5G COUNTRY PROFILE

BOSNIA AND HERZEGOVINA

Version 1.1

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1. ICT background and current status of broadband

In 2003, Bosnia and Herzegovina approved the first national law specifically targeting communication-related affairs, with a particular focus on electronic communications and ICTs. 2018 ITU Measuring Information Society as well as ITU's Digital Innovation Profile for Bosnia and Herzegovina show that hard infrastructure in the country is quickly evolving—there are fixed and mobile broadband connectivity in rural areas as well as in town and cities.[1] Moreover, competition in the telecommunication market as well as pro-growth regulatory measures have impacted the overall progress of services in the country.[2] In the 2017 ITU ICT Development Index, the country ranks 49th out of 176 countries.

One of the country's milestones in ICT has been the adoption of the Policy of Electronic Communications Sector of Bosnia and Herzegovina 2017-2021,[3] which is aligned with the Digital Agenda of Europe.[4] This policy elaborates on the measures and the activities that will lead to their implementation, including the maintenance of market competitiveness that increase service quality and promote price reduction, as well as an expansion of broadband infrastructure in less developed and populated areas.[5] Additionally, it identifies support for the ICT sector and innovation as a central element in driving the country's economy forward on a range of fronts—enhancing competitiveness within Europe, increasing productivity and efficiency in business, and improving public and e-government services. This policy's action plan includes the following measures: [6]

- Construction of broadband networks that will enable high-speed transmission and provision of new services, thus ensuring reliable access to multimedia and interactive content;
- Stimulate the application of broadband wireless access networks in rural areas to reduce the digital divide among the population;
- Encouraging the development of digital content and services as well as translating conventional content into digital format;
- Harmonization of EC and media regulations that will be technology-neutral and easier convergence of information society and media services;
- Ensuring technical preconditions for the implementation of broadband Internet access to all users, especially schools and educational institutions;
- Improving cooperation with all scientific institutions in the country while and enabling their cooperation on important projects for the development of the information society as well as other projects of common interest; and
- Involvement and active participation of Bosnia and Herzegovina in international projects related to broadband access.

[1] See: https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf
[2] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf
[3] See: http://www.sluzbenilist.ba/page/akt/WBr1TX3CmYY=
[4] See: https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/20190529-bosnia-and-herzegovina-analytical-report.pdf
[5] See: http://mkt.gov.ba/saopstenja/default.aspx?id=5751&langTag=en-US
[6] See: http://www.sluzbenilist.ba/page/akt/WBr1TX3CmYY=

The country has introduced the 4G network in 2019 but lacks a national broadband strategy, which remains one of the most pressing issues for the development of broadband in the country in terms of market competitiveness and growth in the ICT sector.[7] Furthermore, an assessment by the European Commission argues that the policy for 2017-2021 is a prerequisite for the further development of the regulatory framework on radiofrequency.[8] Recommendations from the European Union highlighted that efforts should be made to further align this policy with the EU digital single market strategy as well as the Digital Agenda for the Western Balkans. Another point addressed is the need of improving the collection of statistical data on digital performance and digital competitiveness to critically assess Bosnia and Herzegovina in contrast to some of the existing compliances of the EU rules pertinent to electronic communications services.

2. Broadband and mobile telecommunication sectors data

Bosnia and Herzegovina's Agency for Statistics shows that in 2018 alone, 70.12% of individuals in the country had access to the Internet.[9] In 2010, the data estimate for Bosnia and Herzegovina was 42.75% and, in 2000, only 1.08%. Despite the existing ICT divides still present, the data estimates show a significant increase in terms of Internet penetration over the years, particularly from 2013 onwards.

In 2019, the number of fixed-broadband subscriptions per 100 inhabitants was 22.60.[10] According to the Communication Regulatory Agency (RAK), Bosnia and Herzegovina currently has 67 Internet service providers.[11] In 2019, ITU data show that the proportion of households with Internet access at home was 72%,[12] which is similar to what is found in other countries in the Western Balkan region. From the regional perspective, Europe's average fixed-broadband basket cost was 1.5 percent of the GNI per capita in 2019 (and the CIS region was 3.7 per cent), while Bosnia and Herzegovina's corresponded to 2.5 per cent for unlimited Internet data cap.[13] RAK data also show that dominant type of Internet access remains xDSL, which accounted for 56.83% percent of total broadband subscribers, followed by cable access with 33.41%.[14] The regulator also stated that further liberalization of the market of telecommunications and the introduction of new technologies are expected in the upcoming years.

Concerning the mobile sector, Bosnia and Herzegovina had a penetration of 111.91 mobile-cellular subscriptions per 100 inhabitants in 2019,[15] while the number of active mobile-broadband subscriptions corresponded to 59.13.[16] The country's mobile-data basket cost corresponded to 1.5 per cent of the GNI per capita in the same year for a monthly allowance of 2.0 Gb, while the European region's average was

[7] See: https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/20190529-bosnia-and-herzegovina-analytical-report.pdf
[8] See: https://data.consilium.europa.eu/doc/document/ST-8544-2019-INIT/en/pdf
[9] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/Individuals_Internet_2000-2018_Dec2019.xls
[10] See: https://www.itu.int/net4/ITU-D/icteye/#/countries
[11] See: https://www.ripe.net/participate/forms/uploads/fobi_plugins/file/see8/20190415%20-%20CRA%20BH%20-%20Regulatory%20Challenges%20in%20the%20Internet%20space%20in%20BiH_c84b20b9-cdcc-4c16-bd10-faecff78b36f.pdf
[12] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/CoreHouseholdIndicators.xlsx
[13] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2019/ITU_ICTpriceTrends_2019.pdf
[14] See: https://www.sarajevotimes.com/bh-communications-regulatory-agency-issues-report-on-number-of-internet-users/
[15] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i911")
[16] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i911mw")

0.8 per cent (and the CIS region was 2.2).[17] In terms of coverage, 3G covered 96% of the population in 2019, while 4G/LTE's coverage covered 82% of Bosnia and Herzegovina's population.[18]

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

The market development section of the Policy of Electronic Communications Sector of Bosnia and Herzegovina 2017-2021 states the implementation and development of new technologies that enable wireless broadband access to a large number of potential users throughout the country will be encouraged.[19] However, the government plans to provide the necessary frequency bands in order to enable wireless broadband access in urban, suburban and rural areas in the country, while respecting the principle of technology neutrality.

With 4G trials started in 2014, the decision on the conditions for the provision of 4G network services in the country was adopted in March 2019 by the Council of Ministers and the licenses were issued by RAK, thus enabling existing mobile operators BH Telecom d.d. Sarajevo, Telekom Srpske a.d. Banja Luka and JP Hrvatske telekomunikacije d.d. Mostar to market the service since April 2019.[20] Adopting the decision, the Counsel of Ministers' aim was to complete 4G coverage by licensing at a low price and demanding stricter requirements to reduce the length of the investment cycle and enable to start the 5G investment cycle earlier.[21] Coverage obligations, specifying territorial and main roads coverage, have been set for periods 1/3/5 years of operation. In the context of 4G development, there has not been particular reference to 5G yet. However, the decision prescribed allocation of 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHZ spectrum on technology-neutral basis, thus giving the operators possibility even to deploy 5G technology in the available frequency ranges.

Recent public statements by RAK show a positive outlook toward the development of 5G in the country in the context of business opportunities and services for smart cities.[22]

4. Spectrum assignment for 5G & market development

RAK highlights that the volume of investment in the 5G network requires multimillion funds and that the success of 4G implementation will directly shape the development of 5G. Given the late adoption of 4G and the potential delay for effective development of 5G infrastructure and regulation, very little information is public concerning the additional spectrum assignment for 5G.

In April 2019, Bosnia and Herzegovina's major telecom operators - BH Telecom d.d. Sarajevo, Telekom Srpske a.d. Banja Luka and JP Hrvatske telekomunikacije d.d. Mostar —announced they would start

[17] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2019/ITU_ICTpriceTrends_2019.pdf
[18] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i271G and i271GA")
[19] See: http://www.sluzbenilist.ba/page/akt/WBr1TX3CmYY=
[20] See: https://www.sarajevotimes.com/bihs-major-telecom-operators-to-start-implementing-4g-network-in-april/
[21] See: https://archive.vn/ovyVM#selection-3793.111-3793.149
[22] See: https://ba.ekapija.com/people/2864850/aleksandar-mastilovic-savjetnik-direktora-rak-a-5g-je-samo-protocna-tacka-u

implementing 4G network in the cities of Sarajevo, Banja Luka and Mostar, after obtaining 15-year licensees from the Council of Ministers. Through that agreement the government recognized the importance of 4G for state budget and investments in network infrastructure of mobile operators will, including the introduction of new services, all in the best interest of end-users. The plan was that more than 40% of Bosnia and Herzegovina's territory would be covered by 4G networks in 2020 and 75% by 2024. The licenses also pointed that allocated frequencies for 4G would allow coverage of rural areas with lower population density, and operators will be able to plan the development of their networks more efficiently.[23]

Telecom operators were obliged to pay a fee of 17.5 million KM (10.06 million U.S. dollars) into the budget of the country's institutions between the early implementation period between 2019-2023.[24] In this way, 4G licensing paved the way for the transition conditions to 5G.[25]

BH Telecom claimed that the company adopted a master plan for the implementation of 5G back in 2017.[26] BH Telecom also made it explicit that its investments during 2019 on 4G and 5G have been higher than the three previous years. In particular, replacement of the broadband infrastructure during 2019 has opened door for testing and pre-commercial trials of 5G network. Similarly, HT Mostar claimed that the company already started fulfilling the procedures related to the introduction of 5G networks.

5. Electromagnetic fields levels and the implementation dynamics

Bosnia and Herzegovina has no specific guidelines for the limit levels of electromagnetic fields for 5G yet, as only one operator started testing 5G networks, while others are focusing primarily on the continuity of 4G expansion in the country.

Despite that, RAK has adopted the Rule on Restricted Electromagnetic Radiation—which implies that all users of the radio spectrum, which include not only telecom operators, must harmonize the operation of their systems in accordance with this rule. The Rule on Restricted Electromagnetic Radiation refers to level limits from valid international recommendations such as ITU K.83, ICNIRP (2020) and IEEE C.95-1.

In addition to that, the RAK is preparing a campaign to check the technical parameters of licensees in terms of protecting the general population from potential harmful effects. RAK's plan is also to provide transparent information to the public about the current electromagnetic exposure as the early phases of 4G and 5G in Bosnia and Herzegovina continue to take shape.[27]

[23] See: https://rak.ba/en/news/613
[24] See: https://www.sarajevotimes.com/bihs-major-telecom-operators-to-start-implementing-4g-network-in-april/
[25] See: https://docs.rak.ba/documents/d0e3f02b-c260-42e2-953f-e55919d33762.pdf
[26] See: https://hayat.ba/evo-kada-ce-bh-telecom-uvesti-5g-mrezu/5359/
[27] See: https://startbih.ba/clanak/5g-mreza-i-zdravlje-rak-priprema-servis-u-cilju-informisanja-javnosti-o-trenutnom-elektromagnetnom-zagadenju-u-bih/126358

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

A few months after the 4G kick-off, in August 2019, Sarajevo-based BH Telecom—along with its partners Huawei, Ericsson, and Samsung—presented the 5G networks capabilities, including opportunities and applications of new technologies.

While 4G has not been fully provided throughout the country, BH Telecom has claimed that the investments in infrastructures enabled the research and development of 5G network, although RAK had previously informed that telecom operators would likely need to wait until 2024 to return the investment from 4G for the infrastructural development for 5G networks.[28]

In May 2019, national media coverage has reported that BH Telecom has successfully tested 5G technology, achieving downlink speeds of 1.4Gbps in Sarajevo.[29] BH Telecom announced the development in a press release, noting that the test had taken place in a multi-vendor environment, becoming the first operator in Bosnia and Herzegovina to test 5G technology. On that same occasion, BH Telecom made it public that the company hopes to use 5G technology to support the production and distribution of audio-visual content, in cooperation with TV companies in the country. No additional activities were carried out on the expansion or commercialization of the 5G network by the company ever since.

Without revealing a specific timeline for commercial rollout, BH Telecom informed that such a development would arrive when the demand was sustainable for the business model in place and upon appropriate regulatory measures. BH Telecom also did state its intention to utilize 5G to provide a fixed wireless access (FWA) service in rural areas. In face of the COVID-19 pandemic, BH Telecom also reiterated that 5G would help open up new business opportunities while also helping bridge the existing divide between rural and urban areas.[30]

In face of the wave of misinformation surrounding the 5G development, BH Telecom issued in August 2020 a press release informing the public that the operator does not have a 5G base unit installed on its base stations in Bosnia and Herzegovina, nor does it install equipment and base stations without notice.[31]

[28] See: https://www.sarajevotimes.com/bh-telecom-claims-it-is-technologically-ready-to-launch-5g-network/
[29] See: https://www.youtube.com/watch?v=f55m5paA0hw
[30] See: https://www.oslobodjenje.ba/vijesti/bih/testirana-5g-mreza-u-bih-ova-mreza-ce-omoguciti-gigabitne-brzine-na-cijelom-podrucju-nase-zemlje-557304
[31] See: https://www.sarajevotimes.com/bh-telecom-issues-important-notice-about-installation-of-5g-base-stations/