerating the development of mobile networks and services in Montenegro;
- In the period after the new ECA came into force the Agency continued on the creation of an efficient and balanced framework for managing RF spectrum in all segments in more efficient way;
- The most significant activity in 2015/2016: the implementation of the tender procedure (multiband auction) for allocation of spectrum for mobile EC networks



**MONTENEGRO
AGENCY FOR ELECTRONIC COMMUNICATIONS AND
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Thank you for your attention

Questions?

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