



AGENCY FOR ELECTRONIC COMMUNICATIONS AND
POSTAL SERVICES



5G IN MONTENEGRO - CURRENT STATUS AND PLANS FOR FUTURE

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- **Content:**
 - **Overview of mobile networks in Montenegro**
 - **RF spectrum for initial 5G implementation**
 - **EKIP's plans regarding 5G**
 - **Spectrum auction 2021**



Overview of mobile networks in Montenegro

- **Three MNOs: Crnogorski Telekom, Telenor and Mtel**
- **Five bands in use: 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2.6 GHz (last spectrum auction: 2016)**
- **Technology**
 - **2G (GSM/GPRS/EDGE)**
 - **3G (UMTS/HSPA+/DC-HSDPA)**
 - **4G (LTE/LTE-Advanced)**
 - **2x2 MIMO, 4x4 MIMO on few sites**
 - **2CA on many sites, 3CA on several sites**
 - **no VoLTE**
- **Voice traffic in cities: <5% by GSM, >95% by UMTS**
- **Data traffic in cities: <0.3% by UMTS, >99.7% by LTE**



Coverage after four years since Spectrum auction

- **GSM: ~ 98.29% of population**
- **UMTS: ~ 97.93% of population**
- **Composite GSM/UMTS coverage (Voice/SMS):
~ 98.3% of population**
- **LTE basic coverage (RSRP \geq -120 dBm):
~ 97.31% of population**
- **LTE (10 Mbps DL) coverage (RSRP \geq -112 dBm):
~ 96.68% of population**
- **Special coverage obligation:
more than 15 rural areas covered**



RF spectrum for initial 5G implementation

Band 694-790 MHz

- suitable for mMTC, eMBB, URLLC
- wide area and deep indoor coverage
- enable operators to roll out 5G quickly and more cost-effectively
- up to 20 MHz FDD/TDD assignments

In MNE:

- Band 700 MHz is free
- Usage for 5G is possible only in northern region due to DTV signals from ALB, ITA and CRO
- **Regional harmonisation** of deadline for release of the band 700 MHz for MFCN is of crucial importance. Predicted deadline not before 30. June 2022.



RF spectrum for initial 5G implementation

Band 3400-3800 MHz

- suitable for eMBB, URLLC, mMTC
- wide area but no deep indoor coverage
- the best compromise between capacity and coverage
- 100 MHz contiguous assignments

In MNE:

- Part of the band 3400-3600 MHz is licenced to BWA until April 2022
- Whole band 3600-3800 MHz is free
- Usage for 5G possible now



RF spectrum for initial 5G implementation

Band 24,25-27,5 GHz

- suitable for eMBB
- addressing specific use cases requiring extremely high data rates
- 800 MHz contiguous assignments

In MNE:

- Band 24,25-27,5 GHz is identified for IMT in 2020
- Band 24,5-26,5 GHz currently is used for fixed links (gradual migration in other bands, depending of market demand for spectrum for 5G)
- Band 26,5-27,5 GHz (1 GHz) is free
- Usage for 5G possible now



EKIP's plans regarding 5G

- **Regulatory framework for spectrum – will be completed in 2020**
 - The new National frequency allocation plan is adopted by GoM – **Q3 2020**
 - Adoption of channel arrangement and LRTC for bands 700 MHz, 3,5 GHz and 26 GHz – **Q4 2020**
 - Cooperation with NRAs in ALB, ITA and CRO regarding deadline for release of the band 700 MHz for MFCN - **ongoing**



EKIP's plans regarding 5G

- **Consultation with stakeholders on 5G (mobile operators, public institution on state and local level, vertical industries, university...) – Q4 2020**
- **Strategy for implementation of 5G mobile networks in Montenegro (doc) – Q1 2021**
- **Guidelines for the authorization of 5G base stations from the aspect of EM radiation – Q4 2021**



Strategy for implementation of 5G mobile networks in Montenegro

This document is expected, inter alia, to identify technological, regulatory, security, spectral and structural challenges, constraints and barriers to the deployment of 5G mobile communications networks and the development of 5G infrastructure, and to provide appropriate **guidance** and **road map** to enable the deployment of 5G mobile networks in Montenegro by the end of 2022 at the latest



Spectrum auction 2021 - activities

- **Next spectrum auction is planned for 2021 – five years after previous**
- **Preliminary consultation with mobile operators (needs, timing, strategy, format, ...) – Q4 2020**
- **Public procurement for consultancy service and auction software – Q4 2020**
- **Information document – Q1 2021**
- **Auction process – Q3/Q4 2021**



Spectrum to be auctioned for 5G

- Band 700 MHz: 2x30 MHz FDD + (?) up to 20 MHz TDD
 - Band 3400-3800 MHz: 400 MHz
 - Band 26 GHz: 1000 MHz
- Licence duration: 15 years (from mid 2022 (?))
 - Block size: 5 MHz or 10 MHz (700 MHz band) (?)
20-100 MHz (3400-3800 MHz band) (?)
200 MHz (26 GHz band) (?)
 - Auction format (CCA, SMRA, other (?))
 - Spectrum caps/floors (?)
 - Coverage requirements (?)
 - ... (?) - **to be defined...**



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Thank you for your attention.

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