

Finland

	Finland		EU	
	DESI 2017 value	DESI 2018 value	DESI 2019 value rank	DESI 2019 value
1a1 Fixed broadband coverage % households	97% 2016	97% 2017	94% 20 2018	97% 2018
1a2 Fixed broadband take-up % households	61% 2016	57% 2017	58% 27 2018	77% 2018
1b1 4G coverage % households (average of operators)	97% 2016	98% 2017	99% 4 2018	94% 2018
1b2 Mobile broadband take-up Subscriptions per 100 people	147 2016	146 2017	156 2 2018	96 2018
1b3 5G readiness Assigned spectrum as a % of total harmonised 5G spectrum	NA	NA	67% 1 2018	14% 2018
1c1 Fast broadband (NGA) coverage % households	75% 2016	75% 2017	75% 24 2018	83% 2018
1c2 Fast broadband take-up % households	22% 2016	23% 2017	29% 22 2018	41% 2018
1d1 Ultrafast broadband coverage % households	NA	59% 2017	58% 19 2018	60% 2018
1d2 Ultrafast broadband take-up % households	16% 2016	17% 2017	21% 14 2018	20% 2017
1e1 Broadband price index Score (0 to 100)	94 2016	94 2017	94 1 2018	87 2017

1. Progress towards a gigabit society

In October 2018, the Ministry of Transport and Communications published a digital infrastructure strategy. The strategy applies to both wireless and fixed connections and contains measures for promoting the implementation of 5G and supporting optical fibre construction.

Under this strategy, Finland aims to achieve at least the minimum gigabit connectivity objectives set by the Commission. By 2025, all Finnish households should have access to at least 100 Mbps connections, and it should be possible to increase the connection speed to 1 Gbps.

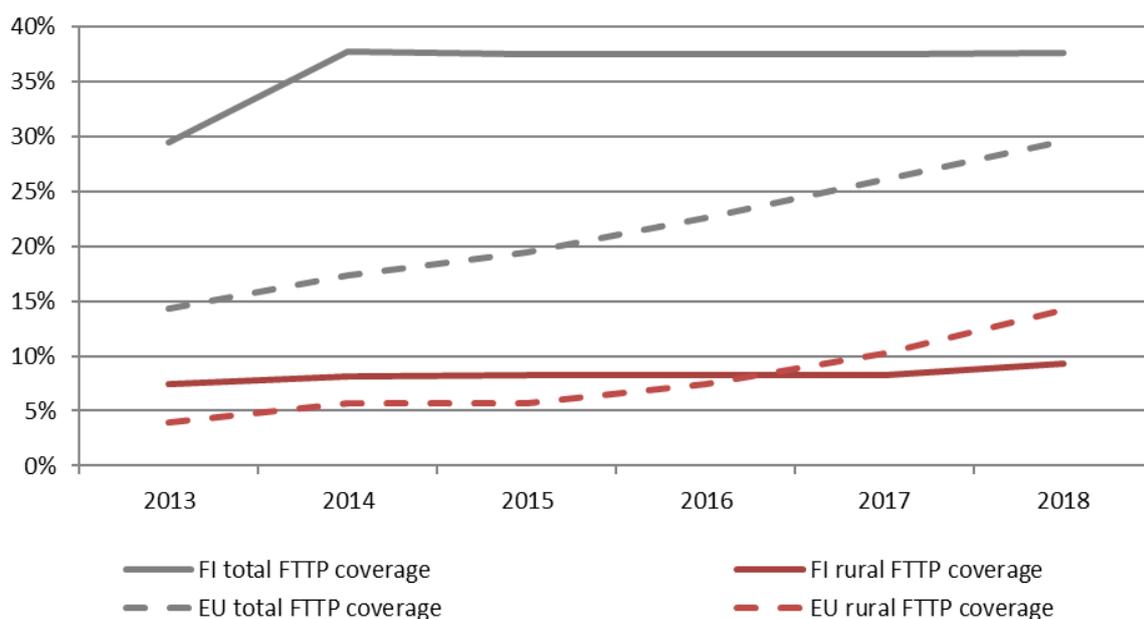
The measures proposed in the strategy include the construction of 5G networks and spectrum policy and streamlining network permit and construction procedures. As far as spectrum is concerned, the strategy provides that the entire 3.4-3.8 GHz band will be used for wireless broadband from the beginning of 2019. To this end, the entire 3410-3800 MHz GHz spectrum was auctioned in September 2018¹. The strategy also provides that the 26 GHz band will be used for wireless broadband so that the user rights for the entire spectrum will be issued in spring 2020.

In parallel to the digital infrastructure strategy, it is worth noting that 5G testing is being carried out across various parts of the country. In September 2018, the market player TeliaCompany also announced that it was launching a pre-commercial 5G network in the centre of Helsinki where its first base stations would be operational.

Finland's total fibre to the premises (FTTP) coverage is above the EU average, namely 37.5 % against 29.6 % for the EU. On the other hand, Finland's rural FTTP coverage is lower than the EU average, namely 9.3 % against 14.2 % for the EU.

¹ See point 3.1 below.

Fibre-to-the-premises (FTTP) coverage, total and rural at Member State level (% of households), 2013-2018



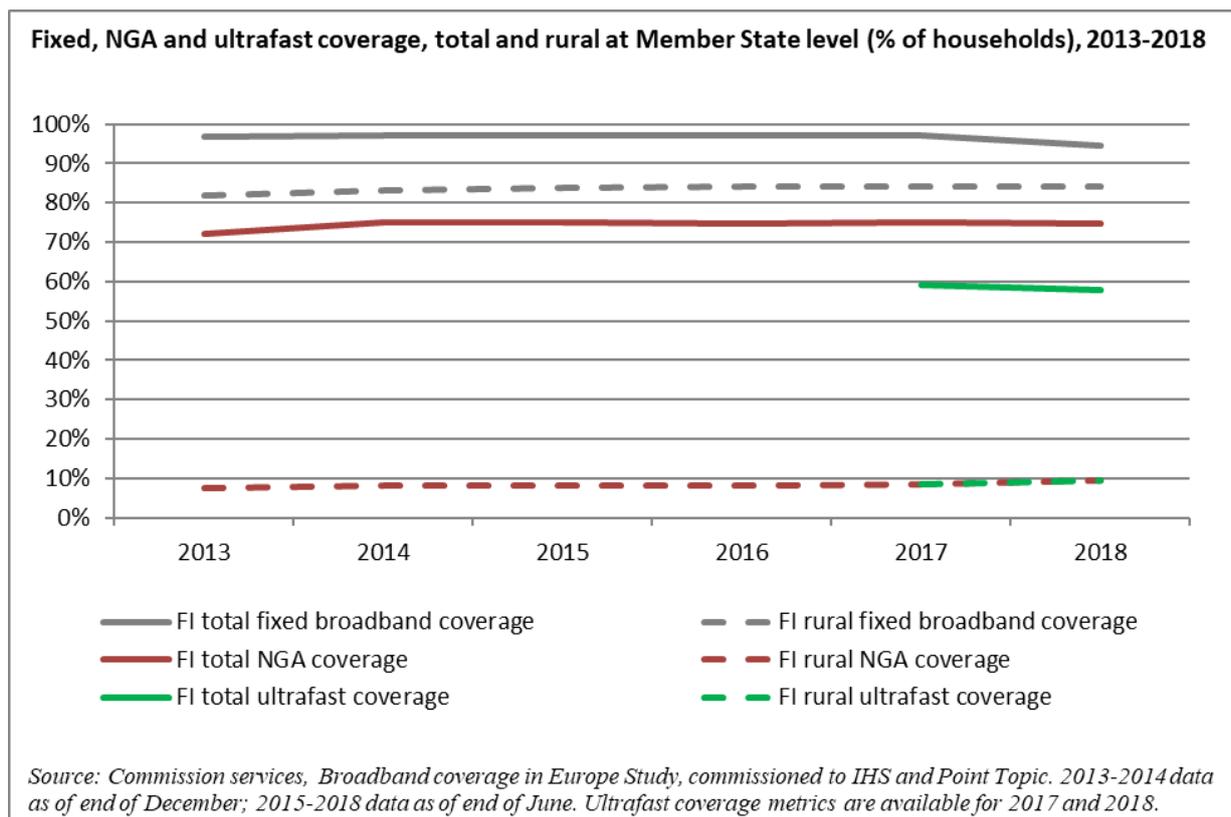
Source: Commission services, Broadband coverage in Europe Study, commissioned to IHS and Point Topic. 2013-2014 data as of end of December; 2015-2018 data as of end of June.

As to broadband rollout in general, Finland’s national broadband plan called the ‘fast broadband project’ runs until the end of 2019. The project aims to provide an optical fibre or cable network to enable connections of 100 Mbps within 2 kilometres of 99 % of all permanent residences and offices in Finland. State aid is available under the project to finance high-speed broadband networks. The amendment of the relevant State aid rules in 2017 has had a positive impact and there are now many ongoing broadband rollout projects.

It is worth noting that broadband access and take-up are still lower in rural areas. There are two programmes to support the rollout of fibre networks in those areas, namely the national State aid scheme for sparsely populated areas and EU funding through the European Agricultural Fund for Rural Development. As of January 2019, the combined use of these sources of funding has allowed Finland to roll out some 24,000 km of fibre network, which amounts to 95,000 dwellings.

Fixed broadband coverage is very high in Finland (94.4 %), including in rural areas (84.3 %). Fixed next generation access coverage (74.6 %), including in rural areas (9.3 %), is below the EU averages of 83.1 % and 52.3 % respectively. As indicated above, all ultrafast rural broadband in Finland is FTTP.

Preparatory work is underway to implement the European Electronic Communications Code. Amendments will be made to the Act on electronic communications services (formerly known as the Information Society Code) The whole Act is being reviewed along a timetable that runs until early autumn 2019, when a public consultation of the draft amending acts will be organised. This is against the overall objective to submit the implementing act to Parliament by spring 2020 and have the Code implemented into Finnish law by autumn 2020.



2. Market developments

Competitive environment

The Finnish telecommunications market features fixed-to-mobile substitution for voice calls. There are only 352,000 landlines left in Finland, while the number of mobile subscriptions is 9.5 million. Fixed call minutes amount to only 3 % of the calls made on fixed and mobile networks². In addition, TeliaCompany announced in January 2019 that they would stop providing new fixed telephone subscriptions and gradually discontinue their existing fixed services.

Elisa, Telia and DNA are increasingly investing in TV and content services. All of them have their own TV service concepts. In July 2018, Telia announced that they had acquired Bonnier Broadcasting, including a number of TV channel brands. Finnish operators are therefore taking measures to strengthen their positions in video content.

2.1 Fixed markets

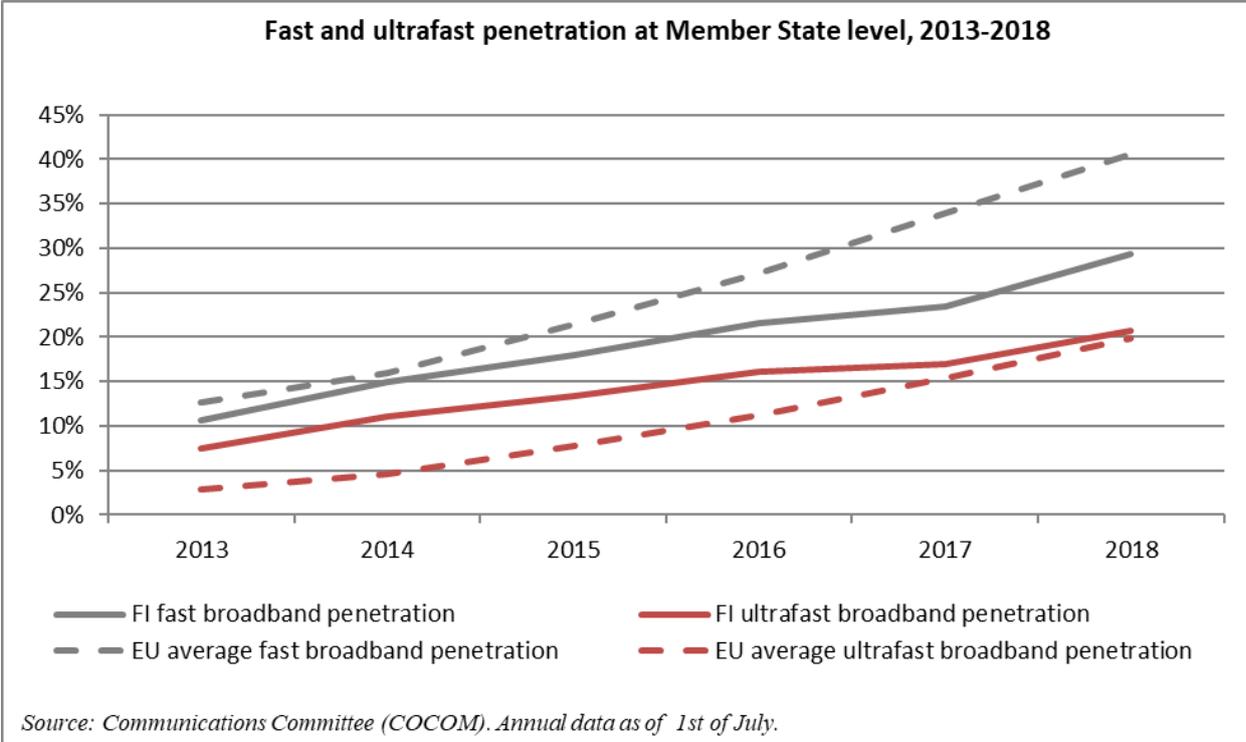
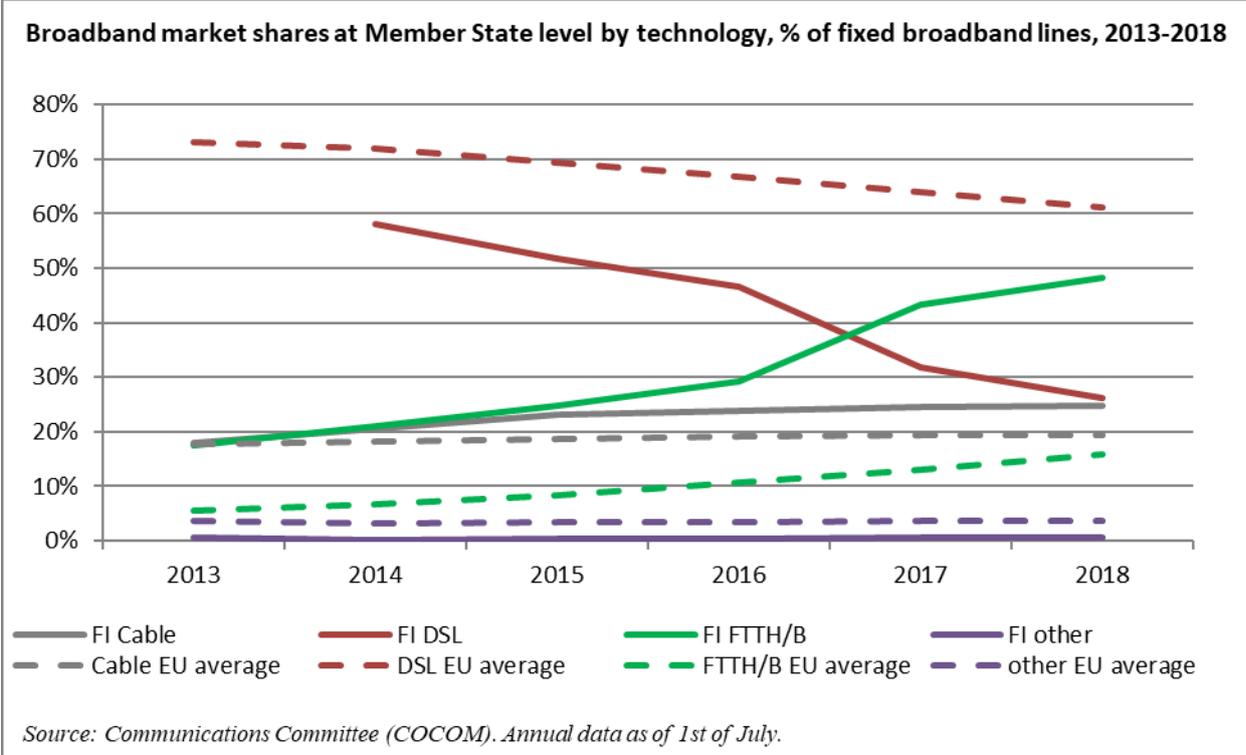
While cable growth has been rather flat year-over-year, almost half of the subscriptions in 2018 were fibre to the home/building (FTTH/B, 48.3 %). Fibre has replaced DSL, which decreased from 63.8 % in 2013 to 26.3 % in 2018.

Some small companies entered the fixed broadband market in 2018: Cinia Plc. purchased Netplaza (ISP and wholesale operator) in June 2018. Market shares have been quite stable over the reporting period.

Access to a fast broadband connection has increased in recent years. Fixed broadband take-up at 58 % lags behind the EU average of 77 %. Only 29 % of households with fixed broadband chose to subscribe to fast broadband (at 30 Mbps or above), which is much below than the EU average of 41 %. One of the reasons for the relatively low take-up of fixed broadband connectivity can be seen in

² Source: Traficom.

Finland's excellent performance in mobile broadband. The relevant pattern is also not price-related insofar as Finland leads the ranks in terms of the broadband price index (94.1 out of 100 against 87.2 out of 100 for the EU as a whole), which pertains only to fixed technology.

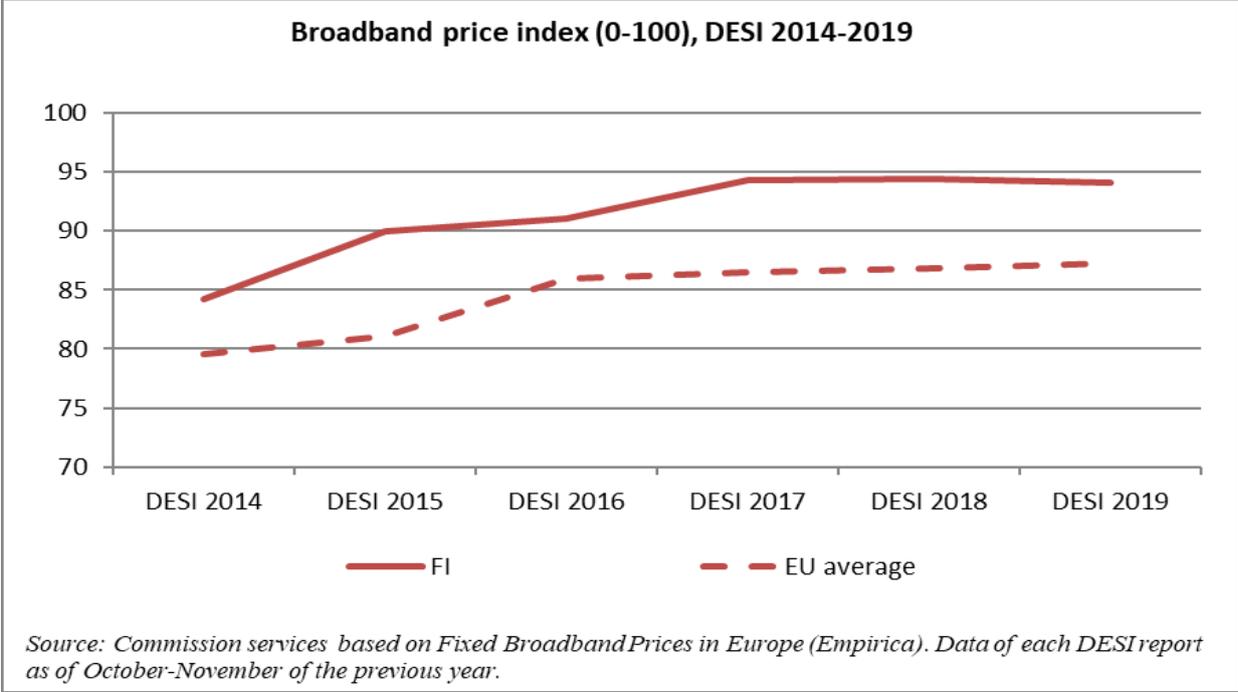


As of June 2018, the market shares by operator for fixed network broadband subscriptions were as follows: Elisa 35 %, TeliaCompany 27 %, DNA 27 %, Finnet Association 8 %³, others 3 %⁴.

³ Finnet Association is a central organisation and co-operative forum of local ICT companies. It consists of 23 companies together with their subsidiaries and affiliates.

While Finland’s fast broadband penetration (29.3 %) is below the EU average (40.6 %) in spite of an increasing trend over the last 2 years (from 21.6 % to 29.3 %), its penetration of more future-proof ultrafast networks (20.8 % in 2018) has consistently been above the EU average over the last 5 years (19.9 % in 2018).

Finland’s broadband price index is above the EU average: in 2018, it stood at 94.1 against 87.2 for the EU as a whole respectively⁵



2.2 Mobile markets

In 2018, there were no significant changes in the market shares of the mobile operators. Elisa is the market leader with a market share of 38 %. TeliaCompany’s market share is 34 % and DNA’s 27 %⁶. The market share of other operators amounts to 1 %⁷.

In January 2019, DNA⁸ announced that it had just acquired Moi Mobiili Ltd, a virtual mobile network operator that has operated on DNA’s mobile network since 2016.

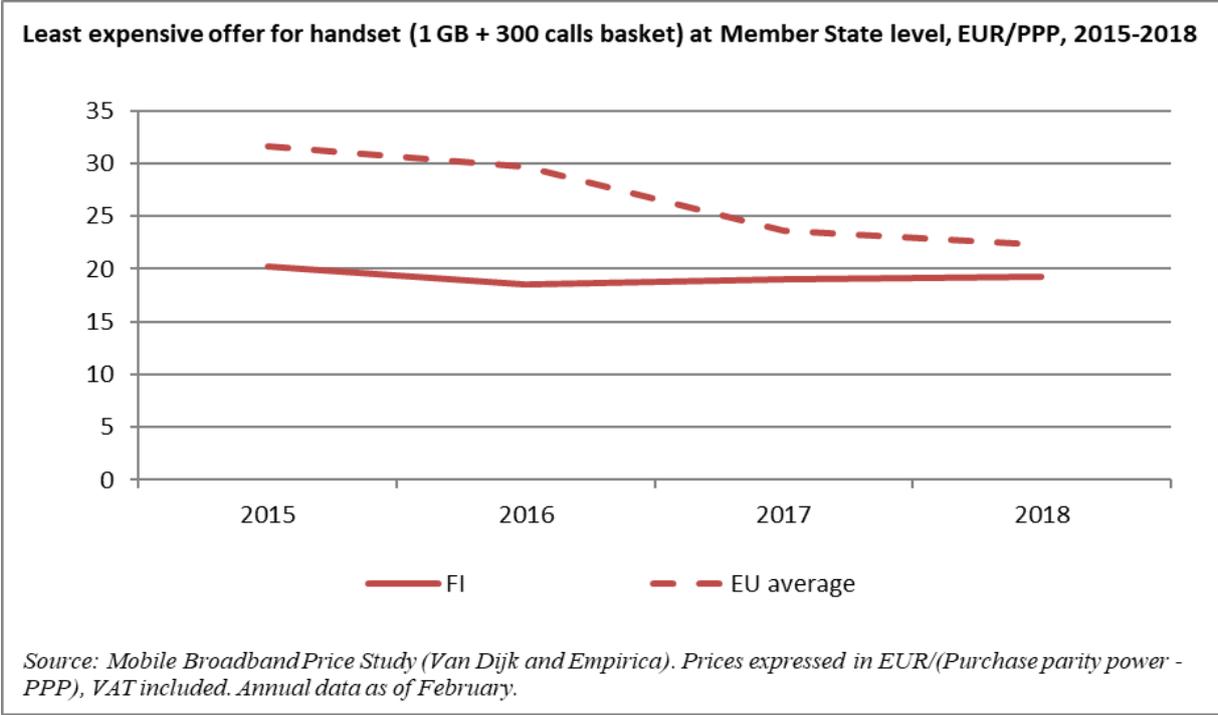
The number of mobile subscriptions has been around 9.5 million over the last 5 years. The total amount of subscriptions has therefore been very stable. With mobile broadband penetration of 156 %, Finland is second in the EU (EU average 96 %). 8.5 million of the subscriptions have unlimited or limited monthly data plans. The number of subscriptions with an unlimited data plan is 6.2 million (around 65 %), and the figure is growing steadily.

Over 2018, mobile network operators continued to upgrade and increase the coverage of their LTE networks, which now reach 100 % of households. At the end of July 2018, 89 % of households had

⁴Source: Traficom
⁵ 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
⁶Source: Traficom
⁷Source: Traficom
⁸ In April 2019, Telenor announced that they would acquire 54 % of DNA’s stake through separate agreements with DNA’s two largest shareholders, Finda Telecoms Oy and PHP Holding Oy. The process is expected to be concluded in Q3 2019.

access to one or several 100 Mbps (theoretical maximum speed) mobile networks. Similarly, up to 98 % were covered by a 30 Mbps network. As LTE construction projects have largely followed residential patterns, geographical coverage is significantly lower: 100 Mbps mobile networks cover 10 % of Finnish territory, and 30 Mbps networks 45 %⁹.

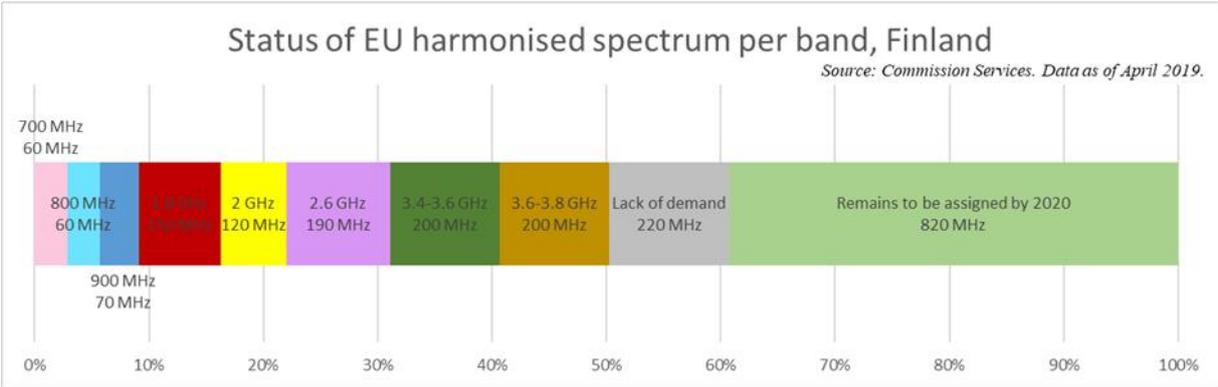
Finland’s least expensive offer for a handset is lower than the EU average (€/PPP 19.30 against €/PPP 22.30 for the EU respectively).



The market shares of mobile operators in Finland are confidential.

3. Regulatory developments

3.1 Spectrum



In Finland, 50 % of the spectrum harmonised at EU level for wireless broadband has been assigned. The spectrum that still needs to be assigned is mainly in the 1.5 GHz and the 26 GHz bands¹⁰.

⁹ Source: Traficom

¹⁰ The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the ‘5G pioneer bands’ in each EU Member State. For the 3.4-3.8 GHz band, this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235 are considered 5G-ready. However, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic

In November 2018, the first licences in the 3.4-3.8 GHz band were granted and the corresponding rights of use may already be used for 5G networks from the beginning of 2019. Frequency 3410–3540 MHz was auctioned to Telia Finland for €30.2 million, frequency 3540–3670 MHz was auctioned to Elisa for €26.3 million, and frequency 3670–3800 MHz was auctioned to DNA for €21 million. The assignment process has therefore enabled the acquisition of large blocks of spectrum, facilitating the provision of gigabit 5G services at reasonable prices (4 euro cent/MHz/pop). The licences are valid until 31 December 2033 and do not contain any coverage obligation. Networks will be built on a commercial basis. However, due to the limitation caused by a non-EU neighbouring country, the use of the 3.6-3.8 GHz band is currently restricted.

As far as spectrum trading is concerned, Elisa purchased band 2570-2620 MHz from Ukkoverkot Oy in June 2018 and agreed to rent the capacity to Ukkoverkot Oy for business use in a few geographical areas. Elisa is using the spectrum to increase capacity in the mobile network. As part of the transaction, Elisa acquired Ukkonet Oy's share capital from Ukkoverkot¹¹.

3.2 Regulated access

On 26 January 2018, the Commission received notifications from the Finnish communications regulatory authority FICORA concerning the market for wholesale local access provided at a fixed location (Market 3a of the 2014 Recommendation on relevant markets¹²) and the market for wholesale central access provided at a fixed location for mass-market products (Market 3b of the 2014 Recommendation on relevant markets) in Finland. In its draft decisions, FICORA designated 21 operators as having significant market power (SMP) on the relevant markets and offered to impose remedies on them.

On the basis of the market analyses, FICORA planned to impose stricter remedies on the three major SMP operators that account for some 90 % of retail and wholesale broadband markets: DNA Oyj, Elisa Oyj and Telia Finland Oyj. The remedies at hand include obligations to lease out network capacity and equipment facilities. On the other hand, FICORA planned to impose lighter remedies on the 18 smaller SMP operators. Those remedies include obligations to apply non-discriminatory prices to the relevant products and services.

On 21 February 2018, the Commission adopted a Decision on the notified measures¹³. It contained the following key points: the Commission invited FICORA to closely follow the evolution of the wholesale central access market and, in particular, the level of investments by operators outside their network footprint. If the stricter regulation imposed on the wholesale local access market and the non-discrimination obligation imposed on the wholesale central access market fails to provide a sufficient constraint on prices charged by operators for their bitstream services, the Commission urged FICORA to already review its approach before the end of the market review period and to apply stricter remedies, at least to the three larger operators, on the wholesale central access market.

TFICORA adopted the relevant decisions in March 2018. On the one hand, FICORA has imposed the following remedies in Market 3a on DNA, Elisa and Telia: access rights, non-discrimination, transparency, pricing, cost-oriented price caps on fibre local loop unbundling (based on Long Run Incremental Cost plus, LRIC+), conditional cost orientation on copper (stable copper prices for next 3

communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

¹¹ Source: Elisa.

¹² 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.

¹³ C(2018) 1211 final.

years), fair and reasonable pricing of virtual unbundled local access and cost accounting. On the other hand, FICORA has imposed the following remedies in Market 3a on 18 smaller operators: access rights, non-discrimination and transparency obligations.

The Finnish Transport and Communications Agency, Traficom, has also started a new market analysis for ex-market 18 (broadcasting transmission services to deliver broadcast content to end-users).

4. End-user matters

By 12 December 2018, 162 complaints had been addressed to FICORA F. Almost all of them were resolved through guidance without the need to open formal administrative proceedings. Quality of service, numbering-related issues and pricing were among some of the most commonly reported issues.

In July 2018, the Finnish Consumer Ombudsman scrutinised the marketing of phone subscriptions and mobile broadband subscriptions as ‘5G subscriptions’ by one of the main market players. The necessary 5G network was not yet in general use and no 5G terminal devices were available to consumers. It turned out that the subscriptions used 4G technology. Against this background, the Ombudsman instructed the relevant market player to stop marketing the subscriptions as ‘5G subscriptions’. The operator promised to comply with the Ombudsman’s request.

In April 2018, the online shops of four of Finland’s largest telecoms companies were found to have given consumers misleading information about the sales processes of mobile phone and mobile broadband subscriptions. The Consumer Ombudsman asked for commitments from the respective companies to have any irregularities on their websites corrected. All of the companies concerned promptly corrected their websites. The involvement of the Consumer Ombudsman took place as part of a joint sweep by the EU consumer authorities in November 2017, when the websites of 207 telecoms companies were checked¹⁴.

a. Net neutrality

In 2018, FICORA did not impose requirements on technical characteristics, a minimum Quality of Service and other appropriate and necessary measures. In April 2018, it issued an opinion on Quality of Service differentiation in mobile networks, enabling internet service providers (ISPs) to offer subscriptions with different Quality of Service as they should be able to agree with their customers while making sure that end-user rights are not infringed.

Traficom has updated its net neutrality guidance for ISPs and stressed in particular that they should give end-users a public IPv4 address free of charge when requested. According to Traficom, network address translation limits end-users’ possibilities to exercise their right to freely use services and applications.

b. Roaming

On 27 April 2018, FICORA allowed Elisa to continue charging its subscribers for data roaming when in another Member State for another year. It also renewed DNA’s authorisation to apply surcharges to its subscribers’ roaming consumption in EU and European Economic Area (EEA) countries¹⁵. Furthermore, it also renewed the roaming derogations granted to Telia and Moi Mobiili.

Even though the operators mentioned above were granted derogations, most Finnish subscribers increased their consumption of roaming services when abroad. They have consumed 1.2 times more roaming minutes (calls made) in Q4-2017 than in Q4-2016 and 2.7 times more data in Q4-2017 than in

¹⁴ Source: Finnish Competition and Consumer Authority.

¹⁵ The renewed authorisation is valid from 15 April 2018.

Q4-2016. Finnish subscribers also consumed 1.2 times more roaming minutes (calls made) in Q1-2018 than in Q1-2017 and 2.9 times more roaming data in Q1-2018 than in Q1-2017.

c. Emergency communications — 112

112 is the only emergency number in use in Finland. As for disabled users, legislation already included requirements for network operators to implement 112 SMS in 2015.

Near instant times (up to 10 seconds) were also reported for the provision of network-based caller location by Finland¹⁶. On the other hand, the time needed to receive handset-based location was 5 seconds.

In 2018, Traficom initiated the update of the Regulation on technical implementation and ensuring emergency traffic (FICORA 33 G/2016 M). The update will include examining the technical requirements to VoLTE and VoWiFi emergency calls. It is expected to be ready in 2019.

d. Universal service

There have not been any changes to the scope of universal service. Public payphones, directories and/or directory enquiry services are not part of the universal service obligation.

A 2 Mbps broadband connection is within the scope of the universal service obligation. Broadband can be fixed or mobile. The download speed of the connection must be at least 2 Mbps. Some variation is allowed, but the average minimum speed must be 1.5 Mbps over a measurement period of 24 hours, and 1 Mbps over any measurement period of 4 hours.

5. Institutional issues

As of 1 January 2019, the Finnish Transport Safety Agency (Trafi), FICORA and certain functions of the Finnish Transport Agency merged to form Traficom, the new Finnish Transport and Communications Agency. Their functions and services have continued without interruption and will be further developed. There are some 900 employees at the Agency across 15 locations in Finland. By Governmental Decision of 19 December 2018, Mrs Kirsi Karlamaa¹⁷ was appointed Director-General.

6. Conclusion

While Finland has good fixed broadband and 4G coverage in general, coverage in rural areas could be further improved. The main problem has been the lack of incentive for market players to invest in sparsely populated areas of the country. State aid rules were amended to tackle this issue. So far, many broadband rollout projects are ongoing as a result of better rules.

In addition, Finland is a frontrunner when it comes to promoting 5G use nationwide. Parts of the necessary spectrum bands for 5G use cases were auctioned in November 2018 in significant blocks and at sustainable prices. Spectrum may already be used to construct 5G networks from the beginning of 2019. The relevant spectrum policy measure is part of a broader digital infrastructure strategy aligned with the Commission's connectivity objectives for Europe in 2020.

¹⁶ Implementation of the single European emergency number 112 – Results of the twelfth data-gathering round.

¹⁷ Mrs Karlamaa had been appointed Director-General of FICORA from 22 October 2015 for a five-year term of office. The appointment decision is valid for a five-year term as of 20 December 2018.