

Slovakia

	Slovakia				EU
	DESI 2017	DESI 2018	DESI 2019		DESI 2019
	value	value	value	rank	value
1a1 Fixed broadband coverage	88%	89%	88%	25	97%
% households	2016	2017	2018		2018
1a2 Fixed broadband take-up	72%	70%	70%	20	77%
% households	2016	2017	2018		2018
1b1 4G coverage	71%	82%	87%	25	94%
% households (average of operators)	2016	2017	2018		2018
1b2 Mobile broadband take-up	73	84	88	18	96
Subscriptions per 100 people	2016	2017	2018		2018
1b3 5G readiness	NA	NA	0%	13	14%
Assigned spectrum as a % of total harmonised 5G spectrum			2018		2018
1c1 Fast broadband (NGA) coverage	75%	79%	86%	17	83%
% households	2016	2017	2018		2018
1c2 Fast broadband take-up	23%	29%	34%	20	41%
% households	2016	2017	2018		2018
1d1 Ultrafast broadband coverage	NA	68%	80%	11	60%
% households		2017	2018		2018
1d2 Ultrafast broadband take-up	8%	10%	13%	21	20%
% households	2016	2017	2018		2017
1e1 Broadband price index	88	88	90	8	87
Score (0 to 100)	2016	2017	2018		2017

1. Progress towards a gigabit society

The national broadband strategy, which is still in place, dates from 2011. With regard to the common EU broadband targets for 2025 as part of the gigabit society communication on coverage of all EU households — rural or urban — by networks allowing speeds of 100 Mbps upgradeable to gigabit speed, no such official plan has been adopted yet at government level. As regards mobile connectivity ambitions, the Ministry of Transport and Construction plans to create a 5G action plan in 2019.

With regard to use of EU funds, €68 million from the European Regional Development Fund and European Agricultural Fund for Rural Development still needs to be used as part of the operational programme integrated infrastructure for backhaul and access networks. Under the rural development programme, €27 million was allocated for last mile access in villages with under 500 inhabitants. The relevant ministry plans to reallocate part of that amount to projects other than those related to connectivity.

The Slovak office of the Deputy Prime Minister for Investments and Informatization plans to launch a new broadband mapping project in 2019 to map broadband at lower levels, i.e. at household level. This new project aims to relaunch mapping at whole country level and is expected to replace the previously cancelled ‘Atlas for passive infrastructure’ project managed by the Ministry of Transport and Construction. Its purpose was to not only map fixed and mobile telecoms infrastructure needed for broadband deployment, but also to map road and energy infrastructure.

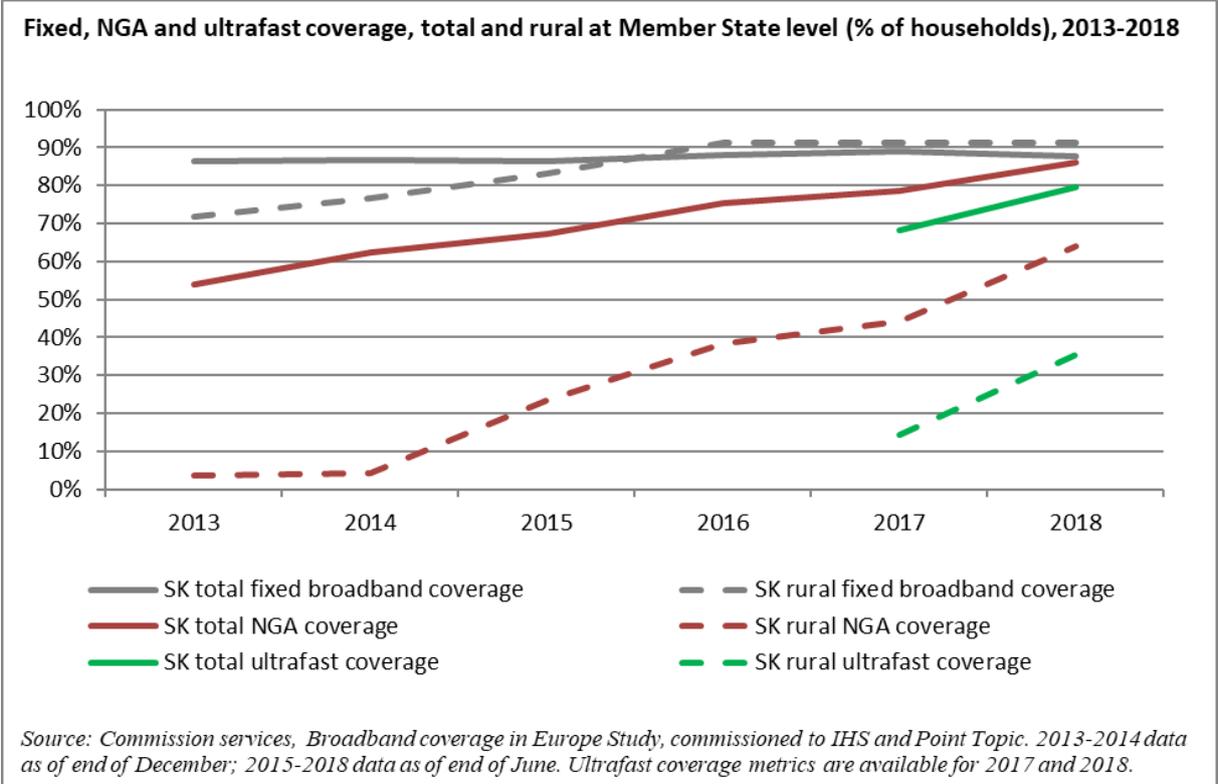
One of the long-term issues is the provision of high-speed broadband coverage for ‘white spots’ (i.e. municipalities covered by speeds of less than 30 Mbps). The new definition of white spots now applied in Slovakia is based on actual coverage rather than ‘planned’ coverage. The new definition recognises the latter as a group of addresses at individual street level and identifies those individual locations where the broadband speed is lower than 30 Mbps. According to this definition, there were

between 400 and 500 white spots in 2017. This fell to around 300 white spots in 2018, which would indicate slight progress. The plan is to eliminate white spots in Slovakia by 2020.

Slovak authorities identified 207 white spots in early November 2017. Following public hearings to assess current broadband coverage and ascertain market players’ future plans to achieve broadband coverage of 30 Mbps in all municipalities by 2020, in 2017 Orange Slovensko and O2 Slovakia declared their intention to cover all 207 remaining white spot municipalities in Slovakia. As these declarations are not binding, another public consultation was launched in 2017 to obtain official commitments by the market players to cover all such white spots in Slovakia by the end of 2020. However, no binding commitments have been made yet. In February 2018, a non-binding memorandum was signed between the relevant governmental department office of the Deputy Prime Minister for Investment and Informatization and three major Slovak market players (Slovak Telekom, Orange Slovensko and O2 Slovakia).

The governmental department has prepared a feasibility study for an intended demand-oriented measure to provide free wifi coverage at municipal level, ‘WiFi for You’, also called ‘WiFi4SK’, which is supposed to be based on the principles of the WiFi4EU initiative. The call was launched in late July 2018 and only municipalities can benefit from the aid, which is granted via the *de minimis* scheme. The project is financed from the operational programme integrated infrastructure and conditions are supposed to be identical to WiFi4EU.

The Ministry of Transport and Construction intends to start drafting its proposal for new legislation to transpose the European Electronic Communications Code in mid-2019 and expects to launch the legislative procedure at the end of 2019. It intends to prepare a new law on electronic communications as a recast, replacing the current law on electronic communications.



Against this background, Slovakia did not make progress on fixed broadband coverage, with 88 % of households covered (89 % previously). It is therefore still below the EU average (97 %). Fixed broadband take-up remained at 70 % of households (stable), which is below the EU average (77 %). 4G coverage increased to 87 % (82 % previously) and is still below the EU average (94 %). Slovakia

made good progress on fast broadband NGA coverage, with 86 % of households covered. This is above the EU average (83 %). Slovakia performed very well on ultrafast broadband coverage, a more future-proof technology, with 80 % of households covered (68 % previously) outperforming the EU average by 20 percentage points.

Fixed, NGA and ultrafast coverage trends in Slovakia indicate relatively good ultrafast coverage except in rural areas. The difference between total coverage and coverage in rural areas is also visible with regard to NGA coverage. By contrast, Slovak FTTP coverage, even in rural areas, clearly exceeds the EU trends.

2. Market developments

Competitive environment

According to the Slovak national regulatory authority (NRA), there is evidence of fixed-to-mobile substitution in Slovakia, borne out by the fact that there are operators that still offer fixed connection via mobile networks. Electronic communications services are offered mainly as bundled offers of various services, including multimedia services. In recent years, the most significant growth can be seen in offers that contain broadband service IPTV in the form of double-play, triple-play and quad-play. There are no commercial agreements for wholesale access to content for electronic communications network and/or services players.

Two Slovak fixed operators, SWAN and BENESTRA, finalised their merger in 2018. The merger aimed to create the largest domestically-owned alternative operator in Slovakia. The merged firm plans to concentrate at first on combining the two respective networks before investing in infrastructure. While SWAN focuses mainly on residential users in the fixed line sector, BENESTRA focuses on the business market. The mobile arm of SWAN, SWAN Mobile, which trades under the '4ka' brand, is not included in the merged firm. The Slovak NCA cleared the merger in April 2018.

In 2017, the Slovak legislator amended the law on electronic communications with effect from January 2018 with regard to the identification of public interest, which is a prerequisite for a telecoms company to gain access to immovable property owned by third parties. As a result, the Slovak legislator introduced a legally binding guideline in the form of an open-ended enumeration of potential situations where the aim to serve the public interest is present. It now stipulates that public interest is present also in case of a telecoms company operating a nationwide network; according to stakeholders, it seems to discriminate those operators who do not operate a nationwide network, e.g. local operators.

Slovakia has prolonged the applicability of the special levy on regulated sectors, including electronic communications, despite the fact that it was originally designed as a measure to tackle the impact of the global financial crisis on the national budget.

2.1. Fixed markets

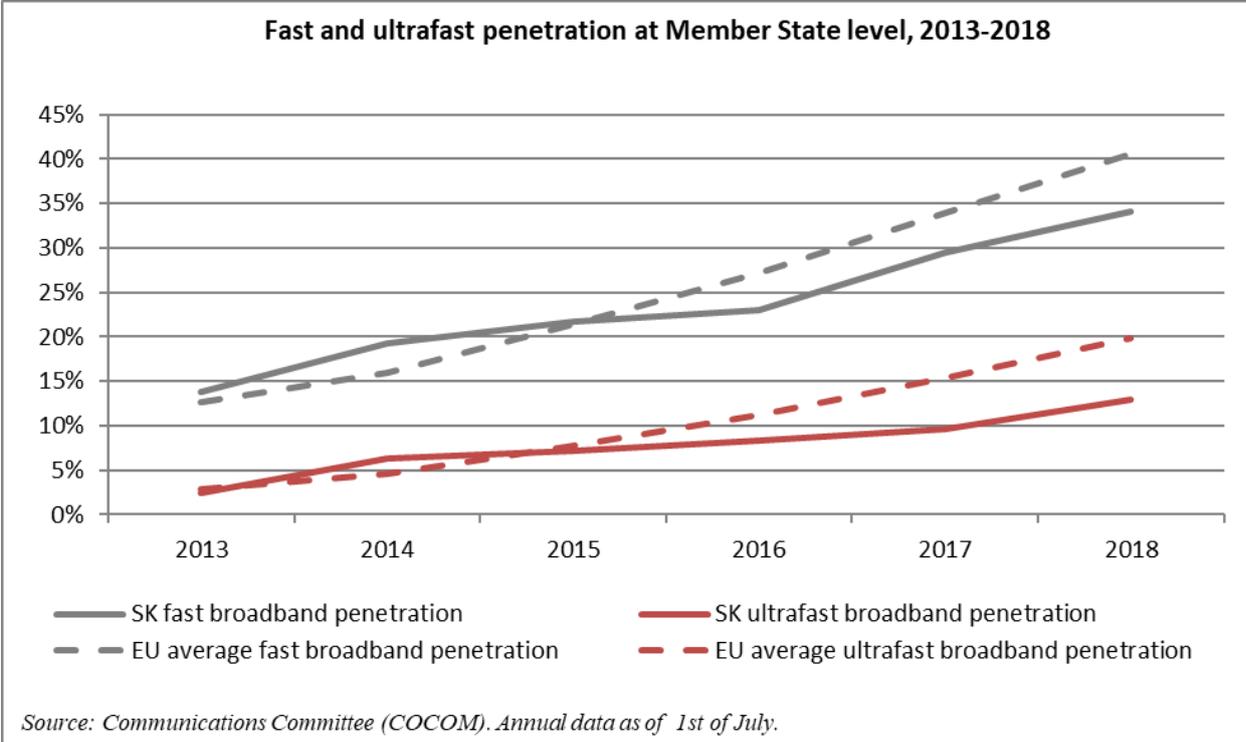
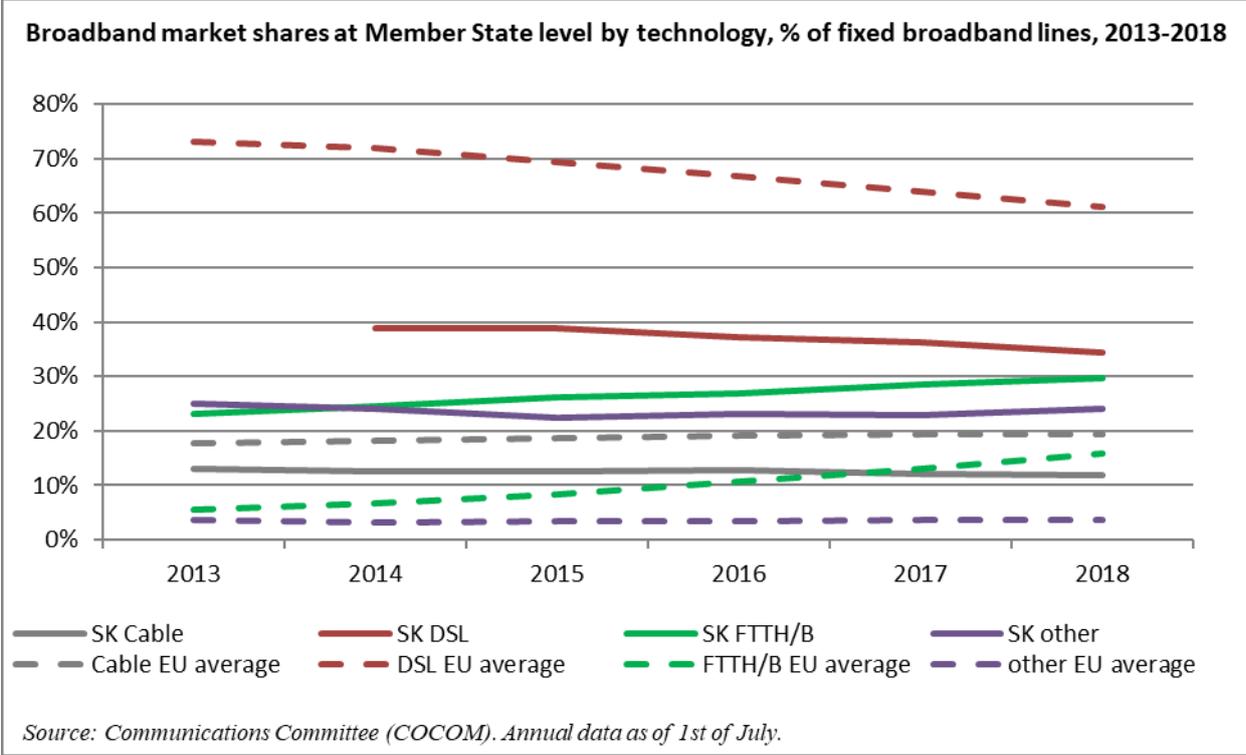
As regards market shares by technology, DSL technology is still out in front with a continuously decreasing share of 34.4 % narrowly followed by fibre to the home/building (FTTH/B) with a 29.7 % share, which continues to rise at the expense of DSL and partially at the expense of wifi/fixed wireless access. Cable technology holds a stable fourth position with around 11.9 %.

With regard to market shares of technologies according to speed, '2Mbps but less than 10 Mbps' holds the highest share followed by '30Mbps but less than 100 Mbps' and '10 Mbps but less than 30 Mbps'.

With regard to overall trends in the proportion of market shares (incumbent versus alternative operators), the number of subscriptions has increased over time for both the incumbent and for alternative operators. However, the incumbent's market share is declining very slightly. The overall

broadband market is therefore growing in size, with a higher share of new subscriptions gained by alternative operators.

There were no major changes in market shares on the Slovak fixed voice market. Slovak Telekom held approximately 83 % market share in the volume of voice call minutes from the fixed network as of mid-2018.



The NGA market segment is more competitive than the DSL segment. It is highly fragmented, with tens of local NGA service providers and several nationwide operators.

There are no wholesale-only broadband network operators. The Slovak market has characteristics of strong orientation on deployment of own access infrastructure. Wholesale access is sought on the market only in cases where there is no other technical or economic solution available.

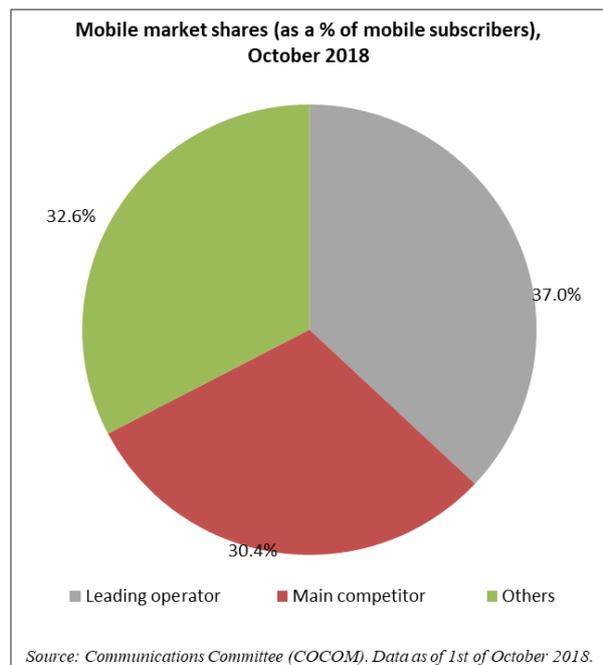
The Slovak broadband market is dominated by access via DSL¹, followed by FTTH/B and WiFi/FWA, with cable access² in fourth position.

Slovakia progressed on fast broadband take-up, with 34 % of households subscribed (29 % in 2017), but remains below the EU average (41 %). Slight progress was also made on ultrafast broadband take-up, with 13 % of households subscribing (10 % in 2017), still below the EU average (20 % in 2017).

The broadband price index³ in Slovakia scored 90, which is above the EU average, with very good performance in retail prices.

2.2. Mobile markets

There are four mobile network operators in Slovakia. Orange Slovensko, a subsidiary of the Orange Group, is the mobile market leader in terms of the number of customers/SIMs and mobile revenues. It operates a second brand, FunFón. The incumbent Slovak Telekom, a subsidiary of the Deutsche Telekom Group operating under T-Mobile, holds second place on the mobile market in terms of



mobile revenues and number of customers/SIMs. It operates a second brand, Juro. O2 Slovakia, a former subsidiary of the Telefonica Group, now a member of the Czech PPF Group, ranks third in terms of mobile revenues and number of customers/SIMs. It operates a reseller, Tesco Mobile. The most recent fourth mobile market entrant, SWAN Mobile, a subsidiary of the SWAN/DanubiaTel Group, operates under the brand 4ka.

According to data available from the NRA, the four Slovak mobile network operators' (MNO) 4G network territorial coverage as of 30 June 2018 was: 69.8 %; 60.4 %; 58.5 % and 23.2 % respectively. These figures corresponded at the same time to population coverage of 93.3 %; 90.5 %; 94.1 % and 69.0 % respectively.

Mobile broadband take-up increased to 88 subscriptions per 100 people (84 subscriptions per 100 people in 2017), although it is still below the EU average (96 subscriptions per 100 people).

The NRA has not yet disclosed its detailed plans for 5G trials or deployments.

The least expensive offer in Slovakia for a basket of 1GB and 300 calls is significantly above the EU average of €46.30 compared with €22.30.

¹ VDSL included.

² Docsis and cable modem.

³ The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100 Mbps. This indicator presents values from 0 to 100 (which should not be read as prices) and the higher the values, the better the country performs in terms of affordability of prices relative to purchasing power.

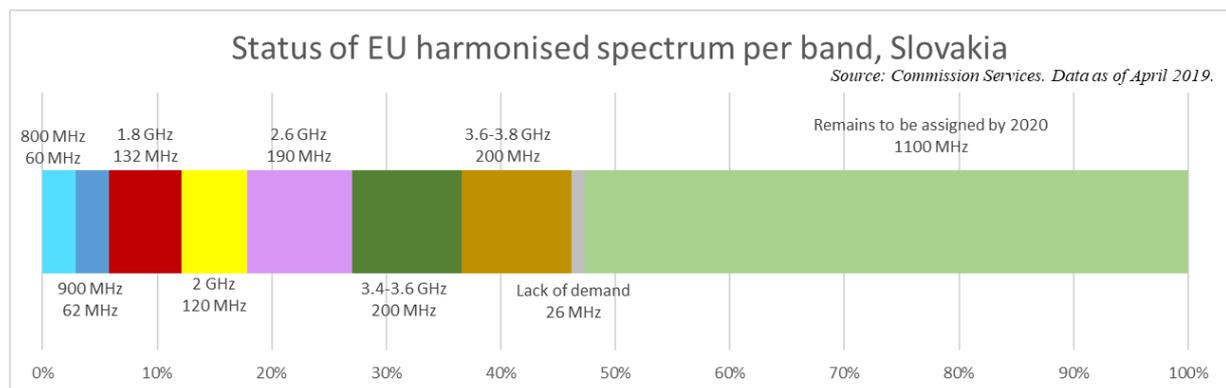
3. Regulatory developments

3.1. Spectrum

In Slovakia, 46 % of the spectrum harmonised at EU level for wireless broadband has been assigned. This percentage is mainly due to the lack of an assignment procedure for the 700 MHz band.

The assignment of frequencies in the lower part of the 3.4-3.8 GHz band (3400-3600 MHz) was already completed in 2016 when frequency licences were assigned on a nationwide basis to three operators (O2 Slovakia, SWAN and Slovanet). These licences will run until August 2025. The 3.6 GHz frequency band is allocated for mobile/fixed communications networks in lots of 40 MHz, and three operators acquired rights of use of spectrum for 80 MHz or more. On that basis, there might possibly occur difficulties with allowing the use of sufficiently large blocks of frequencies by all operators by 31 December 2020. In 2017, it conducted the selection procedures for issuing rights to use frequencies in the upper part of the band (3600-3800 MHz) at local (district) level in order to grant licences until the end of 2024. This process was finalised in June 2017, with all frequencies from both 3.4-3.6 GHz and 3.6-3.8 GHz frequency bands assigned.

With regard to the implementation of Decision (EU) 2017/899 on the use of the 470-790 MHz frequency band (the UHF band) in the EU, there are issues that need to be addressed. There is one nationwide network operator (Towercom) on the Slovak market that holds the rights to use the 700 MHz spectrum beyond 2020. The 694-790 MHz frequency band (the 700 MHz band) is largely used for digital terrestrial television broadcasting.



Three out of four nationwide terrestrial DVB-T/DVB-T2 multiplexes are operated using the 700 MHz frequencies (almost 50 % of operated transmitters use the frequency from the 700 MHz band). Frequencies to operate these multiplexes have been assigned to the network operator through individual licences that are valid until 9 September 2029 except for multiplex 1, where frequencies are assigned until 31 May 2021.

The Slovak authorities are negotiating with the network operator about the possibility of changing the individual licences issued for the 700 MHz band before they expire in 2029 and 2021. This substitution would ensure continuity for digital terrestrial television broadcasting in terms of maintaining the existing coverage of the territory and inhabitants in Slovakia. According to the Ministry, these new frequencies would not constitute any added value for the network operator. The Ministry prepared a new law, which was then adopted by the Slovak legislator in March 2019, with the aim of enabling a compensation for the provider who currently holds the right to use frequencies in the 700 MHz band.

In December 2017, the NRA concluded cross-border coordination agreements with the national regulatory authorities of the neighbouring countries on the new digital terrestrial television (DTT) frequency plans for the 470-694 MHz frequency band.

The NRA intends to ensure the availability of the sub-700 MHz frequency band (470-694 MHz) for DTT and for use by wireless audio programme making and special events at least until 2030.

The use of the 700 MHz band in Slovakia is envisaged for mobile broadband electronic communications services. The NRA envisages that frequencies from the 700 MHz band will be allocated by means of an electronic auction and it anticipates that such auction will take place in the second half of 2019.

According to the NRA, frequencies from the 26 GHz and 43 GHz bands could possibly be taken into account as available for 5G services on the Slovak market. The NRA relies mainly on usage of the 26 GHz frequency band for 5G networks.

In May 2018, the NRA launched a new auction process to allocate the 1800 MHz band. In reaction to this, O2 Slovakia announced its intention to transfer a small portion of its 1800 MHz spectrum to another operator (Slovanet) before the 1800 MHz auction so that it could bid itself in the auction for 2×9MHz, which is more suitable for long-term evolution (LTE). In response to this, the NRA cancelled the auction and the 20 MHz spectrum cap in summer 2018 as it believes that the Slovak mobile market is saturated and competition exists. Following this development, the fourth market entrant SWAN Mobile sued the NRA for its decision to cancel the 20 MHz spectrum cap. The NRA will not relaunch the auction for 1800 MHz until the court decides.

Slovakia does not apply stricter electro-magnetic emission limits than those set by Council Recommendation 1999/519/EC.

As of the end of 2018, the NRA had received four notifications on the lease of rights to use spectrum and one notification on the intention to trade rights to use spectrum. All four notifications on the lease of rights to use spectrum relate to the operation of local DVB-T transmitters in the UHF band. The notification on the intention to trade rights to use spectrum linked to the operation of wireless mobile broadband in the 1800 MHz band has been subsequently withdrawn.

3.2. Regulated access

2018 started with Phase II investigation discussions involving the NRA, the Commission and BEREC with regard to the NRA's notification of price control remedies on the markets for wholesale voice call termination on individual mobile networks⁴ (Market 2 of the 2014 Recommendation on relevant markets⁵). The NRA proposed imposing asymmetric mobile termination rates (MTRs) on the fourth mobile network operator and adding a 'size premium' to the standard WACC⁶ formula, leading to inflated costs of capital used for MTR calculations. BEREC found that the Commission's serious doubts were justified. In February 2018, the Commission issued a Recommendation under Article 7a of the Framework Directive to amend or withdraw the remedies relating to price caps for mobile call termination services in Slovakia. As a result, the NRA withdrew its draft measure.

In February 2019, the NRA announced a new review of the markets for wholesale voice call termination on individual mobile networks. The Commission pointed out that the currently applicable

⁴ The draft measure was notified to the Commission in September 2017, under case SK/2017/2010.

⁵ Commission Recommendation 2014/710/EU of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services. Text with EEA relevance, OJ L 295, 11.10.2014, p. 79-84.

⁶ Weighted average cost of capital.

MTRs in Slovakia, although based on a pure BU-LRIC methodology, are amongst the highest in the EU as they have been calculated based on pre-2013 market data. The Commission therefore urged the NRA to introduce symmetric cost-oriented MTRs based on the BU-LRIC model as soon as possible and, as communicated by the NRA, no later than the first quarter of 2019. In May 2019, the NRA notified⁷ new symmetrical mobile termination rates for all four Slovak MNOs, with decrease from the regulated price imposed since 2013 (the current regulated MTR amounts to 1.226 euro cent/min excluding VAT) to a new regulated MTR which amounts to 0.855 euro cent/min excluding VAT.

In January 2018, the NRA notified the Commission of a proposal for price remedies on the markets for wholesale call termination on individual public telephone networks provided at a fixed location (Market 1 of the 2014 Recommendation on relevant markets). It proposed to set a maximum price for fixed termination rates (FTRs) of 0.0976 euro cent/min, based on a pure BU-LRIC methodology and applied symmetrically to all operators with significant market power (SMP). As in the market for wholesale voice call termination on mobile networks, the NRA intended to add a 'size premium' to the standard WACC formula. This mark-up would reflect the risk of the variability in the return of the operators' shares in the long run depending on the size of undertakings. In line with its approach on mobile termination markets, the Commission therefore opened a Phase II investigation pursuant to Article 7a of the Framework Directive. BEREC again backed the Commission's serious doubts, and in June 2018 the Commission adopted an Article 7a Recommendation asking the NRA to amend or withdraw the proposed remedy. In July 2018, it informed the Commission of its decision not to amend or withdraw the draft measure and adopted the originally notified FTRs of 0.0976 euro cent/min.

In July 2018, the NRA adopted decisions on SMP designations. Subsequently, the NRA adopted a decision on FTR price regulation addressed to all SMP operators and in the same period the adopted decisions were communicated to the Commission.

Regarding the markets for wholesale local access at a fixed location and central access at a fixed location⁸, the NRA adopted decisions in January 2018 on the designation of Slovak Telekom as SMP operator and imposed remedies on both markets. Against this background, it adopted a decision on the methodology for calculating the price of collocation based on the long-run average incremental cost (LRAIC) methodology as well as a decision on the methodology for calculating the price of duct and infrastructure access based on LRIC+. The previous price obligations for the products on markets 3a and 3b were replaced by an economic replicability test; these were communicated to the Commission as adopted measures under Article 7(7) of the Framework Directive in March 2018.

On 20 March 2018, the NRA communicated to the Commission the SMP designation and price calculation method for collocation, for ducts, high-density polyethylene (HDPE) pipes and tubes on the market for wholesale local access provided at a fixed location (Market 3a). It also communicated to the Commission the SMP designation and price calculation method for collocation on the market for wholesale central access provided at a fixed location (Market 3b).

On 31 July 2018, the NRA communicated to the Commission a preliminary measure on the price calculation method for ducts, HDPE pipes and tubes on the market for wholesale local access at a fixed location (Market 3a).

The NRA is expected to come up with new analyses of markets 3a, 3b and 4 by the end of 2019.

Slovakia notified its new transposition of the Broadband Cost Reduction Directive (BBCRD) provisions related to the establishment and operation of the single information point (SIP) by way of an amendment to the Slovak law on electronic communications. The amendment entered into force on

⁷ The draft measure was notified to the Commission under case SK/2019/2167.

⁸ Markets 3a and 3b of the 2014 Recommendation on relevant markets.

1 January 2018. The responsibility for operating the SIP is entrusted to the NRA.

The NRA established the SIP in June 2018. The SIP gathers information on existing physical infrastructure and planned civil works. Information on existing physical infrastructure is provided by central and local administration bodies and by regional and local self-governing authorities. Information on planned physical infrastructure is provided by network operators (including those active in electronic communications, public utilities and transport sectors). Information from the SIP is provided exclusively to the electronic communications industry.

The NRA has not yet been asked to resolve disputes under the BBCRD. It adopted an implementing measure on SIP with legal effect from 1 August 2018.

4. End-user matters

In 2018, the NRA received 235 consumer complaints. The main sources of complaints were related to how contractual penalties were applied, to pricing and billing, to availability and quality of service, terms and conditions related to contracts including their duration, roaming, price increases, number portability, rights of way and unsolicited communication. As regards transparency and publication of information, the NRA relies on a web search engine and comparison website. Consumers can compare offers from individual companies that provide broadband access, including additional services at the level of individual location to be specified by the consumer⁹. There is also a price comparison tool where users can compare prices of fixed broadband access, in particular based on address, price, type of connection, transmission speed, data limit and bundle type.

According to the 2018 consumer markets scoreboard, from a consumer perspective of the markets surveyed in Slovakia, the performance of the internet provision service market did not present any statistically appreciable change between 2015-2017; it scores 80.2 at the market performance index (MPI), 3.4 points above the EU-28 average¹⁰. The performance of the mobile telephone services market decreased in 2018 by 1.5 points compared to the same period; it scores 78.7 at the MPI, 1.7 points above the EU-28 average. The fixed telephone services market did not present any statistically significant change compared to the same period; it scores 82.9 at the MPI, 5.7 points above the EU-28 average. Of the 25 services markets surveyed in Slovakia, fixed telephone services market and internet provision service market are both among the five markets scoring the highest (+5.7 and +3.4 compared to the EU average, respectively).

a. Net neutrality

There are no self-regulatory initiatives in Slovakia. The NRA reported no deviation from the BEREC guidelines on the implementation by national regulators of European net neutrality rules. There were no additional requirements imposed by the NRA except its recommendation for ISPs related to Article 4(1)(d) of Regulation (EU) 2015/2120. The recommendation comprises the definition of particular transmission speeds to be included in contracts for both fixed and mobile operators. It envisages harmonising the publishing of information of internet access service speeds; the normally available speed should be at least 90 % of the maximum speed and available at least 90 % of the time during each continuous 4-hour interval. The minimum speed should be at least 40 % of the maximum speed. There appear to be no major signs of dissatisfaction with the implementation of net neutrality rules on the Slovak market. Net neutrality rules are not among the main sources of consumer complaints. According to the results of the request for information from the NRA addressed to major market players, no dissatisfaction about the quality of service was addressed from the 'consumer versus

⁹ Such comparison tool is available on: <http://porovnavacinternetu.sk/>.

¹⁰ The MPI is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers.

operator' perspective. The NRA therefore sees no non-compliance and no need for intervention. There is no reason to impose requirements on technical characteristics or on a minimum quality of service related to Article 5 of Regulation (EU) 2015/2120.

b. Roaming

The NRA opened investigations into two cases of potential non-compliance. It observed no increase in domestic prices as a result of 'roam like at home' rules in 2018. It also did not receive any complaints about data speed and 3G or 4G connectivity in relation to inbound or outbound roaming. It did not receive any applications for derogation in 2018. As a result, no retail derogation has yet been granted.

Slovak end-users consumed 4.2 times more roaming data in Q4-2017 than in Q4-2016. Between Q1-2017 and Q1-2018, such an increase in usage was represented by 4.9 times increase.

Slovak end-users consumed 1.9 times more roaming minutes (calls made) data in Q4-2017 than in Q4 2016. Between Q1-2017 and Q1-2018, such increase in usage was represented by 1.8 times increase.

The Slovak market belongs to those with a negative balance for roaming calls as the volume of roaming use carried out by Slovak customers abroad is higher than the volume of calls carried out by foreign customers in Slovakia. The Roaming Regulation¹¹ therefore impacted mainly smaller operators and operators that are not a part of a large multinational group.

The NRA has the power to impose penalties ranging from €200 up to 5 % of the undertaking's turnover from the previous accounting period if an undertaking has not fulfilled or has violated obligations stipulated in the Roaming Regulation.

c. Emergency communications — 112

The relevant governmental department reports that free access to 112 by SMS, which is a functionality relevant for equivalent access to emergency services for disabled end-users, is operational. Access to 112 by free text message is excluded for users of foreign SIM cards.

Caller location is sector ID based. Handset-based caller location (advanced mobile location) has not yet been deployed. Calls to emergency services are answered within 6.9 seconds on average.

5. Institutional issues

NRA concerns about the level of salaries of its staff might be addressed, to a certain extent, by a general increase in the basic part of the salary in state administration in Slovakia (which includes the NRA) of 10 % from January 2019 and then by an additional 10 % from January 2020 (these salary increases do not apply to the total salary in the levels mentioned).

6. Conclusion

The Slovak market confirmed some positive trends with regard to ultrafast broadband coverage, which exceeds the EU average. However, issues remain with regard to low total fixed broadband coverage and low coverage of population by 4G networks¹². Moreover, ultrafast broadband take-up is very low relative to network availability. An early definition of a comprehensive 5G strategy might address some of the market needs and propose solutions to issues in 5G pioneer bands that are observed in the 3400-3800 MHz band and in the 700 MHz band. Effective implementation of the operational programme integrated infrastructure could be a good opportunity for the market, while close coordination between public and private stakeholders could help make efficient use of EU funds to

¹¹ Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union, OJ L 172, 30.6.2012, p. 10, as last amended by Regulation (EU) 2017/920.

¹² Average of operators.

improve the coverage of 'white spots' (i.e. municipalities covered by speeds of less than 30 Mbps). The recently established single information point under the Broadband Cost Reduction Directive could be among future opportunities and factors expected to support the market. Implementation of remedies on broadband markets with the focus on detailed practical implementation might catalyse their positive regulatory goals. The entry by the fourth mobile market entrant, which appears to have started the process of building its market position, might be one of the positive signs from the market.