5G COUNTRY PROFILE

PRINCIPALITY OF MONACO

© ITU October 2020

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

Monaco has a strong ICT sector characterized by the majority of its population being connected to the Internet. The government continues to prioritize the roll-out of fixed and wireless Next Generation Access (NGA) networks and the deployment of Monaco Telecom's own mobile network to support ICT development in the country.[1] In the 2017 ITU ICT Development Index, Monaco ranks 19th out of 176 countries.

Unlike most countries in the European region, there is no independent telecommunication regulator in Monaco, but the Department of Platforms and Digital Resources which is part of the Government's General Secretariat, is charged with regulating the telecommunication market in the country.

Monaco does not have a national broadband strategy, but in April 2019 the government implemented "Extended Monaco: Smart Principality" programme as the Monegasque model to the digital world. Led by a cross-disciplinary authority, the Digital Transition Office, the program's overarching vision combines the positive affordance of digital technology and link them matters of public policy and sustainable economic development until 2022. In other words, the program sets out to take advantage of the enormous potential offered by digital technology and ensure that it directly benefits the Monegasque population.[2]

It is the government's view that by liberating Monaco from its territorial constraints, digital technology is an opportunity to embark on a new development cycle and to play a more prominent role alongside other global cities.[3] The areas of interest covered by the "Extended Monaco" include smart city, e-health, e-education, infrastructures, fintech, and initiatives related e-government.[4] The "Extended Monaco" programme is based on three main pillars: I) enhancing quality of life; II) inaugurating a new cycle of economic prosperity; and III) boosting the value of the civil service.

In terms of digital-driven economic growth, the programme focuses on the following strategies and actions:[5]

I) Give companies in the Principality a framework that is conducive to capturing all the potential of digital technology:
- By equipping itself with large digital infrastructures such as 5G and fibre throughout its entire territory;
- By guaranteeing security and sovereignty;
- By adapting Monaco's legislative framework to facilitate the development of digital technology;
- By adapting legislations. Three laws, in particular, were enacted in 2019, enshrining the blockchain, digital identity and digitization concepts;

---

[1] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume2.pdf
[2] See: https://monaconow.com/extended-monaco-the-principality-in-the-digital-world/
[3] See: https://extendedmonaco.com/wp-content/uploads/2019/10/1014_DVCO_1904152_PDF_Telechargeable_GB_SR.pdf
[4] See: https://extendedmonaco.com/wp-content/uploads/2019/10/1014_DVCO_1904152_PDF_Telechargeable_GB_SR.pdf
[5] See: https://extendedmonaco.com/wp-content/uploads/2019/10/1014_DVCO_1904152_PDF_Telechargeable_GB_SR.pdf

- By adopting a Strategic State approach, with for example the Monaco Government initiating and driving digital technology-based economic growth initiatives or attracting digital and industrial partners;

II) Boost and perpetuate the Principality's current economic model:

- By contributing to the Principality's event strategy, for example by increasing the impact of key events such as the Grand Prix or the Yacht Show;
- By encouraging companies that enjoy a monopoly (SBM, SMEG, Monaco Telecom, CAM, etc.) to develop new services via digital technology;

III) Creating new, highly targeted growth drivers for the digital sector in the Principality:

- By focusing on the technologies of the future in tandem with leading sectors in Monaco (Real Estate, Wealth Management, Luxury, Yachting, Sport, Business Tourism) via the creation of financing structures or the setting up of dedicated startups through Monaco Tech, Monaco's business incubator;
- By Attracting innovative and ethical companies through new funding methods such as Initial Coin Offerings.

Additionally, in the context of the COVID-19 global pandemic, the Ministry of State recently announced that the government is working on a digital resilience strategy. To succeed in such a strategy, the Principality will need to build new infrastructure, create and provide access to a local and international digital ecosystem and develop services that ensure continuity for public policies. This action plan will have three main strands: I) Developing digital infrastructure, including telecoms networks and the cloud; II) Optimising digital technology for use by private users and businesses (smartphone equipment rate, availability of electronic signatures and stamps, e-commerce platforms, etc.); and III) Improve the State's digital maturity (education, health, government, cybersecurity, etc.).[6]

2. Broadband and mobile telecommunication sectors data

ITU data shows that 97.05% of individuals had access to the Internet in 2017 in Monaco[7] and in 2019 77.8% of main residencies in the country had some form of Internet access.[8] In 2010, the ITU data for the country was 75% in 2010 and, in 2000, 36.52%. In 2019, the number of fixed-broadband subscriptions per 100 inhabitants was 52.55.[9] While the 2019 ITU Measuring Digital Development ICT Price Trends report does not provide basket cost for the fixed-broadband indicators because the GNI per capita data on Monaco are not available, an unlimited monthly data cap of data traffic costs about 47.23 USD in 2019.[10]

Through an agreement with the Principality of Monaco, Monaco Telecom (a member of Eurecom in France) holds the monopoly of landline telephone services, fixed-Internet access, and TV services. In the past, the telephone network used to be fully owned by the state, which currently owns 45% of it.[11] Additionally, Monaco Telecom is aiming to equip 100% of eligible buildings with fibre-optic cables by the

[6] See: https://extendedmonaco.com/en/project/la-resilience-numerique-une-necessite-dans-le-monde-dapres/
[7] See: https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2019/Individuals_Internet_2000-2018_Dec2019.xls
[8] See: https://www.monacostatistics.mc/content/download/479752/5477820/file/Key%20figures%202019.pdf
[9] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i992b")
[10] See: https://www.itu.int/en/mediacentre/Documents/Documents/ITU-Measuring_Digital_Development_ICT_Price_Trends_2019.pdf
[11] See: https://www.brodynt.com/business-internet-connectivity-in-monaco/

year 2023.[12] In March 2019, local press reported that Monaco Telecom executed a 6-month long optical fibre-networks rollout in the Fleur district of Monaco. The three-part project has been handled by Monaco Telecom, the Monegasque Water Company and the Urban Planning Department for Sanitation. By 2025, the government aims to provide full FTTH coverage.[13]

In 2019, the number of active mobile-cellular subscriptions per 100 inhabitants was of 86.70.[14] Although the penetration of mobile phones has been high since the early 2000s, steady growth has been observed particularly after 2008.[15] Moreover, the number of active mobile-broadband subscriptions per 100 inhabitants corresponded to 86.37 in 2019.[16] Monaco Telecom is the one national Mobile Network Operator (MNO) that dominates the mobile sector, although French MNOs such as Orange, Bouygues Telecom, SFR, and FREE are also widely available in the country. In 2019, the mobile-broadband Internet traffic within Monaco corresponded to 0.001 exabyte according to ITU.[17]

Over the past year, Monaco Telecom has heavily invested in revamping its networks, pioneering the deployment of country-wide infrastructures and services such as mobile coverage in LTE+ technology as fast as 1 Gbps, fixed Internet data speed of 1 Gbps, and high-security data transfer across the operator's networks.[18] Nowadays, 3G and 4G/LTE are widely available in the country with 100% coverage.[19] Although the basket cost for mobile data remains unavailable due to the lack of data on GNI per capita in Monaco, a monthly package of 20 GB Internet data allowance cost 47.23 USD (39.86 EUR) in 2019.[20] Given Monaco Telecom's small area of operation and the intense level of competition, it is facing from French operators, the operator is allowed to have around 30 per cent higher prices than French operators according to government regulations.[21]

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

In 2019, Monaco became the first state in Europe to have a full, operational, and commercial 5G network coverage in its national territory,[22] over an area of an approximately 2-kilometre square with 27 antennas deployed as of October 2020.[23]

While the country does not have a 5G strategy, 5G connectivity is the first pillar of the "Extended Monaco," alongside cloud services and fibre-optic development. Launched in April 2019, "Extended Monaco" holds

---

[12] See: https://monacolife.net/major-disruptions-amid-fiber-optic-extension/

[13] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume2.pdf

[14] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i911")

[15] See: https://www.monacostatistics.mc/content/download/446317/5060895/file/Rapport%20Recensement%202016.pdf

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

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

[18] See: https://www.monaco-telecom.mc/en/enterprise/key-figures.html

[19] See: ITU World Telecommunication/ICT Indicators Database online (2020): http://handle.itu.int/11.1002/pub/81550f97-en (indicator "i271G and i271GA")

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

[21] See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume2.pdf

[22] See: https://extendedmonaco.com/en/project/principality-of-monaco-is-worlds-first-country-to-have-full-operational-5g-coverage/

[23] See: https://extendedmonaco.com/en/project/principality-of-monaco-is-worlds-first-country-to-have-full-operational-5g-coverage/

the deployment of infrastructure and public policy initiatives across all relevant sectors such as health, education, smart city, and others, as priorities until at least 2022.[24]

Through this program the government recognizes the need of building a cross-cutting architectural infrastructure foundation that will support the digital transformation in the country, focusing on the quick development of an ecosystem that meets leading international standards and foster integration with other relevant vertical markets that ultimately will bring further economic development in Monaco.

In February 2020, the government published a user guide to 5G, answering the most frequently asked questions on the 5G roll-out and providing information on how these networks are set to benefit the population as well as both private and public stakeholders.[25]

4. Spectrum assignment for 5G & market development

As of October 2020, no public information or document on spectrum assignment for 5G is available in Monaco. However, it has been reported that 5G is being deployed on frequencies similar to those used for 4G and Wi-Fi.[26]

5. Electromagnetic fields levels and the implementation dynamics

In Monaco, the Smart Nation Department, which is operated under the General Secretariat of the Ministry of State, is responsible for ensuring that emissions from the Principality's radio networks comply with the regulatory thresholds. It takes regular measurements across the Principality, focusing particularly on schools, healthcare institutions, and retirement homes.[27]

Considering the law number 928 of December 8, 1972, the ordinance number 3.020 of 26 November 2010, pertaining to the limits of the public's exposure to EMF, sets a global limit of 6 V/m (volts per metre) on average for all radio frequencies, and a second, lower limit of 4 V/m for mobile phone publics networks (2G, 3G, 4G and 5G).[28] These are more restrictive EMF limits than the international standard published by the ICNIRP (International Commission on Non-Ionizing Radiation Protection) and European Union Recommendation (28 to 87 V/m).[29]

Within the 100 kHz and 6 GHz frequency bands, this limit value is 4.5 times below the lowest limit recommended by the World Health Organization (WHO), which is 28 V/m. Furthermore, an additional restriction of 4 V/m[30] was introduced for emissions from mobile phone base stations (set at 6 V/m for places inside buildings).[31]

---

[24] See: https://extendedmonaco.com/en/extended-monaco-programme-unveiled/

[25] https://en.gouv.mc/Portail-du-Gouvernement/Policy-Practice/A-Modern-State/News/User-Guide-to-5G

[26] See: https://en.gouv.mc/content/download/475991/5426699/file/05_depliant_sante_5G_GB_BAT.pdf

[27] See: https://en.gouv.mc/content/download/475991/5426699/file/05_depliant_sante_5G_GB_BAT.pdf

[28] See: https://en.gouv.mc/content/download/475991/5426699/file/05_depliant_sante_5G_GB_BAT.pdf

[29] See: https://www.meb.mc/en/news/5g-providing-a-foundation-for-the-smart-principality

[30] See: https://electromagnetichealth.org/electromagnetic-health-blog/monaco/

[31] See: https://www.gouv.mc/Portail-du-Gouvernement/Action-Gouvernementale/L-Environnement/Monaco-cite-durable/Carte-des-Mesures-Electromagnetiques

The measurements carried out by Directorate for the Development of Digital Uses (DDUN) are available to the public in the form of an interactive map,[32] thus providing information on all the radio transmission sites constituting the public communications networks in the Principality, encompassing both broadcasting and mobile telephony.[33] This interactive site uses the latest measurements of electromagnetic fields carried out by the DDUN). which are regularly updated and that highlight compliance with the exposure limits of the Principality.[34]

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

In September 2018, Monaco Telecom tested 5G services in conjunction with Huawei as part of an equipment supply deal, extending previous collaboration agreements between the two private stakeholders. In this context, the operator showcased a 5G-connected UAV (unmanned aerial vehicle) broadcasted live high-resolution 360-degree panoramic images through a virtual reality headset.[35] Monaco Telecom also announced that the first 5G antennas have been installed in the Port Hercule area and that extended network coverage was underway.[36]

In February 2019, Monaco Telecom and Huawei signed a Memorandum of Understanding (MoU) to accelerate the deployment of smart city-related projects in the Principality within the context of Monaco's "5G Smart Nation" project.[37] The strategic agreement sets out the collaboration of the project in the fields of Internet of Things (IoT), big data, and cloud services.[38] The MoU also inform that Monaco Telecom will be able to rely on Huawei's 5G and NB-IoT networks already deployed in Monaco as well as on the test cloud platform based in Dusseldorf, Germany.[39] Relying on Huawei's networks, Monaco Telecom switched 5G in July 2019.[40]

In September 2019, the Belgium operators BICS announced it established the live 5G data roaming service between Monaco Telecom and an Italian telecommunications company using BICS's 5G global IPX network.[41]

In addition to the 5G trials and pre-commercial announcements by the country's only MNO, local press has reported in October 2020 that companies such as Vizua 3D entertainment, an augmented reality start-up based in the MonacoTech Incubator, as well as public entities such as Monaco's firefighters working on reconnaissance drones with high-definition cameras, have plans to deploy 5G services shortly.[42]

---

[32] See:
https://cartoradio.mc/search/Afficher%20les%20sites,%20les%20mesures%20ou%20le%20cadastre=CartoRadio_Mesures_Exposition_Vue_2881+Mesure+mesure/@3178895.98451,2056411.50855,3
[33] See: https://cartoradio.mc/
[34] See: https://monacodailynews.com/2020/02/17/website-indicates-monacos-electromagnetic-fields/
[35] See: https://www.huawei.com/en/news/2018/9/huawei-monaco-telecom-5g
[36] See: https://spectrum.ieee.org/static/the-race-to-5g-technology
[37] See: https://www.commsupdate.com/articles/2019/06/03/monaco-telecom-to-proceed-with-5g-launch-this-summer-using-huawei-technology/
[38] See: https://www.monaco-telecom.mc/en/press/news/5g-smart-nation-uk.html
[39] See: https://www.huawei.com/en/news/2019/2/monaco-telecom-huawei-out-mou-5g-nation
[40] See: https://www.commsupdate.com/articles/2019/07/10/monaco-rolls-out-huawei-built-5g-network/
[41] See: https://bics.com/news/bics-enables-the-launch-of-monaco-telecoms-first-5g-roaming-service-in-europe/
[42] See: https://www.webtimemedias.com/article/5g-un-apres-premier-bilan-mitige-pour-monaco-telecom

Other projects related to Smart Cities by local start-ups were also reported within the context of self-driving eco-bus and remote-control installations for better energy efficiency.[43]

[43] See: https://monacolife.net/fully-5g-connected/