5G COUNTRY PROFILE

MONTENEGRO

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Version 1.1

Note: Version 1.1 of this document is an advanced draft for possible additional inputs, comments, feedback. The final version of the document is planned to be released after the ITU Regional Forum for Europe.

1. ICT background and current status of broadband

The electronic communications, information, and communication technologies sectors in Montenegro are regulated by the 2013 Law on Electronic Communications. This law has been enacted to ensure that telecommunication services are provided to Montenegrin users at fair prices, with the adequate stimulation of market competition and reduction of monopolies when it comes to high-speed Internet access.[1] Stakeholders from both the public and private sectors are working together to implement strategic objectives in order to leverage the potential of digital technologies in the country.[2] Following independence and the accession process to the European Union and the telecommunication acquis, the telecommunication sector has grown increasingly independent and competitive, marked by significant financial investments by the country's telecom operators.[3] With many government-led initiatives—such as the Strategy for the Information Society Development (2016-2020) and Strategy of Innovative Activity (2016-2020)—Montenegro has improved the overall ICT sector and the state of broadband throughout the country. In the 2017 ITU ICT Development Index (IDI), Montenegro ranks 61th out of 176 countries.[4]

The Strategy for the Information Society Development (2016-2020) encompass three major components: I) Infrastructure; II) Cybersecurity; and III) E-economy, which involves e-business, e-inclusion, e-government and research, and innovation and development in the field of ICT. Harmonized with the Digital Agenda for Europe by 2020, the strategic priorities for ICT and broadband development in Montenegro include the following:[5]

- Expansion of broadband access by reaching:
    - 100% of the population with basic broadband coverage by 2018;
    - 100% of the population with fast broadband coverage (30Mbit/s or more) by 2020;
    - 50% of households with ultra-fast broadband usage (100 Mbit/s or more) by 2020;
- Strengthening capacities of the National Computer Incident Response Teams (CIRT) for protection, prevention and combat against Internet incidents, elevating the number of team experts to 20 by 2020;
- Improvement of the structure of local CIRTs;
- The percentage of ICT graduates in the total number of the graduating class should amount to 10% by 2020;
- The number of European Computer Driving Licence (ECDL) certification issues should reach 15.000 by 2020;
- The share of ICT in GDP should reach 6%, which will be reflected in economic growth and job creation in other sectors of the economy;
- The share of e-commerce in total commerce should reach 1.5%;
- In the context of e-education, the computer-student proportion should be 1:10 by 2020;

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[1] See:
http://www.mid.gov.me/ResourceManager/FileDownload.aspx?rid=148089&rType=2&file=Law%20on%20Electronic%20Communications%20ispravka.pdf

[2] See: https://www.itu.int/dms_pub/itu-d/opb/inno/D-INNO-PROFILE.MONTENEGRO-2020-PDF-E.pdf

[3] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf

[4] See: https://www.itu.int/net4/ITU-D/idi/2017/index.html

[5] See: http://www.mid.gov.me/ResourceManager/FileDownload.aspx?rid=251855&rType=2&file=StrategijaMID_finalENG.pdf

- The percentage of teachers trained to work on computers should be 30% of the total teaching staff, whilst the percentage of the teachers skilled in the field of cyber security should be 20% of the total number of the teaching staff;
- The percentage of e-prescriptions and e-referrals issued should reach 60% out of all medical prescriptions issued. Online medical appointments should surpass the traditional appointments and reach 70% of the total number of appointments;
- The elimination of the digital divide between urban and rural areas;
- The elimination of the income-based digital divide, and the divide based on social and demographic characteristics;
- The percentage of citizens who use e-services should be 50%;
- The percentage of legal entities using e-services should be 30%;
- The percentage of scientific and research institutions in the field of ICT should reach 30%.

Montenegro has complied its regulatory and legislative framework in the field of ICTs with EU regulations. The government admits that the legal framework has been implemented thoroughly, thus providing operators with a more stable business environment, which benefits domestic customers as they now can access providers and telecom services at affordable prices.[6]

In 2019, the European Union awarded 600,000 EUR to Montenegro at the 20th meeting of the Management Board of the Western Balkans Investment Framework on June 25-26, 2019 to fund the "Broadband Infrastructure Development in Montenegro" (PRJ-MNE-DII-001), which is currently being implemented.[7]Based on the complete mapping process of the infrastructure, the goal of this project is to analyse the current situation and examine the potential of the market to eliminate the existing infrastructural gap. There are three expected results and benefits:[8]

- Increase broadband coverage and availability of new generation broadband networks to the currently uncovered (mostly rural) areas in Montenegro;
- Offer an adequate infrastructure for fast and secure internet to all households, businesses, educational and health institutions in order to support the digital transformation of society and economy;
- Increased the percentage of households passed with NGA (Next Generation Access) network from 70% to 95%.

2. Broadband and mobile telecommunication sectors data

ITU data shows that 73.50% of individuals in Montenegro had access to the Internet in 2019.[9] In 2010, that percentage was 37.50%. In 2018, the number of fixed-broadband subscriptions per 100 inhabitants

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[6] See: https://unctad.org/meetings/en/Contribution/tdb_ede2018_c12_Montenegro_en.pdf
[7] See: https://balkaneu.com/eur-600-000-for-the-montenegro-digital-infrastructure-sector/
[8] See: https://wbif.eu/project/PRJ-MNE-DII-001
[9] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/Individuals_Internet_2000-2018_Dec2019.xls for 2018 data. Data for 2019 data will be made available by ITU soon.

corresponded to 28.80.[10] From the regional perspective, Europe's average fixed-broadband basket cost was 1.5 percent of the GNI per capita in 2018, while Montenegro's fixed-broadband basket cost corresponds to 1.8 per cent of the GNI per capita for unlimited Internet data cap at 2 Mbps[11] for 2019.[12] The country's mobile-data basket cost corresponded to 0.8 per cent of the GNI per capita in the same year for a monthly allowance of 1.5 Gb, which is the same as the European region's average for the same.[13]

The north region of Montenegro remains the least connected, having about 64.8% of the households with some kind of Internet use.[14] The same data report also show that while 80% of households in urban areas were connected in 2019 (representing 3.7% increase compared to 2018), the percentage for rural areas was 62.8%. In terms of household connectivity, data from country's State Statistical Office show that 74.3% of the surveyed households had access to the Internet in 2019, which represents an increase of 2.1% in relation to the previous year.[15]

In 2019, the number of active mobile-cellular subscriptions per 100 inhabitants corresponded to 183.28,[16] while the mobile-broadband subscriptions were equivalent to 80.50.[17] In 2019 alone, the percentage of households connected via mobile increased by 5.1% when compared to 2018. Three mobile network operators (MNOs) secure spectrum in multi-band auction in Montenegro: Crnogorski Telekom (T-Mobile Montenegro), M:tel, and Telenor Montenegro. In terms of the quality of mobile networks, Montenegro's the Agency for Electronic Communications and Postal Services (EKIP) has recently made public that Crnogorski Telekom's mobile network offers the highest download speed in urban areas, at 47.5Mbps, followed by Telenor (43.5Mbps) and M:tel (22.5Mbps).[18] As of 2019, 4G/LTE networks cover 97.65% of the population of Montenegro,[19] with an average download speed of 10 Mbps.[20] 3G coverage is available to 98% of Montenegro's population.[21] In 2019 alone, the mobile-broadband Internet traffic within the country was equivalent to 0.041 exabytes.[22]

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[10] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/Fixed_broadband_2000-2018_Dec2019.xls

[11] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2019/ITU_ICTpriceTrends_2019.pdf

[12] See: 2019 Annual Report - Agency for Electronic Communications and Postal Services (EKIP), Montenegro

[13] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2019/ITU_ICTpriceTrends_2019.pdf

[14] See: https://www.monstat.org/userfiles/file/ICT/2019/ICT%20USAGE%20IN%20HOUSEHOLDS%20IN%202019.pdf

[15] See: https://www.monstat.org/userfiles/file/ICT/2019/ICT%20USAGE%20IN%20HOUSEHOLDS%20IN%202019.pdf

[16] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/Mobile_cellular_2000-2018_Dec2019.xls

[17] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i911mw")

[18] See: https://www.commsupdate.com/articles/2019/04/26/ekip-publishes-report-on-4g-coverage-and-speed/

[19] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i271GA")

[20] See: https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2019/Regulatory%20Forum/3.%20EKIP.pdf For more information please consult http://www.ekip.me/zastita/kvalitet.php (only Montenegrin language)

[21] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i271G")

[22] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i136mwi")

3. Current progress on 5G: consultations and national strategies

As of 2020, there is no public information regarding national strategies for Montenegro's 5G development. However, EKIP is set to launch a 5G roadmap with national strategies and goals by the end of 2020, with an eye on holding spectrum auctions for assigning radio frequencies in the second half of 2021.

Alongside the national strategy for the implementation of 5G, EKIP plans to elaborate a new regulatory framework for spectrum, which is set to be completed by the end of 2020. This will be based upon consultation with stakeholders on 5G pilot projects (MNOs, public institutions at both state and local levels, as well as vertical industries, and universities). EKIP predicts an information document to come out in the first quarter of 2021, with an auction process to occur in the third quarter of the same year — five years after the previous one.[23]

4. Spectrum assignment for 5G & market development

In the past years, the country's major telecom operators have continued to modernize and upgrade their networks, reaching a total investment of 91.5 million EUR in 2018 and 78 million EUR in 2019 for the country's electronic communications sector.[24] In particular, the fibre sector in Montenegro, which is critical in terms of backhaul to supporting 5G development, has shown particularly strong growth since 2010 as the incumbent has invested in infrastructure upgrades, albeit mainly to serve apartment blocks in the main towns.[25]Between 2017 and 2018, for example, an increase of 36.04% has been observed in the number of users who accessed Internet via optical fibres (between 2018 and 2019 increase was 32.77%), followed by an increase in overall Internet data traffic.[26]

In terms of mobile network signal, Montenegro can be compared to the most developed countries in Europe. By the end of 2018, 97% of the populated areas were covered by 4G networks offered by two operators.[27] At the end of 2019, more than 97% of the populated areas were covered by 4G network offered by Crnogorski Telekom, about 97% covered by 4G network offered by Telenor, and about 94% covered by 4G network offered by M:tel. In the past years, quality and availability of mobile broadband services of data transmission were much improved in urban and rural areas, mostly thanks to increased LTE coverage of all three mobile operators and introducing LTE-Advanced technology (2CA & 3CA) with LTE carrier aggregation from two or three bands on a large number of locations.[28] As a result, the wide availability of LTE has made mobile broadband a viable alternative to fixed-line broadband access in many of the country's rural areas.

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[23] See: https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2019/Regulatory%20Forum/3.%20EKIP.pdf
[24] See: http://www.ekip2.me/download/izvjestaji/oradu/AnnualReport2018.pdf
[25] See: https://www.marketresearch.com/Paul-Budde-Communication-Pty-Ltd-v1533/Montenegro-Telecoms-Mobile-Broadband-Statistics-13202843/
[26] See: http://www.ekip2.me/download/izvjestaji/oradu/AnnualReport2018.pdf
[27] See: http://www.ekip2.me/download/INFOFEST2019/prez/S4/1.%20NGA%20Development%20-EKIP-Infofest%202019_v1.pdf
[28] See: http://www.ekip2.me/download/izvjestaji/oradu/AnnualReport2018.pdf

The last spectrum auction in Montenegro took place in 2016. Currently, there are five bands in use by three MNOs: 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2.6 GHz. With 15-years licenses starting from mid-2022, the spectrum to be auctioned for 5G in Montenegro in 2021 are: I) Band 700 MHz: 2x30 MHz FDD + up to 20 MHz TDD; Band 3400-3800 MHz: 400 MHz; Band 26 GHz: 1000 MHz.EKIP articulates the following current configuration for RF spectrum for initial 5G implementation in Montenegro:[29]

Band 694-790 MHz:
- The 700 MHz band is free;
- Usage for 5G is possible only in northern region due to DTV signals from ALB, ITA and CRO;
- Regional harmonisation of the deadline for release of the band 700 MHz for MFCN is of crucial importance. Predicted deadline not before 30 June 2022;

Band 3400-3800 MHz:
- Part of the 3400-3600 MHz band is licenced to BWA until April 2022;
- The whole 3600-3800 MHz band is free and can now be used for 5G;

Band 24,25-27,5 GHz:
- Band 24,5-26,5 GHz is currently used for fixed satellite links (gradual migration in other bands, depending of market demand for spectrum for 5G);
- Band 26,5-27,5 GHz (1 GHz) is free and can now be used for 5G.

As a 5G-related strategy, EKIP and Albania's Audiovisual Media Authority (AMA) have signed a memorandum of understanding in 2019 to cooperate in the area of radio frequency spectrum management harmonisation.[30]The agreement focuses on the 700MHz band. Both EKIP and AMA expressed their readiness to intensify work to migrate Albanian digital television frequencies from the 470MHz-694MHz band to release the 700MHz band for use by mobile telecom networks.

In July 2020, EKIP has determined that the Crnogorski Telekom (CT) must cut the cost of calls from its fixed network to mobile and fixed networks by 10% and 5% respectively. EKIP has also examined the relative market dominance of the country's operators alongside their pricing models. Following this, it has ordered CT, Telenor and m:tel to lower their wholesale call termination fees by 11.8% for mobile networks and 15.5% for fixed networks.[31]

5. Electromagnetic fields levels and the implementation dynamics
Allowed Electromagnetic Field Levels in Montenegro are set by the ministry responsible for environmental protection, which is the Ministry of Sustainable Development and Tourism. According to the "Rules on the limits of exposure to electromagnetic fields" adopted 2015,[32] in Montenegro limits recommended by

[29] See: https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2019/Regulatory%20Forum/3.%20EKIP.pdf
[30] See: https://seedig.net/seesummary-june-2019/
[31] See: https://www.developingtelecoms.com/telecom-business/telecom-regulation/9698-montenegro-regulator-tells-crnogorski-telekom-to-cut-call-prices.html
[32] See: http://www.ekip.me/download/RTTE/Pravilnik_o_granicama_izlaganja_elektromagnetnim_poljima%206-2015.pdf

relevant ICNIRP guidelines for general public exposure, and half of them for sensitive areas (schools, hospitals, kindergartens and buildings in which people live) are applicable.

6. 5G commercial launches: announcements, trail cities, and digital cross-border corridors

As of 2020, there have been no announcements related to 5G commercial launches in Montenegro. Nevertheless, EKIP has anticipated that 5G mobile network will not be commercialized before 2022.[33]The regulator also informed the press that operators have expressed an interest in conducting 5G trials in 2020.[34] For the near future, EKIP claimed that the country's mobile operators are keen to carry out 5G pilot projects 2020, which will provide an opportunity to showcase the technology's benefits to the public and businesses.[35]

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[33] See: https://www.vijesti.me/vijesti/drustvo/431051/5g-stize-u-crnu-goru-za-dvije-godine
[34] See: https://www.developingtelecoms.com/telecom-technology/wireless-networks/9461-montenegro-eyeing-5g-rollout-in-2022.html
[35]See: https://www.commsupdate.com/articles/2020/04/21/5g-to-launch-in-montenegro-by-end-2022/