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| From: | Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director |
| date of receipt: | 11 June 2019 |
| To: | Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union |
| No. Cion doc.: | SWD(2019) 206 final (PART 5/6) |
| Subject: | COMMISSION STAFF WORKING DOCUMENT Digital Economy and Society Index (DESI) 2019 |

Delegations will find attached document SWD(2019) 206 final (PART 5/6).

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PART 5/6

# COMMISSION STAFF WORKING DOCUMENT

## Digital Economy and Society Index (DESI) 2019


# Digital Economy and Society Index (DESI)

## 2019 Telecom Country Reports

## Part I

# Belgium

| | Belgium | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | Value |
| **1a1 Fixed broadband coverage**<br>% households | **>99.5%**<br>2016 | **>99.5%**<br>2017 | **>99.5%**<br>2018 | ***7*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **80%**<br>2016 | **81%**<br>2017 | **NA**[1]<br>2018 | | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **95%**<br>2016 | **97%**<br>2017 | **>99.5%**<br>2018 | ***2*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **68**<br>2016 | **72**<br>2017 | **76**<br>2018 | ***24*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **0%**<br>2018 | ***13*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **98%**<br>2016 | **98%**<br>2017 | **99%**<br>2018 | ***3*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **65%**<br>2016 | **67%**<br>2017 | **67%**<br>2018 | ***3*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **92%**<br>2017 | **96%**<br>2018 | ***3*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **30%**<br>2016 | **42%**<br>2017 | **40%**<br>2018 | ***5*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **84**<br>2016 | **82**<br>2017 | **83**<br>2018 | ***19*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

According to the Plan for ultrafast internet in Belgium, by 2020 all Belgian households should have internet access with speeds of at least 30 Mbps, via a mix of technologies. However, Belgium wants to go further than the European connectivity targets and also provide, by the same deadline, half of the country with connections that allow speeds of up to 1 Gbps. Indeed, the first commercial offers in Belgium at 1 Gbps are expected to be launched in the course of 2019.

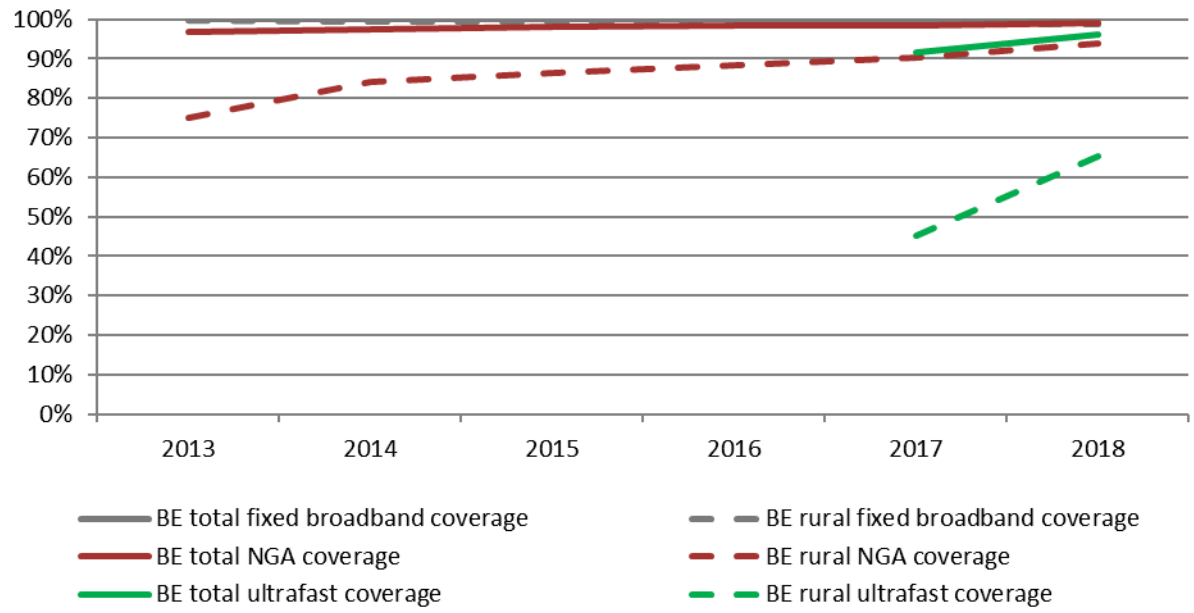
Belgium has universal broadband coverage and the indicators for fixed broadband and NGA coverage have remained stable compared to the previous year. Ultrafast broadband coverage increased by a further 4 percentage points and reached a good 96 % of households, and 4G coverage increased by 3 percentage points to reach almost 100 % of households, bringing the country to third place as regards ultrafast broadband coverage and to second place as regards 4G coverage among its peers. However, FTTP coverage in Belgium clearly lags behind the EU trends.

Most investments in Belgium are market-driven, with national and EU funding playing only a minor role.

In order to achieve universal NGA coverage by 2020, a white areas action plan was launched in 2016. This plan identified 39 municipalities in which at least 40 % of the population does not have access to connection speeds of 30 Mbps and where there is no full 4G coverage. Since then, thanks to stimulations of investment in these areas, operators have already invested more than €32 million in improving their coverage, and in 2018 only 16 municipalities remained in white zone.

1 The data is under revision by the Belgium authorities.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

Fluvius is a new utility company in Flanders, created by the merger of Eandis and Infrax in July 2018. It operates the distribution networks for gas, electricity, sewerage, cable distribution and heat. The utility intends to launch a fibre to the home (FTTH) network in Flanders as a wholesale-only operator. In 2019, a pilot project will start in five Flemish cities, with the aim of connecting 15,000 households. Fluvius' intention is to build the passive network, i.e. the ducts and dark fibre, and telecommunications operators will then connect their infrastructure and services to the network. For this project in the five pilot cities, Fluvius will collaborate with Orange with its role being to contribute the active components and the commercial rollout. The network will also be open to other interested players on a wholesale basis.

roximus' €3 billion FTTH investment plan ('Fibre for Belgium') for 2017-2027 is to cover the centres of cities and communes, through deployment both on the façade of buildings and in certain sections in underground ducts. Its plan is moving ahead, with fibre being rolled out in several cities since the beginning of 2017.

Telenet's €500 million 'Grote Netwerf' investment programme, which aims at enabling download speeds of at least 1 Gbps, is expected to be complete by mid-2019. At the end of 2018, almost all of the nodes in Telenet's HFC (hybrid fibre-coaxial) network had already been upgraded.

On 10 September 2018, the Belgian Institute for Postal services and Telecommunications (BIPT) adopted a Communication regarding the introduction of 5G in Belgium. The Communication mentions that the 5G pioneer bands will be assigned in autumn 2019 (with the exception of the 26 GHz band, which is scheduled for 2021). However, this timing is likely to be delayed due to disagreements on the division of the proceeds. Orange announced in December 2018 that they would be the first operator to introduce 5G in Brussels. All operators are indeed looking into 5G use cases and a 5G network launched by Ericsson is active in a technology park in Hasselt, serving as a test environment for companies and researchers. However, the upcoming spectrum auction is a prerequisite for the timely launch of 5G.

For the purpose of enabling the launch of 5G in the Brussels Capital region, a political agreement was reached in October 2018 to raise the electromagnetic field exposure limits from 6 to 14.5 V/m. The text was expected to be voted on by the government of Brussels in early 2019.

The implementation of the European Electronic Communications Code started. BIPT is preparing a draft law amending the current Electronic Communications Act. This draft is expected by summer 2019.

## 2. Market developments

### Competitive environment

The Belgian telecommunications market is a strongly consolidated one, with the incumbent and the cable operators dominating the fixed market. In any part of the country, the combined market share of Proximus and of the regional cable operator is higher than 95 %. All big players offer bundled services, which are indeed an important driver of competition on the Belgian market. According to a BIPT survey, 93 % of the population uses the internet from a fixed line at home and 67 % uses the mobile internet[2]. The increasing use of mobile internet does not seem to be at the expense of fixed line use since the multiplay offers with both mobile and fixed broadband internet are still experiencing increasing success.

The demand for bundles grew by 4.3 %. Quadruple play was the strongest riser, confirming the trend towards fixed-mobile convergence. However, triple play[3] remains the biggest bundle, which counts for 53 % of the total residential bundle volume. Mobile is present in 42 % of bundles, and 95 % of bundles include TV. Another factor which could help increase bundle use is 'easy switch'. This has been in place since 1 July 2017 and introduces a number of measures aimed at facilitating an operator switch.

Orange strengthened its position as a converged operator and increased its market share by 2 % in the residential market. By end 2018, it had expanded its 'LOVE' convergence customer base (internet + TV + mobile) to 180,000 customers.

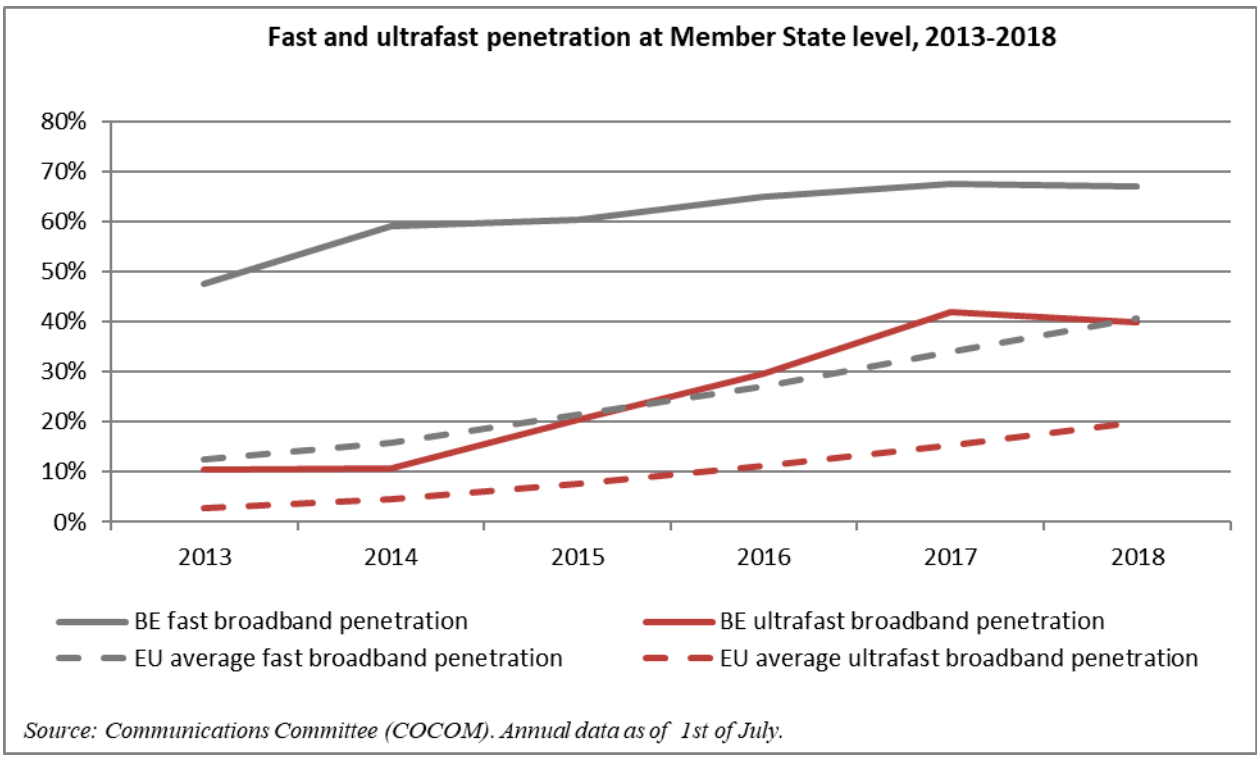
roximus's VDSL2 coverage reached 95 % of the Belgian population, with a vectoring coverage of 88 %. VOO launched offers with speeds of 400 Mbps in December 2018.

The business market is still dominated by the incumbent, which has ¾ of the market in this segment, although Telenet succeeded in increasing its share slightly.

### 2.1. Fixed markets

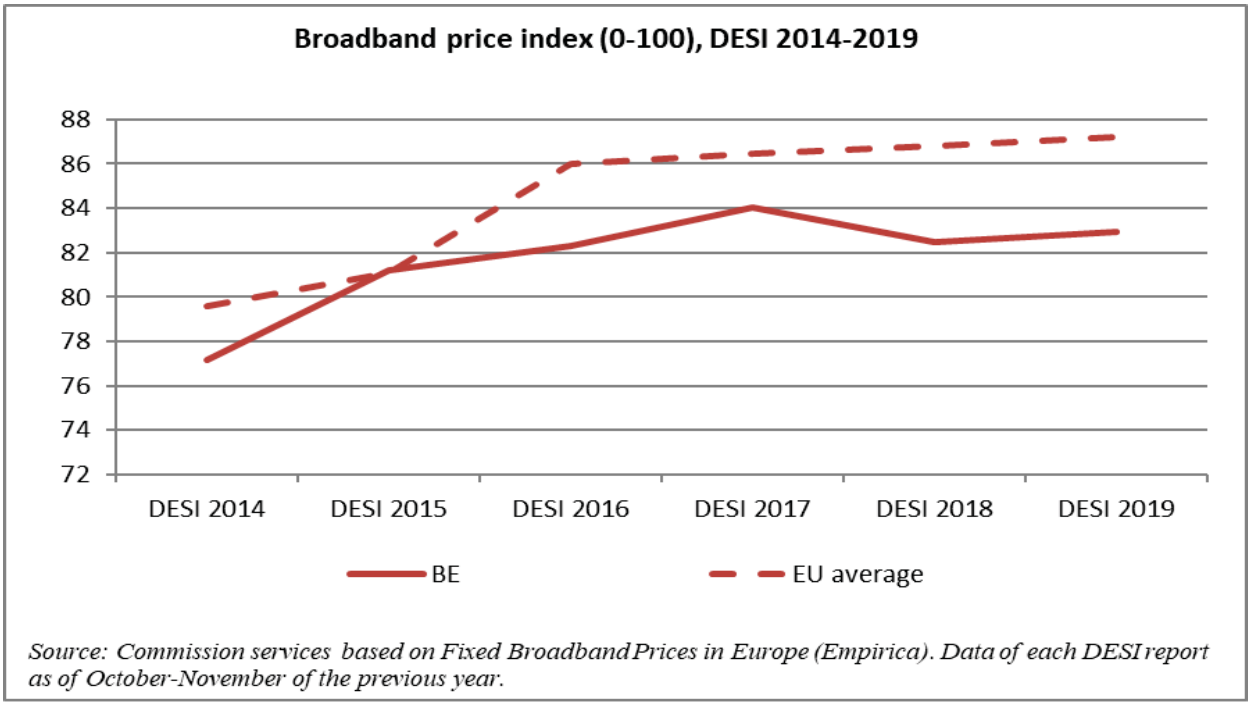
The number of fixed broadband lines grew in 2017, mainly driven by cable. With a market share of 46 % of fixed broadband subscriptions, the Belgian incumbent is the 10th strongest incumbent in the EU. Proximus and Telenet together dominate the market with a cumulative share of 85.1 %. Telenet consolidated its position following the acquisition of SFR Belgium, while Proximus saw a slight increase in its market share. Orange continues to grow but remains a small player compared to the other two.The Belgian broadband market is dominated by access via cable, followed by DSL with only a very minor share of FTTH/B. Belgium scores very well in terms of fast (3rd place) and ultrafast (5th place) broadband take-up. The operators are constantly increasing the speed in their offers. Telenet is continuing to upgrade its coaxial cable network to offer 1 Gbps data rates by 2019. More than 200 municipalities are already eligible. The operator VOO announced the launch of the first commercial offers at 400 Mbps for December 2018 in Brussels and Wallonia.

[2] BIPT, Inquiry about users' perception of the Belgian electronic communications market, 2018.
[3] Broadband, television and fixed telephony.




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

In terms of prices, Belgium scores relatively low in the broadband price index[4], and stabilises at the 19th place, 4 points below the EU average. The Belgian market is the second most expensive for triple play bundles including broadband, fixed telephony and television, both in the segments 12 Mbps-30 Mbps and 30 Mbps-100Mbps[5].

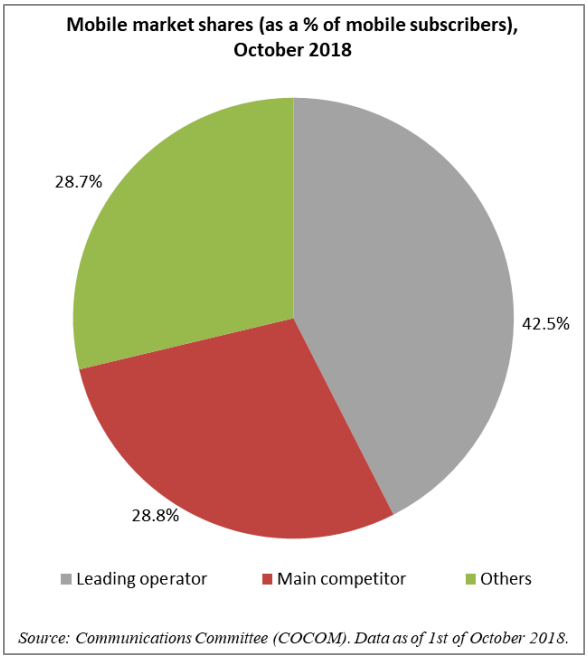



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

[4] 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.

[5] Source: European Commission based on Empirica, Fixed Broadband Prices study, 2018.

## 2.2. Mobile markets

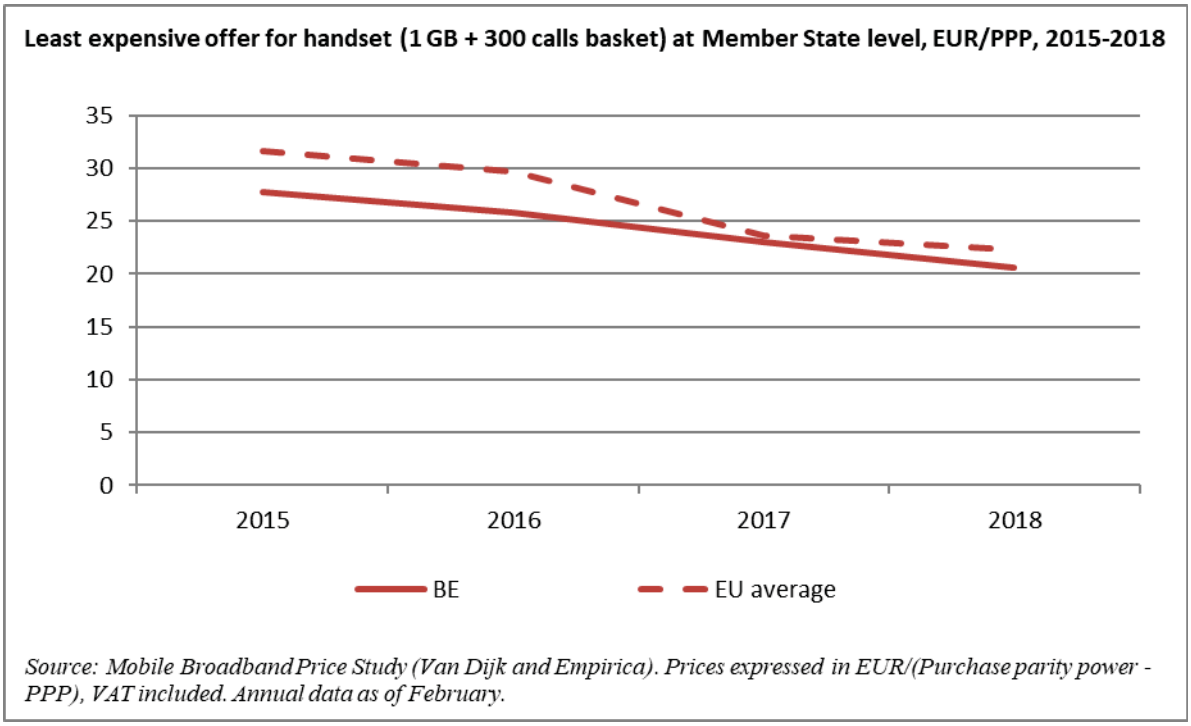



*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

There are three mobile network operators (MNOs) and the BIPT reported three full mobile virtual network operators (MVNOs) for the end of 2018 in the Belgian market, along with many resellers. With 42.5 % share, Proximus is the market leader, followed by Orange with 28.8 %. The third mobile operator and the MVNOs market shares amounts to 28.7 %.

The least expensive offer in Belgium for a basket of 1 GB and 300 calls is slightly below the EU average, costing €20.56 compared to €22.32. Consumers seeking data-only subscriptions of 5GB and above find prices much more expensive than on EU average[6].

Mobile broadband take-up remains very low at 76 subscriptions per 100 people, compared to the EU average of 96.




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

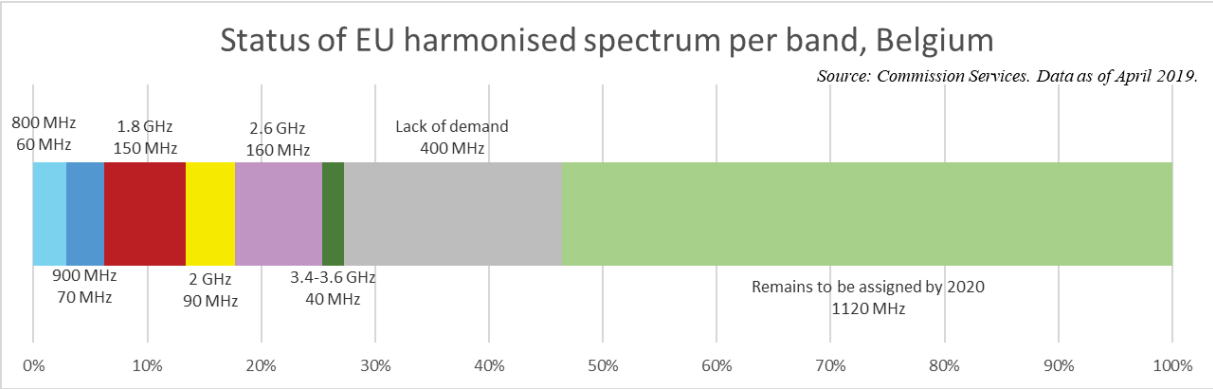
## 3. Regulatory developments

### 3.1. Spectrum

In Belgium, 27 % of the spectrum harmonised at EU level for wireless broadband has been assigned[7]. The spectrum that remains to be assigned is mainly in the 5G pioneer bands, i.e. 700 MHz, the 3.6-3.8 GHz and the 26 GHz bands.

[6] Source: Empirica, Mobile Broadband Prices in Europe study, 2018.

[7] 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 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU) 2019/235 are considered 5G-ready. On the contrary, the




Under Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union, Member States can allow the use of this band ('the 700 MHz band') for terrestrial systems capable of providing wireless broadband electronic communications services by 30 June 2020. In order to allow such use of the 700 MHz frequency band, Member States had to conclude all the necessary cross-border frequency-coordination agreements within the Union by 31 December 2017.

As Belgium had not concluded all cross-border coordination agreements by this deadline, the Commission sent a letter of formal notice to Belgium on 20 July 2018, expressing concerns that Belgium had failed to fulfil its obligations under Article 1(2) of Decision (EU) 2017/899. At the end of 2018, Belgium informed the Commission about the conclusion of the missing agreements.

A multi-band auction covering the 700 MHz, 900 MHz, 1.5 GHz, 1.8 GHz, 2 GHz and 3.6 GHz bands was expected to be carried out in late 2019. However, meetings of the concertation committee, made up of representatives of the federal government, the communities and the regions in February and in March 2019 revealed that an agreement on the division of the income of the auction could not be reached. This means that the spectrum auction will be delayed at least until 2020.

On 26 June 2018, BIPT published a study regarding the impact of a fourth mobile network operator on the Belgian market. This study left the door open for such entry, so a call for interest is expected to be carried out to establish if there is indeed interest by a new entrant. If so, some spectrum will be reserved in the 700 MHz, 900 MHz, 1.5 GHz, 1.8 GHz, 2 GHz bands. Belgium also plans to reserve spectrum for the existing operators in the 900 MHz, 1.8 GHz and 2 GHz to ensure continuity of services. Existing operators are concerned about the favourable conditions for a new entrant.

On 26 July 2018, the federal Government adopted a number of draft Royal Decrees regarding these frequency bands. On 18 September 2018, the BIPT launched a public consultation concerning the organisation of the rights allocation procedures for the mentioned bands.

The 700 MHz band will contain obligations regarding coverage, obligations to cover rail tracks and providing services to the emergency services operators. With regard to the coverage obligations, the obligation will be to cover 70 % of the population after 1 year, 99.5 % after 2 years and 99.8 % after 6 years, with a minimum speed of 6 Mbps.

### 3.2. **Regulated access**

On 5 October 2017, the Commission addressed a letter of formal notice to Belgium in view of persistent delays in carrying out several market analyses. During the course of 2018, Belgium caught up on the delays and notified all missing markets to the Commission. Details of these market reviews are set out below.

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percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

Analysis of markets 3a/14, 3b/14 and 18/03

The analysis of the market for wholesale local access provided at a fixed location (market 3a of the 2014 Recommendation on relevant markets[8]), the market for wholesale central access provided at a fixed location for mass-market products (market 3b of the 2014 Recommendation on relevant markets) and the market for the delivery of broadcasting signals and access to broadcasting networks (market 18 of the 2003 Recommendation on relevant markets[9]) was notified to the Commission on 27 April 2018. The final measures were adopted on 29 June 2018. In a market like Belgium's, which is dominated by bundles and is concentrated, the provision of regulated access to fixed networks on terms permitting sustainable competition should also help boost competition in mobile networks.

The Conference of Regulators ('CRC') defined market 3a as the market for passive physical and virtual (VULA) access to copper and fibre networks at a local level, with a national geographic dimension.

Concerning market 3b, the CRC identified two separate wholesale central access markets according to the underlying network type:

- the market for central access over copper and fibre networks (market 3b-1) for residential and non-residential end-customers, with a national geographic dimension;
- the market for central access over cable networks (market 3b-2) for residential and non-residential end-customers, with a geographic dimension matching the coverage area of each cable operator (Brutélé, Nethys, and Telenet).

The regulator argued that there is a distinction between central access over copper/fibre (Proximus's network) and central access over the network of the cable operators because they use different protocols and also because there are significant switching costs at wholesale level, which lead to the absence of substitutability between the two markets.

On the demand side, an access-seeker migrating between products under different types of standardisation would generate considerable costs and delays, which would make the switch unprofitable. On the supply side, the regulator argued that the provider of wholesale central access under a particular type of standardisation would not be able to adapt its means of production to the other type of wholesale central access without facing considerable costs and delays. Finally, the regulator concluded that there are not sufficient indirect constraints to justify including these two products together in the same market.

However, the regulator also provided a supplementary joint significant market power (SMP) analysis, in which they assumed a combined market in the market for wholesale central access provided at a fixed location for mass-market products in which both cable and copper/fibre are present. On the basis of this alternative reasoning, the NRA concluded that the presence of a joint SMP would justify imposing a similar set of regulatory obligations as in the case of single dominance on markets 3b-1 and 3b-2.

Market 18 is defined as wholesale access to broadcasting over cable networks whose geographical coverage area matches that of each cable operator. Wholesale broadcast access over alternative

[8] Commission Recommendation 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 (OJ L 295, 11.10.2014, p. 79–84).

[9] Commission Recommendation of 11 February 2003 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 communication networks and services (Text with EEA relevance) (notified under document number C(2003) 497), OJ L 114, 8.5.2003, p. 45–49.

platforms such as satellite, IPTV and digital terrestrial television is not included in this market. Subsequently, CRC designated the following undertakings as holding SMP: Proximus on market 3a and 3b-1; Telenet, Brutélé and Nethys on markets 3b-2 and 18.

The regulator proposed to continue imposing a set of regulatory obligations on the SMP operators (access and interconnection, non-discrimination, transparency, cost-accounting and price control), while also putting forward a number of new remedies. Notably, the regulator dropped the retail-minus approach for the cable operators and put in place a "fair" price remedy whereby the regulated (fair) price is determined mainly on the basis of the underlying costs of the access (costs are to be determined using the BU-LRIC cost model (i.e. BU-LRIC+)). The regulator imposed the obligation to charge "fair" prices for access to Proximus' fibre network and for access to the cable networks, the copper network (VDSL) of Proximus remains regulated on the basis of price that is supposed to be cost oriented.

Furthermore, the CRC is reducing remedies in areas where at least three sufficiently independent NGA operators are present (including those covered by co-investment arrangements between operators, open access networks, etc.) and in areas covered by one NGA infrastructure (white or grey zones).

The Commission heavily criticized the preferred approach of finding separate wholesale markets for copper/fibre and cable. The Commission pointed out that the different wholesale platforms serve an identical retail market which is why they should, on the face of it, be considered substitutable and therefore part of the same wholesale access market. Most notably this concerns instances where wholesale access products are technically feasible and readily available, such as in a – usually uniform – wholesale central access market 3b.

In general, the delineation of markets depends on the outcome of the so called 'SSNIP test, which ultimately depends on the ability of operators to switch wholesale platforms. The Commission pointed out that empirical evidence in the Belgian market strongly suggests that switching between platforms is possible, as Orange switched its access platform in the past. The cost of switching should be assessed further, together with the expected future benefits, such as technological advantages of a chosen platform and/or the need to be able to supply multi-play packages to compete sustainably on the retail market. Moreover, the Commission pointed out that the analysis did not sufficiently take into account the perspective of potential new access seekers, which would not have to incur switching costs when entering the market. It therefore considered that the NRA should assume a hypothetically competitive access regime when assessing the costs of switching.

However the Commission was able to accept the decision based on the supplementary joint-SMP analysis, which was considered more appropriate.

The Commission therefore did not move to phase 2 as, in the circumstances, a broader definition of market 3b (including the jointly dominant Proximus and cable operators) would not lead to a different regulatory outcome.

Furthermore, in view of long-term dynamics of the markets, the Commission invited the CRC to closely monitor the business development of access-seekers, switching behaviour, new entry, as well as the potential signing of commercial access or co-investment agreements.

With regard to the pricing methodology, the Commission suggested that it might be more appropriate for the CRC to take account of the investment risk in its calculation of the cost of capital, instead of an additional mark-up to the cost-oriented prices resulting from the cost model.

Finally, the Commission urged the CRC to finalise the BU-LRIC cost model for fibre and cable access services without delay and to notify the new prices to the Commission.

To this end, the regulator published its draft cost models and launched a public consultation on 13 December 2018.

Telenet, Brutélé and Nethys appealed the market analysis decisions. Telenet also appealed the Commission's decision issuing comments on the draft measure at the General Court of the European Union. The appeal to the General Court was subsequently withdrawn.

The national court already decided that the appeals in national court do not suspend the effects of the market analysis decision.

Analysis of market 1/14

A new analysis of the market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1 of the 2014 Recommendation on relevant markets) was notified to the Commission on 4 October 2018.

The relevant geographic markets coincide with the coverage area in which each operator provides a fixed call termination service (within the territory of Belgium) and BIPT proposed to designate 27 operators as having SMP in their relevant market.

BIPT imposed on all SMP operators obligations of access and interconnection, non-discrimination, transparency and cost-oriented price control and set the new fixed termination rates at €0.00116/minute, calculated based on the arithmetic average of termination costs in 2018-2020.

The Commission did not have comments on the notification and the measures were adopted on 20 November 2018.

Analysis of markets 1/07 and 2/07

The analysis of the market for access to the public telephone network at a fixed location (market 1 of the 2007 Recommendation on relevant markets[10]) and of the market for call origination on the public telephone network (market 2 of the 2007 Recommendation on relevant markets) was notified to the Commission on 30 October 2018.

BIPT concluded that the retail market for access to the public telephone network at a fixed location no longer meets the three criteria and therefore proposed to withdraw all regulatory obligations.

Similarly, BIPT concluded that the wholesale market for call origination services on the public telephone network provided at a fixed location no longer meets the three criteria and thus no longer warrants *ex ante* regulatory intervention. BIPT therefore proposed to withdraw the obligations previously imposed on Proximus.

The Commission did not make comments on the notification and the final decision was adopted on 7 December 2018.

Analysis of market 4/14

BIPT started its analysis of the market for high-quality wholesale access in year 2018. This market concerns leased lines and similar services and primarily addresses (larger) companies. A draft decision was published in March 2019.

Following public consultation, the draft analysis will be submitted to the Belgian Competition Authority, the media regulators and to the European Commission. The final decision is expected before the end of year 2019.Transposition of the Broadband Cost Reduction Directive

[10] Commission Recommendation of 17 December 2007 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 (notified under document number C(2007) 5406) (Text with EEA relevance), OJ L 344, 28.12.2007, p. 65–69.

On 15 September 2017, the European Commission brought an action in front of the European Court of Justice against Belgium for failure to fulfil its obligations under Article 13 of the Broadband Cost Reduction Directive 2014/61/EU[11], i.e. for failing to communicate all measures necessary to transpose the Directive into national law.

At the end of 2018, Belgium had still not adopted all the laws, regulations and administrative provisions necessary to comply with the Directive, even though the deadline for transposing the Directive into national law was 1 January 2016.

A hearing in front of the European Court of Justice took place on 22 January 2019 (Case C-543/17). Advocate General delivered his opinion on 11 April 2019.

## 4. End-user matters

The mediation service for telecommunications received 10,625 consumer mediation complaints in 2018, the large majority of which resulted in an amicable agreement. Most complaints related to billing/pricing, followed by contractual issues and availability/quality of the service.

A new simulator for tariff comparison is being prepared by the regulator. It is expected to be available at the end of Q3 2019, focus on user-friendliness and directly integrate the user's consumption profile to allow a tariff comparison adapted to the consumer's needs. Tariff information on the website 'besttariff.be' will be made available in open data format to stimulate price comparison by third parties. In addition, a price comparison study to compare domestic prices with prices in neighbouring countries is expected to be made available by the regulator in 2019.

According to the 2018 consumer markets scoreboard, from a consumer perspective all four electronic communications markets score below the EU average (-2.8 points for the internet provision service market[12]; -2.9 points for the mobile telephone services market ; -1.4 points for the fixed telephone services market and -3.8 for the TV-subscriptions market). They do not present statistically significant variation between 2015 and 2017.

### a. Net neutrality

BIPT registered only a few complaints about net neutrality and does not see major issues in Belgium as regards open internet access. It is currently investigating some zero-rated offers by different operators. BIPT's concerns regarding one of the offers are that the maximum allowance for access to the internet does not allow end-users to use other apps with similar content or functionalities as the zero-rated apps and that the operator does not engage proactively to open up the zero-rated platform to other content and application providers. The regulator asked the operator to adapt their offer.

BIPT also examined the use of deep packet inspection (DPI) for traffic management, the analysis of which will be continued where necessary, taking into account the principles of the General Data Protection Regulation.

### b. Roaming

No major issues or violations of the Roaming Regulation were detected in 2018. BIPT continuously monitors offers on the market and any issues could be solved with the operators on an informal basis.

In 2017, VOO was the only operator which was granted a sustainability derogation. In 2018 they applied for a renewal of this derogation, which was granted by the NRA for one year, i.e. until June 2019.

[11] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[12] The MPI is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers.

### c. Emergency communications - 112

Handset-based caller location (AML) has been deployed on a voluntary basis by all MNOs, and has been available and used for emergency calls since 1 July 2017.

Since June 2017 the '112 BE' app allows users to contact emergency call centres without needing to remember the numbers for emergency services providing help on site (i.e. urgent medical assistance, urgent police assistance and fire service) and with the possibility to store personal information within the app. The app has automatic access to the location of the mobile phone and can also be used by hearing or speech impaired individuals using the chat function of the app. The app was downloaded already over 400,000 times.

Alternatively, the emergency services can be reached via SMS, which is also open to anyone.

Since 2017 Belgium also has a public warning system ('BE-ALERT') where registered users will receive warnings via text messages on mobile phones or via voice-messages on fixed phones at their residence in the event of an emergency. The BE-ALERT platform also encompasses 'SMS-Alert' which allows authorities to send text message to the population within a designated geographical area alerting them to impending danger or to mitigate the consequences of emergency situations or disasters.

The Commission services are currently looking into the functioning of emergency communications and the 112 number in Belgium, with particular regard to caller location information.

### d. Universal service

In Belgium, broadband is included in the scope of universal service. The bit rate for functional internet access is set at 1 Mbps[13].

The Belgian legal framework still needs to be adapted to the judgment of the Court of Justice of the European Union of 11 June 2015 in Case C-1/14, which ruled that special tariffs and the financing mechanism provided for in Articles 9 and 13(1)(b) of the Universal Service Directive[14] can only apply to fixed internet, but not to mobile communication services. In order to bring the law in line with the Court's judgement, an amendment to the Electronic Communications Act had been proposed. While there is agreement on eliminating the mobile part, the draft law is still pending because agreement has not yet been reached on all points of the law.

[13] Royal Decree of 2 April 2014 on the specification of the speed level of functional internet access in the provision of the geographical element of the universal service regarding electronic communications.
[14] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

## 5. Conclusion

While Belgium's performance on ultrafast fixed networks is at the top of the list, this hides the delay in the deployment of FTTH networks. There are also gaps in the mobile sector, where take-up of mobile broadband remains low. Coordinated efforts are needed to carry out the multi-band auction in a timely manner and to ensure a smooth transition towards 5G. Adding to that, the country's rollout of 5G depends on achieving a political agreement between the federal state and the regions, the lack of which is likely to delay the 3.4-3.8 GHz spectrum auction until 2020. Achieving such agreement is crucial to prevent Belgium lagging behind in 5G deployment. The provision of regulated access to fixed networks on terms permitting sustainable competition should also be conducive to enhanced competition on the mobile side and could be beneficial for the Belgian market, which is currently dominated by bundles. However, given these developments, it may not be justified to sponsor additional mobile market entry through privileged spectrum authorisation conditions.

# Bulgaria

| | Bulgaria | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage** | **95%** | **95%** | **96%** | ***19*** | **97%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1a2 Fixed broadband take-up** | **57%** | **59%** | **58%** | ***28*** | **77%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1b1 4G coverage** | **66%** | **72%** | **80%** | ***27*** | **94%** |
| % households (average of operators) | 2016 | 2017 | 2018 | | 2018 |
| **1b2 Mobile broadband take-up** | **82** | **87** | **97** | ***11*** | **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** | **74%** | **75%** | **75%** | ***23*** | **83%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1c2 Fast broadband take-up** | **31%** | **39%** | **43%** | ***15*** | **41%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1d1 Ultrafast broadband coverage** | **NA** | **75%** | **75%** | ***15*** | **60%** |
| % households | | 2017 | 2018 | | 2018 |
| **1d2 Ultrafast broadband take-up** | **5%** | **7%** | **10%** | ***23*** | **20%** |
| % households | 2016 | 2017 | 2018 | | 2017 |
| **1e1 Broadband price index** | **76** | **80** | **81** | ***20*** | **87** |
| Score (0 to 100) | 2016 | 2017 | 2018 | | 2017 |

## 1. Progress towards a gigabit society

Bulgaria ranks 25th in the connectivity dimension of DESI 2019 (down one place from last year) despite a small increase in most of the connectivity indicators. At the end of 2018, the total coverage of fixed broadband networks in Bulgaria rose by one percentage point to 96 % of households, slightly below the EU average of 97 %. Broadband take-up stands at 58 %. Despite a notable increase in 4G coverage by 8 percentage points to 80 % of households, Bulgaria still needs to catch up by 14 percentage points with the EU average. Nevertheless, take-up of mobile broadband has risen significantly (by 10 percentage points) to 97 %, slightly above the EU average of 96 %. While Bulgaria is close behind the EU average of 83 % of households covered by 30 Mbps NGA networks, at 75 %[15], it is remarkable that all the networks concerned are ultra-fast, putting the country significantly ahead of the EU average (60 %) in the latter, more future-oriented category. Moreover, take-up of fast broadband has risen considerably to 43 %, and exceeding the EU average of 41 %, although there is still a lag in the transition to ultrafast broadband subscriptions (10 % versus an EU average of 20 %) which would take advantage of the full capacity of the available networks. The fixed broadband price index[16] is 81, which is below the EU average of 87, which represents higher prices per person, that might partly explain the low take-up.

15 NGA (FTTH, FTTB, VDSL, Cable DOCSIS 3.0 and other NGA) subscriptions as a percentage of total fixed broadband subscriptions.

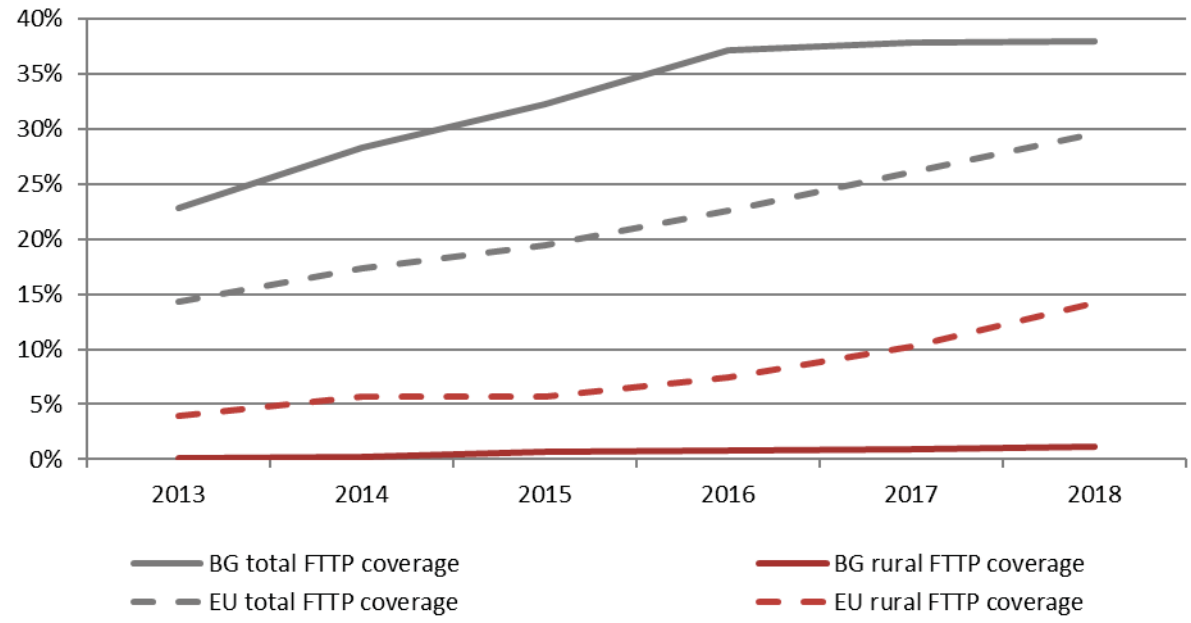
16 The broadband price index measures the prices of 12 representative broadband baskets as the percentage of household income. The baskets include three speed categories (12-30 Mbps, 30-100 Mbps and at least 100 Mbps) and four types of products (standalone internet, internet + TV, internet + fixed telephony and internet + TV + fixed telephony).

Two years before the end of the national funding programmes under the National Broadband Plan (NBP) for 2014-2020, the execution rate reached only 47 %[17]. 85 % of the financing for the Operational programs comes from EU funding. The main financing portion came from the two operational programmes: Good governance and Science and education for smart growth. Necessary additional national financing and legislative changes brought difficulties and delays and the EU funds earmarked for this have not yet been used. Bulgaria plans a state aid notification for the main project to establish broadband access in remote, sparsely populated and rural areas. The sum of €30 million, €25.5 million of which funded under the EARDF, is earmarked for the project under preparation. The next milestones are: publishing of the application guidelines, preparing the application, obtaining the Commission state aid approval decision and the launching of the tender, although this is not expected before September 2019.

Some Bulgarian municipalities have NGA access, as a result of the broadband projects funded and realized during the previous programming period ERDF 2007-2013 (e.g. 29 municipal centres and 24 small settlements). Access is provided either through the state network or by commercial operators. The unified backbone network for the needs of education and science is in the process of redevelopment and integration. Almost all 28 regional departments (RED) of the Ministry of Education and Science are connected which has allowed more than 2,200 schools to develop high quality free WiFi to be used on school property.

While total fibre to the premises coverage (38 %) significantly exceeds the EU average (29.6 %), in rural areas the situation is more challenging.

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



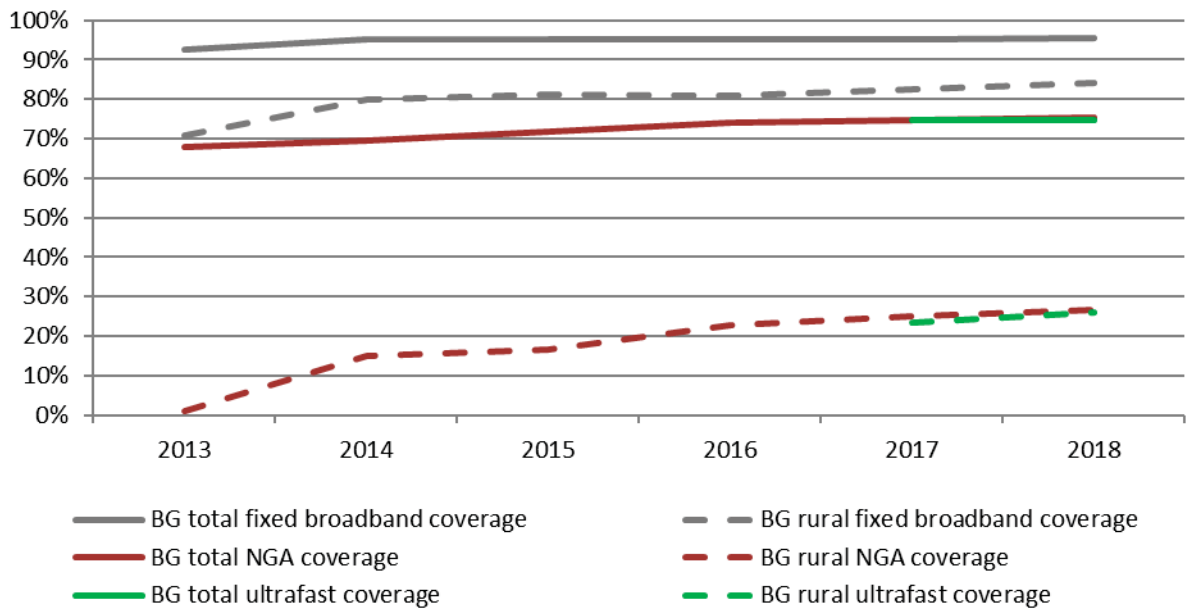

*Source: Commission services, Broadband coverage in Europe Study, commissioned to IHS and Point Topic. 2013-2014 data as of end of December; 2015-2018 data as of end of June.*

As of the beginning of 2018, fixed broadband Internet access has been provided in 3,807 villages and settlements in Bulgaria in which 97 % of the total rural population is located. The following table presents data on fixed, NGA and ultrafast coverage in rural areas and in Bulgaria as a whole between

[17] The total value of the planned financing is over €75 million.

2013 and 2018. There is a clear digital divide between urban and rural areas with regard to NGA and ultrafast broadband networks, despite a small, but constant, increase in recent years.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

Widespread publicity of the WiFi4EU initiative, meant that 246 municipalities (92.8 % of all those in the country) registered on the WiFi4EU portal. Moreover, 215 municipalities applied in response to the first call and 113 obtained a voucher for €15,000 each. The majority of the contracts for installing the WiFi hotspots have been already signed. Furthermore, 65 municipalities obtained a voucher for €15,000 each from the second call for applications.

The delayed first draft of the secondary legislation needs to ensure the effective implementation of the Broadband Cost Reduction Directive (BB CRD) and is expected at the first half of 2019 while preparatory work is under way to update the mapping of existing infrastructure and quality of service. The evaluation of the potential for using the existing infrastructure in a given area should reduce the costs of building new infrastructure and avoid the duplication of infrastructure or inefficient use of the available resources.

An economic analysis gathering up-to-date reliable data on the dissemination and use of broadband-based products and services has been performed[18]. The results will help in updating the measures in the NBP in order to justify possible public intervention, based on sustainable investment models that improve access to open, quality and future-proof infrastructure and services. Although the NBP should have been updated in 2018, a first draft, based on the results of the study and following stakeholders' consultations, is only planned by June 2019 and is expected to be formally approved by September 2019.

The NBP's priorities already cover part of the gigabit connectivity goals. To complete the plan, Bulgaria has started assessing the investment gap to be addressed, so as to fully align its core

[18] https://www.mtitc.government.bg/bg/category/46/obshta-informaciya-za-predlaganeto-na-visokoskorosten-internet-v-republika-bulgariya

objectives. In 2018, a national road map was adopted as required by Decision (EU) 2017/899[19] detailing the steps needed to meet obligations as regards the use of the 700 MHz pioneer band for 5G.

An experiment, meeting the requirements of the Internet of Things (IoT), has been conducted by Vivacom at end of 2017, using LoRa (long range) technology. In early 2018 A1 Bulgaria conducted a 5G technology test and achieved a real speed of more than 2 Gbps, demonstrating virtual reality (VR) and balancing industrial robots. Bulgaria has already identified some potential candidates for 5G-enabled cities such as Sofia with its system for reading water meters. Several other cities including: Stara Zagora, Burgas, Varna, Russe and Pleven, have built up complete city traffic management systems, stop control panels and intelligent traffic lights. Furthermore, Vratsa will soon become a smart city with the implementation of new technological solutions for organising car traffic, parking and urban video surveillance in the city.

In June 2018, a letter of intent was signed between Bulgaria, Greece and Serbia on preparing and conducting tests for cooperative, connected and automated driving across the three countries for the purposes of 5G deployment. The Thessaloniki – Sofia – Belgrade corridor will provide a technologically neutral hub for industry, research centres, academia and other stakeholders for testing and evaluating 5G technology.

As the retail markets in Bulgaria are assessed as competitive, other instruments should be used to stimulate demand. Developing applications requiring gigabit access and encouraging public institutions to use very high-capacity connectivity will enable the use of the best products, services and applications, which in turn will stimulate the development of innovative services. There are also other factors like demographic, average revenues and social preferences, which could not be solved by typical demand stimulation measures and could explain low demand, including in the big cities where the majority of the population and businesses are concentrated, and where there should therefore be a business case.

The preparation of the national strategy for transposing the European Electronic Communications Code (EECC) has been initiated and is currently under public consultation. The first draft on the necessary legislation modifications is expected by the end of 2019.

## 2. Market developments

Based on the latest relevant market analyses[20], the substitutability between fixed and mobile services in Bulgaria is not sufficient to conclude that the two services belong to the same product market. There is an upward trend in the use of internet access services with a rise in the number of subscribers of both fixed and mobile. Currently, there are no clear indications that the fixed internet subscribers tend to switch to mobile access only. On the contrary, the number of the subscribers of bundled services which include both fixed and mobile internet access increased more than threefold between years 2015 and 2017. Consumers use mobile internet access rather as an additional service to fixed internet access, primarily for accessing services that do not require large capacity.

TV and fixed Internet access are the most popular services included in a bundle, followed by mobile and fixed telephony. The most significant growth was observed in the quadruple-play bundles in 2017, but because of their small relative share of 0.6 %, this did not affect the development trends of bundled services. For the three-year period (2015-2017) the share of bundles which include among other services mobile and TV services in the total number of subscribers of bundled services increased 2

[19] https://www.mtitc.government.bg/bg/category/59/reshenie-na-ms-no-887-ot-6-dekemvri-2018-godina-za-priemane-na-nacionalna-putna-karta-za-izpulnenie-na-zadulzheniyata-na-republika-bulgariya-po-reshenie-es-2017899-na-evropeyskiya-parlament-i-na-suveta-ot-17-may-2017-g-za-izpolzvaneto-na

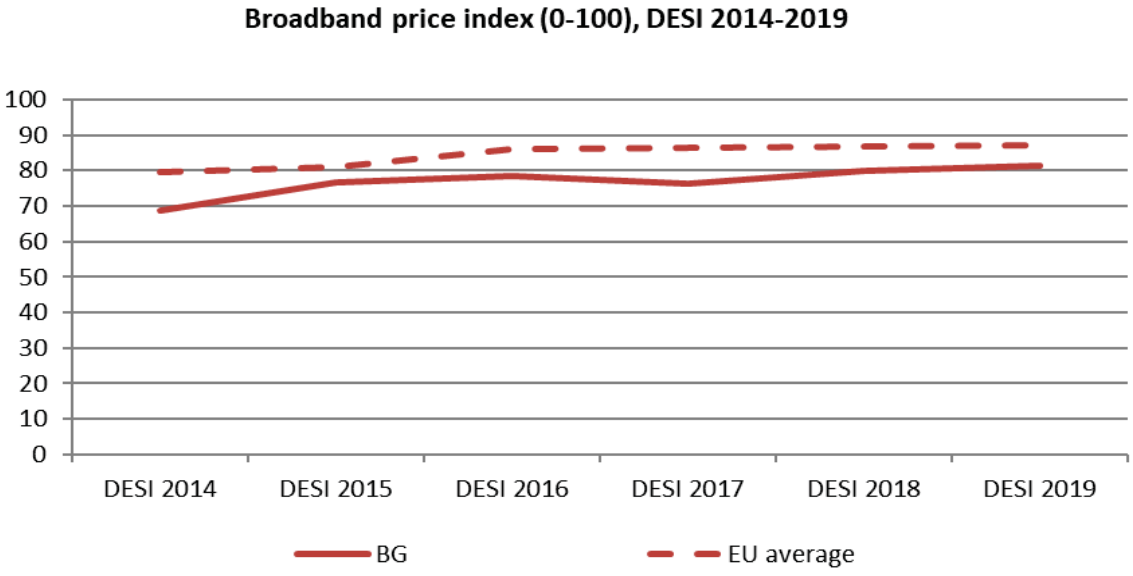
[20] CRC`s Decision N° 581/22.11.2016 (market 1 of Recommendation 2007/879/EC and markets from 3 to 6 of Recommendation 2003/311/EC), CRC`s Decision N° 372/13.08.2015 (markets 3a and 3b of Recommendation 2014/710/EU).

times. The deployment of 4G led to a greater variety of commercial offers, including TV through the internet. Despite the fall in the number of subscribers to bundles including TV, due to a drop by half of the incumbent's subscribers, TV service continues to increase the market segment of bundled services and of electronic communications in general. Bundles including TV and fixed voice service continued to lose popularity. A growth by 1.6 times between 2015 and 2017 was recorded in quadruple play offers including fixed voice and TV and two other services (except fixed internet access service), while quadruple-play offers that include fixed internet and television increased more than sixfold. For the same period, triple-play offers including fixed internet access, mobile service and TV increased by 3.5 times.

### 2.1. Fixed markets

There were 22 undertakings providing access to fixed telephone service in 2018. The increase of the market share of A1 is probably due to the acquisition of Blizoo EAD in mid-2017. Five undertakings provide a fixed telephony service only to business subscribers, but have no significant impact on the market as their share is only 1.9 % of the segment of business users' access to a fixed telephone service. The main competitors in the fixed telephone market also have the highest market shares of business users.

The fixed broadband price index is 81, which is close to, but below, the EU average of 87 and represents higher prices per person, that might partly explain the low take-up[21].

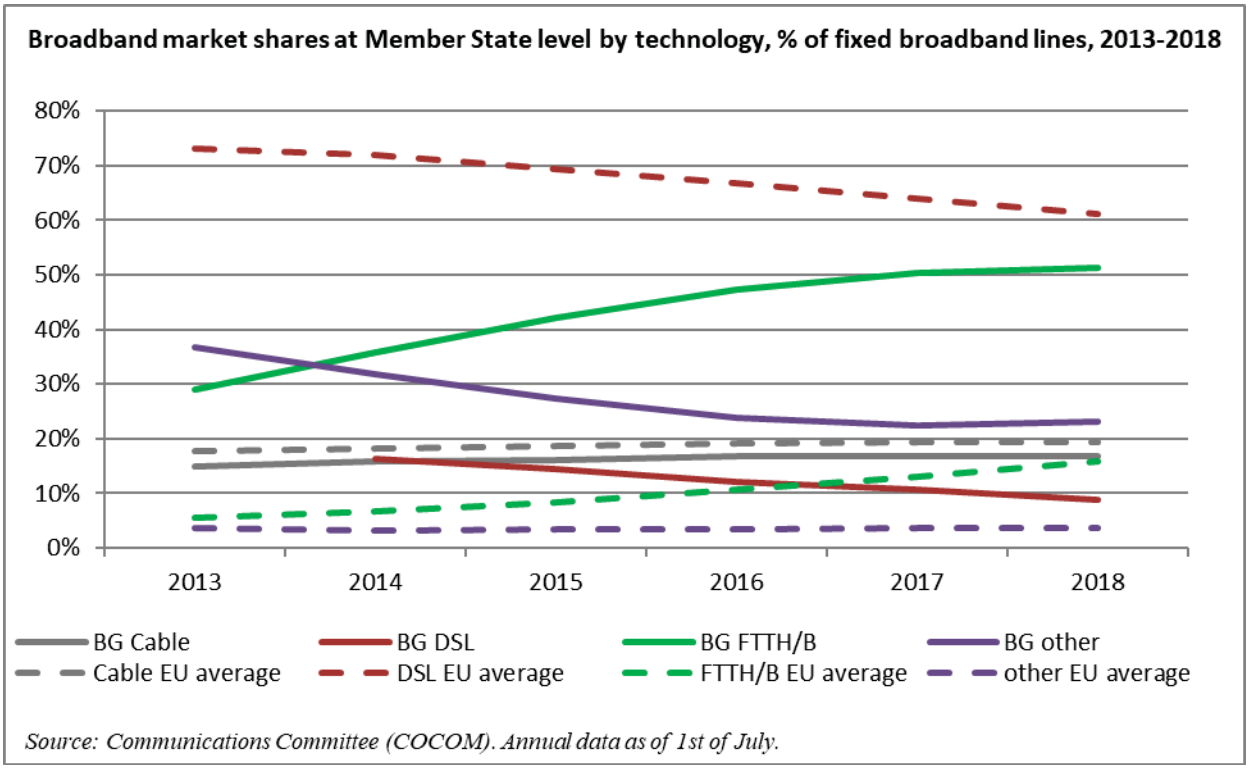



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

Data from the Communication Regulatory Committee (CRC) shows that the number of undertakings providing fixed internet access has continued to decrease, reaching 610 in the middle of 2018. The incumbent, Bulgarian Telecommunications Company (BTC), maintains its leading position in the fixed Internet access market with 27 % of the total number of subscribers. A1 Bulgaria EAD (A1)[22] has the second largest market share, which continued to grow and now stands at 26.2 %. There have been 14 new entrants on the fixed broadband access market as of 01.07.2018 and their total market

21 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.
22 Mobiltel renamed as of 18 May 2018.

share on subscriptions is 0.2 %. The number of the operators providing retail fixed internet access services to business subscribers remains 36 and their market share on subscriptions is 0.02 %. BTC's market share in the business subscribers segment continued to slightly diminish to 28 % in favour of the total share of its major rivals which reached 47.7 %. The market share of all other players with market shares of less than 1 % remains 24.4 %.

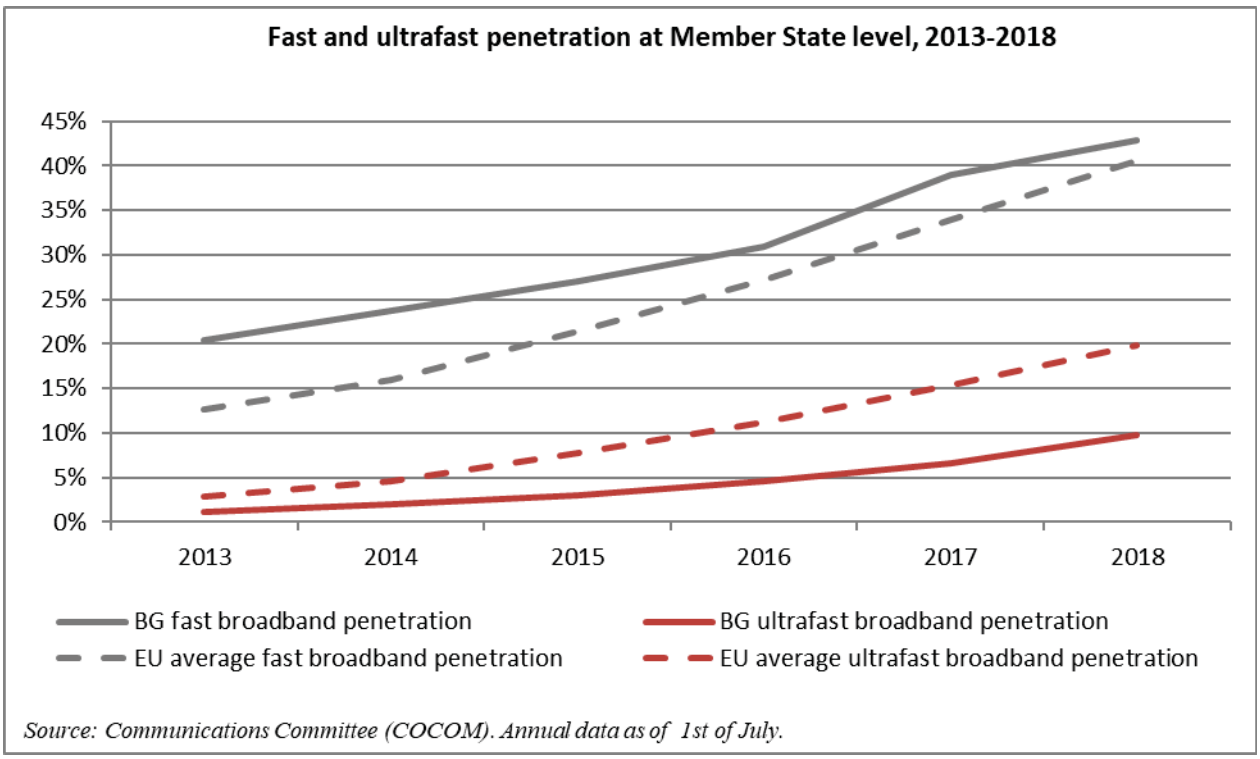



The evolution of the market shares of the different broadband technologies show signs of stabilisation, and predominance of FTTH/B.

In 2018, Bulgaria maintained its position among the leading countries in the EU in terms of subscribers of NGA broadband internet access. Subscribers continue to migrate towards hybrid and fibre access networks, which enables the undertakings to provide higher quality services., Indeed,42.8 % of the broadband homes as of 1 July 2018 use fast broadband services (against 40.6 % at EU level), but only 9.7 % ultra-fast broadband (19.9 % at EU level). The share of households using speeds of 30 Mbps to 99.99 Mbps grew by 4.0 p.p. last year reaching 42.8 % and the share of households using speeds of 100 Mbps and higher grew by 3 p.p., reaching 9.7 %. The share of subscribers using speeds of 30 Mbps to 99.99 Mbps grew by 1.9 p.p., 57.1 % and the share of subscribers using speeds of 100 Mbps and higher grew by 5.6 p.p., 16.8 %.

In 2017, BTC launched VDSL connections as part of the upgrade of its copper network and covers as of 07 December 2018 113 Bulgarian settlements[23]. The provision of VDSL is increasing rapidly, both in terms of numbers of settlements and of subscribers. On 1 July 2018, the fixed broadband penetration in Bulgaria was 61.1 % based on households[24] and 26.1 % based on population[25]. In 2017, operators invested €37 million in NGA and the amount for 2018 reached €43 million (preliminary data). This growth is explained by the increase in fixed broadband subscribers using high-speed access via NGA networks (including FTTH and FTTB) as the increase in broadband access via these networks improved the speed of Internet services offered.

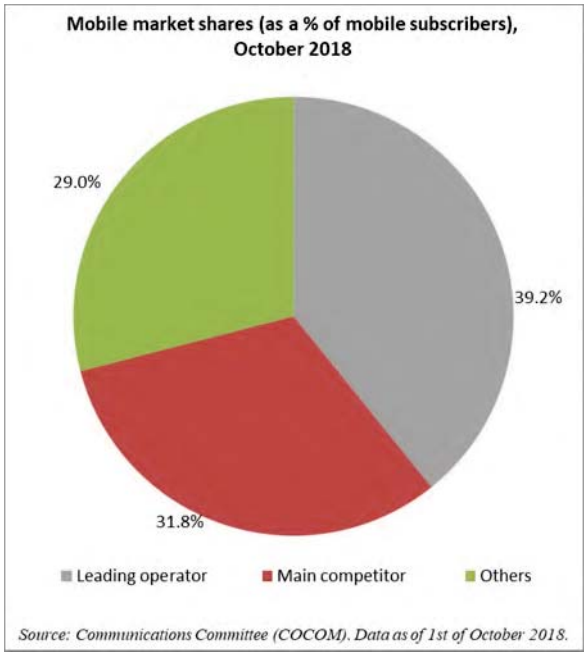
[23] https://www.vivacom.bg/bg/files/7119-spisyk-po-t-2-3-ot-prilojenie-2.pdf
[24] According to data taken from the last official census of NSI, conducted in 2011.
[25] According to NSI's data estimations for the population in Bulgaria as of 31.12.2016.




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

## 2.2. Mobile markets

In 2018, there were five undertakings providing public mobile services in Bulgaria (voice telephone service and/or data services): A1, Telenor Bulgaria EAD (Telenor), BTC, Bulsatcom EAD (Bulsatcom) and T.com AD (TiCom)[26]. Four undertakings (A1, Telenor, BTC and Bulsatcom) provide both mobile telephone service, and mobile data services and TiCom provides mobile data services only. There is no variation in the market positions of the players on the mobile market: as mid-2018 A1 keeps the largest market share by number of subscribers (39.2 %), followed by Telenor (31.8 %) and BTC (29 %). Bulsatcom entered the mobile telephony segment in 2018. In the middle of 2018, A1 continues to play a leading role in the mobile telephone service segment by number of subscribers with 39.4 %, followed by Telenor with 32.9 % and BTC with 27.7 %.



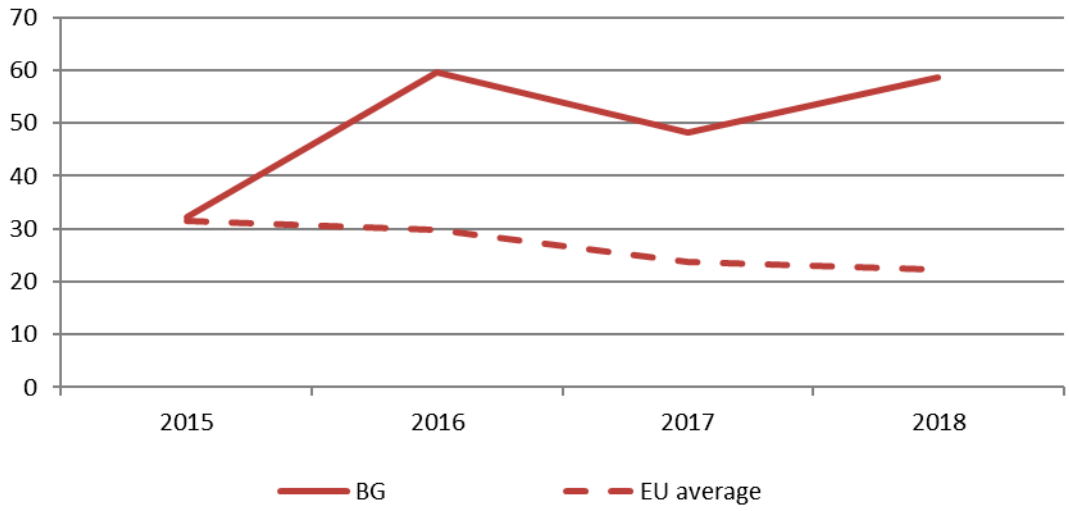

*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

The total number of mobile telephony subscribers decreased by 0.7 % in the first half of 2018. The penetration rate by population of mobile telephone services is 121 % and is lower for mobile broadband. The total consumption in minutes of mobile telephone service continues to increase by 6.9 %, as well as the off-net traffic originated to other mobile networks in the country by 22.7 %. The total revenue from providing mobile telephone services decreased and there was a slight drop in wholesale revenue (interconnection) in 2017 compared to 2016.

[26] By Decision 510/14.09.2017 the CRC permitted the transfer all authorisations from Max Telecom OOD to T.com AD.

At the beginning of 2018, Max Telecom ceased its activities, while TiCom entered the market segment and inherited Max Telecom's spectrum licence in 1800 MHz, after an approval decision of the CRC. TiCom currently offers only mobile internet, but aims at obtaining a national roaming agreement with one of the big Bulgarian operators in order to ensure national coverage and develop also mobile telephony services.

**Least expensive offer for handset (1 GB + 300 calls basket) at Member State level, EUR/PPP, 2015-2018**




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

As of 1 July 2018, Telenor has the highest market share (35.3 %) in the provision of mobile broadband internet by number of subscribers, followed by BTC (33.2 %) and A1 (31.5 %). The number of subscribers using mobile Internet access services in Bulgaria continues to increase (by 6.5 % in the first half of 2018) as does the share of long-term evolution (LTE) subscribers. The penetration rate of the mobile internet by population increased by 10 p.p. and reached 98 % mid 2018[27]. The revenue from providing mobile internet services also grew.

While the least expensive offer for handset including 1GB and 300 calls in Bulgaria is significantly more expensive than the EU average (prices expressed in €/PPP, VAT included) this basket also includes SMS, the use of which in Bulgaria is according to CRC very low. As a matter of fact, the usage baskets defined by the OECD may or may not be a good reflection of the actual usage patterns in a country.

## 3. Regulatory developments

### 3.1. Spectrum

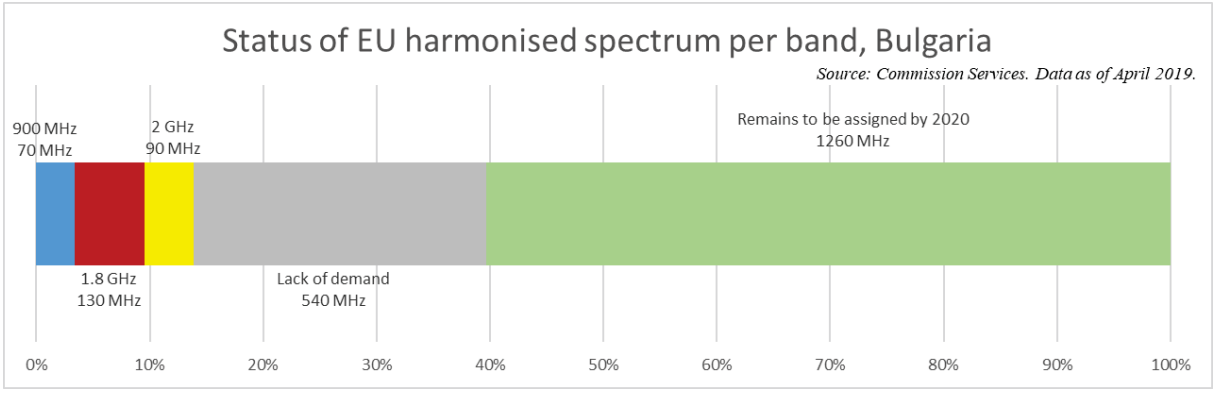
In Bulgaria, only 14 % of the total 2090 MHz EU-harmonised spectrum for wireless broadband has been assigned[28]. This is the lowest percentage in the EU, and is due mainly to delays in making available crucial spectrum below 1 GHz for electronic communication services, combined with the lack of commercial interest in other frequency bands. However, according to the CRC, in case of demand, all available spectrum of 540 MHz could be assigned. The amount of spectrum per band not

[27] *Source: Communications Committee (COCOM)*

[28] 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 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

assigned due to lack of demand is: band 1500 MHz - 40 MHz, band 2100 MHz - 30 MHz, band 2600 MHz - 190 MHz, band 3400-3800 MHz - 280 MHz. The chart below illustrates the spectrum situation in Bulgaria, including the 5G pioneer bands.

Despite some administrative and legislative advances, efforts to release all spectrum in the 800 MHz and 700 MHz bands have not yet yielded any results. All stakeholders suffer from the standstill situation, which amounts to uncertainty, a lack of transparency and obstacles in planning investments and network deployments. Tests agreed in 2017 for shared civil-military use on the 800 MHz band have not started yet. On the positive side, in 2018, the Council of Ministers adopted a national roadmap for the partial release of the 700 MHz band, which details the steps needed to meet obligations as regards the use of the 700 MHz pioneer band for 5G. According to this roadmap only 2x20 MHz (703 - 723 MHz paired with 758 - 778 MHz) would be released and allowed for use for broadband by mid-2020, as well as 2x5 MHz for public protection and disaster relief (PPDR) (698-703 MHz and 753-758 MHz). The rest of the 700 MHz band has not yet been released in line with the harmonised conditions at EU level, mainly because it is currently used for national security. The sub-700 MHz (470-694 MHz) band will continue to be used for broadcasting. The European Commission is currently looking into the issue.




In Bulgaria, a large part of the 3.4-3.8 GHz band is available and ready to be used for 5G services, but none has yet been assigned under technical conditions suitable for 5G. However, this frequency is already allocated for terrestrial networks capable of providing electronic communications services, and the free resource amounts to 280 MHz (30 MHz are used for national security purposes and 2x45 MHz for the point-to-point networks). It is planned to allow the use of the band for 5G services before the end of 2020.

With regard to the 26 GHz band, it is planned to allow the use of at least 1 GHz (non-contiguous) for terrestrial systems capable of providing wireless broadband by 31 December 2020. The rest of the spectrum in this band is still used for national security purposes and for fixed wireless access (point-to-point links), where the licences for this expire on 30 January 2022 and 25 April 2025 respectively. The frequency band 26.5-27 GHz is used for civil and national security purposes and the frequency band 27-27.5 GHz is used for national security. There are national security operating facilities in the frequency bands 25.25-25.50 GHz and 26.25-26.50 GHz and Bulgaria intends to maintain them.

The issue with the remaining unassigned 2x10 MHz in the 1800 MHz band has still not been solved and inspections on coverage and subscribers conditions fulfilments are still ongoing.

The 2.6 GHz band was released for civil use in 2015, but remained unused due to lack of interest among the mobile operators. In order to ensure optimal and efficient use of spectrum and to promote competition and innovation, the amount of one-off and annual fees was reduced in 2018. This is part of a long-awaited revision of the general tariffs, which the CRC plans to continue in 2019.

In 2018, Vivacom upgraded its 4G mobile network in the largest cities, introducing LTE Advanced to generate faster internet up to 150 Mbps for download, depending on the radio spectrum used. In mid-2018, A1 extended its 4.5G network coverage and currently reaches over 700 of the 2000 settlements covered by the 4G network.

The electromagnetic (EMF) limits in Bulgaria are stricter than the ones recommended at EU level[29] and operators claim this sometimes poses deployment problems in some areas. There is no special regime for granting permits for small area access points, where permits are issued by local authorities. However, in order to transpose the EECC and in anticipation of the introduction of a lighter / permits-free regime for small cells at EU level, the current legislation should be amended.

### 3.2. Regulated access

Only three markets are still regulated in Bulgaria, namely the market for wholesale call termination on individual public telephone networks provided at a fixed location, the market for wholesale voice call termination on individual mobile networks and the market for wholesale local access provided at a fixed location (markets 1, 2 and 3a of the 2014 Recommendation on relevant markets[30]). All the other markets have been deregulated in recent years since they were no longer fulfilling the three criteria test.

The review of market 3a (wholesale local access), which was due by mid-2018 has been slightly delayed, to take into account the revised Guidelines on significant market power (SMP), which needed to be transposed in Bulgarian legislation and a change of methodology recently adopted by the CRC. The findings were presented in mid-December 2018 and the public consultation ran until the end of January 2019. Market 3a was proposed to be deregulated in March 2019 and the relevant decision has been notified to the Commission.[31] The CRC plans also to review the termination markets in 2019 and remedies are expected to be notified in Q4.

The mobile termination rates, (MTRs) in Bulgaria were set below their previous level and bellow the EU weighted average (€ 0.85 cents per minute) at € 0.7158 cents per minute for the years 2017-2020. Until the end of 2018 the fixed termination rates, (FTRs) were € 0.0767 cents per minute and decreased to € 0.0716 cents per minute for the period 2019-2020[32].

The number of undertakings using the ducts provided by the incumbent, BTC increased and reached 227 (41.4 % of the total number of active undertakings). 149 of those undertakings do not have their own ducts. In only 14 settlements with more than 10.000 inhabitants there is no alternative to BTC's passive infrastructure and the total number of settlements where BTC is the only provider of electronic communication services continues to decrease. Alternative providers competing with the incumbent continue extending their territorial coverage. In one year, the revenues from ducts grew by 6 % and dark fibre doubled its income.

The new Electronic Communication Networks and Physical Infrastructure Act (ECNPIA), transposing the Broadband Cost Reduction Directive[33] (BB CRD) in to Bulgarian law was adopted in March 2018 and entered into force on 9 March 2018. Its practical implementation is still at an early stage and no

[29] Ordinance No. 9 of 1991 for the maximum admissible levels of electromagnetic fields in populated areas and definition of the sanitary-protective zones around emitting objects, issued by the Ministry of Health, Prom. SG, 35/03 May 1991, amend. SG, 38/14 May 1991, amend. SG. 8/22 Jan 2002.

[30] 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.

31 CRC Decision N° 109/14.03.2019.

[32] CRC's Decisions N° 550/20.10.2016 and N° 585/24.11.2016 Calculated by BULRIC models updated 2016.

[33] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks Text with EEA relevance, OJ L 155, 23.5.2014, p. 1–14.

trends have been outlined yet. The Bulgarian authorities expect that the new legislation will enhance interactions between operators of electronic communications networks and operators of electricity distribution networks in particular in sparsely populated and remote regions. By Ordinance No 34/24.10.2018, the Ministry of transport, information technology and communications adopted a Methodology for the allocation of costs in setting the prices for provision of access to and sharing of physical infrastructure and the right to way under the ECNPIA. The Ordinance was promulgated in SG, 92/6 Nov 2018, and entered in force from 9 November 2018. Three pieces of secondary legislation (Ordinances) are currently under preparation: (i) on the rules and norms for the design, deployment and dismantling of electronic communications networks (at final stage), (ii) on the content, the conditions and the order for creating and maintaining the specialised maps, registers and information systems for the electronic communications networks and the related physical infrastructure and iii) on the easements on land properties to benefit the operators of electronic communications networks. At the time this report was being drafted, they were all expected in the first half of 2019.

The single information point (SIP) is still on testing and integration mode and is not fully functioning. The project envisages the development of a GIS-based electronic platform to provide access to information about existing physical infrastructure suitable for the deployment of electronic communications networks, as well as planned and ongoing construction activities. It would integrate and systematize information on the procedures and regulations governing the deployment and maintenance of infrastructure and on the authorities competent to issue regulations and their respective fees. The SIP will provide access to all available models of documents for obtaining permits and other acts related to infrastructure construction. The platform envisages the possibility for completing and submitting all necessary electronic applications and documents and obtaining information about their progress with the competent authorities. The SIP will provide a system of base layers to be used by all stakeholders according to the INSPIRE Directive and the Law on access to spatial data. It will proactively gather data on planned infrastructure in order to provide broader information to operators. All public sector bodies are obliged to provide information to the SIP. The database is integrated with the available databases of the Agency for Geodesy, Cartography and Cadastre, Road Infrastructure Agency, National Railway Infrastructure Company, Port Infrastructure State Enterprise and others.

CRC is the dispute settlement body (DSB) under Chapter Eight of the ECNPIA. Also, the CRC controlls the provision of access to and sharing of physical infrastructure and to built-in physical infrastructure in buildings. When resolving disputes related to physical infrastructure for networks other than electronic communications networks, the DSB will adopt a decision in accordance with a binding opinion of the competent state bodies regulating and controlling the utilities network operators (electricity, gas, water and drainage systems), transport operators (railways, roads, metropolitan, ports and airports), *etc*.

According to ECNPIA there are two procedures to resolve disputes - by giving binding instructions and by voluntary settlement. At this stage, CRC received two dispute settlement requests involving electricity distribution companies, of which one is still pending. As a result of the CRC's assistance, an agreement was signed in the other dispute, without giving binding instructions.

Furthermore CRC has received 26 complaints against the three electricity distribution companies that operate on the territory of the country for voluntary settlement (mediation). The subject of the disputes are the general terms and conditions of the electricity distribution companies. Following the mediation, the electricity distribution companies have accepted some of the requests and partially amended their general terms and conditions for access to physical infrastructure.

Currently the CRC is asked to resolve a dispute over access to public lighting (Art. 2(1).a.ii of Directive 2014/61/EU) and trolleybus electricity poles of one municipality.

## 4. End-user matters

The number of consumer complaints in Bulgaria is falling. However, operators have started preparing a joint self-regulatory Code of good practices in the electronic communications sector[34]. This was encouraged by the CRC with the aim of increasing transparency for consumers. Most of the consumer complaints still concern pricing and billing, contract termination, penalties, roaming (more specifically on inadvertent roaming in non-EEA countries), opt-out from unsolicited services and misleading SMS services from third parties.

According to the 2018 consumer markets scoreboard[35], from a consumer perspective, the performance of the internet provision service market is higher than the EU average (+1.7 points), while for telephony services it is lower (-1 point for fixed and -4.5 for mobile). The mobile communications (+5 %), and the internet access (+1.4 %) and fixed communications (+0.7 %) markets did not show any statistically significant changes between 2015-2017 in the way consumers assessed their performance.

### a. Net neutrality

In 2018, the CRC investigated seven cases related to the obligations laid down in Article 4(1)(b) and 4(1)(d) of the Regulation, i.e. transparency. In all these cases, the chairman of CRC imposed the foreseen minimum administrative fine of €250. Six of these penalties were appealed by the internet services provider (ISP). In three cases the first instance court annulled the penalty notices and in the other two the penalty notices were upheld. All first instance court decisions were appealed before a second instance court. At second and last degree, four of the penalty notices were upheld and one was annulled. One case is still pending.

Furthermore, the CRC issued a decision with regard to a zero-rating offer by Telenor Bulgaria in which it obliged the ISP to provide and publish information about which functionalities and services of Facebook and WhatsApp are zero-rated and about the conditions applicable to this zero-rating offer and to inform subscribers accordingly. This decision has not been appealed by the ISP[36].

The CRC surveys the consumers' satisfaction with the quality of their internet access service, based on a dedicated questionnaire published on its website. The data collected since 2016 makes it possible to gage consumers' satisfaction and the criteria/reasons for their choice of a subscription plan.

### b. Roaming

There is no particular issue as regards roam like at home (RLAH) and Bulgarian consumers greatly benefit from the new rules. The figures from the 21st BEREC Roaming Benchmark Report, covering October 2017-March 2018, show that the Bulgarian end-users consumed 4.4 times more roaming minutes (calls made) in Q1 2018 (RLAH) than in Q1 2017 (before RLAH), which is one of the highest increase in EU roaming consumption[37]. The report shows a steady increase in the average monthly domestic consumption per customer. According to the data available the average retail revenue per

[34] http://www.bacco.bg/novini/ma-Godishna-Konferentsija-na-BAKKO-Klientite-sa-vyv-fokusa-na-industrijata-73

[35] See Eurobarometer Consumer Markets Scoreboard 2018, p 12 and p 88, available at: https://ec.europa.eu/info/files/consumer-markets-scoreboard-making-markets-work-consumers_en . The market performance index takes into account how easy/difficult it is from consumers perspective to compare offers; whether consumers trust that retailers/suppliers comply with consumer laws; whether they encountered problems and harm (including but not limited to financial loss); whether services live up to their expectations and whether consumers were satisfied with the number of providers in the market.

[36] Bird & Bird & Ecorys, Net Neutrality study Final report Part II Country chapters SMART 2017/0011 p.30-38. https://ec.europa.eu/digital-single-market/en/news/study-implementation-open-internet

[37] See International Roaming BEREC Benchmark Data Report October 2017 - March 2018, available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8251-international-roaming-berec-benchmark-data-report-october-2017-march-2018

user (ARRPU) has increased by 19 %[38], while national voice minutes consumed have risen by 38 % and data consumption by 69 %.

In 2018, a single case of non-compliance with the RLAH rules due to a technical error by a Bulgarian roaming provider was reported. The provider levied a surcharge in addition to the domestic retail price for a regulated roaming call. The tariff plan of the customer included unlimited minutes for off-net calls, the charge was unjustifiable and the sum was returned to the subscriber. In addition, some other one-off cases of violations were detected and CRC applied fines for all these violations.

### c. Emergency communications – 112

Since April 2018, the National emergency call system (112) also handles eCall communications. Caller location is provided for every emergency call in Bulgaria. For users with hearing or speech disabilities, access to emergency services has since August 2018 been provided through a special Android mobile app, which has been operational since October 2018. Access also was extended to IoS and Windows phone systems in January 2019. A total of 5.14 million calls were made to 112 in 2018. The average response time was 7.39 seconds and 80 % of the calls were answered within 10 seconds.[39]

The national system for early warning and alert of the population (NSEWAP) consists of two systems. One sends early warnings and alerts to the executive bodies and the components of the unified rescue system, built in the 28 regional districts of the country. The other is for sending early warnings and alerts to the population and is built on the territory of 11 regional cities in the country and 43 settlements and in the Kozloduy nuclear power plant, which provides the means to alert of 37.2 % of the population.

### d. Universal service

In July 2018 BTC proposed to change the terms and prices for the packages Limited plan, Handicap 160 and Handicap 300 to increase the volumes of services they include and their prices with a view to the current packages being dropped. After public consultation, the CRC refused all the proposed changes[40].

## 5. Institutional issues

The NRA Chairman elected by the Council of Ministers on 15 January 2018 resigned on 20 September 2018, when he was appointed Minister of Transport, Information Technologies and Communications. A new chairman was appointed on 22 November 2018 to cover the rest of the mandate until the end of 2023. However, the CRC board still has three members with expired mandates, and Parliament is expected to nominate new members.

To speed up the administrative and court proceedings, as of January 2019 some amendments to the Bulgarian Administrative Procedural Code have entered into force: (i) the competent court hearing complaints against NRA's decisions at first instance is going to be the Administrative Court of Sofia Province (which is the administrative court of last instance hearing complaints against district courts in Sofia Province, a territory outside the capital); and (ii) the court of second (last) instance is the Supreme Administrative Court, with a three-judge panel (which so far has been the court of first instance).

## 6. Conclusion

[38] Q1 2018 compared to Q1 2017.
[39] COCOM 19-04 Implementation of the single European emergency number 112 – Results of the twelfth data-gathering round: https://ec.europa.eu/digital-single-market/en/news/2018-report-implementation-european-emergency-number-112
[40] Decision N° 398 of 19 September 2018.

To date, Bulgaria is lagging behind on the EU-harmonised spectrum assignment in the EU due to delays in making available crucial spectrum below 1 GHz for electronic communication services, combined with the lack of commercial interest in other frequency bands. Despite some administrative and legislative advances, the efforts to release all spectrum in the 800 MHz and 700 MHz bands have not yet yielded any results. Higher ambition and swift steps in this regard could considerably improve the deployment of high-quality wireless broadband services. Together with its 5G strategy which is soon to be incorporated in the NBP, Bulgaria would gain by making sure that all EU-harmonised spectrum, including the 5G pioneer bands, is made available in good time to all relevant market players, to achieve the gigabit connectivity goals. An increased focus on deploying broadband in rural areas, combined with more training in digital skills and further development of digital services would benefit the country's overall connectivity and help to bridge the digital divide, which is particularly challenging in light of factors like the predominantly aging population in rural depopulated areas. Additional measures could help boost demand and realise the NBP's objectives and use the earmarked funds in good time. There is still scope to reduce deployment costs and price levels.

# Czechia

| | Czechia | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **99%**<br>2016 | **98%**<br>2017 | **98%**<br>2018 | ***14*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **71%**<br>2016 | **73%**<br>2017 | **74%**<br>2018 | ***14*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **94%**<br>2016 | **99%**<br>2017 | **99%**<br>2018 | ***3*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **77**<br>2016 | **81**<br>2017 | **82**<br>2018 | ***22*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **17%**<br>2018 | ***11*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **75%**<br>2016 | **89%**<br>2017 | **90%**<br>2018 | ***12*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **26%**<br>2016 | **32%**<br>2017 | **37%**<br>2018 | ***18*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **60%**<br>2017 | **63%**<br>2018 | ***17*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **14%**<br>2016 | **16%**<br>2017 | **18%**<br>2018 | ***16*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **88**<br>2016 | **87**<br>2017 | **88**<br>2018 | ***9*** | **87**<br>2017 |

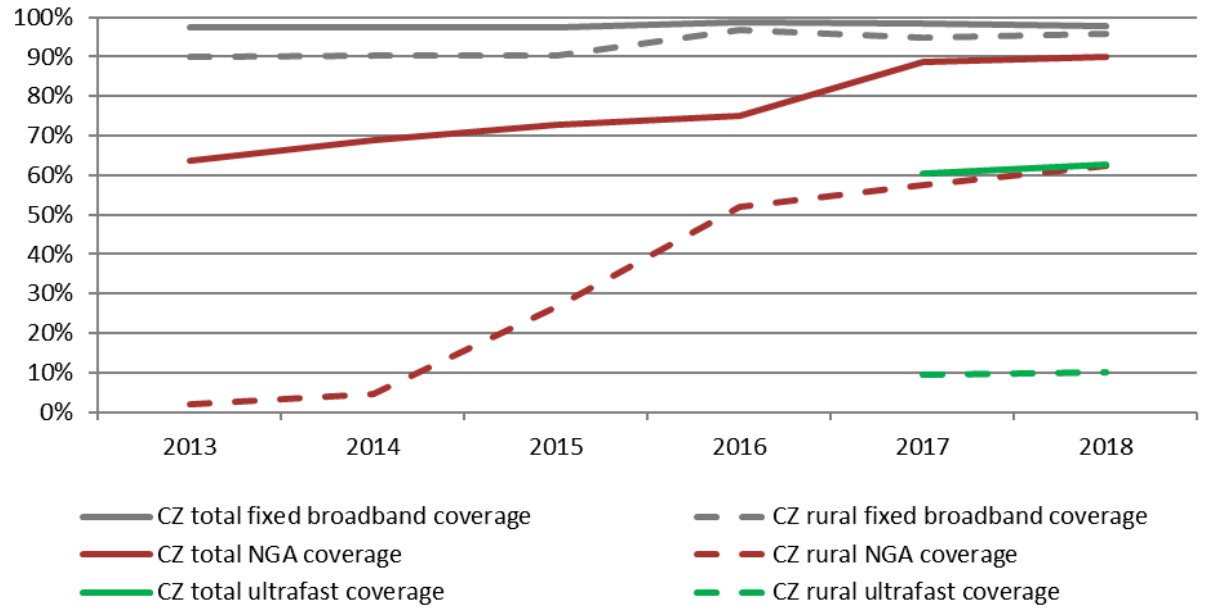
## 1. Progress towards a gigabit society

In 2018, Czechia's overall growth in the connectivity dimension slowed down, falling just below the EU average. It has almost met the target for fixed broadband full coverage, and next generation access (NGA) coverage grew to exceed the EU average. Both the deployment of fibre by alternative operators and the wholesale incumbent upgrading its copper network to VDSL contributed to this increase.

The growth of subscriptions to fixed broadband is achieved mainly in the (well-developed) urban areas, reaching 74 % of households, although this is still below the EU average of 77 %. In terms of utrafast broadband coverage, Czechia performs slightly better (63 %) than the EU average (60 %). However, Czechia's urban-rural digital divide is illustrated by the figures for FTTP coverage, where 8.3 % of rural areas are covered (slightly more than half of the EU average of 14.2 %) as opposed to the aggregate coverage of 38.4 % that is above the EU average of 29.6 %.

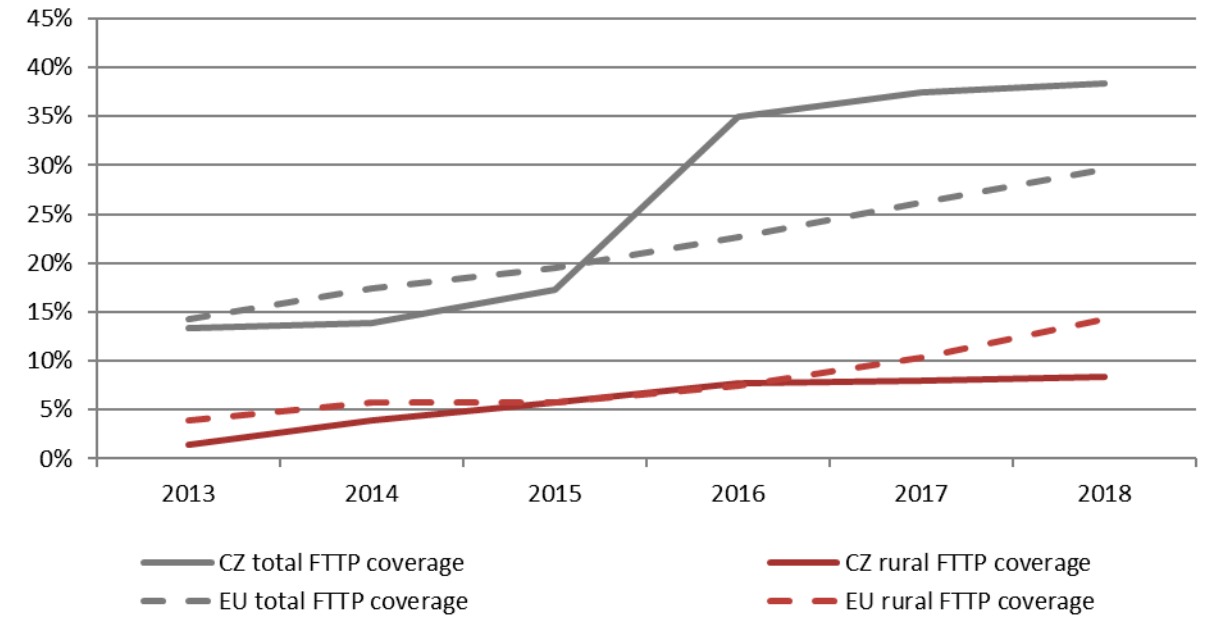
In 2018, the wholesale incumbent Česká telekomunikační infrastruktura a.s (CETIN) continued upgrading its DSL network to VDSL. This is part of the CZK 22 billion (approx. €800 million) plan launched in 2015 to develop NGNs over the next 7 years, mainly by upgrading its network to VDSL2, VDSL3 and vectoring technology. In 2018, the lease of VDSL lines to new entrants grew by 20 %. In 2018, CETIN announced an increase of its investment plan with CZK 5 billion (approx. €195 million). In January 2019, T-Mobile, the third largest provider of fixed broadband at retail level, announced investments of CZK 16 billion (approx. €624 million) in a five-year plan to cover one million households (20 % of total) with fibre access.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

**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.*

**National and EU investment in broadband**

The national broadband plan has not yet been updated to bring it into line with the gigabit society targets. To address the urban-rural digital divide, in market failure areas, deployment will benefit from public support co-financed with EU funds within the Operational programme enterprise and innovations for competitiveness (OPEIC). The OPEIC support to broadband rollout has been

significantly reduced to €281 million from the initially planned €521 million as a result of a reduction of the intervention areas with no NGA coverage and lower demand for funding by operators than initially expected. These funds will support the concession of grants under a new call for projects in areas with no NGA coverage on the basis of a new map prepared by the Ministry of Industry and Trade based on the data collection carried by the national regulatory authority, the Czech Telecommunication Office (CTU). The Czech authorities are also assessing a new intervention to reinforce backhaul networks. The remaining funds will support the preparation of an Infrastructure Atlas to ease the reuse of existing infrastructure suitable to support the deployment of electronic communications networks. The OPEIC is also expected to contribute to setting up a demand support scheme, which is currently under preparation, and a programme of loans to support SMEs in the provision of electronic communication services.

**5G:** On 22 November 2018, the national roadmap for the 700 MHz frequency band was published, 5 months after the legal deadline, on the website of the Ministry of Industry and Trade. In August 2018, the proposed auction of the 700 MHz spectrum in Czechia took another step forward, with the CTU issuing its 'framework position' after completing the first stage of its industry consultation. The auction is planned for the second half of 2019 and will offer interested parties apart from the frequencies in the 700 MHz band, the remainder of the 3.4-3.6 GHz band, followed by a refarming of the 3.4-3.8 GHz band by 2020.

## 2. Market developments

Several consolidation processes were finalised in 2018. In the fixed broadband access market, Kaprain Industrial Holding – owner of the broadband access provider Nej.cz – extended its portfolio by purchasing RIO Media. The merger was not notified to the NCA as it did not meet the minimum turnover threshold. Nej.cz is not only a fixed provider, but it is also a mobile virtual network operator (MVNO) using T-Mobile's Czech network. The merger was finalised on 1 October 2018. The broadband access providers COMA s.r.o. and PODA a.s. also merged in 2018.

Vodafone notified the Commission of its plans to acquire certain Liberty Global assets (including UPC Czech Republic). On 11 December, the Commission opened an in-depth investigation into the proposed acquisition by Vodafone of Liberty Global's business in Czechia, Germany, Hungary and Romania. If the acquisition is cleared, it could influence the competition dynamics in Czechia for fixed-mobile converged bundled offers.

In July 2017, 4-play services had a penetration of only 1 % (EU average 11 %) and 3-play services only 6 % (EU average 25 %). Czechia has the lowest uptake of bundled services (total of 2-3-4 play): 25 % against the average of 67 % in the EU. This may also be altered by T-Mobile Czech Republic's recently announced plans to invest in its fibre-optic network in order to strengthen its bundled products business.

### 2.1. Fixed markets

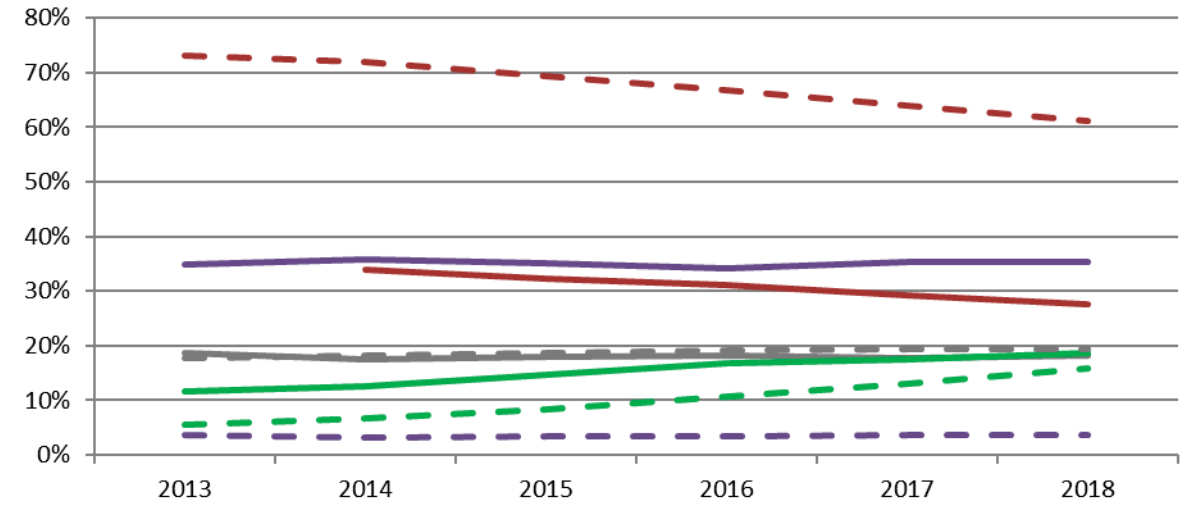
The Czech telecoms market has a number of notable features. The incumbent[41] voluntarily separated in 2015. Before the separation, its delayed broadband deployment on its DSL network saw the emergence of more than 1,500 local alternative operators that use fixed wireless access (FWA) technology, including WiFi technology. The biggest FWA provider has only 5 % share of the FWA

[41] In June 2015, O2 Czech Republic a.s. (the former vertically integrated incumbent) voluntarily separated into two companies:
- Česká telekomunikační infrastruktura a.s. (CETIN), which retained the infrastructure of the former vertically integrated incumbent and now acts solely as a wholesale service provider; and
- O2 Czech Republic, which provides retail services on the fixed market and is also a mobile network operator (holder of frequency licences and owner of mobile exchanges) that offers both retail and wholesale services on the mobile market.

market. These operators exert considerable competitive pressure on the wholesale incumbent, with FWA representing one third of the technology used in the broadband market. FWA gained market share in 2018 boosted also due to the spectrum allocations in the 3.6–3.8 GHz band that took place in 2017. However, it is worth noting that the deployment of FTTH/B networks was driven by these local operators, while the incumbent is focusing on upgrading its copper network to VDSL. Cable companies — CATV providers — have had a stable number of subscribers, coverage and market share in recent years. The main CATV provider enjoys a market share of more than 85 % in this segment. Its urban footprint is a major competitive constraint for the retail incumbent as cable provides the wide majority of ultrafast broadband connections (above 100 Mbps) in Czechia. There are no wholesale access products available via cable. In 2018 a significant increase in fixed long-term evolution (LTE) deployment – fixed broadband access via LTE networks was observed. In mid 2018 fixed broadband services via LTE technology served 8 % of the fixed retail market.

In 2018, the new entrants' share of DSL subscription by type of access increased due to the significant migration from CETIN's ADSL bitstream access to its VDSL offer. Still, 35 % of the new entrants' DSL broadband subscriptions use ADSL bitstream access. New entrants using xDSL account for a growing share of the DSL broadband market (currently 20 %), mainly as a result of the take-up of VDSL products. On the other hand, the retail incumbent O2 Czech Republic relies heavily on the ADSL and VDSL bitstream access lines supplied by the wholesale incumbent CETIN.

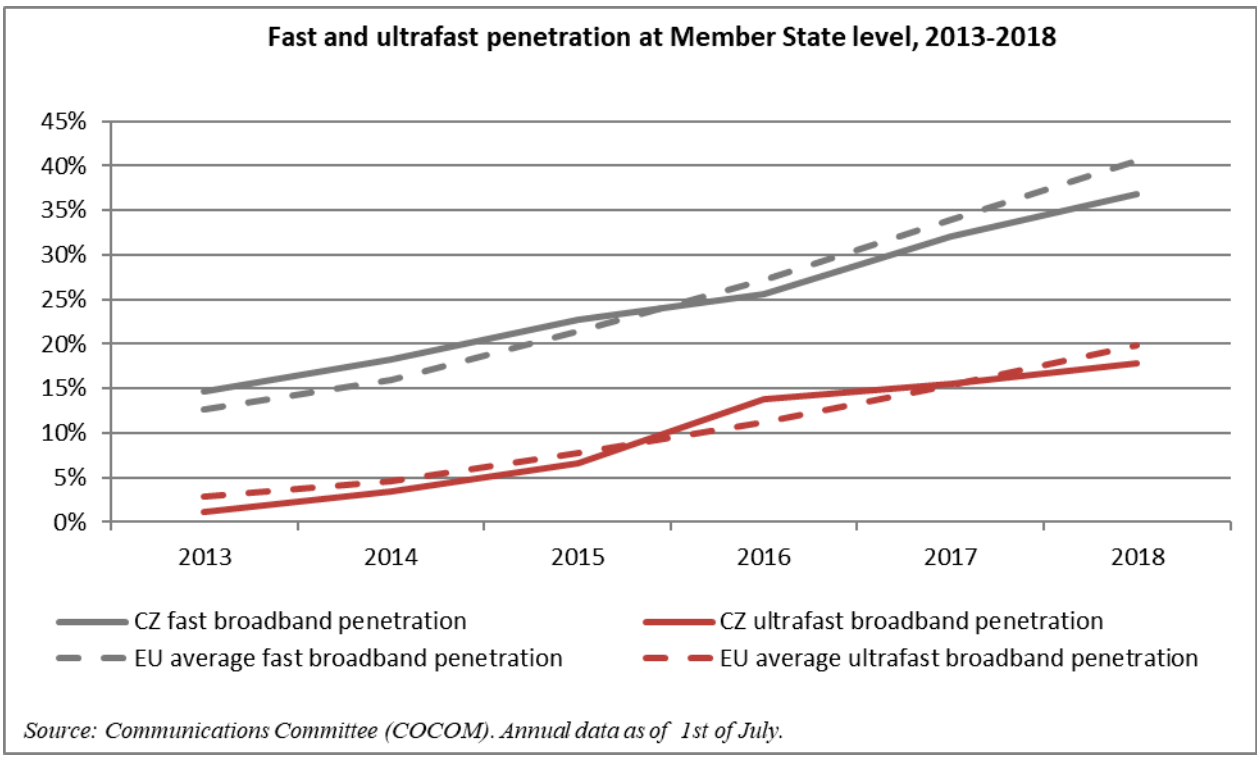
**Broadband market shares at Member State level by technology, % of fixed broadband lines, 2013-2018**



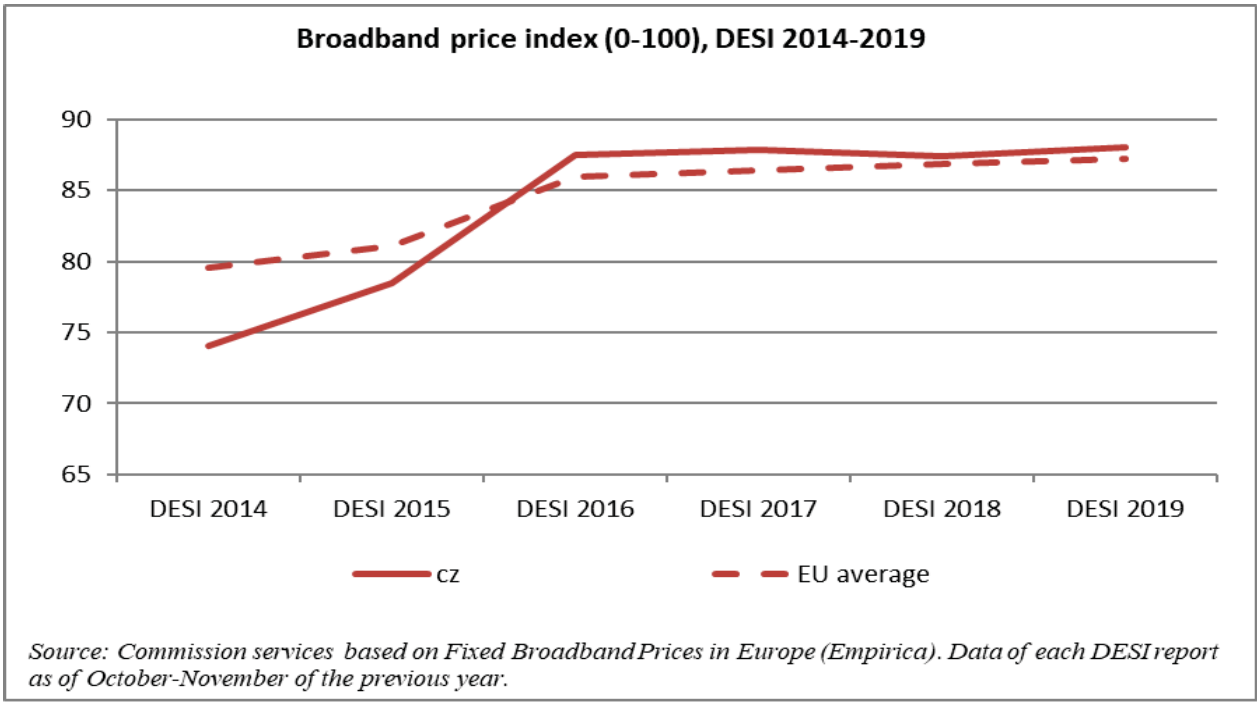

*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

The take-up of fast broadband (37 %) and ultrafast broadband (18 %) in Czechia is below the EU average (of 41 % and 20 % respectively), and shows a significantly slower pace of growth. The ultrafast broadband uptake is catered for by new entrants through FTTP and cable technology, with a marginal deployment on the incumbent's network. Czechia scores 88.1 on the indicator for fixed broadband prices, which is just above the EU average of 87[42].

42The 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.




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

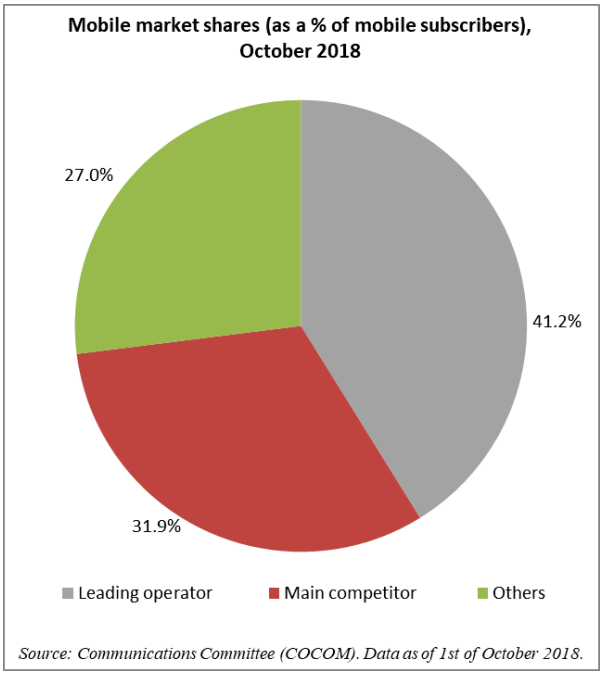



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

PODA and Nordic Telecom, owners of the licences acquired in the 3.6–3.8 GHz band in 2017 announced in the second half of 2018 the launch of wholesale access to data services in 2019 through fixed wireless access technology. This could influence the wholesale fixed market in Czechia.

The number of nation-wide IoT networks is growing (ex: LoRa, Sigfox, Wightless, Waviot). No specific regulatory measures are in place for M2M services.

## 2.2. Mobile markets

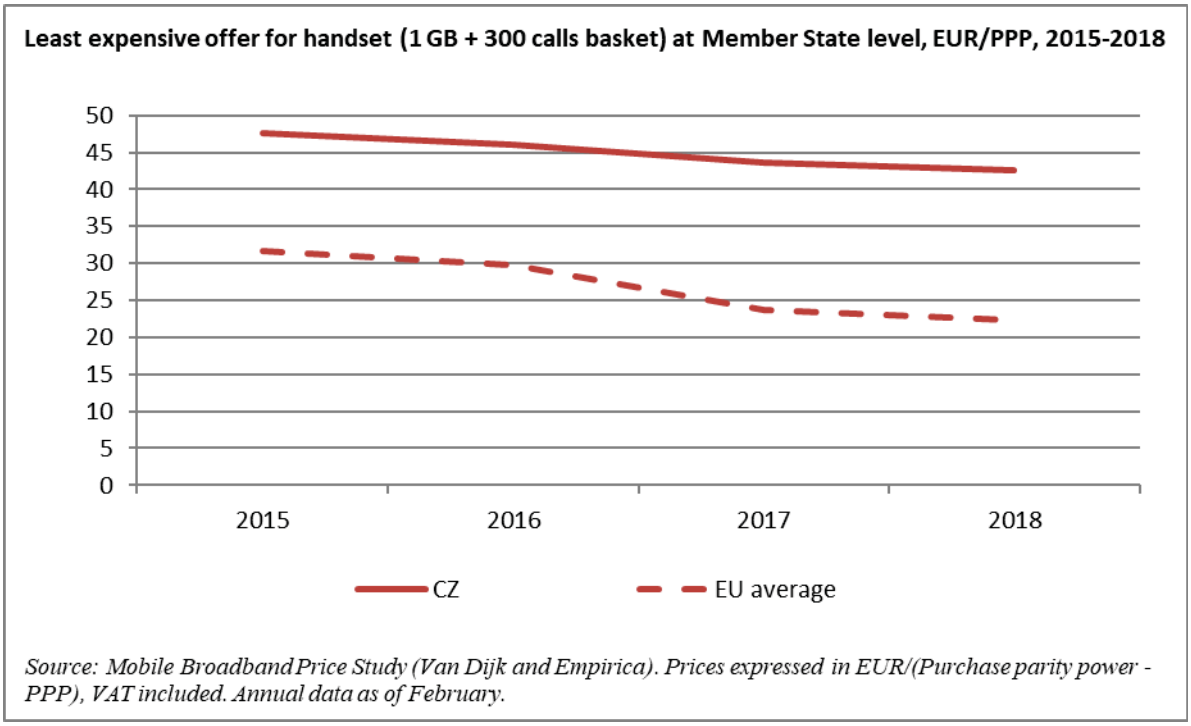



*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

In terms of mobile broadband, 4G coverage is almost ubiquitous (99 %). Mobile broadband take-up (82 %) saw a marginal increase in the past year, but remains well below the EU average of 96 %. The low take-up of mobile broadband may be due to the fact that prices for mobile phone users are among the highest in Europe. The mobile broadband prices for handset offers[43] (€42.6) are almost double the EU average of €22.3. At the same time, the fixed broadband price index is very close to the EU average.

According to CTU, the most common technology for mobile backhaul was microwave lines, which are used to connect more than half of base stations, while fibre made up around 30 % of the available backhaul.

A network sharing agreement between O2 Czech Republic/CETIN and T-Mobile Czech Republic has been in place since 2011, and its scope has been expanding. It currently covers all mobile technologies (2G, 3G and 4G) and all of Czechia apart from Prague and Brno (which means it covers the other cities and all rural areas, which together account for about 85 % of the population). On 25 October 2016, the European Commission started investigating the network sharing agreement. The investigation was ongoing in 2018 and examines whether the agreement restricts competition and thereby breaches EU antitrust rules.




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

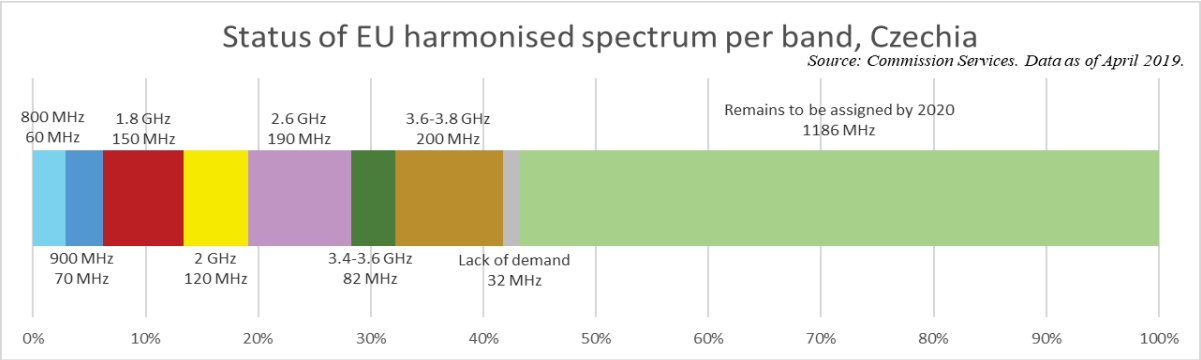
149 mobile virtual network operators (MVNOs), excluding branded resellers, were present on the Czech telecom market in mid-2018. 121 of these offer voice services along with data packages, while

[43] Offers from February 2017 including 1 GB, 300 calls and 225 SMS. Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/PPP, VAT included. Data as of February 2019.

19 MVNOs provide stand-alone mobile data services (broadband for laptops, tablets and other portable devices).

## 3. Regulatory developments

### 3.1. Spectrum




In Czechia, 42 % of the spectrum harmonised at EU level for wireless broadband has been assigned44. The spectrum that remains to be assigned is mainly in the 700 MHz, 3.6 GHz and the 26 GHz bands.

The Czech Telecommunication Office is in the process of preparing auction terms for a 5G auction to auction frequencies in the 700 MHz and 3400-3600 MHz bands. This auction is expected to take place during the second half of 2019. In June 2018, CTU published on its website first version of the basic principles of the spectrum auction followed by an update[45] in February 2019. The auction conditions seem to favour new entrants on the Czech telecommunications market in line with the objective to promote infrastructure-based competition. CTU's intention is to reserve a 2x10 MHz block in the 700 MHz band is reserved for a new entrant. In addition, a time-limited, cost-oriented national roaming access is ensured on the networks of the incumbent operators participating in the auction to allow the new entrant to compete during the period required for its own network rollout.

The CTU assesses that, under the current legislative framework, no other suitable mobile spectrum below 1 GHz range is likely to be available in the foreseeable future, not until at least 2030. After the 700 MHz auction, spectrum below 1 GHz will be fixed and a new entry into the Czech mobile market will only be possible by way of access or spectrum trading. In order to ensure that the licences are 5G ready, winners of the 3400-3600 MHz licences will have to accept refarming with the 3600-3800 MHz band. Similarly the licences granted following the auction in 2017 contain the condition to accept refarming with the 3400-3600 MHz band.

The call for offers for the 700 MHz and the 3400-3600 MHz bands is expected to be launched in the second half of 2019.

In 2018, the CTU initiated negotiations for refarming in the 900 MHz band with all current right holders.

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

[45] https://www.ctu.eu/notice-prepartion-tender-right-use-radio-frequencies-700mhz-band-and-related-steps

### 3.2. Regulated access

In 2017, the CTU launched a public consultation on the fulfilment of the three criteria test for a wholesale 'mobile services market' (Market 15 - Access and call origination on public mobile telephone networks - in the 2003 Recommendation) covering all network technologies (2G, 3G, 4G). In 2018, the CTU completed its examination and is currently preparing its competition assessment – SMP analysis. While the mobile wholesale data market is not identified in the 2014 Commission Recommendation as a market susceptible to *ex ante* regulation, the CTU identified the 'mobile services market' in Czechia as susceptible to ex ante regulation. The CTU concluded that the three criteria test is passed[46] and is finalising its assessment of the potential existence of joint significant market power (SMP) of mobile operators. The CTU expects to send a pre-notification of its conclusions to the European Commission in the first half of 2019.

The markets for wholesale local access provided at a fixed location, wholesale central access provided at a fixed location for mass-market products and wholesale high-quality access provided at a fixed location (markets 3a, 3b, 4 of the 2014 Recommendation[47]) in Czechia were notified to and assessed by the Commission in 2017 (cases CZ/2017/1985-1986 and CZ/2017/1999). The CTU designated CETIN as the only operator holding SMP in markets 3a, 3b and a segment of market 4. The CTU imposed on CETIN the obligation of access, transparency, non-discrimination, accounting separation and on market 3a price control obligation on collocation services and access to the dark fibre. In its analyses, the CTU took into consideration the impact of the 2015 voluntary separation of O2 Czech Republic into two legal entities: CETIN, which operates at wholesale level only, and the retail arm O2 Czech Republic. In 2018, the CTU notified[48] the details of the regulatory obligations imposed on CETIN. The Commission commented on the lack of cost-oriented prices for access to CETIN's passive infrastructure. It considered that the CTU should maintain the cost-orientation obligation imposed on the SMP operator even after transposition of the Directive 2014/61/EU into national law. As a result, the Commission asked the CTU to monitor the application of Directive 2014/61/EU in practice. Where access to CETIN's civil engineering infrastructure could not be ensured in an appropriate, timely and effective manner, in accordance with Article 16(4) of the Framework Directive and Articles 12 and 13 of the Access Directive the Commission asked the CTU to impose a cost-orientation obligation for access to CETIN's passive infrastructure even before the end of the regulatory review period. In addition, the Commission welcomed the CTU's plan to review the weighted average cost of capital (WACC) in 2018 and asked the CTU in that regard to take account of recent Article 7 case practice concerning the WACC calculation method. In 2019, the CTU notified[49] to the Commission the updated WACC value together with the details of its calculation. The Commission had no comments.

The final access remedies in market 3a imposed on CETIN include an obligation to provide access to specific network elements and associated facilities, specifically to copper and optical access lines, VULA and dark fibre. CETIN is also obliged to ensure SLA agreement. Price regulation on the market 3a was to some extent relaxed following the relevant market analysis. The CTU lifted cost orientation on copper Local loop unbundling (LLU) and on access to physical infrastructure. The cost orientation was re-imposed on collocation services and on access to the dark fibre. In addition, an economic replicability obligation was imposed to avoid margin squeeze between services on markets 3a and 3b.

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[46] https://www.ctu.eu/notice-consultation-preliminary-analysis-wholesale-mobile-market

[47] Commission Recommendation 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.

[48] On 27 March 2018 CTU notified the remedies introduced for markets 3a (case CZ/2018/2067), 3b (case CZ/2018/2068) and 4 (case CZ/2018/2069).

[49] On 03 January 2019, the CTU notified the updated WACC value together with the details of its calculation (case CZ/2019/2135)

The remedies imposed on market 3b include access to specific network elements and associated facilities in order to provide wholesale service with a central and regional access point.

The remedies imposed in market 4 include access to specific network elements and associated facilities in order to provide termination segments of leased lines for services up to 6 Mbps.

In March 2019 the CTU initiated the analysis of the wholesale termination markets, and the findings are expected in Q1 of 2020.

## 4. End-user matters

According to the 2018 Consumer Markets Scoreboard, of the 25 services markets surveyed in Czechia 'Mobile telephone services' (-3.9 percentage points) and 'TV-subscriptions' (-3.3) score the lowest compared to the EU-28 average, with the former market recording a decrease in consumers' assessment between 2015-2017 (-2.4 points, now ranks 24th of 25 markets assessed), whereas the fixed telephone services market ranks equally low (23th, -3.2 points below the market's EU average).[50]

1,587 complaints had been registered by the end of September 2018.

On 15 October 2018, the Supreme Administrative Court upheld the second instance decision of CTU to impose a fine of CZK 4.5 million (approx. €175,000) on O2 Czech Republic for changing contracts in May 2015 without the prior approval of its customers and for automatically charging for extra data when the limit was exceeded. The Court stated that any contract change that requires the customer to spend more money constitutes a 'substantial change' that is detrimental to the consumer.

The CTU awards accreditation to independent price calculators of electronic communication services upon their request and provided they fulfil all the accreditation criteria set in the CTU's accreditation scheme. Each accreditation needs to be renewed annually. All currently accredited price comparison calculators may be found on the CTU's web page[51].

### a. Net neutrality

The CTU cooperates with an independent association CZ.NIC to provide the Net Metr[52] monitoring tool to end-users. This application allows end-users to test the speed and overall quality of their internet connection at any time. If the Net Metr test identifies issues with the quality of the internet connection, the CTU will use its own technical measurement procedures to investigate the issue. Consequently, the NetMetr application is not yet certified.

The CTU has been performing its own technical measurements of the data speeds in mobile networks through mobile terminals with the QualiPoc Android software tool. The database of the results of the monitoring is used in assessing complaints. The CTU has published[53] on its website interactive maps reflecting the measurements.

The CTU is keeping a special separate register of complaints focusing on net neutrality issues.

The CTU has undertaken approximately 60 investigations and has reviewed approximately 150 IAS contracts on the basis of Article 4(1) of EU Regulation 2015/2120 (the Regulation). These investigations resulted in 17 enforcement decisions. Most of the investigations and decisions concern orders relating to infringements of multiple (sub)paragraphs of Articles 3 and 4 of the Regulation:

- 15 investigations initiated and six decisions related to restrictions on using terminal equipment (Article 3(1)). Remedial orders were imposed in relation to (i) provisions in the IAS agreement

[50] Consumer Market Scoreboard – 2018 edition. Published on 12 October 2018: https://ec.europa.eu/info/publications/consumer-markets-scoreboard_en
[51] https://www.ctu.eu/price-calculators
[52] https://www.netmetr.cz/en/
53 https://qos.ctu.cz/

prescribing the use of terminal equipment offered by the ISP; (ii) unclear and incomprehensible contractual provisions regarding the use of terminal equipment; and (iii) contractual provisions requiring prior approval of the terminal equipment by the ISP.

- four investigations and four decisions related to zero-rating (Articles 3(2) and 3(3) of the Regulation). The investigations focused on issues such as restrictions after the data cap was reached and the (potential) reduction of quality of service for certain categories of data. None of the decisions were based on a comprehensive assessment as referred to in paragraph 46 the BEREC Guidelines.

- four decisions related to other traffic management measures (Article 3(3) of the Regulation) such as reductions of transmission speed after the specified volume of data was reached for certain types of applications, services and content.

- 12 decisions were taken referring to lack of transparency regarding obligations in relation to specialised services (Article 4(1)(c) of the Regulation).

- 24 investigations and 17 decisions related to other transparency obligations. Two of these decisions have been appealed and the court cases are still pending.

All of the decisions require ISPs to amend their contract terms or commercial practices. No penalties have yet been imposed.

**b. Roaming**

CTU evaluated the impact of one operator which did not automatically apply the roam like at home (RLAH) rules on end-users. The shortcomings identified were rectified in Q1 2018. As of June 2018 there have been no cases of non-compliance with the RLAH rules. The new roaming rules are now well assimilated by the market and understood by end-users. Czech travellers now use approximately 12 times more data while roaming than they did before RLAH, and they call two to three times more.

**c. Emergency communications**

Caller location requirements are laid down in Decree 267/2017 on localisation and identification of the caller. In June 2017 new requirements for caller location accuracy were imposed on operators. Consequently, as of 1 March 2018 mobile network operators had to provide a sector-ID-based location to the authority handling the call. It is planned to implement the handset-derived caller location solution. According to the COCOM report on the implementation of 112, access to emergency services for disabled end-users is ensured through a text relay service.

The Commission is currently looking into the functioning of emergency communications and the 112 number in Czechia, with particular regard to equivalent access to emergency services for end-users with disabilities.

**d. Universal service**

On 4 November 2018 CTU issued a new list of public payphones included in universal service for 2019. This decision is effective as of 1 January 2019 and amended the decision ČTÚ-41 366/2017-610/VI. vyř. of 7 November 2017 on the obligation to provide a partial service within the frame of the universal service. This obligation has been imposed on O2 Czech Republic a.s

Persons with special social needs are entitled to obtain a CZK 200 (approx. €8) allowance in the form of a price discount. The obligation to provide special prices has been imposed on O2 Czech Republic a.s. A universal service obligation is in place to enable access for disabled persons to the publicly available telephone service, to the telephone directory enquiry service and to telephone directories at the same level of quality as the access enjoyed by all other end users, based on, in particular, specially equipped telecommunications terminal equipment. End-users with a disability may rent or buy a

special terminal device for the price of a standard terminal device.

The net cost of the universal service is financed from the state budget. The universal service compensation paid in 2018 for the service provided in 2017 was CZK 34,066,380 (approx. €1,300,000) for public payphones and CZK 74,720,929 (approx. €2,900,000) for special prices for end users with a disability.

## 5. Conclusion

The 2025 strategic targets proposed by the European Commission seem to be supported by the deployment of future-proof technologies by alternative operators. Greater market-led deployment than previously anticipated means that Czechia's direct public investment needs to close the urban-rural divide as regards NGA networks have been reduced. All the remaining measures provided for by the OPEIC should be swiftly implemented. The forthcoming auction of 5G spectrum auction needs to be held soon if 5G is to be deployed in good time.

# Denmark

| | Denmark | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **99%**<br>2016 | **99.5%**<br>2017 | **99.5%**<br>2018 | ***10*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **83%**<br>2016 | **86%**<br>2017 | **82%**<br>2018 | ***8*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **97%**<br>2016 | **97%**<br>2017 | **99%**<br>2018 | ***5*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **120**<br>2016 | **128**<br>2017 | **131**<br>2018 | ***5*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **33%**<br>2018 | ***3*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **93%**<br>2016 | **95%**<br>2017 | **95%**<br>2018 | ***6*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **41%**<br>2016 | **52%**<br>2017 | **55%**<br>2018 | ***8*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **86%**<br>2017 | **92%**<br>2018 | ***4*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **11%**<br>2016 | **19%**<br>2017 | **28%**<br>2018 | ***11*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **89**<br>2016 | **86**<br>2017 | **86**<br>2018 | ***13*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

On 17 May 2018, all political parties in the Danish Parliament agreed on a new political framework for the telecommunications industry. Among others, the agreement confirmed the national broadband target. According to this target, all homes and businesses should be covered by broadband speeds of minimum 100/30 Mbps downlink/uplink by 2020, and they should have good mobile coverage. In 2020 the parties will discuss whether the target would need to be updated.

The political agreement confirmed the fundamental principle of the Danish telecom policy that the rollout of digital broadband is primarily done by the telecom sector on ordinary market terms. State aid should only be a possibility in local areas with poor prospects for better coverage by the market.

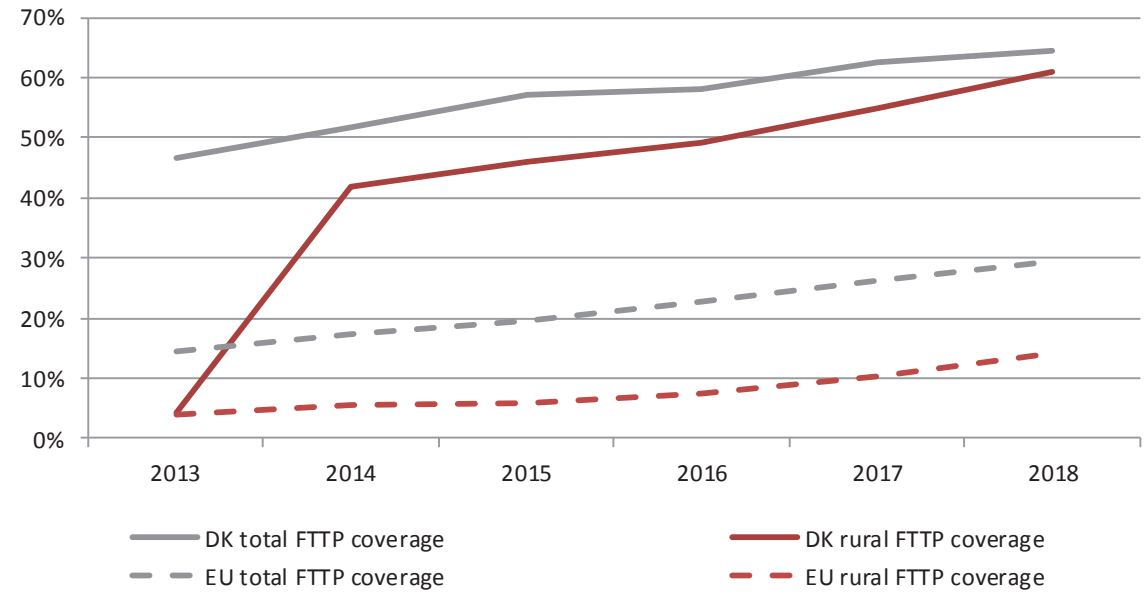
4G coverage is among the best in the EU (99 % of households). Both mobile and fixed broadband take-up have progressed.

In general, Denmark has a very good broadband coverage, including in rural areas. Ultrafast broadband coverage of 92 % of households is also well above the EU average (60 %). Total NGA coverage is among the best in the EU (95 %). Rural NGA coverage has improved, but with 70.6 % coverage these remote areas are still lagging considerably behind total NGA coverage. There are still some smaller white spots with poor coverage. Many of these white spots (but not all) are situated in rural areas. In parts of the country, local or regional (consumer-owned) energy utilities are rolling out high-speed broadband (fibre) to a large percentage of local addresses – including in many rural areas. Several of these utilities have announced their intention to cover all remaining shareholders in these areas (urban and rural) with high-speed broadband (in most cases fibre) within the next few years.

A number of small (and in most cases, local) providers of fixed wireless broadband are expanding their activities, typically in rural areas. Some of the providers are offering access to high-speed broadband with speeds of 100 Mbps or more. Thus, it is expected that most addresses in Denmark will receive access to high-speed broadband through commercial rollout. However, it is recognised that

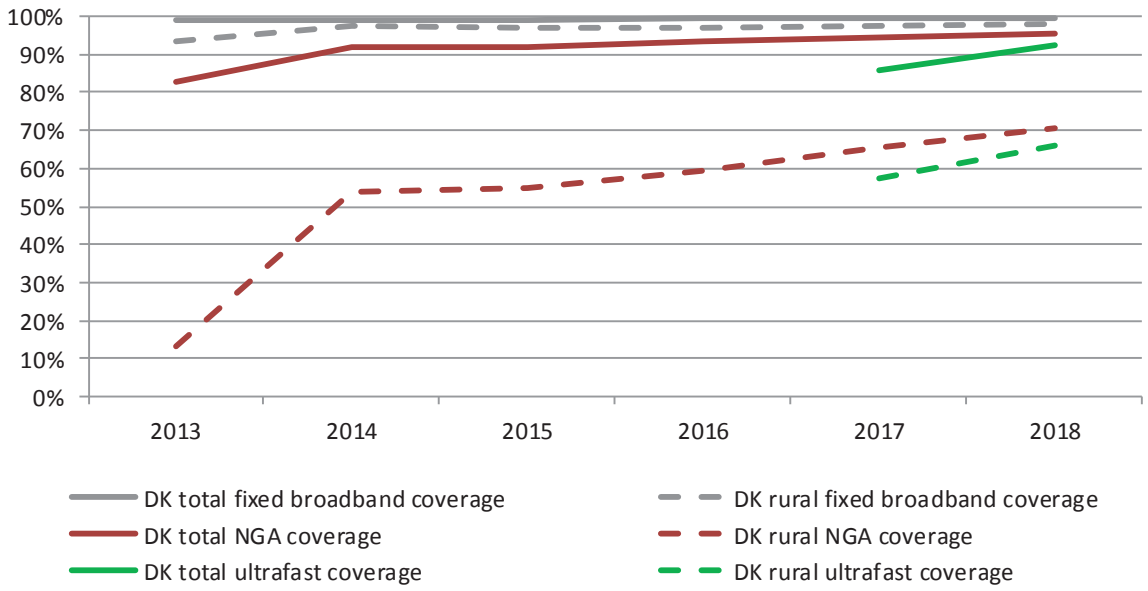
there will be white spots (notably in rural areas), where the market probably will not be able to deliver rollout within a predictable future.

**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.*

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

Two initiatives have been taken to support the rollout in such white spots.

The National Broadband Fund, established in 2016 by the Danish government has focused more on sparsely populated areas in 2018. The Fund had DKK 100 million for 2018. The same amount is approved for 2019. The Fund can offer grants for the rollout of high-speed broadband (minimum

100/30 Mbps downstream/upstream) in underserved areas (which have access to max 10/2 Mbps). The Fund targets local households and/or businesses aggregating their demand to apply for financial assistance collectively. Back in 2016-2017, the National Broadband Fund offered approx. DKK 180 million in grants to a total of 73 projects comprising some 7,600 addresses (homes, businesses and holiday homes).

In November 2018, the Danish Parliament adopted a proposal to amend the Telecommunications Act in order to establish a more concise framework for state-aid from municipalities to support the local rollout of digital infrastructure. The Danish Energy Agency (DEA) has been commissioned to prepare one or more state aid schemes, which will be presented to the Commission for approval.

The major challenge is the mapping of the addresses that can obtain better coverage through projects supported by the National Broadband Fund. Denmark has a very detailed mapping of broadband coverage at address level. However, this is very demanding in terms of manpower each year for the Danish Energy Agency (DEA), in order to ensure that grants are only provided for addresses with very poor coverage (max 10/2 Mbps). Some operators also decline to participate in the grant projects for another reason, namely because in their view the rules for open access are too much of an administrative burden. This is in particular an issue because the projects are typically quite small (50-100 addresses, or even fewer). Accordingly, in some parts of Denmark it is more difficult to organise local projects to apply for a grant from the National Broadband Fund.

The high degree of digitisation of the Danish society and the low level of prices are contributing factors to the high take-up of broadband.

WiFi4EU is criticised by mobile network operators (MNOs) as putting their business case under threat. The option to set usage limitations corresponding to the wording in the WIFI4EU Regulation if the competition in the market is negatively affected had been introduced into national legislation at the end of 2017, but had not yetbeen applied.

Denmark has started preparations for the transposition of the European Electronic Communications Code (EECC). The project team for the overall implementation process has been put together to coordinate specific input to the legislative process. It has started to analyse central access provisions, including symmetric access, wholesale-only and co-investment, with stakeholder meetings and desk-research on the schemes in other EU countries. The aim is to transpose the Code in as open a process as possible. According to the approved timetable it is expected, that the legislative measures necessary for the implementation will be presented to parliament in the second half of 2020.

## 2. Market developments

### Competitive environment

Since 2014 the telecommunications market has been constantly decreasing in terms of turnover, while investment is increasing. According to the DEA, investments by the telecommunications companies are up from DKK 6.6 billion in 2016 to DKK 7.3 billion in 2017, which represents an increase of 10.3 %. Investments have been on the rise since 2013. From 2014, the total turnover has decreased, thus contributing to an increase in the investment rate from 17.4 % in 2016 to 19.3 % in 2017. [54]

The incumbent, TDC, which operates the nationwide telecommunications network, the coax cable TV network (serving approximately 50 % of Danish households) and one of the four mobile networks, has been taken over by Danish pension funds and an Australian investment fund. In February 2018 DK Telekommunikation – acting on behalf of Macquarie and three Danish pension funds, namely PFA, ATP and PKA – bought TDC for about USD 6.7 billion. Macquarie on the one hand and the three

[54] The DEA issued its publication on economic key figures for the telecommunications sector for 2017 in July 2018.

pension funds on the other respectively own 50 % of the shares. In July, the new owners sold GET, a TDC-owned cable TV company in Norway, thereafter focusing solely on activities in Denmark. They announced their intention to focus on long term returns with low risk. They are considering restructuring the company to structurally separate retail and wholesale businesses, with a possible subsequent full divestiture of the retail arm. A network-focused unit, so far called NetCo, is intended to operate all infrastructure – both landline and mobile. The focus here will be on expanding infrastructure in Denmark available to service providers (including OpCo). A customer-focused division, at the time called OpCo, but later expected to be renamed Nuuday, is intended to manage the retail business with both private and corporate customers, with a focus on innovation, digital services and customer experiences. The CEO of TDC resigned in early December 2018 in the context of these changes.

In May 2018, TDC (with its brand Yousee) was and Dansk Kabel-TV estimated to have 1.28 million TV subscribers (down by 50 000 since June 2017) and 1.28 million broadband subscribers in 1H 2018. TDC is still the biggest player in Denmark in all four markets (status May/June 2018): in mobile telephony it had 40 % market share, in fixed telephony 65 %, in TV 56 % and in broadband connections 50 % – without the 47,000 Hiper subscribers. The main brands used by TDC are: YouSee, Telmore, Fullrate, Blockbuster and Dansk Kabel-TV.

### 2.1. Fixed markets

Fixed subscriptions (VoIP, PSTN and ISDN) continue to decrease or stagnate. VoIP remains at aproximately 887,000 in 1H 2017 and 1H 2018, and PSTN and ISDN subscriptions fell to 396,000 and 25,000 respectively. Accordingly PSTN and ISDN subscriptions declined by 24.7 % and 36,3 % from 1H 2016 to 1H 2018 (12.5 % and 19,9 % from 1H17 to 1H18 alone).

Syd Energi (SE) and Eniig, two of the regional energy companies which are also FTTH providers, announced a merger in October 2018. They intend to work in the future under the name Norlys. The merger is subject to the approval of the Danish national competition authority (NCA) Konkurrencerådet – part of the Danish Competition and Consumer Authority. After the consolidation, Norlys is estimated to have approximately 709,000 shareholders (this also means customers getting their power supply from Norlys) and more than a million households subscribing to TV and broadband via either fibre or coax (42 % of all households). Geographically, Norlys will cover about 40 % of Denmark.

Norlys announced that the 'OpenNet' platform, intended to enable third party fibre access, will continue to function as an independent company with the aim of opening utility companies' fibre networks to strengthen the digitalisation of Denmark.

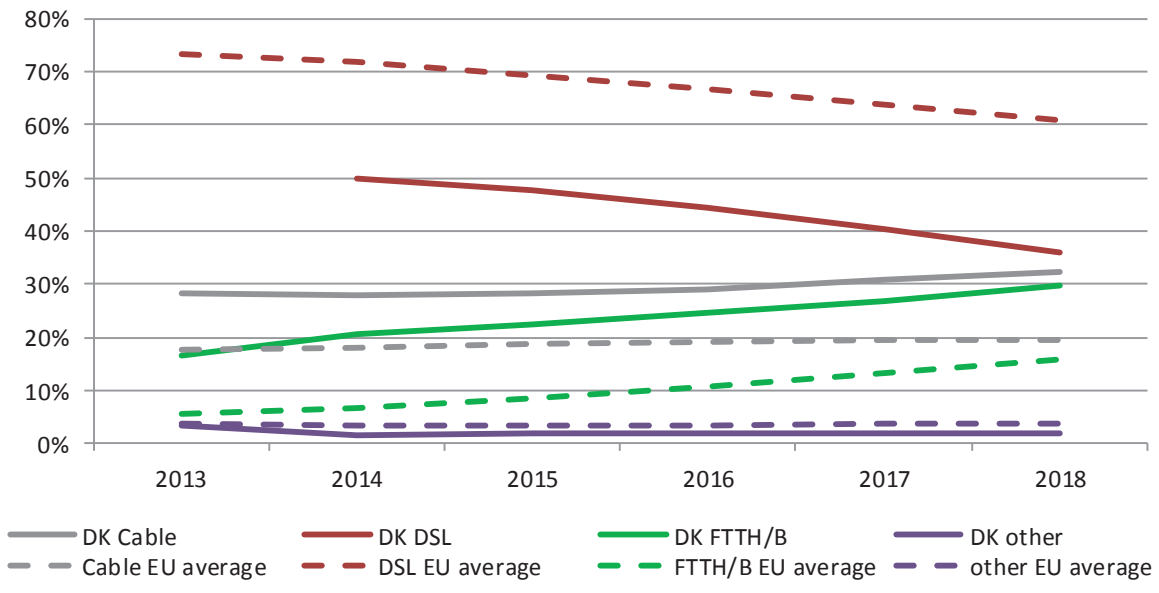
Later in October 2018, TDC announced that it had bought the company Hiper, a service provider selling broadband connections using TDC's fixed network infrastructure (copper, fibre and coax). Hiper had reached 47,000 customers. Due to the limited volume of the deal, it does not need approval from the NCA.

In Denmark there are currently eight utility companies functioning as wholesale-only operators. However, two are partly owned by larger corporate groups that have retail-level activities, and one owns a stake in a larger corporate group that has retail-level activities. All these companies taken together cover only a small, sparsely populated part of Denmark, meaning they have little geographical reach and the impact on overall competition is also very limited.

Between 1H 2017 and 1H 2018 fixed broadband subscribers in Denmark continued migrating to higher bandwidths and replacing DSL subscriptions by fixed broadband subscriptions based on fibre (+2.9 percentage points of market share) and on coax cable (+1.5 percentage points of market share).

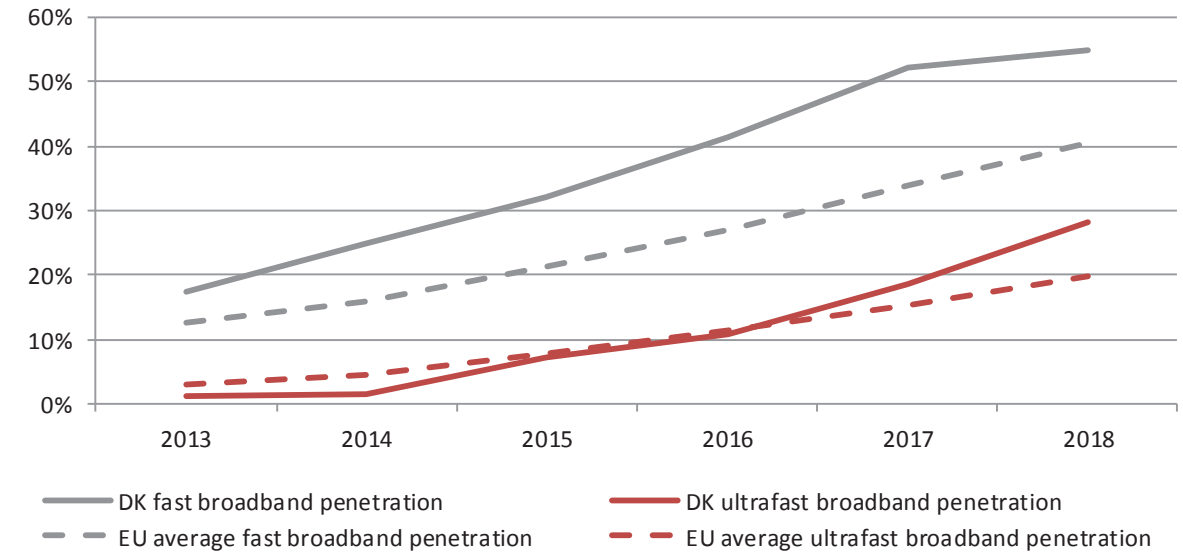
Fixed broadband take-up has progressed, in particular in ultrafast broadband, where there was a sharp increase in take-up from 19 % of fixed broadband lines in 2017 to 28 % in 2018. 9 % of Danish households subscribed in 2018 for the first time to ultrafast broadband. However, there are still 58 % of Danish households that could access ultrafast broadband, but so far did not choose to.

**Broadband market shares at Member State level by technology, % of fixed broadband lines, 2013-2018**




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

**Fast and ultrafast penetration at Member State level, 2013-2018**

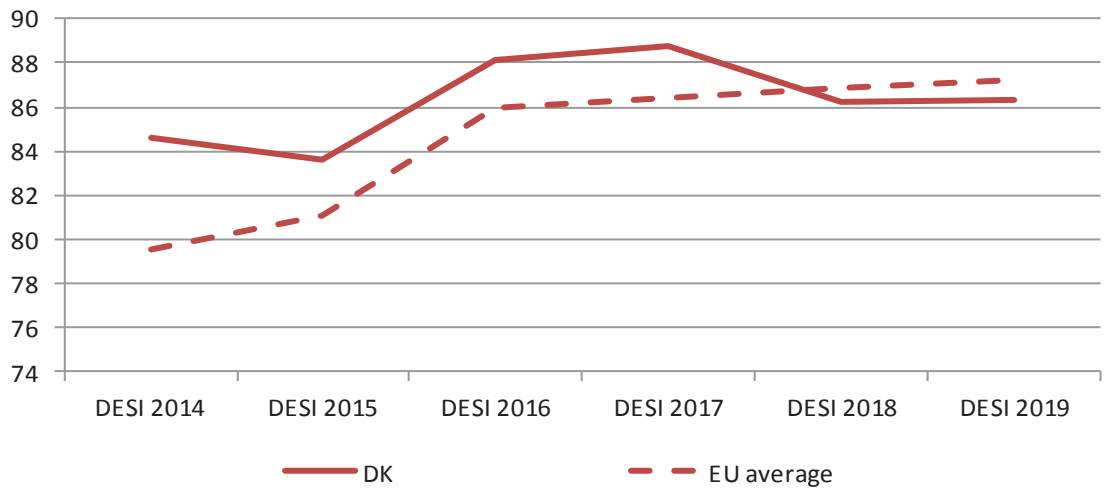



*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

Denmark scores in the midfield at the broadband price index[55], its prices calculated using purchasing

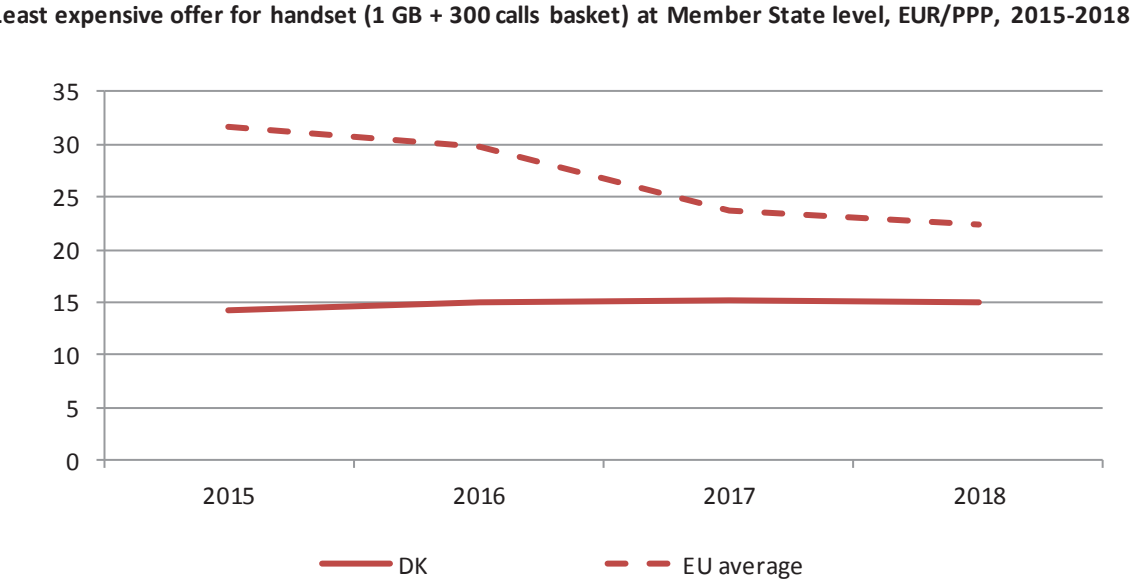
55 The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100 Mbps. This indicator presents values from 0 to 100 (which should not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

power parity (PPP) being slightly higher than the EU average.




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets

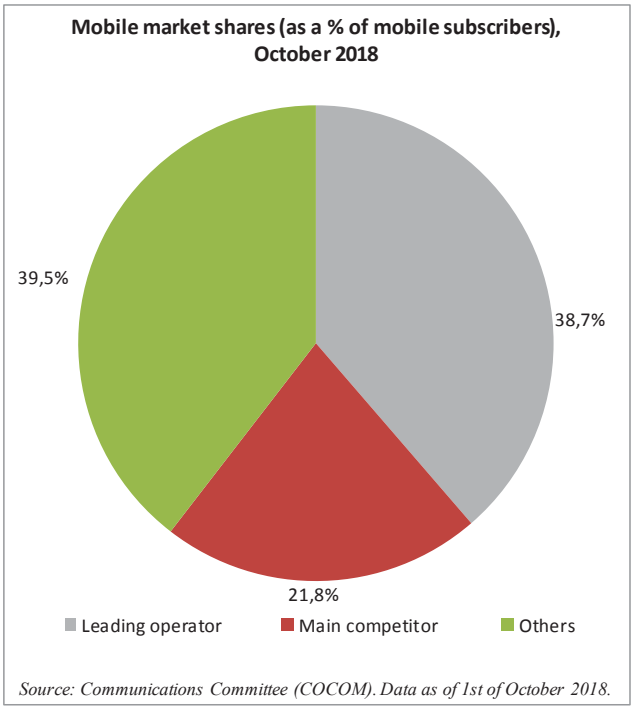



*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

Data traffic volumes have increased by 36.8 % from 367,850 Terabyte (TB) in 2016 to 503,218 TB in 2017. Mobile call volumes (in terms of calls originated) decreased slightly by 0.3 % from 2016 to 2017 to around 13.5 billion minutes. SMS volumes continue to decline. From 2016 to 2017, SMS communication fell by 9.9 % from 6.4 billion units to around 5.8 billion.

The number of mobile subscriptions remained almost stable (down by 0.1 % from the second half of 2016 to the second half of 2017). Due to a growing population, the number of subscriptions per 100 citizens dropped by 0.6 % between the end of 2016 and the end of 2017. At the end of 2017 there were 144.2 mobile subscriptions per 100 citizens in Denmark.

Mobile broadband prices for handset offers have not changed significantly in the past year -and are even below the EU average.




*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

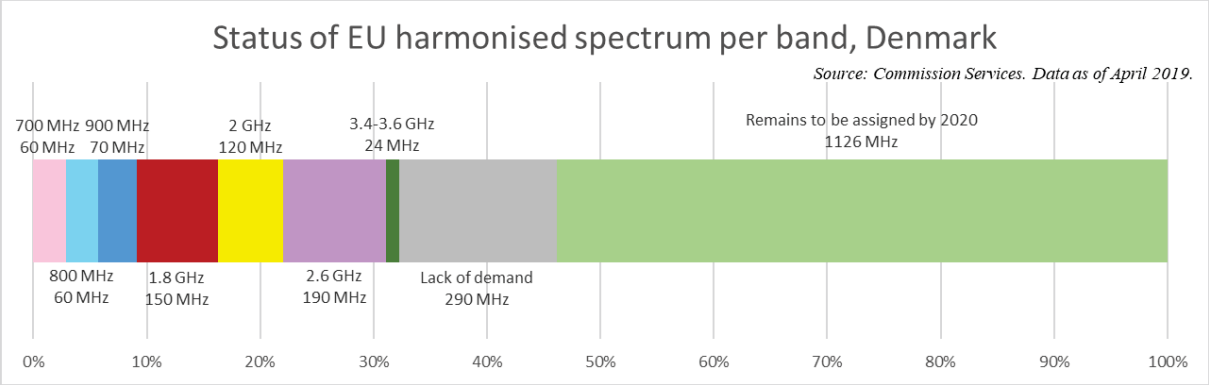
According to the DEA's estimates, most Danish mobile subscriptions are in the form of bundles with minutes, SMS, MMS and data included for a single tariff. High usage bundles are offered with both unlimited minutes, SMS/MMS and unlimited data. The majority of mobile bundled offers include a limited amount of data to be used for roam like at home (RLAH). The amount of the data which can be used for RLAH is a selling point. It appears that the companies are now reducing the number of their bundled offers. Bundles including over the top (OTT) services like film and music streaming services also exist.

OTT services generate significant traffic in the mobile networks. Some OTT services also generate a substantial revenue. This is the case for Netflix, Spotify, HBO, etc. This forces operators to include their own equivalent services or third party OTT services in their service offers. However, the DEA has no specific information about this.

On 1 October 2018, the mobile market share of the leading operator was 38.7 %, the market share of the main competitor was 21.8 % and the market share of all other operators was 39.5 %.

## 3. Regulatory developments

### 3.1. Spectrum




In Denmark, 32 % of the spectrum harmonised at EU level for wireless broadband has been assigned[56]. This relatively low percentage is mainly due to the lack of a procedure for assigning the the 1.5 GHz, the 3.4-3.6 GHz and the 26 GHz bands.

hree participants took part in the auction for the assignment of spectrum in the 700 MHz, 900 MHz and 2.3 GHz spectrum bands, that started on 19 February 2019. .As Telia and Telenor have a network

56 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 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU) 2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

sharing agreement, they had to participate as one entity in the auction. The other two participants were the MNOs TDC and Hi3G. The auction had originally been scheduled for September 2018 but had been postponed by DEA on the eve of the starting day for unspecified reasons. On 17 December 2018, DEA communicated publicly that the auction would start in February 2019[57]. The terms, procedures and participants remained unchanged: the frequencies in the 700 MHz band to be awarded comprised 2x30 MHz paired frequencies (703-733 MHz paired with 758-788 MHz) and 20 MHz unpaired frequencies (738-758 MHz). The frequencies in the 900 MHz band comprised 2x30 MHz paired frequencies (880.0-891.9 MHz and 896.9-915.0 MHz paired with 925.0-936.9 MHz and 941.9-960.0 MHz respectively). The frequencies in the 2300 MHz band comprised 100 MHz unpaired frequencies (2300.0-2400.0 MHz). The auction ended on 28 March 2019. Hi3G acquired 2x10 MHz in the 700 MHz band and 2x10 MHz in the 900 MHz band. TDC acquired 2x15 MHz and 20 MHz for supplementary downlink in the 700 MHz band, 2x10 MHz in the 900 MHz band and 60 MHz in the 2.3 GHz band, the latter with no coverage obligations. The joint entity formed by Telia and Telenor acquired 2x5 MHz in the 700 MHz band and 2x10 MHz in the 900 MHz band[58] The remaining 40 MHz of the 2.3 GHz band were not acquired. The way forward with regard to this spectrum is currently under consideration.

As to the coverage obligations in the 700 MHz and 900 MHz bands, the coverage areas are divided into three non-overlapping coverage area groups equally distributed throughout Denmark. By 4 April 2022, licensees must ensure provision of an outdoor mobile voice service and a mobile broadband service with a download bit rate of at least 30 Mbit/s and an upload bit rate of at least 3 Mbit/s. The coverage obligation applies in the coverage areas allocated in the auction process and specified in the licence, and at least 90 % of each individual coverage area must be covered.

All coverage obligations may also be fulfilled via national roaming agreements. Usage conditions also apply, over and above, the coverage obligations. Antennas and transmitting and receiving equipment capable of using the frequencies specified in the licence musts be installed by the licensees no later than 4 April 2022 at a minimum of 100 mast positions[59]. The usage conditions apply to both the 700 and 900 MHz licences and the 2.3 GHz licence. The MNOs are expected to use any additional spectrum acquired first and foremost to provide additional capacity to mobile communication subscribers.

5G trials and tests are limited in scope and focu on the health sector, pharmaceutics, agriculture and broadcasting.

A public consultation on interest in the market for the 3.6 and 26 GHz bands has been held in August 2018. A decision on the licence regimes for these bands is expected to be taken in 2019. It is specified that the assignment method is expected to be an auction. The award procedure and authorisation of the use of the relevant spectrum is planned to be carried out in 2020 to comply with the deadline specified in the EECC. Assigning sufficiently large blocks in the 3.6 GHz band is expected to be fairly straightforward as the existing users (all with time limited licences) will have vacated the band before the deadline. The DEA has not yet decided how to make space in the 26 GHz band for 5G services, but will work further to allow the use of at least 1 GHz of the band by 31 December 2020.

The DEA does not have to authorise base stations used in mobile networks on a case-by-case basis. Base stations can be established as the operators wish as long as they comply with the conditions in their spectrum licence. Macro base stations, mini base stations, pico cells and small cells can be used as the operators wish. Hence, there is no specific authorisation required for the deployment of small

[57] The auction started on 19 February 2019.
58 See https://presse.ens.dk/pressreleases/flere-steder-i-landet-kan-se-frem-til-bedre-mobildaekning-2853575
[59] For further detail see https://ens.dk/en/our-responsibilities/spectrum/auctions and https://ens.dk/sites/ens.dk/files/Tele/information_memorandum_-_updated_feb_2019.pdf

cells, but a municipal building or digging permit or an agreement with the owner of a building or structure may be needed.

### 3.2. Regulated access

In April 2018, the DBA adopted a supplementary price decision which became effective on 1 July 2018. This was a decision regarding fixed, fibre networks in Denmark for the year 2018. The DBA updated the long run average incremental cost (LRAIC) model used to determine the regulated rates for the provision of wholesale local and central access services by the operator TDC. TDC was found to have significant market power (SMP) in the DBA's 2017 market analysis. The adjustment of the model takes into account the fact that TDC is no longer obliged to provide network access to its fibre network in 56 geographically defined areas. The updated model has got a geographical dimension and is hence able to calculate separately the costs associated to TDC's fibre network in the regulated areas of the country (or in other areas if necessary)..

In June 2018 the DBA adopted a decision regarding the withdrawal of regulations on the retail market for access to the public telephone network at a fixed location for residential and non-residential customers (market 1, cf. Commission Recommendation of 17 December 2007). It will enter into force in June 2019.

Also in June 2018, the DBA adopted a decision regarding the withdrawal of regulations on the wholesale market for call origination on the public telephone network provided at a fixed location (market 2, cf. Commission Recommendation of 17 December 2007). It will enter into force in June 2019.

DBA reviews the cost calculations and sets the wholesale prices on an annual basis. In December 2018, the DBA updated the cost model for prices of wholesale services provided on fixed networks for 2019 in Denmark[60]. The review includes updating a number of the model's parameters, i.a. the number of active lines, broadband traffic, and the weighted average cost of capital (WACC). Apart from updating the inputs, the DBA calculated the WACC parameters using the same underlying approach as in previous years. According to the DBA, wholesale prices have increased compared to last year, mainly as a result of a decline in the number of active lines.

Finally, also in December 2018, the DBA updated the price caps for mobile termination rates (MTRs) for 2019. The DBA sets the new MTRs, valid from 1 January 2019, at DKK 0.0385 per minute (approx. 0.52 euro cent, down from 0.60 euro cent, comparing to the EU weighted average of 0.85 euro cent per minute[61]). Only five SMP operators received a decision (as opposed to the six identified in the market review) as the company Mundio (Vectone) had closed down.

The DBA is starting to prepare for its 2020 market analysis of broadband markets (markets 3a and 3b)[62]. While utilities have again announced that they will open up their fibre networks voluntarily, this has not yet materialised. One utility, Eniig has introduced and invested in a wholesale platform, OpenNet, with the aim of enabling third party fibre access Because of the small size of some of the utility companies, technical and administrative challenges are significant and access might have to be limited to bitstream access in some cases to ensure proportionality. So far, no utility companies have yet effectively opened up their fibre networks.

The DBA does not have explicit plans to revise the FTR and MTR models, due to the harmonisation of termination rates as set out by the Commission. The euro rate for both markets will be in place from

60 The DBA issued a new price decision 27th February 2019 valid from 1st April 2019. This new price decision was issued due to a correction of the LRAIC-model.
61 BoR (18) 218, Berec report on Termination rates at European level, July 2018.
62 Due to competitiveness of the business market, DBA had deregulated the wholesale market for high quality access provided at a fixed location in Denmark as of 6 September 2017.

2021 according to the DBA's planning, which means that the DBA would not have a model ready before then.

For FTRs, the DBA implemented pure long run incremental cost (LRIC) as pricing methodology as of 1 January 2013 as laid down by the recommendation on termination rates from 2009. The FTR applies symmetrically to all 38 SMP operators in Denmark, is applicable from 1 January 2019, and will remain valid until the DBA adopts a new price decision. There has been no change to the pricing methodology since 1 January 2013. Volumes of terminating minutes in the fixed network have been declining year-on-year since 2012. The FTR price has been stable since 2015.

In 2008, the DBA began using LRAIC to regulate MTR, and implemented pure LRIC in 2012 as provided by the recommendation on termination rates from 2009. Since 2011 and until 2018 all MTRs have applied symmetrically to the six regulated mobile operators (four MNOs and two MVNOs). Only the latest data show a slight increase in the volumes of terminated minutes, but overall terminating minutes are stable. DBA is not aware of an intention by operators to move towards bill-and-keep. The MTR price has been decreasing each year since 2011.

As regards take-up of access products and new, NGA-related products (status: 1 July 2018) there is nothing to report for duct access. However, for dark fibre on market 3a, all companies taken together use approximately 615,400 lines. In local loop unbundling on market 3a, approximately 1.21 million lines from TDC are in use. VULA products from TDC in market 3b are used on 65,782 lines and on another 58,755 lines bitstream products are used. For dual pair bonding there is a total take-up of 31,200 connections. The DBA does no specific registration on the take-up of VULA products over copper lines which are upgraded with vectoring. For dark fibre, there has been an uptake of 52,312 new connections since 1 July 2017 (status: 01 July 2018). The total take-up of virtual fibre bitstream access (BSA) is 31,961 connections, while for fibre drop cables there is nothing to report. Coax bitstream access is not regulated.

DBA made a decision in one case regarding a price squeeze on TDC's flagship product for fibre bitstream access (FttH 50 Mbit/s). TDC was required to fulfil its price squeeze obligations on market 3a and 3b. TDC took the decision to the Danish Telecommunications Board of Appeal, where the decision later was upheld in December 2018.

The DEA maintains a database of future radio coverage plans and existing and planned antenna positions. The Danish Road Directorate provides a web service map where network operators can publish planned civil works. The Danish Telecommunications Industry Association maintains a database from which interested telecommunications companies automatically receive notification with offers of joint digging efforts from other telecommunications companies digging in certain areas. There is an agreement to coordinate on civil engineering works between telecommunications operators. The Danish Register of Underground Cable Owners (LER) has a microsite 'Graveinfo' ('Digging info') that shows digging information on a map based on queries. LER is being further developed to better support the coordination of civil works and in the future also to better support the joint utilisation of physical infrastructure.

If regulated, DBA expects that the price setting related to access to and coordination of civil works will be challenging..

## 4. End-user matters

In 2017 the Telecommunications Complaint Board received 612 complaints. As to overall market performance from a consumer perspective, in Denmark the market for Internet provision ranks 22nd out of the 25 service markets assessed, 1.6 points lower with respect to the market's EU average

score[63]. The mobile telephony ranks 21rst out of 25 services markets assessed, 1.7 points lower than the EU average score.

### a. Net neutrality

The DEA has opened in one case an investigation on a potential breach of the Net Neutrality Regulation. The case is still pending. The DEA has not been confronted with any new specialised services[64]. The DEA has received several general operator statements that there are issues relating to primarily 5G network slicing and the rules on specialised services. However, it has not received any concrete examples of incompatibilities in this respect.

### b. Roaming

Roaming usage (data and calls) has increased considerably compared to the situation prior to the introduction of roam like at home (RLAH). End-users with subscriptions in Denmark consumed twice the roaming data and 15 % more call minutes in Q4 2017 (under RLAH rules) than they did in Q4 2016 (before the introduction of RLAH). For the subsequent three-month period the figures are largely similar: End-users with subscriptions in Denmark consumed 2.2 times more roaming data and 16 % more call minutes in Q1 2018 (under RLAH rules) than in Q1 2017 (before the introduction of RLAH).[65]

The DEA has made one decision relating to non-compliance with the RLAH rules. The case originated from August 2017 but the lack of response from the operator meant the final decision was taken on 15 June 2018. Due to the lack of response and failure to comply with the final decision, the DEA sent an enforcement notice to the operator on 28 August 2018. Subsequently the operator made changes to its fair use policy and on 13 September 2018. The DEA finally found the fair use policy compliant with the DEA's decision and the Roaming Regulation. Contrary to the mobile price trends in 2017, the DEA found no increases in domestic mobile prices in 2018. However, the amount of mobile services has been increasing, in particular for higher data allowances included in the subscriptions.

### c. Emergency communications - 112

112 is the single emergency number in Denmark. 1.44 million calls were made to 112 in 2018. The average response time was 7 seconds and 80 % of the calls were answered within 10 seconds. The Danish emergency services provide an app that uses the GPS (if available) in the handset. This location data is transmitted to the public safety answering point by an SMS from the handset. It is under discussion between the operators and the DEA whether the mobile service providers could charge the end-user for these SMSs if their subscription does not include SMS flat rates.

The Ministry of Justice is in charge of implementing Advanced Mobile Location (AML) in Denmark.

Two different public warning systems are deployed in Denmark: Sirens and a special app[66].

## 5. Institutional issues

TLegislation for assigning numbering resources to public authorities and companies which use M2M communication in the execution of their tasks was passed in 2018. The purpose is to ensure that such public authorities and companies can switch operator without changing SIM cards and ensure

63 The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers. See Consumer Markets Scoreboard 2018, available at https://ec.europa.eu/info/files/consumer-markets-scoreboard-making-markets-work-consumers_en

64 See also Net Neutrality Report by Bird&Bird&Ecorys, 2019, forthcoming.

65 See 'International Roaming BEREC Benchmark Data Report October 2017 - March 2018' available at https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8251-international-roaming-berec-benchmark-data-report-october-2017-march-2018

66 See Communications Committee, Working Document: "Implementation of the single European emergency number 112", available at https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=57406

competition in the market by avoiding lock-in effects.

## 6. Conclusion

Fixed broadband and mobile network coverage are significantly above the EU average. As Denmark overwhelmingly relies on private investment, more clarity on the issue of prospects for regulated access to fibre networks resulting from the market reviews under preparation could help investors to assess potential benefits and risks more reliably. Bringing down the administrative burden for small localised fixed broadband funding projects in white spots will be another challenge.

# Germany

| | Germany | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **98%**<br>2016 | **98%**<br>2017 | **98%**<br>2018 | ***15*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **86%**<br>2016 | **88%**<br>2017 | **87%**<br>2018 | ***4*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **86%**<br>2016 | **88%**<br>2017 | **90%**<br>2018 | ***24*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **73**<br>2016 | **79**<br>2017 | **81**<br>2018 | ***23*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **33%**<br>2018 | ***3*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **82%**<br>2016 | **84%**<br>2017 | **88%**<br>2018 | ***14*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **26%**<br>2016 | **36%**<br>2017 | **44%**<br>2018 | ***14*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **66%**<br>2017 | **66%**<br>2018 | ***16*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **8%**<br>2016 | **11%**<br>2017 | **15%**<br>2018 | ***19*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **94**<br>2016 | **92**<br>2017 | **93**<br>2018 | ***3*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

The federal ministry of transport and digital infrastructure (BMVI) is currently working on a gigabit strategy based on the coalition agreement[67], which includes a commitment to full coverage with gigabit-ready networks by 2025. About 75 % of this goal should be reached thanks to the commercial upgrade of cable networks. Commercial fibre rollout is expected to add to this. However, it is not clear to what extent the commercial rollout will extend beyond the areas currently covered by cable networks. It is expected that, in addition to the commercial rollout, at least 10 % of households will be connected with fibre by means of subsidy programmes in white spots. For the remaining 15 % of households, which have at least 30 Mbit/s available via next generation access (NGA) networks, but with connections that cannot be upgraded to gigabit speeds, the German government is working on a programme to subsidise such 'grey areas'. It is also working on ensuring the rollout of direct fibre connections for socio-economic drivers (schools, hospitals, business parks etc.) by 2021. Besides the subsidy programme for gigabit connectivity, the coalition agreement between the political parties forming the federal government announced a legal 'right to fast internet' with effect from 1 January 2025.

There is an obvious urban-rural digital divide as regards fixed NGA coverage. The share of fibre connections has increased from 7.3 % of households in mid-2017, to 8.5 % of households as of mid-2018.

Under the current federal funding scheme, over €4 bn in appropriations had been made available until 2018. By mid-November 2018, 700 subsidised infrastructure projects were running and 2,400 consultancy services had been awarded. Roughly 50 % of the awards went to the incumbent telecom operator, Deutsche Telekom AG (DTAG), reflecting its overall market share. The measures targeted the 15 % of German households located in white spots. Altogether 91,000 km of subsidised fibre lines

67 The agreement between the political parties forming the federal government

have been rolled out. By mid-November 2018 €82.3 m had actually been paid. It is expected that this delay will be reduced significantly over 2019. The conversion of the ongoing subsidy schemes to fibre optic technology was made possible, and municipalities had been able to change their copper-based projects to fibre until the end of 2018. Since 1 August 2018, in practice, only FttB/H projects had been awarded. Before that, FttC projects had also been awarded, but the funding was already limited to the fibre part only. In mid-November 2018, at least 80 % of the projects were FttB. The projects enable also fibre connections to mobile network sites. In future the inclusion of towers for mobile communications in white spots could also be considered.

Currently 85 % of the projects submitted follow the profitability gap model where a telco operator builds and operates the network. The remaining 15 % of the projects submitted follow the operator model under which a municipality tenders the civil work for building its own passive infrastructure which is then leased to an internet access service provider.

In addition, a €10-12 bn gigabit investment fund will be envisaged. For 2018, up to €1.6 bn was already available. The funding intended for 2019 amounted to €3.4 bn. It is expected that the fund is to be filled by the revenues from the 5G auction in spring 2019. If this would not be sufficient, there would also be the possibility to use the general budget.

Parallel to the continuation of the current funding programme, the new gigabit programme to develop grey areas is being considered. Players investing in commercial fibre rollout are pleading for a subsidy system that matches well with private activities. Some industry stakeholders propose that in cases where vectoring had been subsidised, there should be an interim period of at least 3 years, allowing for amortisation, before a new, fibre-based subsidy scheme can kick in.

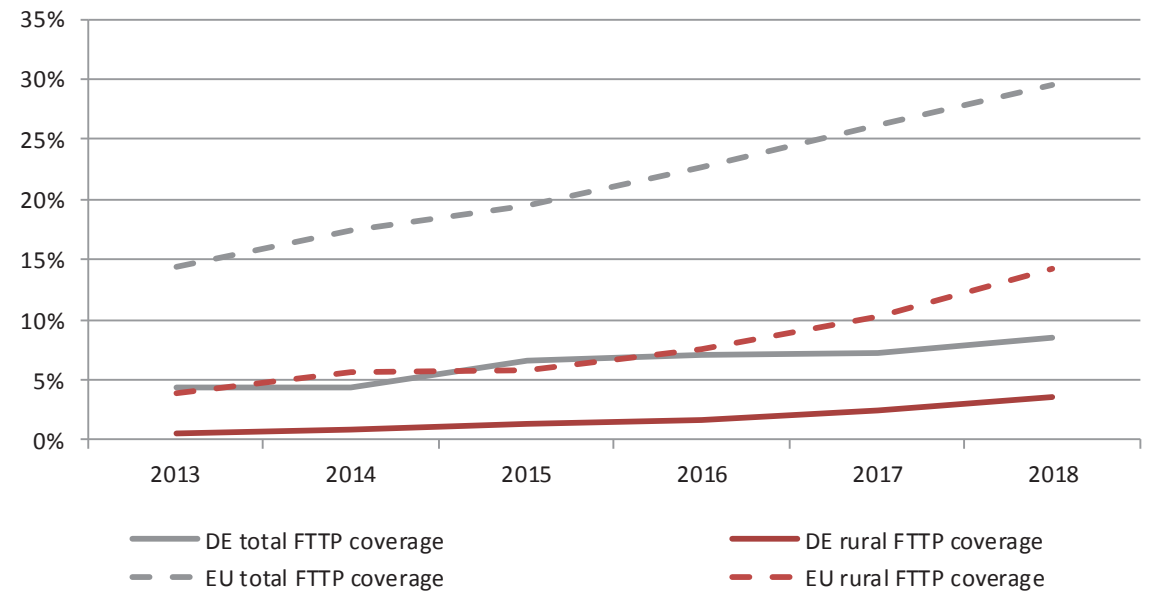
Identifying and geo-locating the over 15 % of households in Germany which do not have high-speed broadband connections (i.e. the white spots with less than 30 megabits per second (Mbps) remains a challenge even though BMVI can provide local authorities with a (less granular) overview of white spots. It is planned to consolidate and integrate existing planning and information instruments and to enable a forward-looking planning tool for the purposes of broadband funding[68].

The BMVI is working on draft legislation preventing the overbuild of fibre projects financed by state aid. For such projects that provide open access, it would be possible that applications for coordination of civil works could be considered as being not reasonable[69]. BnetzA is expected to decide on disputes over refusals for applications for coordination of civil works on a case-by-case basis.

The European Commission has approved under EU State aid rules public support for the construction of physical infrastructure required to deploy state-of-the-art mobile networks based, at the very least, on long-term evolution (LTE) technology in areas of Bavaria where no mobile services are currently available. Municipalities will receive funds to either build the infrastructure themselves or to tender its construction to third parties as a public works' concession. The use of the supported infrastructure will be open to all interested mobile network operators on equal and non-discriminatory terms[70]. The Commission has also approved a Bavarian gigabit project, which aims to develop new infrastructure that will be publicly financed and have a very high capacity connectivity capable of offering speeds of 200 Mbps to households and 1 gigabit per second (Gbps) to companies and public institutions. These broadband speeds are far above those that users currently have in the target areas[71].

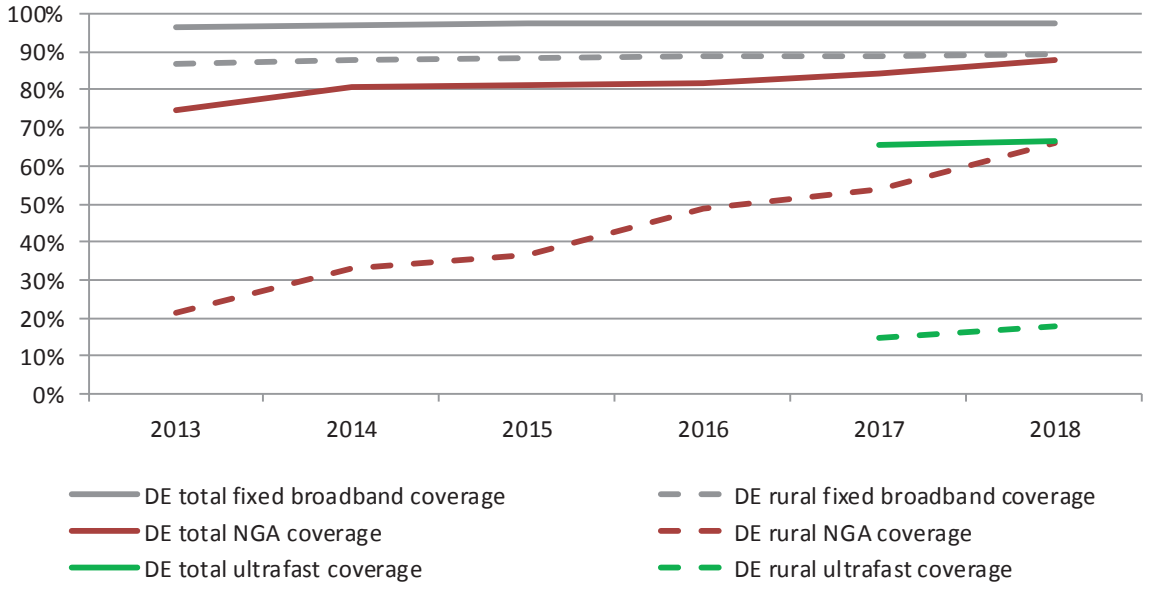
68 In the context of the transposition of the EECC, see at the end of this section and the paper referenced in the footnote.
69 See Article 5(2) first sentence of the Cost Reduction Directive 2014/61/EU: "Member States shall ensure that every network operator performing directly or indirectly civil works, either fully or partially financed by public means, meets any *reasonable* request to coordinate civil works […]"
70 http://europa.eu/rapid/press-release_MEX-18-6466_en.htm?locale=en
71 http://europa.eu/rapid/press-release_IP-18-6868_en.htm

**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.*

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

Fixed broadband coverage is 98 % of households. Although rural NGA coverage has improved since 2017, from 54 % to 66 %, and is above the EU average, the digital divide between urban and rural areas is still obvious (total NGA coverage was 88 % in Germany in 2018). Ultrafast coverage now stands at 66.3 % in total (rural 18 %). Ultra-fast broadband coverage is above the EU average of 60 %, but is almost static year over year, reflecting Germany's reliance on upgraded legacy infrastructure. Germany also lags significantly behind the EU average with regard to total (8.5 % against 29.6 %) and rural (3.6 % against 14.2 %) FTTP coverage.

5G is being trialled by Mobile Network Operators (MNOs). DTAG and Vodafone have launched the first 5G sites. Policy envisages stimulating dynamic demand for 5G services by creating lighthouse projects, in particular with new collaborations with 'vertical' industrial and service sectors. Various research projects for automated driving (including in urban test fields and on motorways) and for integration of 5G into industrial communications networks are currently running.

he award of the 3.7-3.8 GHz and of the 24.25 GHz to 27.5 GHz bands is planned to take place before the end of 2020, including a possibility for licensing directly to industrial users.

A first meeting of the two ministries involved in transposing the European Electronic Communications Code (EECC) with stakeholders had already taken place in 2018. A paper highlighting main points (Eckpunktepapier) has been presented on 26 February 2019[72]. A draft legal text should be made available, also in 2019. Separate draft legislation transposing the new EECC provisions on car radio receivers and other consumer radio receivers is already in the pipeline[73].

## 2. Market developments

The telco market is flat in terms of growth, with the market share of cable networks, already well above 60 % in the fixed broadband retail market, increasing. Scarcity of skilled labour and potential difficulties in expanding the available capacity for civil works are considered the most relevant obstacles to further expansion of and investment in the industry. The number of municipal utilities or their subsidiaries providing telecommunications services is still increasing. Some of these companies only build up infrastructure to be used by telecommunications service providers. Others provide services directly on the telecommunications retail markets. In addition to DTAG there are other broadband providers which are also active in the wholesale market. However, BNetzA is not aware of any companies that operate exclusively in the wholesale sector.

In May 2018, Vodafone announced that it wished to take over large parts of Liberty Global's cable business in Germany (and also in Hungary, Czechia and Romania). The European Commission launched an in-depth investigation on 11 December 2018 amid concerns the takeover might, among other things, reduce competition in Germany, particularly on retail fixed telecommunications markets and on the retail TV markets. Furthermore, the merger might eliminate competition between the merging companies in terms of investment in next generation networks and substantially increase the bargaining power of the merged entity vis-à-vis TV broadcasters[74]. These concerns are shared widely by competing German operators (e.g. DTAG, Telefonica).

### 2.1. Fixed markets

Germany performs particularly well when it comes to fixed broadband prices and to fixed broadband take-up. Currently, 87 % of households subscribe to fixed broadband. The Broadband Pricing Index (based on several fixed broadband offers and also income) was the third best in the EU. Commercial upgrade of cable TV networks to Docsis 3.1[75] allowing for gigabit download speeds is progressing in cities such as Bochum, Köln, Leipzig, Düsseldorf, Frankfurt, Nürnberg and in smaller urban constituencies, driven by demand. Vodafone announced it will complete the upgrade of its entire network by 2021 at the latest. In addition to Docsis 3.1, cable operators roll also out FttB and FttH fibre networks where there is sufficient demand.

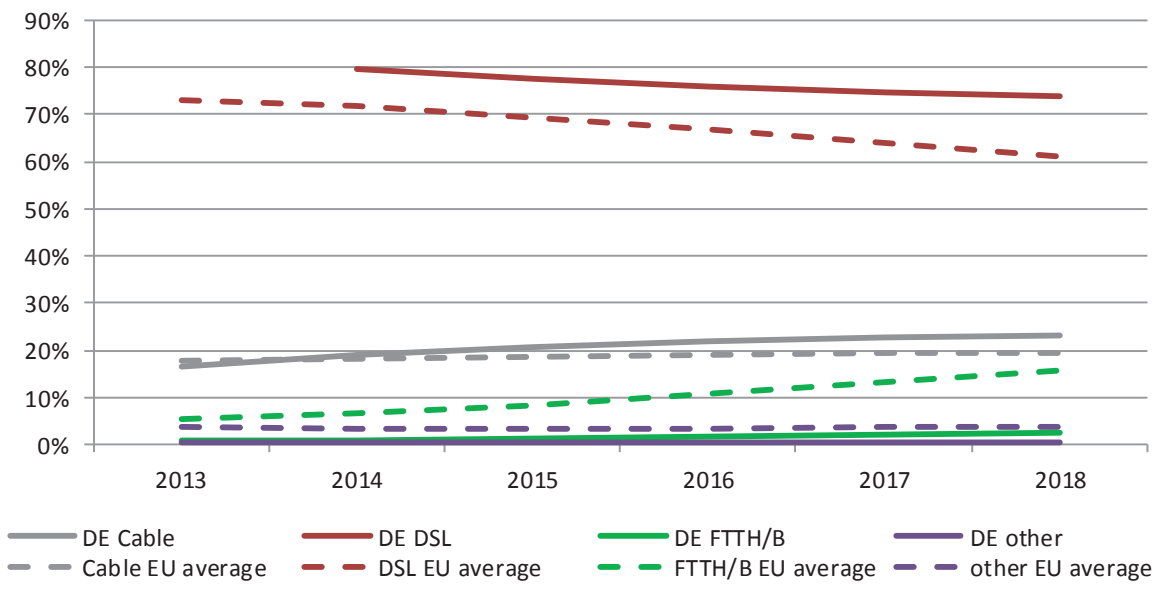
[72] https://www.bfw-bw.de/wp-content/uploads/sites/4/2019/03/190228_Eckpunkte_TKG_Novelle-1.pdf
[73] See https://www.bmwi.de/Redaktion/DE/Downloads/P-R/sechstes-gesetz-zur-aenderung-des-telekommunikationsgesetzes.pdf?__blob=publicationFile&v=6
[74] http://europa.eu/rapid/press-release_IP-18-6772_en.htm
[75] According to the industry association ANGA, by mid-December 2018 over 10 million connections had been rolled out, 7.3 million based on coaxial networks and 3.4 million were fibre networks (FttB/FttH).

Additionally, the deployment of VDSL2 vectoring technology contributes to NGA rollout in Germany. Between September 2014 and February 2019 approximately 75 % of the street cabinets outside the MDF-proximity areas (street cabinets with a distance to MDF larger than 550 meters) have been equipped by DTAG and its fixed network competitors.

As a substitute for access to the local loop, the companies that deploy vectoring have to offer a virtual unbundled local access (VULA) and – within the proximity areas – a VULA product to competitors at the street cabinet.

The supply of connections over 50 Mbps continued to improve. These connections stood at 82.9 % of households in mid-2018, up from 76.9 % in mid-2017. The increase was mainly due to DSL/VDSL connections. These now account for 65.8 % of connections over 50 Mbps (mid-2017: 48.5 %). CATV (mid-2018: 63.9 %; mid-2017: 63.7 %) and FttH/B (mid-2018: 8.5 %; mid-2017: 7.3 %) have seen little change. At some specific premises where subscriber lines have low capacity and have not been upgraded, the migration of DTAG to IP-telephony in rural areas can leave subscribers with lower voice quality and discontinuation of basic internet access functionality that was previously available.

**Broadband market shares at Member State level by technology, % of fixed broadband lines, 2013-2018**

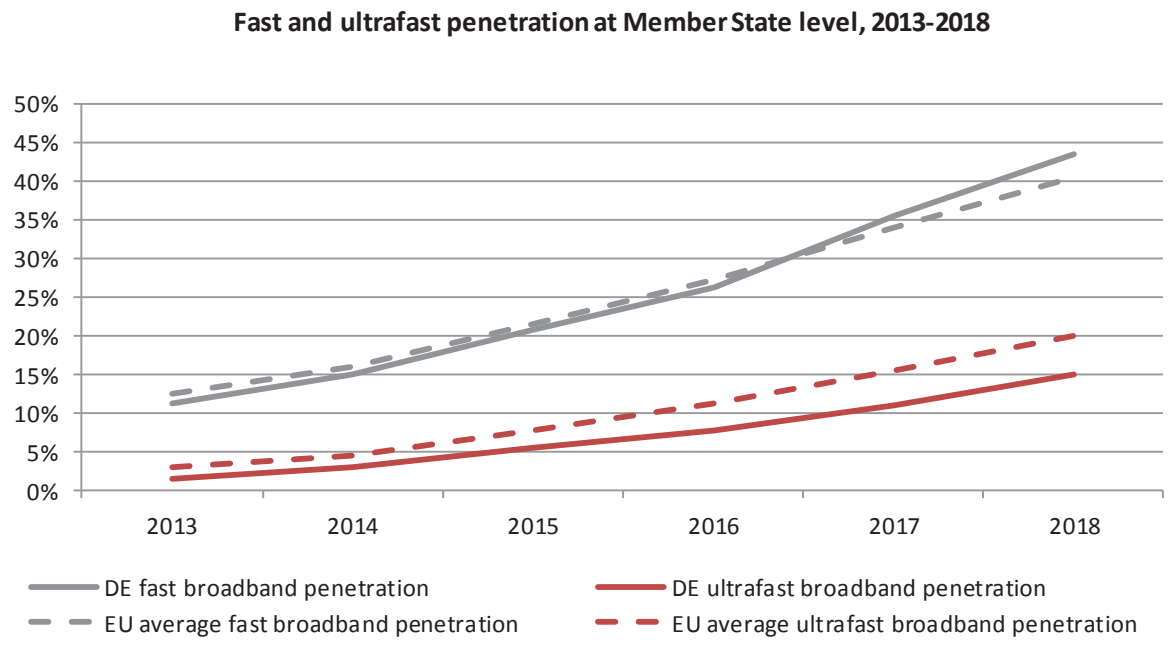



*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

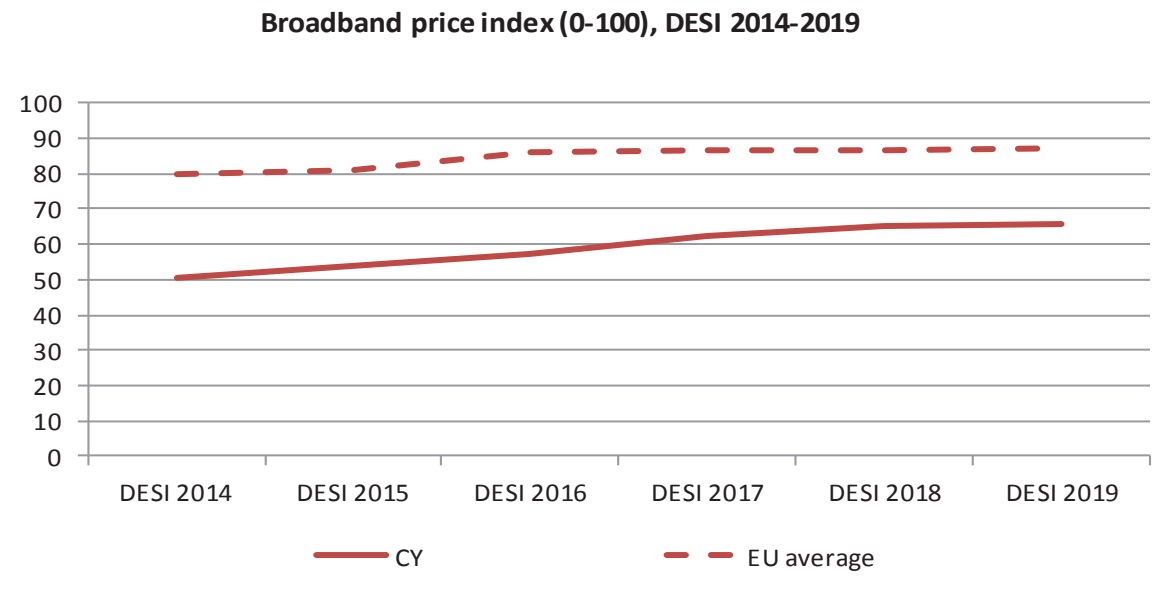
At the end of 2017, around 0.8 million premises had been connected by FttH/B. Compared to the more than 2.7 million connections available, the number of actual users was still relatively low. At the end of 2017, almost 396,000 customers were connected to the internet via FttB and 362,000 customers via FttH. The spatial distribution still shows relatively low coverage with fast broadband connections above 50 Mbps in rural areas.

By the end of 2025, the Federal Government aims to achieve universal coverage with bandwidths of at least 1 Gbps. This is supported by Federal Government and Länder initiatives.

DTAG has so far predominantly focused on deploying vectoring technology in the context of broadband deployment. In addition, since August 2018, it has also offered super vectoring connections up to 250 Mbps. For 8.9 million of DTAG's lines, such speeds are possible. In May 2018, DTAG announced that as of 2021, 2 million households will be directly connected to glass fibre annually if an appropriate policy framework would be in place.




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

Under a joint venture, DTAG and EWE TEL envisage investing €2 bn in the development of a fibre network in the Länder of Lower Saxony, North Rhine-Westphalia and Bremen. On 21 March 2019 DTAG and EWE TEL GmbH registered the contract on the establishment of the joint venture for approval by the German national competition authority (NCA).

Germany scores well on the broadband price index[76], its prices per purchasing power parity (PPP) being lower than the EU average.

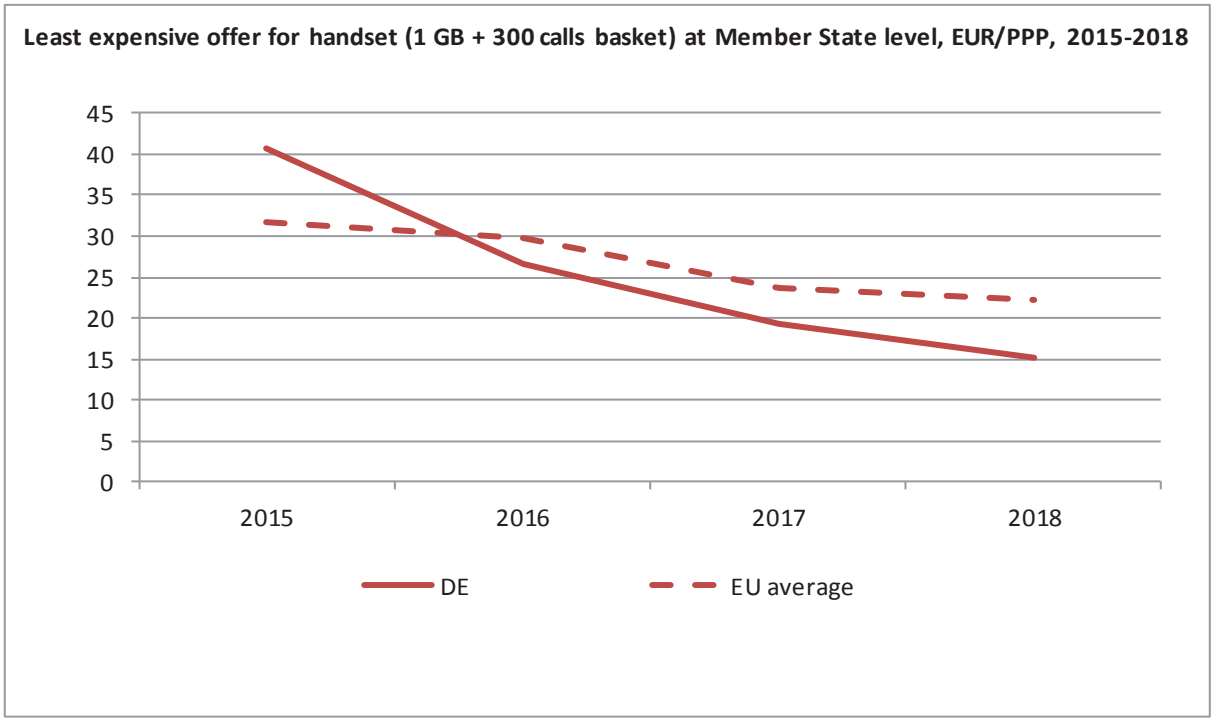
[76] The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100 Mbps. This indicator presents values from 0 to 100 (which should 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.

## 2.2. Mobile markets

In mid-2018, 97.5 % of all households in Germany had LTE available at speeds of at least 2 Mbps. The availability of LTE with speeds of at least 6 Mbps was 95.2 % (mid-2017: 89.1 %).

At the end of 2018, there were 137 m. active SIM cards for mobile communications (1.7 cards per inhabitant) and 23.1 m SIM cards were in use for machine-to-machine communications[77].

The market share of mobile virtual network operators (MVNOs)/resellers in the mobile retail market is currently being debated. DTAG refers to consumer polls indicating that more than 50 % of private end- users subscribe to resellers (i.e. not with the three MNOs), while other market analyses find that non-MNOs have a retail revenue market share of 20 % and a share of 23 % of subscribers.




The mobile market shares calculated based on the number of mobile subscriber's active SIM cards are available from BNetzA's website[78]. These figures were published by the operators in their quarterly / annual reports. Data from the Communications Committee is based on 'active subscribers' and is not available for Germany. Mobile broadband prices for handset offers have substantially fallen between mid 2017 and mid 2018 (by 4.1 index points), and are even below the EU average.

# 3. Regulatory developments

## 3.1. Spectrum

In Germany 52 % of the total 2090 MHz spectrum harmonised at EU level for wireless broadband has been assigned[79]. Only the 26 GHz band remains unassigned.

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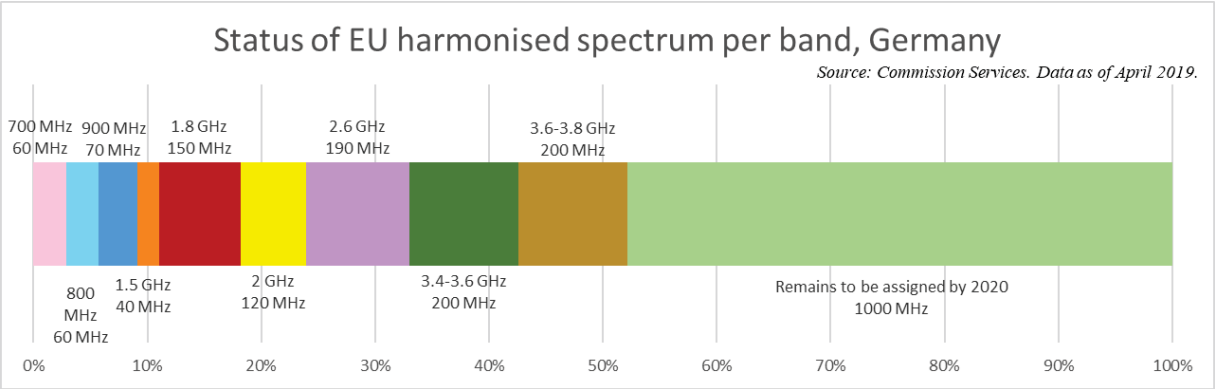
[77] See BNetzA's annual report for 2018 at https://www.bundesnetzagentur.de/DE/Allgemeines/Presse/Mediathek/Berichte/berichte-node.html

[78] See https://www.bundesnetzagentur.de/cln_1411/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktbeobachtung/Deutschland/Mobilfunkteilnehmer/Mobilfunknehmer.html?nn=268208

[79] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

Furthermore, Germany ranks third in the 5G readiness indicator, as by the end of 2018 it had assigned spectrum in the 700 MHz band, which is expected to become available for use for 5G by 2020.




The spectrum award of the 2 GHz and the 3.6 GHz bands, originally scheduled for 2018 and which started on 19 March 2019, was of utmost interest to consumer associations, MNOs, resellers[80], the BMVI, the federal economic affairs ministry (BMWi) and BNetzA. Main issues under debate concerned coverage obligations and access obligations as part of the auction design. Political pressure from MNOs, service providers, the automotive industry, the national railway company, harbour authorities, and politicians was extremely high and led to the publication of BNetzA's draft decision well in advance of the meeting of the advisory council held on 26 November 2018, which finally agreed to the draft. Compared to the version put for public consultation previously, coverage obligations had been substantially increased (in some cases now also including requirements for latency between the base station and the device) and reserve prices were significantly decreased. MNOs are concerned that a large share of the rollout has to be focused on areas where there is very little demand, instead of others such as major cities where there is high demand and where rollout would therefore make most sense, also from a commercial perspective.

The coverage/rollout obligations include the following.

- Delivery of speeds of 100 Mbps in the antenna sector to at least 98 % of the population, for each operator.
- Rollout of 1,000 5G base stations linked to licences in the 3.6 GHz band per operator.
- Installation of 500 base stations per operator in white spots, i.e. in rural areas and other areas where rollout is not commercially viable. The municipalities and Länder inform BNetzA about the white spots based on the needs identified and communicated by the municipalities. BNetzA can also identify sites, e.g. based on its mobile network coverage tool 'Funkloch-App'.
- Provision of symmetrical speeds of 100 Mbps and latency of 10 milliseconds on all federal motorways and highways.
- Provision of symmetrical speeds of 50 Mbps on all federal and regional roads and on waterways.
- Provision of speeds of 100 Mbps on railway routes with more than 2,000 passengers per day, 50 Mbps on all other railways.

[80] On 25 January 2019, the MNOs DTAG, Vodafone, Telefonica and the newcomer United Internet (1&1) had confirmed their participation in the auction.

- For these coverage obligations along transport paths except motorways coverage by competing operators is taken into account and thus parallel infrastructures do not need to be installed.
- Newcomers have significantly lighter coverage obligations.

As regards access obligations, a light regime (based on an obligation to negotiate, coupled with a dispute settlement by BNetzA if negotiations have failed) is established. A distinction is made between:

- nagreements to use mobile network capacity between a mobile network operator and a reseller;
- regional roaming agreements between mobile network operators in areas where one of them, e.g. a newcomer, has not rolled out any network infrastructure;
- localised roaming agreements between mobile network operators in specific areas where technical or economical obstacles prevent the rollout of more than one mobile network;
- Aagreements to lease spectrum in specific areas where spectrum remains unused.

The award of the 3.7-3.8 GHz (for site-specific use by corporate users of applications in the field of industry automation and industry 4.0, but not for use by publicly available telecommunications services)[81] and of the 24.25 GHz to 27.5 GHz bands (for wireless network access enabling telecommunications services, applications such as infrastructure integration, industry 4.0 or IoT) is scheduled to take place before the end of 2020.

The rights of use in the 700 MHz, 1.8 GHz and 1.5 GHz bands, auctioned in 2015, include obligations for each operator to cover 98 % of all households in Germany and 97 % of households in each Land with speeds of 50 Mbps per antenna sector. Usual speeds available to consumers should be 10 Mbps or more. Main traffic corridors should be fully covered if this scenario is feasible legally and becomes a reality.

### 3.2. Regulated access

BNetzA has determined that a joint venture between EWE TEL GmbH, a regional operator in North-Western Germany, and Telekom Deutschland GmbH would not be subject to the obligations imposed on DTAG in the local loop and bitstream markets. The reason for this is that obligations which have been established for one entity cannot apply to another entity.

On 25 September 2018, BNetzA approved the 'one-off charges' for access to the DTAG's local loops between 1 October 2018 and 30 September 2020. The decision relates to the provisioning and cancellation charges of the 18 types of local loops as well as charges for a number of additional services[82]. BNetzA had notified the corresponding draft measure to the Commission under case DE/2018/2110. In its comment the Commission called on BNetzA to reconsider the use of the 'exponential smoothing' adjustment in its weighted average cost of capital (WACC) calculations.

On 8 March 2018, BNetzA approved the charges for Layer2 bitstream access provided by DTAG. The standard monthly rental charge for an ADSL connection is €15.17; for a VDSL connection with 16/25/50 Mbps it is €18.02 per month; and for a VDSL connection with 100 Mbps it is €19.10 per month. DTAG also offers discounted monthly charges under the 'contingent model'. This case was

[81] BNetzA's decision to assign 100 MHz for licenses on a local basis has been welcomed by industry at large and criticized by MNOs.
[82] On 16 January 2019 BNetzA has issued a partial decision in a dispute about the use of copper inhouse telephony cabling, protecting the functionality of existing vectoring and super vectoring connections provided by DTAG in case a competitor has rolled out fibre to the building and intends to co-use this same cabling to connect new customers in the same house.

notified to the Commission under DE/2018/2055. The Commission reiterated comments made in previous cases concerning BNetzA's use of the less strict cost standard of an abuse test and the application of a 15 % mark-up ('Erheblichkeitszuschlag') above LRIC+ costs. As in the case mentioned above DE/2018/2110, the Commission also commented on BNetzA's use of 'exponential smoothing' in its WACC calculations.

Since 1 August 2018, DTAG has been offering subscriptions to end-users based on super-vectoring with speeds up to 175 and 250 Mbps. BNetzA submitted its draft approval decision for the respective Layer2 bitstream wholesale products for consultation to the Commission (case DE/2018/2126). The Commission repeated its comments in case DE/2018/2055 concerning the use of an abuse test cost standard and the 15 % mark-up above LRIC+ costs.

Also in February 2019, BNetzA approved DTAG's revised Layer2 bitstream standard offer, which now includes VDSL 175 and 250 Mbps subscriptions, for national consultation. The amendments of the reference offer to include VDSL 175 and 250 were already notified to the Commission under DE/2019/2136 and the Commission expressed no comments.

On 20 December 2018, BNetzA adopted a decision on deregulating the market for use and/or sharing of VHF radio antennas (i.e. for FM radio transmissions) (see below). BNetzA is expected to complete the analysis of the downstream market for broadcast transmission services by July-September 2019.

Under case DE/2018/2130 BNetzA notified to the Commission its analysis of the market for use and/or sharing of VHF radio antennas (part of the market for wholesale broadcasting services to deliver broadcast content to end-users — market 18 of the 2003 Recommendation on relevant markets[83]). Because of the sale of the antenna infrastructure of Media Broadcast (previously designated as the significant market power (SMP) operator), BNetzA proposed the deregulation of this market as well as the removal of ancillary remedies on the downstream market for broadcasting transmission services[84]. In its comment, the Commission urged BNetzA to analyse and notify the downstream market without delay so as to clarify if the SMP status of Media Broadcast has been also affected the downstream market.

Under case DE/2018/2133 BNetzA notified to the Commission a remedies decision on the market for wholesale high-quality access provided at a fixed location (market 4 of the 2014 Recommendation on relevant markets[85]). It proposed to provide a full set of remedies[86] on both the market segment for bandwidths of 2 Mbit/s to 10 Mbit/s and that for bandwidths of 10 Mbit/s up to and including 155 Mbit/s. In its comments letter, the Commission criticised the significant delay between the remedies notification at hand and the market analysis on which it is based (2016) and urged BNetzA to notify the new price control details as soon as possible.

DTAG submitted an application to approve charges for fixed carrier lines Ethernet 2.0 (i.e. leased lines based on native Ethernet). BNetzA had intended to make a decision in the first quarter of 2019.

[83] Commission Recommendation of 11 February 2003 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 communication networks and services (Text with EEA relevance) (notified under document number C(2003) 497), OJ L 114, 8.5.2003, p. 45–49.

[84] The notification did not include the market analysis of the downstream market, which is also part of market 18/2003.

[85] 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.

[86] Price control is differentiated as follows: (a) prior approval of rates for leased lines and point-to-point substitute products; and (b) lighter form of price control (ex post) for point-to-multipoint and VPN products, provided that DTAG continues offering a corresponding point-to-point solution.

Current Fixed Termination Rates (FTRs) were valid until end-2018. They were not based on the pure LRIC approach, but on comparative market analysis. It is planned that the new draft decision will be submitted for consultation to the European Commission in H1 2019.

The FTR issue also has repercussions on the termination rates of the small operator Telco Village, which only owns and controls fixed network elements but terminates calls on both fixed and mobile numbers as part of its call collection service. In May 2018, BNetzA adopted a decision on the remedies to be applied to Telco Villages. BNetzA notified the latter measure to the Commission under case DE/2018/2070.

Specifically, BNetzA proposed to calculate the price cap for TelcoVillage based on a mixed calculation, using both national fixed and mobile termination rates as a benchmark. The Commission reiterated the position expressed in previous cases, commenting that BNetzA should ensure that FTRs are based on a pure bottom-up long run incremental cost (BU-LRIC) methodology.

On the MTR market, BNetzA also notified to the Commission (case DE/2018/2072) proposals for a reference offer of Telefónica Germany for mobile termination over IP. The Commission had no comments.

The MTR decisions of BNetzA apply until 30 November 2019. MNOs had planned to submit new applications for the new mobile termination rates (MTRs) during June 2019.

For fixed network rollout it would be desirable to further cut red tape for the award of building and other permits. In addition, the process for granting permits to cross railway lines takes a very long time.

**4. End-user matters**

As to overall market performance from a consumer perspective, the mobile telephony market in Germany ranks 3rd out of 25 services markets assessed (no change between 2015 and 2017), 7.9 points higher with respect to the market's EU average score[87]. Internet provision services rank 5th, 7.7.8 points higher than EU average.

BNetzA handled approximately 81,000 consumer complaints in 2017 and 38,000 in the first half of 2018. As in previous years, the two main categories of complaints were those regarding switching (continuity of service, number portability and questions related to the switching process) and contractual issues. Other complaints were related to moves[88], universal service, network access and billing. In addition, by 30 September 2018 BNetzA had already handled 90,507 consumer complaints and requests regarding the misuse of numbers (around 164,000 were handled in 2017). Furthermore, in the category of unpermitted telephone advertising, the number of written complaints increased from around 57,000 in 2017 to an estimated 63,000 in 2018. Also, BNetzA received via its telephone hotline 18,638 questions and complaints about misuse of numbers and about unpermitted advertising. BNetzA publishes a list of its measures against misuse of numbers on its website. The complaints were almost exclusively received from end-users.

Actual measured broadband speeds for end users continues to fall significantly short of the speeds advertised in their contracts. For fixed broadband, only 12.8 % of subscribers got the advertised maximum speed (or more) and only 71.3 % of subscribers got at least 50 % of advertised speeds. For

[87] The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers. See Consumer Markets Scoreboard 2018, p 12 and p 100, available at https://ec.europa.eu/info/files/consumer-markets-scoreboard-making-markets-work-consumers_en

[88] problems people encountered moving house or area

mobile broadband, the results are even more negative, as only 1.5 % of subscribers got the advertised maximum speed (or more) and only 16.1 % of subscribers got at least 50 % of advertised speeds.89

### a. Net neutrality

BNetzA's decision requiring changes to the zero-rated 'Stream-On' offer from DTAG was confirmed in emergency proceedings at first instance. The Court upheld, among other things, that limiting video traffic to a maximum speed of 1.7 Mbps was not in line with the Net Neutrality Regulation[90]. BNetzA executed its decision and imposed €200,000 in fines on DTAG[91]. These fines are not yet applicable[92] and the product is still available on the market, including for new subscriptions.

On 15 June 2018, BNetzA adopted a decision against Vodafone regarding its 'Vodafone Pass' offer. According to the terms and conditions, all Vodafone passes are restricted to domestic use only. When going abroad, the data volumes used by the applications which are included in the Vodafone pass are deducted from the data volume of the basic tariff plan. This means that, while roaming, the Vodafone Pass is not zero-rated like at home. In addition, Vodafone reserves the right to open the Vodafone Pass to roaming under the condition of implementing a fair-use-policy of 5 GB roaming data volume for each pass. From BNetzA´s persepctive, this would be an infringement of the Roaming Regulation. Consumers should be able to use their tariff plans under the same condition and the same charging mechanism when travelling within the EU. Also, the 5 GB roaming data volume for each pass would not be in line with the 'roam-like-at-home' (RLAH) rules and would be too low. The investigations against Vodafone could be concluded without adopting further decisions, since Vodafone voluntarily adjusted its zero-rating offer[93].

### b. Roaming

BNetzA has not uncovered price increases for mobile services on a national level, subsequent to introduction of RLAH. Consumers in Germany greatly benefit from these new rules. Roaming usage (data and calls) has increased considerably compared to the situation prior to the introduction of RLAH. End-users with subscriptions in Germany have consumed 2.3 times more roaming data and 20 % more call minutes in Q4 2017 (under RLAH rules) than in Q4 2016 (before the introduction of RLAH). For Q1 2018 the figures are largely similar with end-users consuming 2.7 times more roaming data and 10 % more call minutes (under RLAH rules) than in Q1 2017 (before the introduction of RLAH).[94]

### c. Emergency communications - 112

Between 1 July 2017 and 30 June 2018, 55 % of emergency calls were made to the emergency number 112, amounting to some 13.3 million calls. Germany did not report on key performance indicators such as average response time and call abandon rate. For public warnings three different systems are deployed in Germany: Sirens, TV and radio alerts, and a special app[95]. The Commission is currently

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[89] https://breitbandmessung.de/downloads/Breitbandmessung_Jahresbericht_2017_2018.pdf

[90] The court upheld also that zero-rating would have to apply not only to streaming of content on DTAG's national network, but also when roaming in other EU-Member States, in accordance with and within the limits of the roam like at home (RLAH) provisions.

[91] http://www.justiz.nrw.de/JM/Presse/presse_weitere/PresseOVG/archiv/2018_02_Archiv/20_11_2018_1/index.php

[92] In the context of an appeal BNetzA had agreed to a suspension until 31 March 2019. 0n 6 March 2019 this suspension had been extended for the duration of the appeal procedure by an interim court decision of the higher administrative court of Northrhine-Westphalia.

[93] See Net Neutrality Report by Bird&Bird&Ecorys, 2019, forthcoming.

[94] See "International Roaming BEREC Benchmark Data Report October 2017 - March 2018" available at https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8251-international-roaming-berec-benchmark-data-report-october-2017-march-2018

[95] See Communications Committee, Working Document: "Implementation of the single European emergency number 112", available at https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=57406

looking into how emergency communication and the 112 number functions in Germany, in particular regarding caller location information.

The Technical Directive on Emergency Calls (TR Notruf) details the technical requirements for transferring location data to public safety answering points (PSAPs) in Germany. Release 1.0 of the Directive specified the manner in which network derived location data would be transferred. BNetzA is responsible for laying down criteria for determining the accuracy and reliability of the caller location. The Technical Directive on Emergency Calls specifies the accuracy of the caller location. It specifies the address or the geographic coordinate of a single residence for fixed networks and the area of the mobile cell for mobile networks. Release 2.0 of the revised Directive (published in August 2018) specifies the the manner in which handset derived location data would be transferred[96]. Requirements from Release 2.0 have to be implemented by telecommunications providers by August 2021. The *handling* of location data is not within the scope of that Directive. According to German law, the organisation of emergency services is under the responsibility of each individual federal state.

For end users with disabilities, access to emergency services is made possible through a dedicated communication service provided by TESS Relay Services[97]. The dedicated communication service provided by TESS Relay Services for people with hearing disabilities is now available 24 hours a day. A smart phone app (a project under the BMWi) is in a pilot phase and supports text communication to PSAPs.

E-calls made to 112 are routed like regular 112 calls. Unmanaged voice over IP calls have to be handled like regular calls.

#### d. Universal service

The scope of universal service is unchanged and includes a subscription to a public telecommunications network, which also allows for sufficient data to be communicated enabling functional access to the internet. DTAG voluntarily provides the universal service and does not receive compensation.

## 5. Institutional issues

All MNOs have introduced lawsuits against the envisaged licence conditions for the 5G auction planned for spring 2019. The grievances concern the coverage and national roaming obligations which are considered excessive. Resellers such as 1&1 and regional fixed operators are litigating with the opposite grievance, namely that the roaming obligations in the licences are not sufficient. Some of the lawsuits had included requests for an emergency ruling and had risked delaying the auction. These requests were dismissed by the court.

In 2018, there have been 79 lawsuits introduced against decisions of the BNetzA in the field of telecommunications (status 6 November 2018). This figure covers all instances. Out of the 79 lawsuits 20 of them were emergency procedures, 51 ordinary procedures and 8 interim procedures. These lawsuits focused mainly on decisions concerning prices and charges (23 lawsuits), access regulation (17) and spectrum (5). Other issues were regulatory ordinances, roaming/net neutrality (concerning the StreamON product from DTAG and the Vodafone Pass product from Vodafone) and dispute resolution in the field of information about and shared use of infrastructures for the rollout of digital high-speed networks. Court procedures (emergency and ordinary procedures) take longer than previously as, according to the German authorities, many resources are still needed for asylum-related court cases.

[96] http://ec.europa.eu/growth/tools-databases/tris/en/index.cfm/search/?trisaction=search.detail&year=2018&num=195&dLang=EN
[97] https://www.tess-relay-dienste.de

A preliminary ruling had been requested from the ECJ on the question whether the e-mail service 'Gmail' provided by Google is to be considered as a telecommunications service.

## 6. Conclusion

Germany continues to face challenges on the fixed and mobile markets. There is an obvious urban-rural digital divide regarding fixed NGA coverage and the share of fibre connections is still very low. While federal broadband funding has been refocussed and applies de facto almost exclusively to fibre, and preparations for increased funding over the next four years are on track, the focus of the incumbent, DTAG, on vectoring technology (now including super-vectoring) could further delay the deployment of gigabit connections. The incumbent's plans for substantial investment in fibre (in the order of 2 million new connections annually) would not kick in before 2021 and are still said to be contingent on adaptations to the policy and regulatory framework. While policy for stimulating demand for 5G services progresses, the political debate about coverage and access obligations in the 5G auction has been intense and is expected to continue regarding the regulatory implementation of the obligations. The overriding need for sufficient economic incentives to roll out 5G infrastructure in the first place and to sustain competition based on infrastructure will have to be carefully balanced against other objectives such as rural development and quality of service for end users. Several zero-rating services are established in the market. Subsequent to BNetzA's intervention, some of them had been amended to be compatible with roaming and net neutrality rules. Others, e.g. DTAG's StreamON offer, are still subject to appeal procedures.

# Estonia

| | Estonia | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage** | **91%** | **89%** | **92%** | ***24*** | **97%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1a2 Fixed broadband take-up** | **77%** | **78%** | **81%** | ***9*** | **77%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1b1 4G coverage** | **94%** | **98%** | **99%** | ***7*** | **94%** |
| % households (average of operators) | 2016 | 2017 | 2018 | | 2018 |
| **1b2 Mobile broadband take-up** | **116** | **125** | **144** | ***3*** | **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** | **79%** | **80%** | **83%** | ***19*** | **83%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1c2 Fast broadband take-up** | **24%** | **29%** | **34%** | ***21*** | **41%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1d1 Ultrafast broadband coverage** | **NA** | **71%** | **83%** | ***9*** | **60%** |
| % households | | 2017 | 2018 | | 2018 |
| **1d2 Ultrafast broadband take-up** | **7%** | **9%** | **11%** | ***22*** | **20%** |
| % households | 2016 | 2017 | 2018 | | 2017 |
| **1e1 Broadband price index** | **83** | **85** | **85** | ***18*** | **87** |
| Score (0 to 100) | 2016 | 2017 | 2018 | | 2017 |

## 1. Progress towards a gigabit society

Estonia's current connectivity targets are in line with the Digital Agenda for Europe 2020 targets, namely to provide all residents with internet access above 30 Mbps and to achieve at least a 60 % rate of household subscriptions for speeds above 100 Mbps. Its intention is to align its national targets with the Gigabit society objectives. This will take the form of a new Digital Agenda for Estonia 2020+ which will be developed during 2019-2020.

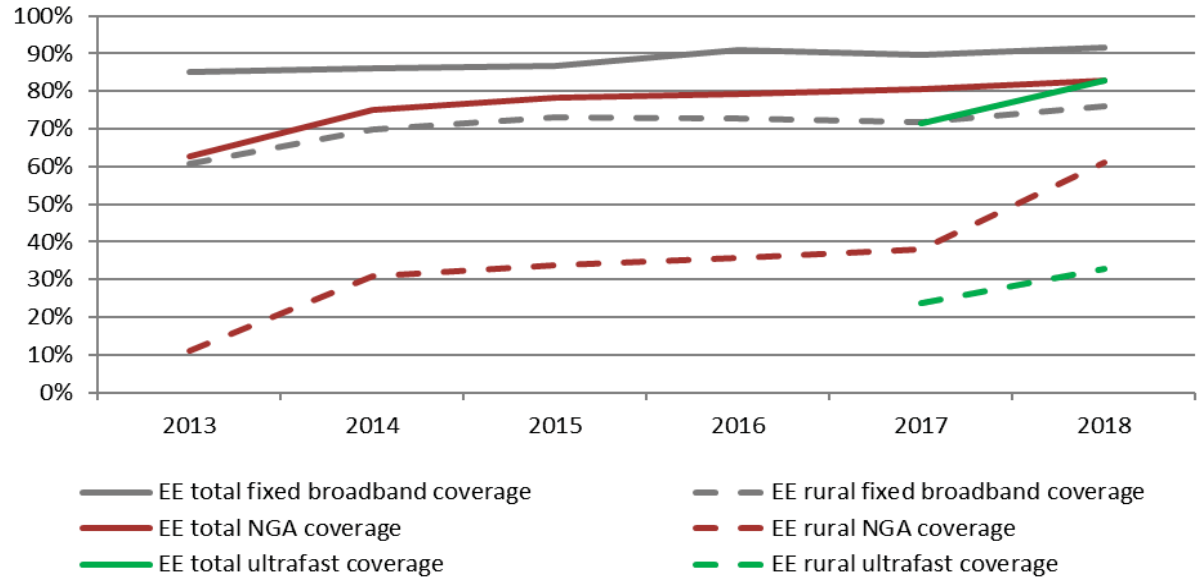
While Estonia has improved both its fixed (92 %) and fast (83 %) broadband coverage by 3 percentage points compared to 2017, it still ranks under the EU average in the first indicator. The situation is far better with regard to its total ultra-fast broadband coverage (an indicator with increasing importance for the future) where Estonia is in ninth place with 83 % of its households covered against an EU average of 60 %. Ultra-fast coverage in rural areas from year 2017 to 2018 increased from 23.6 % to 32.8 %. With regards to the deployment of FTTP (which is a future-proof technology), Estonia largely outperforms the EU both for total coverage (54.2 % against 29.6 %) and rural coverage (18 % against 14.2 %), where there was an increase from 16.8 % in 2017.

Despite the availability of networks, the penetration of fast (34 %) and ultra-fast (11 %) broadband is below the EU average (41 % and 20 % respectively). This could be due to broadband prices being higher in Estonia than the EU average.

One key measure to achieve the 2020 connectivity targets is the "Estonian Wideband Infrastructure Network" (EstWin) project, launched by the Estonian Ministry of Economic Affairs and Communications in 2009. The aim of this project is to ensure the EstWin network is not more than 1.5 km away from 98 % of households, businesses and institutions and all existing network nodes should be connected with core networks. This is being achieved by rolling out more than 6,600 km of fibre backhaul networks in rural areas and in settlements with less than 10,000 inhabitants, where optical

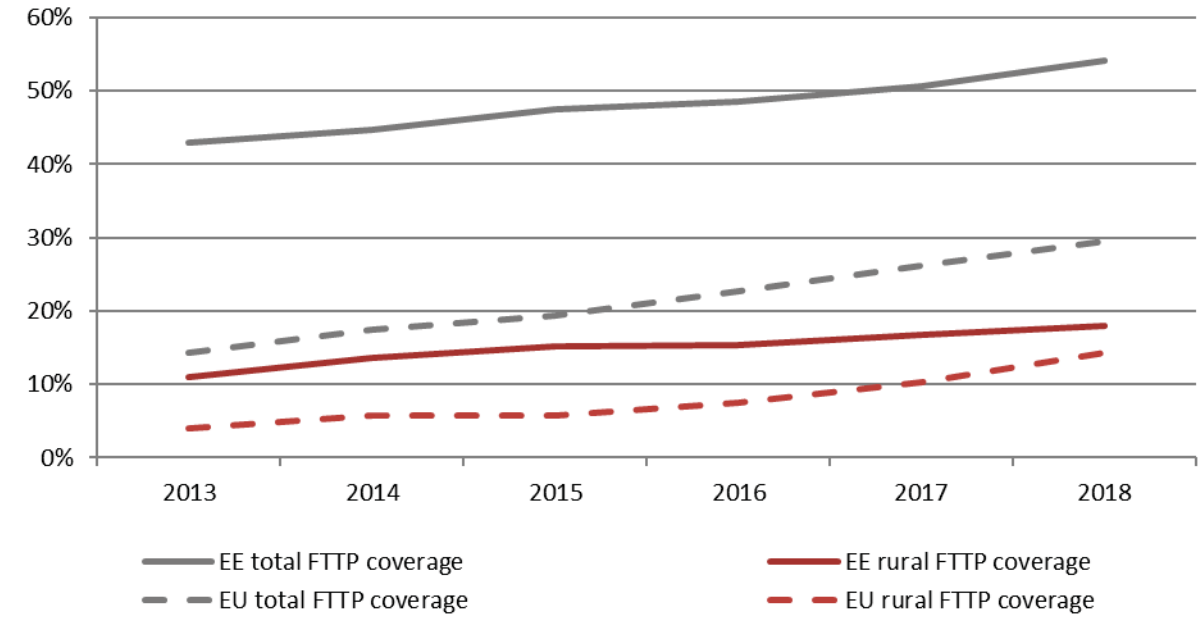
networks did not exist and the construction of which had not been planned by operators. These networks are rolled out by non-profit organisations, which are required to provide wholesale access on equal terms to all operators and public authorities. Approximately 85 % of the project costs are financed by the European Regional Development Fund (ERDF) while the remaining 15 % of the network construction cost is co-financed by backhaul network operators. By the end of 2018, 6,175 km of backhaul networks had been rolled-out and 479 km were under construction.

**Fixed, NGA and ultrafast coverage, total and rural at Member State level (% of households), 2013-2018**

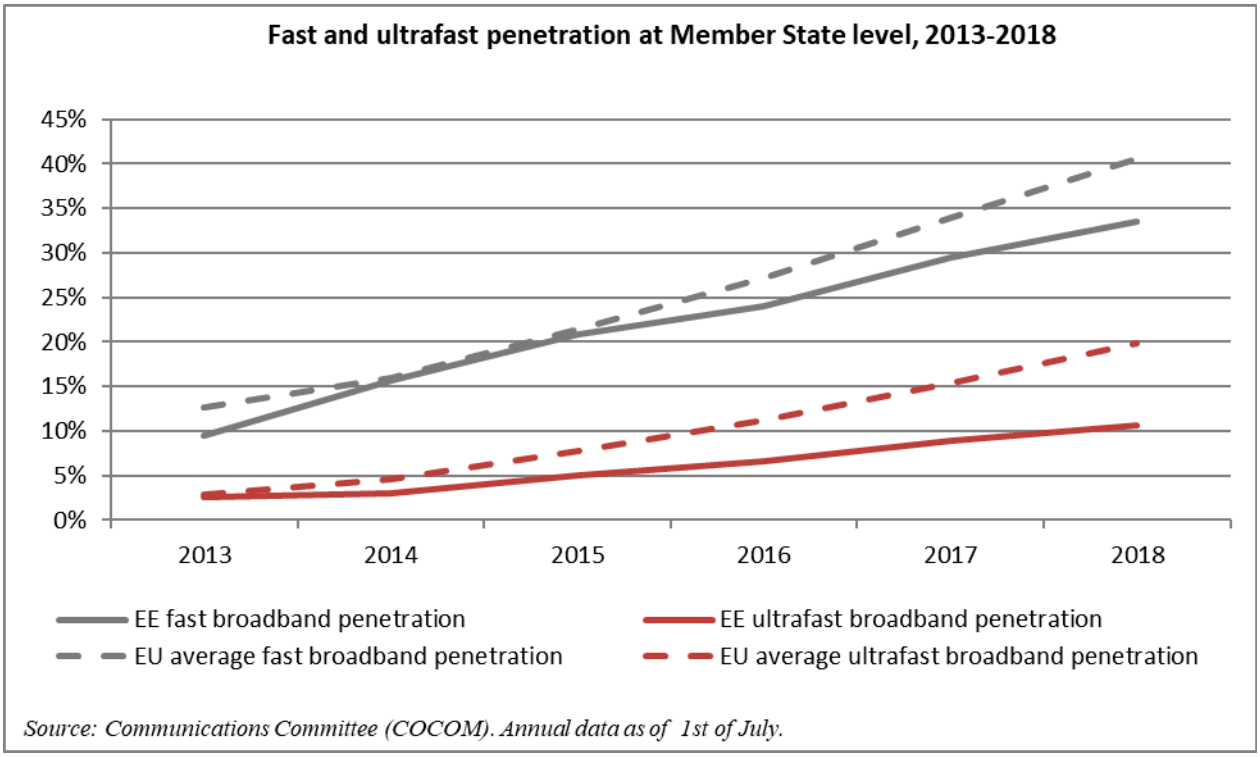



*Source: Commission services, Broadband coverage in Europe Study, commissioned to IHS and Point Topic. 2013-2014 data as of end of December; 2015-2018 data as of end of June. Ultrafast coverage metrics are available for 2017 and 2018.*

**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.*




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

On 11 June 2018, the Minister of Entrepreneurship and Information Technology signed a Ministerial Decree for a State aid scheme[98] to support the last mile access part in NGA white spots. Consequently, a countrywide single public tender was put out for a €20 million government support. In the relevant competitive procedure, the task was to compile an analysis and present an estimate on the number of connections that could be established in the white spots with the support scheme. The network should have a technical capability of 1 Gbps download and be built over a maximum period of 5 years with a household/business contribution of no more than €200 per connection.

On 28 October 2018, the national regulatory authority (NRA), the Estonian Technical Regulatory Authority (ETRA), announced that Elektrilevi, which is part of the Estonian state-owned energy group Eesti Energia, won the public tender. With this €20 million support, Elektrilevi committed to connecting 40,016 households in white areas. It also intends to cover an additional 60,000 households with its own funding. Elektrilevi will provide access on a wholesale basis with at least five operators being able to access their network on equal conditions. The construction of the network is expected to start in March 2019.

Concerning mobile connectivity ambitions, a 5G roadmap was developed by the Ministry; it is built upon four pillars: 1) a clearer legal environment; 2) infrastructure investments; 3) innovation of services; and 4) frequencies. Operators are involved and consulted in the drafting of this roadmap. This roadmap is drafted as a living document with a first draft published in February 2019[99].

All operators have 5G test licences and have already carried out 5G tests. For instance, Telia and Ericsson have launched a 5G pilot network at the Tallinn University of Technology that can be used by businesses and research institutions. More specific 5G plans will be made public only once the 3.4-3.8 GHz auction has been carried out.

Preparations for implementing the European Electronic Communications Code have already started. The Ministry of Economic Affairs and Communications has formed a working group with electronic

[98] This scheme falls under the General Block Exemption Regulation and is thus exempted from the requirement of prior notification and Commission approval.
[99] Cf. https://www.mkm.ee/et/tegevused-eesmargid/infouhiskond/elektrooniline-side.

communication operators and the Estonian Association of Information Technology and Telecommunications and will transpose the Code by means of an amendment to the Estonian Electronic Communications Act. The roadmap of the implementation process is as follows: (i) consultations with the stakeholders are being carried out between December 2018 and March 2019; (ii) the draft law will then be produced between April and December 2019; and (iii) the procedure to adopt the law in the Parliament is planned to take place in 2020.

## 2. Market developments

### Competitive environment

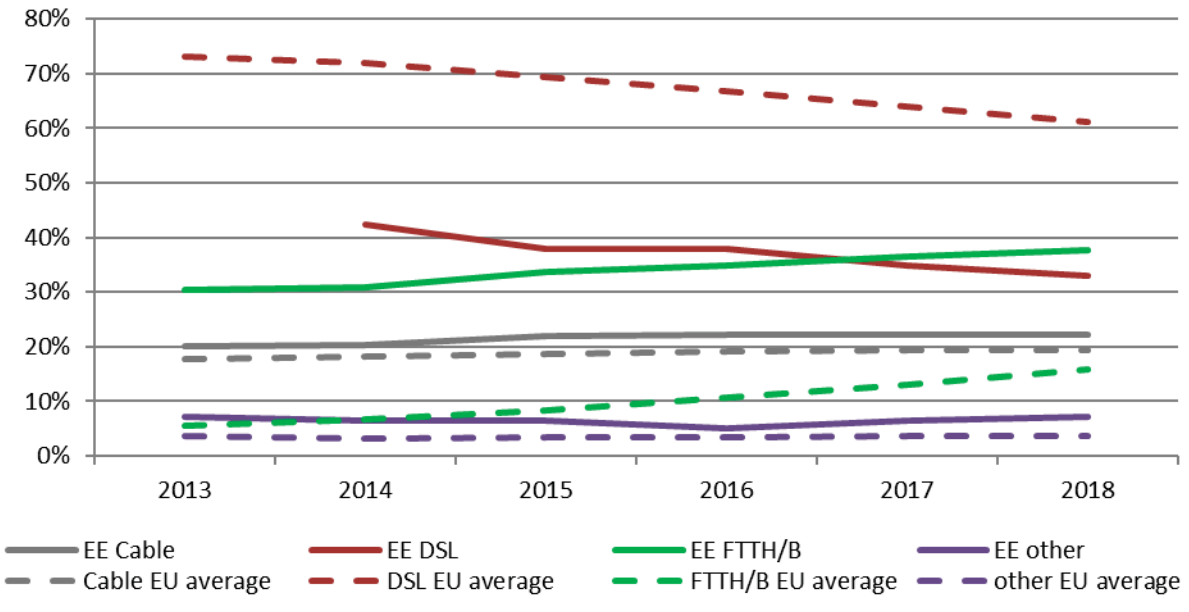
The last merger in 2017, namely the acquisition of AS Starman by the Elisa group, was a further step towards the consolidation in the Estonian market. Since January 2018, the two entities (Starman and Elisa) also act under the common brand name Elisa.

The volume of mobile broadband data per user grew significantly in 2018, specifically by 38 %, to an amount of 14 GB. Around a third of end-users are using bundled services and all mobile operators offer bundled Over-the-top (OTT) TV services over mobile broadband..

### 2.1. Fixed Markets

In terms of share in the market for fixed broadband subscriptions, the Estonian incumbent operator holds 56 %, the fifth strongest incumbent in the EU. Alternative operators rely on their own infrastructure to compete and do not use the incumbent's infrastructure. In the business segment, the incumbent (Telia Eesti AS) has an 82 % market share in broadband (well ahead of its main competitor SkyLive Telecom AS which holds 3 %) and 77 % in the telephony sector (its main competitor CITIC Telecom CPC Estonia OÜ holds 16 %).

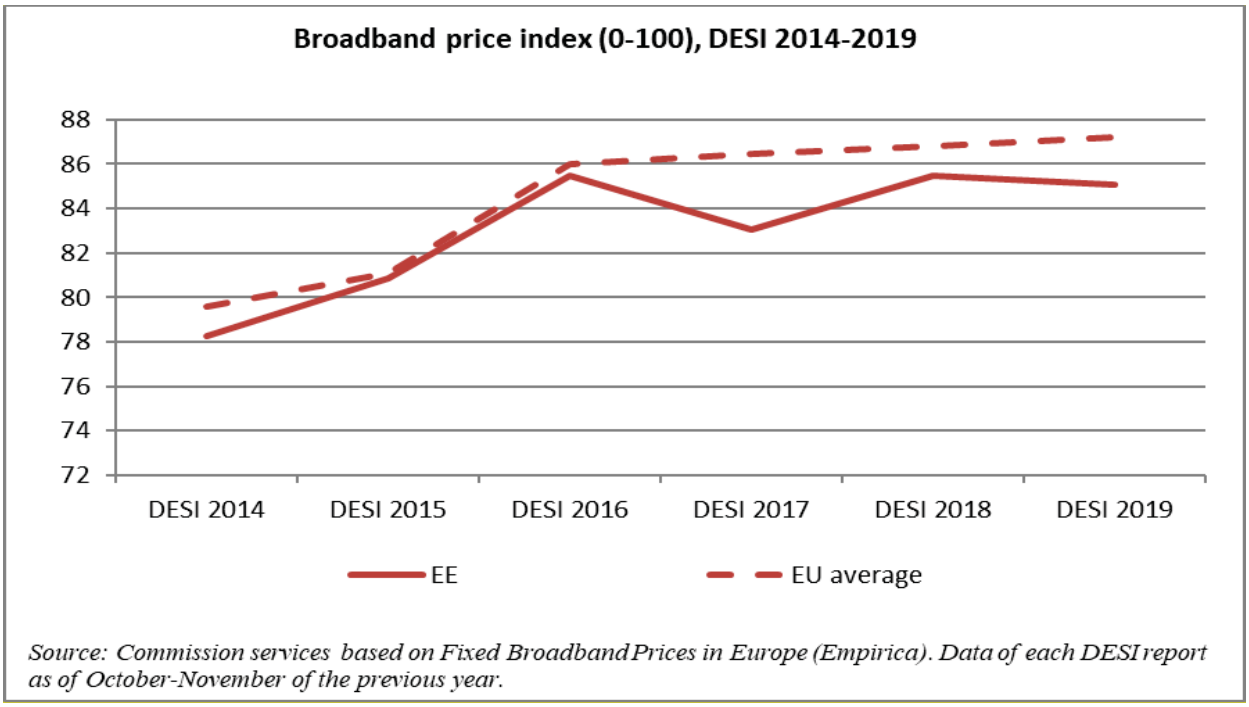
**Broadband market shares at Member State level by technology, % of fixed broadband lines, 2013-2018**




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

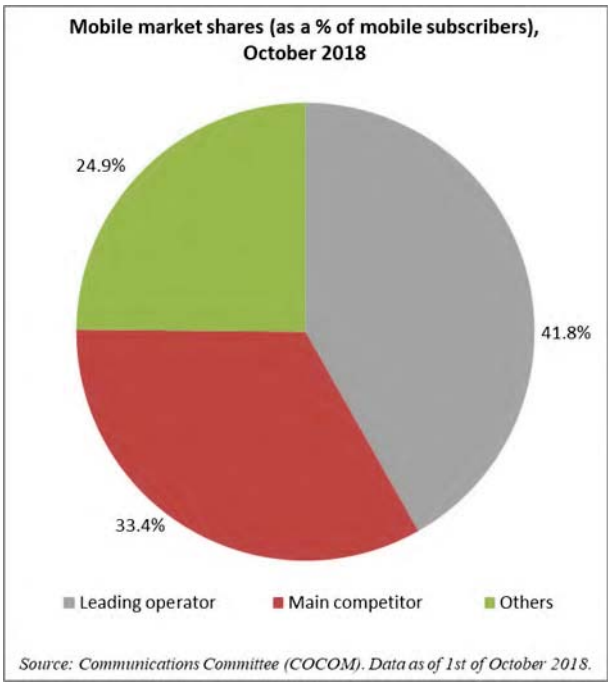
Estonia's fixed market is characterised by a strong presence of fibre. The share of FTTH/B is very high (37.7 %), more than double the EU average (15.9 %).Its share of cable technologies (22.2 %) is only slightly above EU average (19.4 %), while the share of DSL is very low with 33 % comparing to the EU average of 61.1 %.

Fixed broadband prices in Estonia are higher but are still close to the EU average. Estonia thus has a score lower than the EU average in the broadband price index[100].




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets



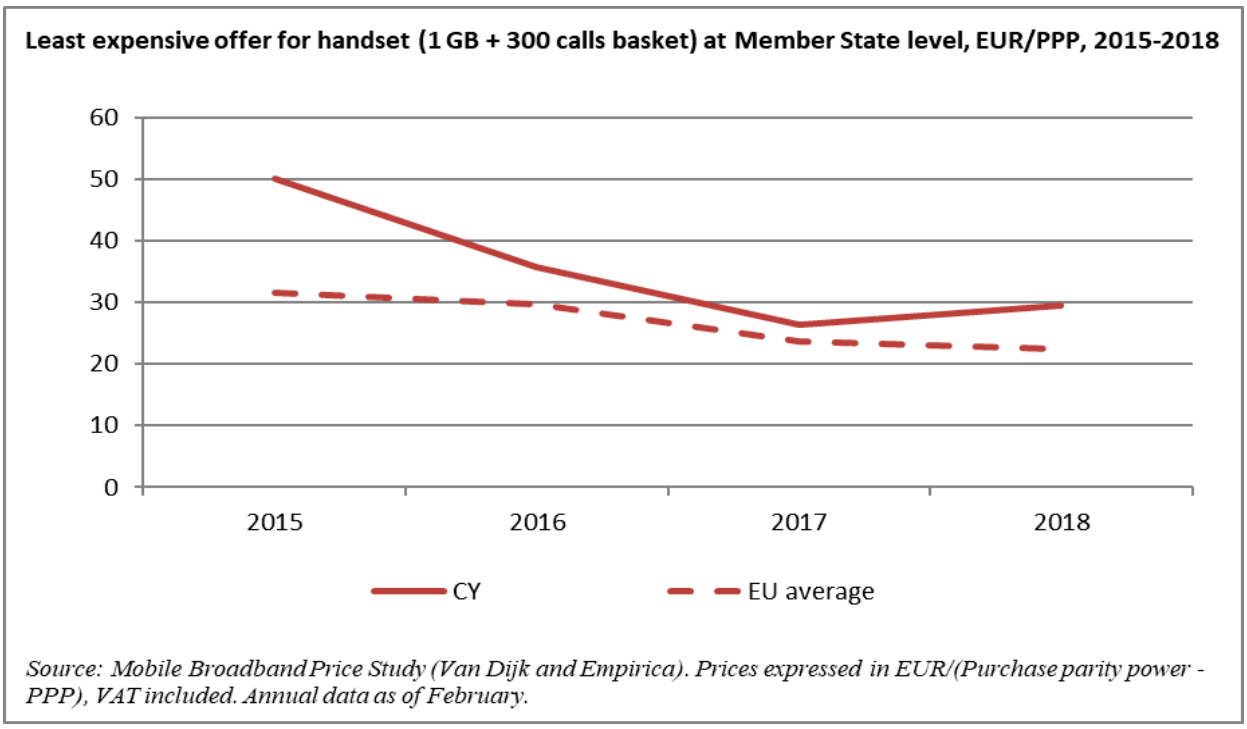

*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

Mobile broadband penetration stood at 144 % in July 2018, against 125 % a year before. As of October 2018, the leading mobile operator in Estonia Telia had a 41.8 % share of the market for mobile subscribers. With 33.4 %, its main competitor, Elisa followed, while the remaining operators (3rd MNO and MVNO combined) served 24.9 % of the subscribers.

According to data provided by the regulator, the mobile broadband usage per month per user was 14 GB during the third quarter of 2018, increased from 10 GB year over year, representing a 38 % increase. The call volumes remained relatively stable (151 minutes per user per month for the third quarter of 2018 against 150 for the same period in 2017) while the SMS volume grew by 33 % to 33 SMS per user per month during the third quarter of 2018.

Mobile prices are low in Estonia and almost half the price of the EU average when comparing a basket of 1 GB data + 300 calls (€12.20/PPP versus €22.30/PPP).

[100] 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.

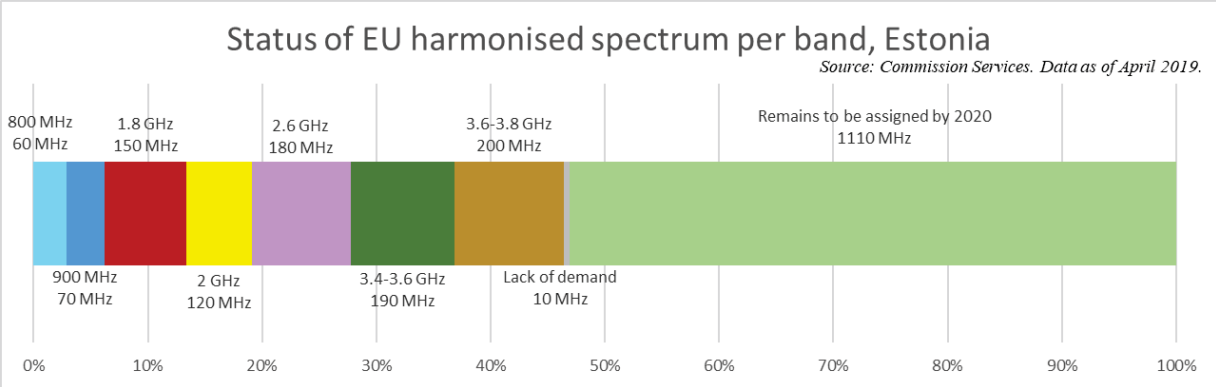



*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

## 3. Regulatory developments

### 3.1. Spectrum

In Estonia, 46 % of the spectrum that is harmonised at EU level for wireless broadband has been assigned[101]. This percentage is mainly due to there being no procedure for assignment for the 700 MHz band and the 26 GHz band.




The 700 MHz roadmap was adopted in September 2018. While the target is to carry out an auction in Q2 of 2020, the Interior Ministry's demand for allocating a part of spectrum (2 x 10 MHz) for Public Protection and Disaster Relief (PPDR) networks may influence the full implementation of mobile broadband in the band concerned. A solution for this issue is still pending. To address unresolved spectrum coordination issues with non-EU countries, Estonia requested assistance from the European Commission.

[101] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

An analysis concerning the defragmentation of the 26 GHz band is currently ongoing. The frequency band has already been allocated for wireless broadband and the authorisation of the 26 GHz band for 5G is scheduled to take place within the deadline provided by the EECC (by end 2020).

### 3.2. Regulated access

Two regulatory decisions were notified to the European Commission in 2018.

The first one[102] concerns an update to the remedies in the market for wholesale voice call termination on individual mobile networks (market 2 of the Recommendation on Relevant Markets of 2014[103]). ETRA had previously defined the relevant market designating Telia Eesti AS, Elisa Eesti AS and Tele2 Eesti AS as having significant market power for calls terminating on their respective individual mobile networks, irrespective of the technology used (i.e. 2G, 3G or 4G). The companies mentioned are the only ones that have control of call termination services in a mobile telephone network in Estonia. The following obligations are imposed on the SMP operators: access, non-discrimination, transparency (including the publication of a reference offer for interconnection), and price control.

By the notified draft measure, ETRA proposed to update the benchmark with the most recent available results of pure BU-LRIC calculations of other NRAs (published in December 2018, BEREC BoR (17)227). Consequently, ETRA proposed to set the maximum MTRs for 1 July 2018 – 30 June 2019 at the level of 0.083 euro cent per minute (a decline of 6.4 % compared to the previous rate, EU weighted average 0.85 euro cent per minute[104]). The Commission did not make comments regarding this notification. The decision with the new prices was adopted by the NRA on 5 April 2018.

The second notification[105] concerns the analysis of the market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1 of the Recommendation on Relevant Markets of 2014).

Similar to its previous markets analysis, ETRA defined the market as including the termination of calls on an operator's network as well as ancillary services needed to provide termination services to other operators. The network of each fixed operator is considered a separate market. Therefore, the geographic dimension of the market corresponds to the physical coverage area of the telephone network of each operator offering call termination services. Consequently, ETRA proposed to designate 13 operators as having SMP on their respective networks imposing the full set of remedies.

Concerning the price control obligation, the NRA continues to calculate the FTRs by using the average rate of the EU Member states, which have implemented the recommended pure BU-LRIC cost methodology. The new proposed price cap for 2019 is set at 0.089 euro cent per minute (EU average 0.21 euro cent per minute). The Commission did not make comments regarding this notification and the NRA adopted the measures on 11 October 2018.

At the end of 2018, ETRA was carrying out an analysis of market 2 of the Recommendation on Relevant Markets of 2014 and was planning to launch the domestic public consultation in the beginning of 2019. This market analysis is expected to be notified to the European Commission in Q2 of 2019.

[102] Notification of 7 March 2018, Case EE/2018/2064.
[103] Commission Recommendation 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 (OJ L 295, 11.10.2014, p. 79–84).
[104] BoR (18) 218, Berec report on Termination rates at European level, July 2018.
[105] Notification of 5 September 2018, Case EE/2018/2112.

All markets from the Recommendation on Relevant Markets of 2003 and 2007 have been deregulated as well as the market for wholesale high-quality access provided at a fixed location (market 4 of the Recommendation on Relevant Markets of 2014 (deregulated since 2015)).

## 4. End-user matters

The Consumer Protection Board of Estonia received 378 written requests for explanation (in addition to 875 counselling sessions via phone or face-to-face) and the Consumer Disputes Committee received 80 complaints in 2018. This Committee is an independent and impartial unit that operates under the auspices of the Consumer Protection Board and resolves disputes independently in accordance with the Consumer Protection Act and other legislation.

The Committee is competent to resolve domestic and cross-border consumer disputes initiated by the consumer and arising from contracts between consumers and traders, where one party is a trader whose place of establishment is in Estonia. The Consumer Disputes Committee resolved disputes free of charge and in most cases, the outcome will be reached within 90 days of the start of the complaint proceedings.

The main sources of consumer complaints in the Consumer Disputes Committee in 2018 were similar to the previous year and were related to, among other things, pricing and billing, roaming, termination of contracts and penalties, quality of the services, and content services.

Operators signed a Code of Conduct whereby they committed themselves to refrain from cold calling. Unsolicited commercial communications have been a problem in Estonia and it is expected that the Code of Conduct will help alleviate the problem.

According to the 2018 consumer markets scoreboard, from a consumer perspective, the market performance indicator (MPI) of the internet provision service market increased by 4.9 points between 2015-2017 (second most improved market); it scores 83.9, 7.1 points higher than the EU-28 average[106]. Ranking 5th out of the 25 services markets surveyed in Estonia, the Fixed telephone services market, is among the three markets scoring the highest (+9.6) compared to the EU average. The mobile telephone services markets also has a MPI higher than the EU average (+6.3 points) and was relatively stable in the period 2015-2017. The TV-subscriptions market's MPI also increased from 2015 to 2017 (+2.7 points) and outperforms the EU average by 5 points.

### a. Net neutrality

The NRA is continuously monitoring offers from websites, in line with the BEREC guidelines. Overall, no issues have been detected on the market and no consumer complaints have been received. There is only one zero-rating offer on the market which the NRA investigated and deemed in line with Regulation 2015/2120/EU as interpreted by the BEREC guidelines.

### b. Roaming

All three big Estonian MNOs (Telia, Elisa and Tele2) applied for a renewal of the sustainability derogation. All renewals for 1 more year, i.e. until June 2019, were granted by the NRA, but the amount of the granted surcharge significantly decreased. In fact, the majority of the offers in Estonia already allow RLAH without a surcharge and the sustainability derogation could potentially be completely abandoned in 2019. Indeed, despite the derogation, Estonian users have also markedly increased their consumption of mobile services abroad within the EU/EEA in proportions that are similar to many other Member States.

[106] The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers See Eurobarometer Consumer Markets Scoreboard 2018, p 12 and p 100, available at https://ec.europa.eu/info/files/consumer-markets-scoreboard-making-markets-work-consumers_en

The ‘Roaming calls made traffic Index’ shows that between Q1 2017 and Q1 2018 there was an increase from 119.2 to 173.8 showing that Estonian end-users have consumed 1.5 times more roaming minutes (calls made) in Q1 2018 than in Q1 2017. As to the data roaming services, the Retail Data traffic Index shows that in Q1 2018 end-users consumed 2.9 times more roaming data than in Q1 2017.

### c. Emergency communications - 112

In Estonia 112 is the sole emergency number, with contact points for all emergency services located in the Estonian Emergency Response Centre (EERC). Estonia was the first country to implement advanced mobile location (AML) for Android phones in 2016 and, since March 2018, AML has also been available for iOS. In over 80 % of cases, calls made from Android phones are located with an accuracy of 50 metres or less. Hearing or speech-impaired users can use text messages to contact 112 (sms112.ee). Since October 2017, it has been possible to make e-calls in Estonia.

## 5. Institutional issues

The NRA and the Consumer Protection Board (CPB) were merged to become one single authority as of 1 January 2019. It now operates under the new name Consumer Protection and Technical Regulatory Authority. The purpose of this consolidation was to improve the supervision and intensify the exchange of information between the experts as well as to cut bureaucracy. The implications of this merge in practice are yet to be seen.

## 6. Conclusion

Estonia is a country characterised by a high importance of mobile networks, with high coverage as well as high uptake. The rollout of 5G will depend on the implementation of the 5G strategy as well as the prompt carrying out of the 3.4-3.8 GHz and the 700 MHz award procedures. Coverage with high-speed networks in rural areas remains rather low although it has increased significantly over the past year. The successful completion of the EstWin project as well as the last mile scheme could contribute to further improving the situation. Elektrilevi's entrance in the market could bring a significant improvement in fixed connectivity as well as spur competition and innovation in the market.

# Ireland

| | Ireland | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **96%**<br>2016 | **97%**<br>2017 | **98%**<br>2018 | ***13*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **69%**<br>2016 | **74%**<br>2017 | **73%**<br>2018 | ***17*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **92%**<br>2016 | **92%**<br>2017 | **96%**<br>2018 | ***16*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **94**<br>2016 | **101**<br>2017 | **102**<br>2018 | ***9*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **30%**<br>2018 | ***6*** | **11%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **82%**<br>2016 | **93%**<br>2017 | **96%**<br>2018 | ***5*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **41%**<br>2016 | **51%**<br>2017 | **54%**<br>2018 | ***10*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **53%**<br>2017 | **56%**<br>2018 | ***21*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **14%**<br>2016 | **18%**<br>2017 | **20%**<br>2018 | ***15*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **72**<br>2016 | **72**<br>2017 | **75**<br>2018 | ***24*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

Ireland outperforms the EU with regard to most connectivity indicators. It ranks 5th on fast broadband coverage with 96 % (compared to an 83 % EU average) and 10th on fast broadband take-up with 54 % (compared to a 41 % EU average). However, it lags behind on ultrafast broadband coverage (ranks 21st with 56 %, compared to a 60 % EU average). Ireland's geography and population distribution are significant factors discouraging market players from widely expanding their networks. This means that Ireland will have to rely on state intervention if it is to reach the target of 100 Mbps coverage for all households in the intervention area.

Next Generation Access (NGA) coverage further increased over the last year in Ireland (to 96 % of households, well above the EU average of 83 %). At the same time, fixed broadband coverage improved slightly to 98 %, slightly above the EU average (97 %). Ultrafast coverage reached 56 % and remains below the EU average of 60 %. Fibre-to-the-premises (FTTP) coverage lags even further behind (at 13 % in Ireland compared to a 30 % EU average).

The deployment of gigabit networks in Ireland relies on both public and private investment.

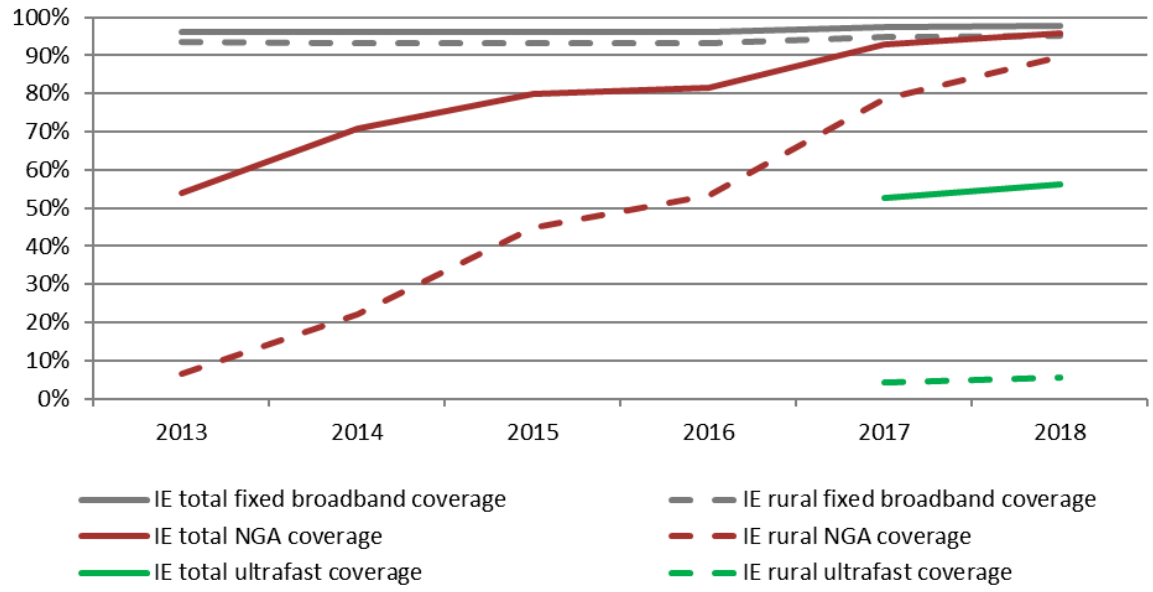
Eir, the incumbent operator, is in the process of rolling out an FTTP network to ultimately cover 330,000 premises by June 2019, having covered 307,000 premises as of Q4 2018.[107] It has already rolled out an extensive Fiber-to-the-cabinet (FTTC) VDSL network to approximately 1.6 m. premises offering speeds of up to 100 Mbps. Eir has also announced plans to upgrade the FTTC network to FTTH over the next 5 years.

Virgin Media's CATV (DOCSIS 3.0) and FTTP network covers approximately 890,500 premises, offering speeds of up to 360 Mbps.

[107]https://www.eir.ie/opencms/export/sites/default/.content/pdf/IR/presentations/2018_2019/quarter2/eir_Q2_FY19_results_presentation.pdf

Finally, SIRO, a joint venture between the ESB (the state-owned electricity distribution network operator) and Vodafone, who offers wholesale only services, is rolling out an FTTP network aiming to pass 500,000 premises in 50 towns. The FTTP network offers speeds of approximately 1 Gbps. So far, SIRO has connected approximately 200,000 premises in 30 towns and has not yet rolled out to the largest population centres.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

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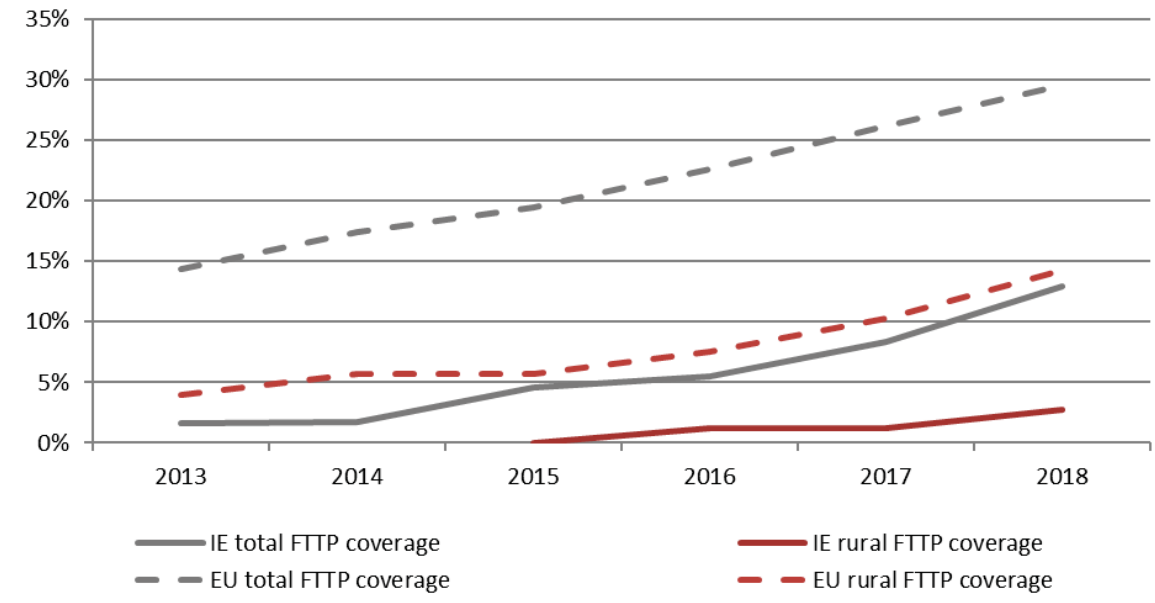



*Source: Commission services, Broadband coverage in Europe Study, commissioned to IHS and Point Topic. 2013-2014 data as of end of December; 2015-2018 data as of end of June.*

In this context, the main challenge for Ireland is to cover the more sparsely populated remote areas, where the digital divide remains significant.

The Irish national broadband plan (NBP) aims to ensure high-speed broadband access to all premises in Ireland, via a combination of commercial investment and State aid intervention. The Department of Communications, Climate Action and Environment (DCCAE) is responsible for the strategy.

The market has generally reacted well to this strategy, invoking the benefits it can bring to the sector and the overall economy. National authorities suggest that the NBP has been a catalyst in encouraging investment by the telecoms sector. According to the DCCAE, commercial operators in the Irish market have invested over €2.75 billion in upgrading and modernising their networks over the past 5 years, with further investments planned.

The area where commercial investors have neither invested nor plan to deploy a next generation access network comprises 540 000 premises located on around 96 % of Ireland's landmass and has been designated as the intervention area. DCCAE is responsible for the procurement process to appoint a company who will build, maintain and operate over a 25-year term a State funded network, and offer wholesale only services on an open access basis. The subsidised network is required to offer a minimum of 30 Mbps download and 6 Mbps upload speeds. The remaining bidding consortium consortium is proposing a predominantly fibre-to-the-home (FTTH) network solution offering a future proof network. This will be capable of delivering upload and download speeds significantly in excess of the minimum requirements and in line with the 2025 targets set out by the European Commission.

The government has allocated an initial €275 million to the Capital Plan[108] for the initial years of network build-out, and this is also eligible for €75 million under the European Regional Development Fund (ERDF) programme for 2016-2020. Substantial additional funds will be required in the course of the 25-year project period.

The procurement process to appoint a contractor for the State intervention network was launched in December 2015. The project has faced substantial challenges, especially as a result of a reduction in the intervention area to exclude commercial investment planned by eir and the decision of two of the three bidders (SIRO and eir) to withdraw from the procurement process in 2017 and 2018 respectively.

The process continues with one bidding consortium, led by Granahan McCourt. In September 2018, this bidding consortium submitted its final tender in the procurement process, which entered its final stage. This is the final stage of the procurement process before contract award. On 7 May 2019, the Irish Government announced the approval of the appointment of a preferred bidder to the National Broadband Plan. According to this announcement, the contract will be awarded, following confirmation of State Aid Approval by the European Commission.

In addition, a Mobile Phone and Broadband Taskforce (established in 2016), aims to identify solutions to broadband and mobile coverage problems, particularly in rural areas, and to investigate possible ways for improving services, before resorting to State intervention. Since its establishment, it has addressed over 60 targeted actions to facilitate the deployment of infrastructure and the improvement of services.

In parallel, Irish authorities have implemented a number of demand-side initiatives that aim to drive digital adoption in business and facilitate the integration of digital technology in education. The Trading Online Voucher Scheme offers small businesses a financial incentive of up to €2 500 to develop their online trading capacity, including with training, mentoring and networking support. The School Digital Champion Programme seeks to promote digital adoption and encourage the productive

[108] Building on Recovery: Infrastructure and Capital Investment 2016-2021 (29 September 2016)

use of technology by students and provides them with a platform to drive digital adoption outside the walls of the classroom, by connecting with local businesses and the wider community.

Ireland is preparing a *Connectivity Strategy*, which will identify key relevant infrastructural and regulation challenges and opportunities. It will align with Ireland's new National Digital Strategy, which is currently under development, led by the Department of the Taoiseach (the Irish Prime Minister). The draft Strategy will be submitted for Ministerial consideration in 2019, with a view to stakeholder consultation and publication thereafter.

5G ready service and technology neutral licences in the 3.4 - 3.8 GHz band were issued to five licensees, including the three Irish MNOs, on 1 August 2017. ComReg observes that this band continues to be used for the delivery of fixed wireless access (FWA) services, and that a number of the new licensees are making preparations to roll out FWA services. On 15 March 2019, DCCAE also published Ireland's National Roadmap on the use of the 700MHz Frequency Band[109], which sets out the process and timelines for the award of the 700 MHz band.

On 21 November 2018, Vodafone Ireland launched the first live 5G site for commercial trials in Ireland. Three expects to begin roll out of 5G later in 2019,[110] while Eir has commenced work on upgrading to 5G over the next two years.[111] ComReg's Test and Trial Ireland[112] facilitates tests or trials for all wireless services including 5G.

## 2. Market developments

In early 2018, the French telecommunications group Iliad completed the acquisition of a controlling stake in Ireland's incumbent operator eir. This is the only significant change in Ireland's electronic communications market during 2018.

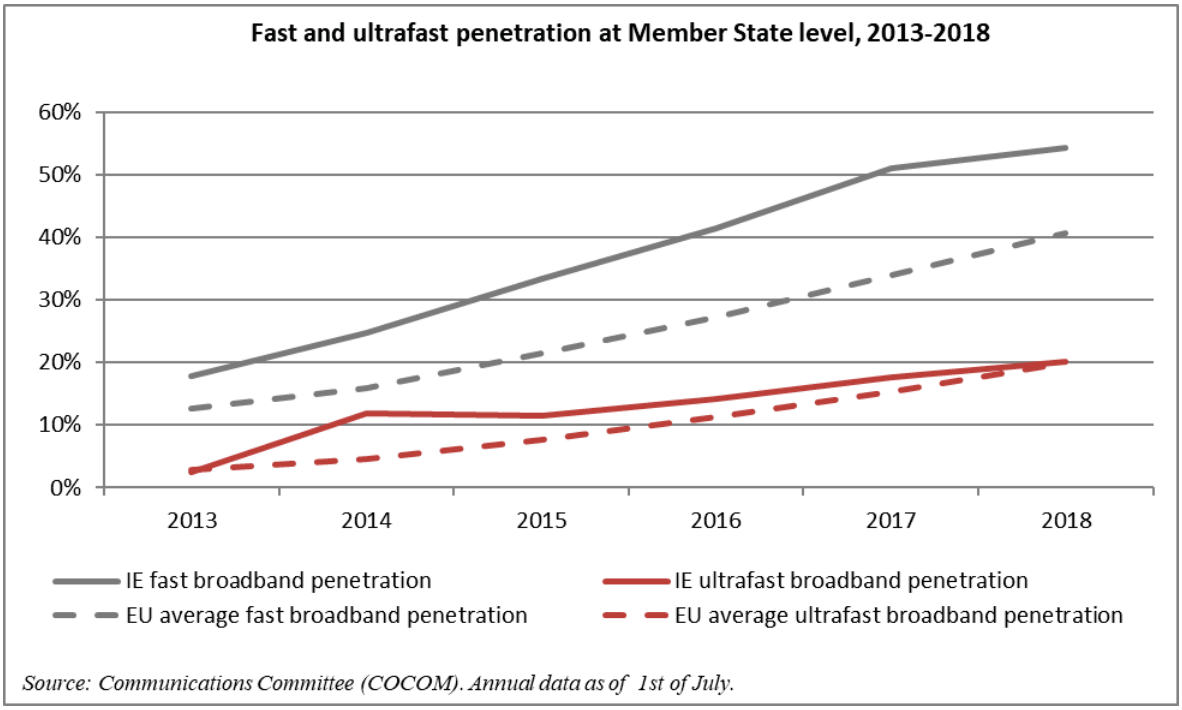
Network sharing agreements and joint ventures that include other (non-telecom) network operators are in place. Eir and Three have entered into a 'mosaic' network sharing agreement. According to Three's press release of 29 August 2014, this agreement involves sharing 2 000 sites, including site equipment, power supply, towers and transmission. The maintenance of this sharing agreement was one of the commitments Three made to the European Commission in exchange for approval of its acquisition of Telefónica (O2) in 2014.

Examples of mobile site sharing include the sharing of all Office of Public Works (OPW)[113] sites, managed by Shared Access[114], and site shares operated by Cignal[115] (formerly Coillte Telecoms).

### 2.1. Fixed markets

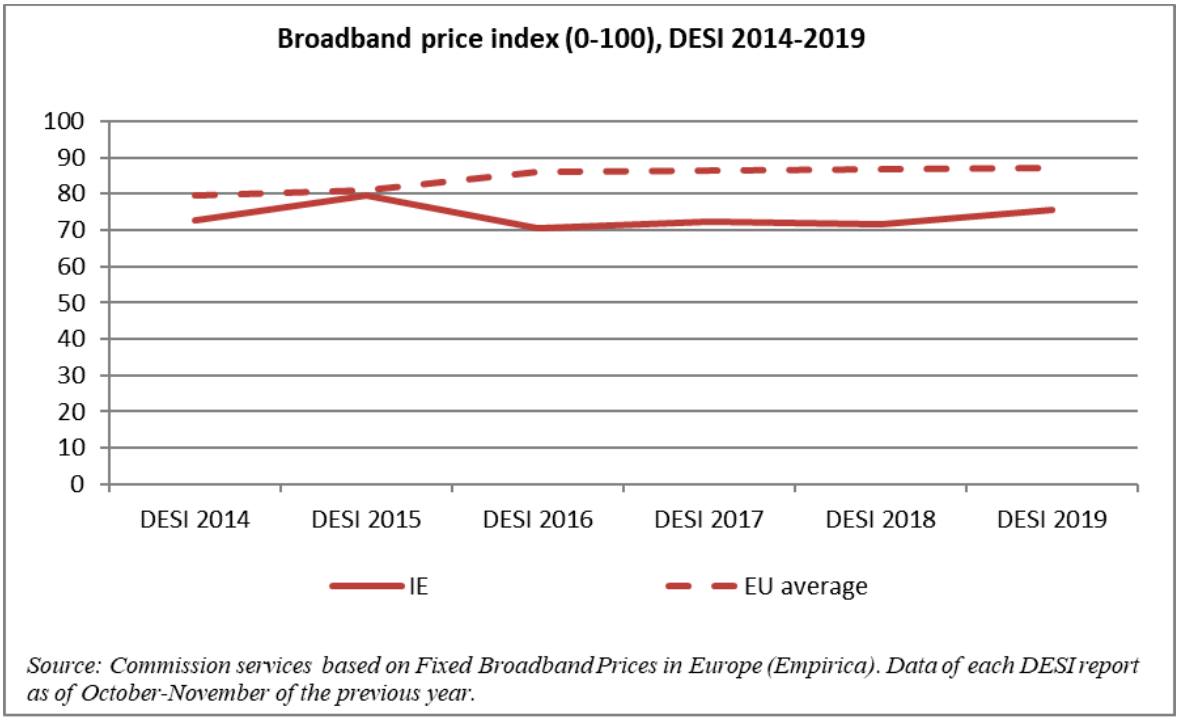
DSL continues to be predominant in Ireland, with a market share of 65 %. According to NRA data, at the end of Q2 2018 there were approximately 39 000 unblinded local loop (ULL) lines, (decreasing), 144 000 bitstream DSL lines, 127 bitstream VDSL lines and 199 000 virtual unbundled local access(VULA) lines. Cable subscriptions follow but have been slightly losing ground (26 % in July 2018, down from 26.5 % a year ago). The share of FTTH remains low at 4.2 % and well below the EU average of 16 %, despite the remarkable recent increase (up from 1.4 % a year ago).

[109] https://dccae.gov.ie/en-ie/communications/publications/Pages/Ireland_%E2_%80_%99s-National-Roadmap-on-the-Use-of-the-700MHz-Frequency-Band.aspx, published on 15 March 2019.
[110] https://www.siliconrepublic.com/companies/three-ireland-5g-network-roll-out-2019
[111] https://www.eir.ie/support/latest-updates/we-are-upgrading-our-mobile-network-to-become-5g-ready/
[112] www.testandtrial.ie
[113] http://www.opw.ie/en/
[114] https://www.sharedaccess.com/about/
[115] http://cignal.ie/




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

The market share of the incumbent in total fixed broadband further decreased to 31.8 %, compared to a 39.7 % EU average.



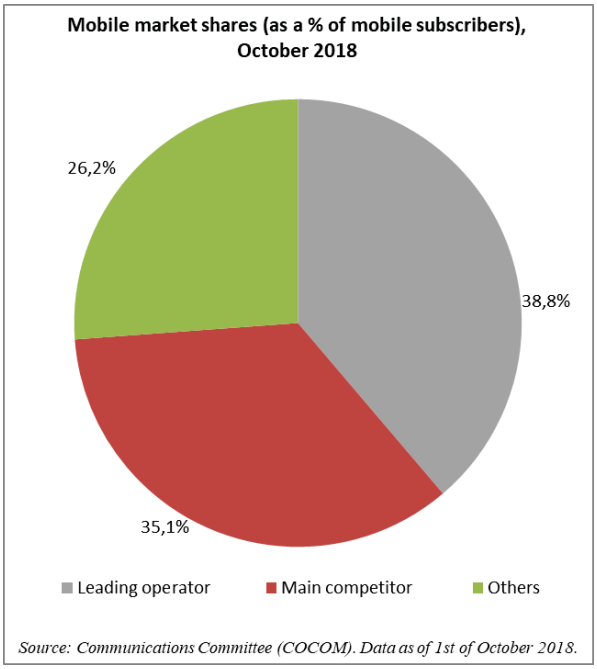

*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

Fixed broadband prices[116] in Ireland are substantially higher than the EU average for all speeds and types of product. In fact, for the 12-30 and 30-100 Mbps baskets, prices in Ireland are among the four highest in the EU, while for single and double-play products (internet and TV) they are the highest.

[116] Source: Study for fixed broadband prices in Europe 2018 (Empirica, project SMART 2016/0044) - forthcoming. Comparisons are for the least expensive price (PPP) per basket. Each basket is defined based on the speed bracket (up to 10 Mbps, 10-30 Mbps, 30-100 Mbps, 100-200 Mbps) and the service components (internet, '2-play' with internet+telephone or internet+TV, and '3-play' with internet+telephony+TV).

The difference between Irish prices the EU average is substantially lower in the higher-end basket (100-200 Mbps). This is also reflected in the broadband price index[117].

## 2.2. Mobile markets

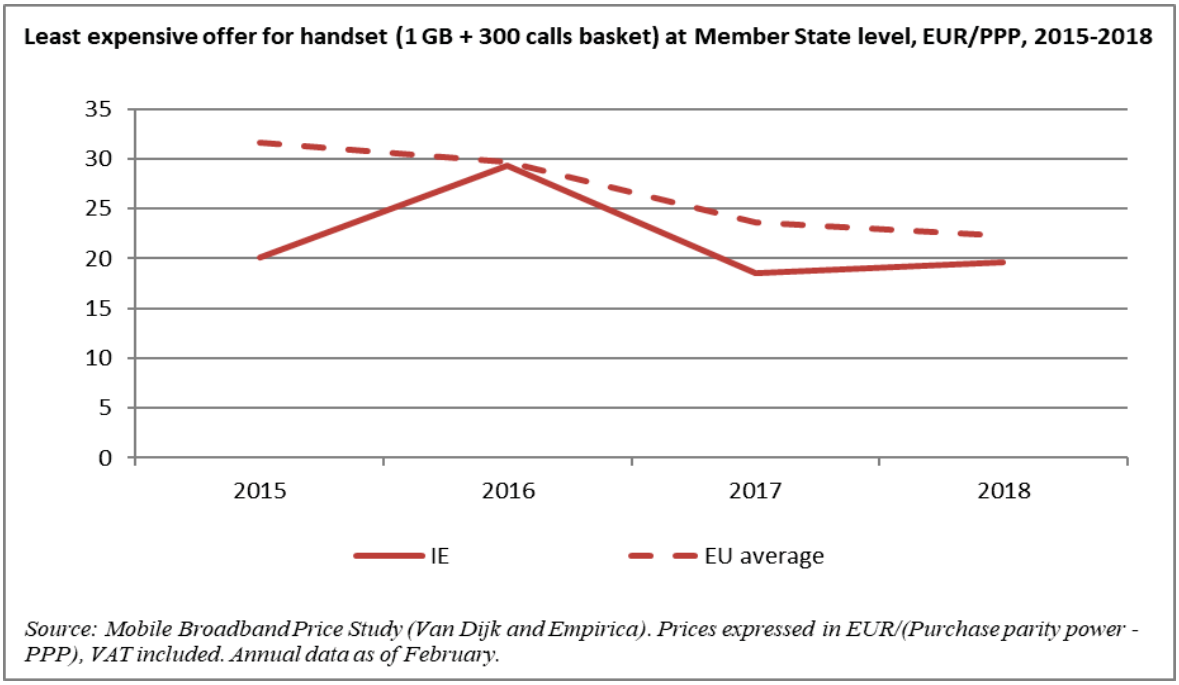



*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

At the end of 2018, the Commission for Communications Regulation (ComReg) reported over 6.2 million mobile subscriptions, including mobile broadband and machine-to-machine subscriptions, in Ireland. Excluding mobile broadband and machine to machine, mobile voice subscriptions totalled just under 5 million for a penetration of 101.7 %.

Vodafone remained the largest mobile operator with 38.8 % (including mobile broadband and M2M), followed by Three with 35.1 %.

In 2018, iD Mobile, one of the two MVNOs who had entered the market in 2015 (following the takeover of O2 Ireland by Three), exited the market.




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

Prices for mobile broadband also tend to be higher than the EU average. For data-only packages, the difference is higher at lower allowances (twice as much for up to 512 MB) but is substantially reduced at higher allowances (up to 11 % more expensive for 5GB and 10 GB while 29 % cheaper for 20 GB). There is a similar trend for data and voice packages.

[117] 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.

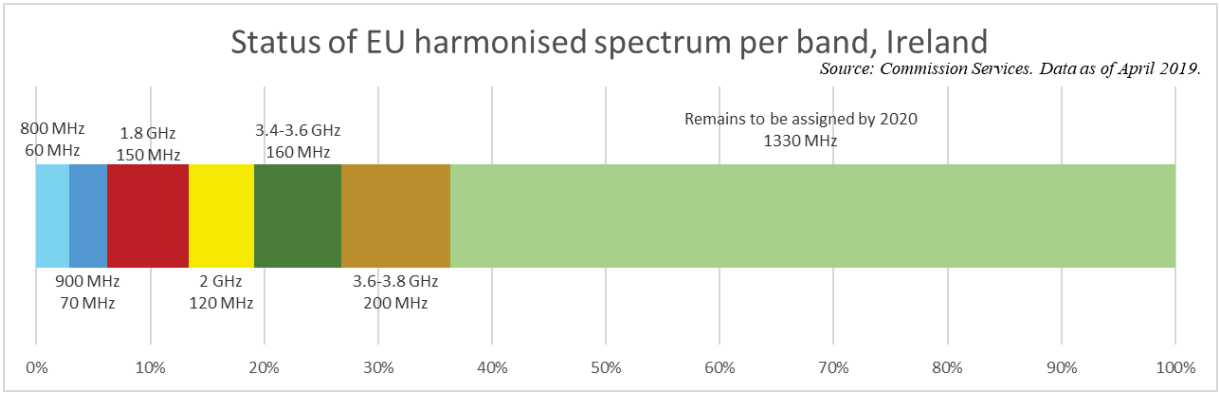
## 3. Regulatory developments

### 3.1. Spectrum

Ireland has assigned 760 MHz, which accounts for 36 % of the spectrum harmonised at EU level for wireless broadband[118]. The spectrum that remains to be assigned is mainly in the 700 MHz, the 1.5 and 2.6 GHz bands. ComReg has commenced the process to consider assigning all or some of these bands[119].

Ireland has carried out the necessary cross-border coordination work with the UK regarding the 700 MHz band. The two countries have identified 4 September 2019 as the start date for the coordinated migration of terrestrial broadcasting services out of this spectrum band in both jurisdictions. In Ireland, a simulcast period is planned until 4 March 2020, when all terrestrial broadcast transmissions in the 700 MHz band will be required to cease.

In 2018, ComReg completed the award of spectrum rights of use to meet the requirement for point-to-point radio links, a critical piece of backbone infrastructure for Ireland's mobile communications networks (the "26 GHz Band Spectrum Award 2018"). 15 of 19 Lots of 2 × 28 MHz were awarded, resulting in 840 MHz of new spectrum rights of use[120].




In June 2018, ComReg's preliminary consultation on the next Multi-Band Spectrum Award (MBSA)[121] proposed to include the paired 2.1 GHz band in the MBSA alongside the 700 MHz duplex, the 2.3 GHz and the 2.6 GHz bands in the next award process, but postponing the assignment of the 26 GHz band for a subsequent process. It also proposed the potential use of 'an early liberalisation option' to allow some or all the existing licensees in the paired 2.1 GHz band the option to convert their respective existing rights of use into new "liberalised" rights of use via the proposed award. Ireland's National Roadmap on the Use of the 700MHz Frequency Band, sets out the process and timelines for the Multi-Band Spectrum Award.

Some market players noted the continuing delay in the liberalisation of the 2.1 GHz band, which is complicated by the different expiry dates. They complain about delays in the award of spectrum and have requested that at least the auction of the 700 MHz be expedited. They also complain about the prolonged use of the 3.6 GHz band by legacy users, which prevents them from making use of the

[118] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.
[119] ComReg Document 18/60 (June 2018) – Proposed multi band spectrum award - preliminary consultation on which bands to award.
[120] ComReg Document 18/53.
[121] ComReg Document 18/60.

band. According to ComReg, transition licenses allow legacy users to continue using the band to provide broadband services[122].

### 3.2. Regulated access

In Ireland, all markets included in the 2014 Recommendation on Relevant Markets are subject to regulation, along with a few legacy markets, i.e. the retail market for access to the public telephone network at a fixed location for residential and non-residential customers (market 1 of the 2007 Recommendation on relevant markets) and the market for call origination on fixed networks (market 2 from the 2007 Recommendation), as well as the broadcasting transmission market (market 18 from the 2003 Recommendation).

Since October 2017, the Commission has addressed a letter of formal notice (LFN) to Ireland, concerning delays in the analysis of the market for wholesale local access at a fixed location, the market for wholesale central access provided at a fixed location for mass-market products and the market for wholesale high-quality access provided at a fixed location (markets 3a, 3b and 4, respectively, of the 2014 Recommendation on relevant markets[123]). During Q4 2018, ComReg adopted decisions on the analysis of markets 3a and 3b, designating eir as having significant market power (SMP) on the national WLA market, and the Regional WCA market. ComReg published the full market analysis decision (including remedies)[124], in parallel with two two additional decisions on price control and on price control on bundles[125]. In response to the associated notified draft measures, the Commission issued comments on: (i) including alternative operators' FTTH network infrastructure in the market definition, (ii) the need for appropriate and consistent price control of wholesale products, and (iii) the need for updated current generation access prices. Furthermore, as regards the then proposed regulatory remedies for wholesale local access provided at a fixed location and wholesale central access provided at a fixed location for mass-market products in Ireland, the Commission commented on the need to urgently review the retail access market. On the other hand, the analysis of Market 4 is still pending. On 30 November 2018, the Irish authorities formally informed the Commission that the notification of Market 4 was to be expected in Q2 2019 instead of Q3 2018 as initially planned, however this has since moved to Q3 2019 owing to the need to consider further information. ComReg held a second public consultation[126] in February 2018 and a workshop with stakeholders in September 2018, to discuss the practical application of certain proposed obligations[127]. It has strengthened the market analysis team with experts, including from other departments, and is optimistic about reaching the above (updated) deadline without requiring a third consultation.

ComReg notified the draft final measures for the markets for wholesale call termination on individual public telephone networks provided at a fixed location as well as for wholesale voice call termination on individual mobile networks (Markets 1 and 2 of the 2014 Recommendation on relevant markets respectively) in Q2 2019[128]. Fixed termination rates (FTRs) and mobile termination rates (MTRs) in

[122] Legacy users may use to this effect either Transition Unprotected Licences or Transition Protected Licences as appropriate, as detailed in the 3.6 GHz award Information Memorandum, ComReg Document 16/71, published in August 2016 and setting out the rules of the award. These transition rules serve to minimise the impact on consumers while ensuring that rural consumers in particular continue to receive a broadband service while alternative commercial services are being rolled out by new licensees.

[123] 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.

[124] ComReg Document 18/94.

[125] ComReg Documents 18/95 and 18/96 respectively.

[126] ComReg Document 18/08.

[127] ComReg Document 18/54 and ComReg Document 18/98.

[128] Both markets 1 and 2 were notified in March 2019.

Ireland are set based on the BU Pure LRIC Model[129]. In March 2018, ComReg published a Pricing Consultation Paper that detailed updated BU Pure LRIC models for both FTRs and MTRs. In 2018, the MTR in Ireland was 0.79 euro cent/minute, the same for all operators (compared to a 0.85 euro cent/minute weighted EU average). The regulated FTR cap was set at 0.072 euro cent/minute in 2018.

ComReg is also commencing the other two delayed reviews, i.e. markets 1 and 2 of the 2007 Recommendation (to be reviewed on a joint basis), and market 18 of the 2003 Recommendation.

The Broadband Cost Reduction Directive 2014/61/EU (BB CRD)[130] is transposed as the Broadband Cost Reduction Regulations in Ireland. However, transposition of Article 8 of the BB CRD is still pending. ComReg is designated as the Dispute Settlement Body (DSB) and responsible for providing a Single Information Point (SIP).

So far, there have not been any disputes raised in this framework. ComReg has been engaged with the Commission for Regulation of Utilities ('CRU') (Gas, Water & Energy). The two agencies are in the process of concluding a Memorandum of Understanding. This will make it possible to share information between agencies, which will help ComReg to carry out its tasks in its role as the DSB.

The SIP is publicly available via the ComReg website with no access conditions[131]. It provides links to the online resources of gas, electricity, telecoms, radio, transport (including railways, roads, ports and airports) infrastructure providers, as well as of local authorities, city councils and others. Where ComReg receives notification of planned works, these are stored electronically and are available on request.

## 4. End-user matters

According to the 2018 Consumer Markets Scoreboard, of the 25 services markets assessed by consumers in Ireland 'fixed telephone services', 'mobile telephone services' and 'internet provision', rank quite low (15th, 18th and 23rd respectively) and below the "services" average. They are also below the respective EU averages (by 2.1, 3.6 and 6.9 points respectively)[132].

According to information provided by ComReg, during the period from 1 January 2018 to 9 November 2018 a total of 24 276 issues were raised via its Consumer Line. 3 921 of these were complaints and the rest queries. Most complaints concerned premium rate services, billing (including disputed charges), service issues (such as loss of service and quality of service) and contractual matters (such as contract termination requests and terms and conditions).

### a. Net neutrality

[129] ComReg Decision D12/12 "Mobile and Fixed Voice Call Termination Rates in Ireland" and ComReg Decision D02/16 "Mobile Termination Rates: Response to Consultation 14/29 and Supplementary Consultation 15/19 and Decision Document"

[130] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

[131] https://www.comreg.ie/industry/electronic-communications/single-information-point-bcrr/single-information-point-sip/

[132] The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers. See Eurobarometer Consumer Markets Scoreboard 2018, p 12 and p 100, available at https://ec.europa.eu/info/sites/info/files/consumer-markets-scoreboard-2018_en.pdf.

As also reported in the 2018 report, Ireland has still not set out rules on the penalties referred to in Article 6 of Regulation (EU) 2015/2120[133]. Consequently, there is no provision for criminal sanctions, no provision to seek penalty orders from the civil courts and no provision that allows ComReg to impose a penalty for infringements of the Regulation. In the absence of enforcement powers, ComReg has still not commenced any formal assessment of practices that might infringe the Regulation.

**b. Roaming**

Following the introduction of 'roam like at home'[134] (RLAH), the consumption of roaming services by Irish subscribers has shown a sharp increase for voice and an explosive increase for data. Specifically, in Q4 2017 it was 1.5 times more for voice and 3.6 times more for data, compared to Q4 2016. Similarly, in Q1 2018 it was 1.6 times more for voice and 3.6 times more for data, compared to Q1 2017[135].

ComReg is the competent authority for enforcing the Roaming Regulation. In May 2018, it formed the opinion that Tesco Mobile was non-compliant with its obligations under Articles 6a and 6e of the Roaming Regulation because it failed to correctly calculate and apply roaming charges/ surcharges to roaming data consumption in the period from 15 June 2017 to 24 January 2018. Tesco Mobile responded to ComReg and took immediate measures to remedy the non-compliance; it identified the affected customers and initiated refunds. In view of Tesco Mobile's response and remedial measures, no other action was taken by ComReg.

**c. Emergency communications - 112**

Emergency calls in Ireland can be placed using either 112 or 999. They are routed to a single Public Safety Answering Point (PSAP), which is provided by BT Ireland under a contract with DCCAE.

For mobile network calls, the cell ID associated with the call is transferred to the PSAP. Network operators provide the PSAP with sufficient information to allow them to look up the cell ID and identify the geographic location of the caller. For handsets, Ireland uses AML (advanced mobile location), deployed on all three mobile networks. The implementation of AML by Apple in iOS in Q1 2018 has resulted in greater coverage for the AML solution. In addition, eCall[136] was implemented in Ireland in Q1 2018 and is supported on all main networks.

People with hearing disabilities can rely on three methods to contact the PSAP in an emergency situation. The principal means of access to the emergency call answering service for persons with disabilities is the 112 short message service (SMS). This service (introduced in January 2012) allows deaf, hard of hearing and speech-impaired people to send an SMS text message to the PSAP. The message is relayed to the Emergency Services by a PSAP operator. In addition, there is a silent call option, with set procedures in place for dealing with silent calls received by the PSAP, to process calls from persons who may not be in a position to communicate verbally. Finally, the Irish text relay service (ITRS) enables contacting the PSAP with the use of a minicom device (text telephones for users with hearing impairments). ITRS agents relay the calls to the PSAP and translate text into voice and voice into text. The service is available 24 hours a day.

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[133] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

[134] 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 amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

[135] Figures compare Q4/2017 and Q1/2018 with Q4/2016 and Q1/2017 retail roaming volumes according to the BEREC International Roaming Benchmark Report, October 2017-March 2018, of 4 October 2018

[136] See https://ec.europa.eu/transport/themes/its/road/action_plan/ecall_en.

The Commission is currently looking into the functioning of emergency communications and the 112 number in Ireland, with particular regard to caller location.

### d. Universal service

Eir is the designated universal service provider until 31 December 2020. During 2018, ComReg issued separate consultation documents on the scope of the following universal service obligations: public pay telephones, provision of a directory of subscribers, and quality of service related to the universal service obligation of access at a fixed location. In early 2019, ComReg issued two final decisions on USO. Decision D01/19 (25/2/2019) observes a continuous need for a public payphone USO and maintains the status-quo, designating eir as the USP for the public payphone USO, for the period 25/2/2019-31/12/2020. Decision D02/19 (13/3/2019), re-imposes the previous national and sub-national connection targets and service availability targets.

ComReg received funding applications from eir in relation to its universal service obligations for all financial years from 2010 to 2016. It assessed the direct net cost, intangible benefits and unfair burden, issued individual consultation documents for financial years 2010-2015 and is in the process of reaching decisions on each of these years.

## 5. Institutional issues

The market continues to express concerns that ComReg lacks sufficient resources, which leads to considerable delays in several policy areas, including market reviews. The NRA is making substantial efforts to expedite work, for example by strengthening the market analysis team with experts from other departments, as well as seeking to improve the efficiency of its data collection processes in collaboration with stakeholders. In late 2018, DCCAE concluded talks on ComReg's staffing levels with the Department of Public Expenditure and Reform (DPER), securing a substantial increase in resources for the Regulator.

One issue persistently raised by some stakeholders concerns the enforcement and sanction powers ComReg has to regulate the sector. These powers include inter alia the power to handle criminal offences (with fines up to € 500,000) and civil enforcement powers (by applying to the High Court for an order of compliance and an order to pay a financial penalty). The Irish Government's position is that the suite of enforcement tools available to ComReg fully meets the requirements of the EU Regulatory framework of 2009. Notwithstanding that, DCCAE is actively reviewing ComReg's general enforcement powers to ensure that it is able to meet current and future challenges in delivering on its statutory and regulatory remit, including penalties set at a suitably high level to provide an effective deterrent. This work is being carried out with close engagement with the Regulator, and within prescribed constitutional limits.

Following an application by ComReg to the High Court on 16 June 2017 for declarations of non-compliance and orders directing that eir pay financial penalties to ComReg, eir challenged the legal basis of ComReg's enforcement powers. In late 2018, eir and ComReg reached a settlement, which included *inter alia* the withdrawal of eir's challenge to the legislation and the introduction of a new Regulatory Governance Model for eir.

ComReg is in the process of completing a review of non-geographic numbers (NGN), which had started in 2017. In a further consultation published in July 2018[137], ComReg confirmed its preliminary view that the current NGN platform does not protect or promote the interests of consumers. ComReg concluded that there is a need to take measures at both the retail and wholesale level. In December

[137] ComReg Document 18/65. See also www.comreg.ie/ngnreview.

2018, ComReg, ComReg published its Response to Consultation 18/65 and final Decision[138], where it maintained its preliminary view and proposed measures.

Following a review of numbering for machine-to-machine (M2M) services and for mobile services in general, ComReg introduced a new dedicated M2M number range in mid-2018, explicitly permitting extraterritorial use. The review, prompted mainly by the strong growth in IoT/M2M services, led to ComReg decision 18/46[139], which made the 088 number range available for dedicated use by M2M services. These are 15-digit numbers in international dialing format (i.e. +353 88 and 10 digits). ComReg considers that this measure should ensure the availability of sufficient resources to meet expected demand with no impact on existing interpersonal mobile services. The decision makes it possible for 088 numbers to be used for eCall and explicitly allows the extraterritorial use of 088 M2M numbers. It further maintains ComReg's current approach of not charging fees for assigning numbers. The use of 088 numbers is subject to the General Authorisation conditions. A specific condition of use attached to 088 numbers is that they should be used in compliance with consumer protection and other national rules in the country in which they are used. ComReg has already notified other CEPT[140] countries of the introduction of the new 088 range for M2M service, with the assistance of the European Communications Office, and has expressed its readiness to provide BEREC with the required details in the light of Article 93(4) of the EECC. ComReg assigned the first 088 numbers in September 2018 and is liaising with the industry to ensure that numbers are operational ideally by the end of 2018 and in any case not later than June 2019.

## 6. Conclusion

Ireland's NBP is an ambitious project based on future-proof technologies. Expediting its implementation will help not only to bridge the country's geographical divide but also improve ultrafast broadband coverage, which is currently lagging behind. Ireland still lacks a 5G connectivity strategy and a clear timetable for assigning the 700 MHz band. However, it has already assigned substantial spectrum at 5G conditions in the 3.6 GHz band. Persistent delays specifically in laying down rules on the penalties for breaching the net neutrality rules and on transposing Article 8 of the Broadband Cost Reduction Directive 2014/61, as well as the absence of dissuasive, direct sanctioning power of ComReg as regards market monitoring and regulation, might also undermine legal certainty and the further development of the electronic communications sector. Delays also persist in market analysis. The notification of Market 4 is now postponed until Q3 2019. The agreement reached between DCCAE and DPER, which secured a substantial increase in ComReg's staff, should substantially improve this situation. Finally, Ireland is reviewing the general enforcement powers of its Regulator to ensure it can meet current and future challenges in the sector.

[138] ComReg Document 18/106 and Decision D15/18.
[139] "Review of Mobile Numbering – Promoting Innovation and Facilitating New Services" ComReg 18/68 D06/18, 11/6/2018.
[140] European Conference of Postal and Telecommunications Administrations, www.cept.org.

# Greece

| | Greece | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **96 %**<br>2016 | **96 %**<br>2017 | **96 %**<br>2018 | ***17*** | **97 %**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **66 %**<br>2016 | **69 %**<br>2017 | **74 %**<br>2018 | ***15*** | **77 %**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **77 %**<br>2016 | **86 %**<br>2017 | **92 %**<br>2018 | ***23*** | **94 %**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **50**<br>2016 | **66**<br>2017 | **74**<br>2018 | ***25*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **0 %**<br>2018 | ***13*** | **14 %**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **48 %**<br>2016 | **53 %**<br>2017 | **66 %**<br>2018 | ***26*** | **83 %**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **5 %**<br>2016 | **7 %**<br>2017 | **11 %**<br>2018 | ***28*** | **41 %**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **0.4 %**<br>2017 | **0.4 %**<br>2018 | ***28*** | **60 %**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **0.01 %**<br>2016 | **0.01 %**<br>2017 | **0.10 %**<br>2018 | ***28*** | **20 %**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **70**<br>2016 | **70**<br>2017 | **65**<br>2018 | ***28*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

With an overall connectivity score of 41.2 Greece ranks last among the EU Member States, without improving its place compared to 2018. It features wide availability of fixed broadband with 96 % coverage, which is slightly lower than the 97 % EU average, but take-up is still progressing slowly. Despite progress being made, with an increase of 13 percentage points from 53 % in 2017 to 66 % in 2018, Greece ranks 26th among the Member States in NGA coverage per household, far from the EU average of 83 %. The transition to fast broadband connections is slower than in other EU Member States and Greece ranks only 28th in 2018.This slow transition could be linked to the fact that Greece has very low ultrafast broadband coverage. In addition, between 2013 and 2018 Greece only had a marginal availability of FTTP.

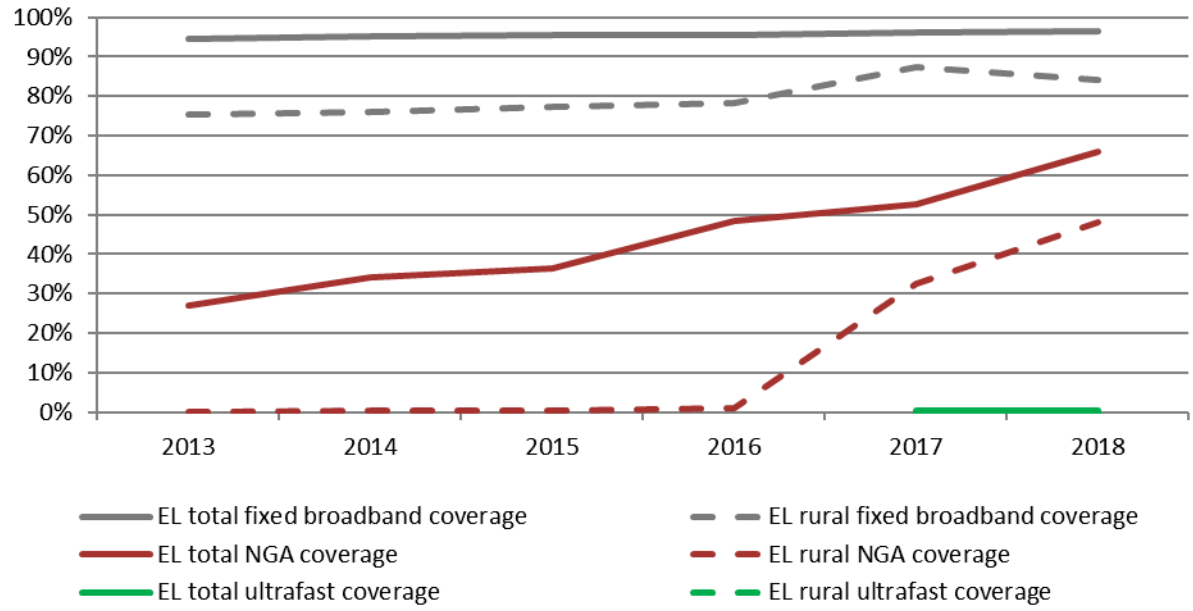
The projects of the National Broadband Plan[141] have been updated in order to comply with the gigabit society targets. To this end, only future-proof infrastructure providing at least 100 Mbps is being funded (in most cases the possibility of upgrading to 1 Gbps is a prerequisite).

Greece has had considerable delays in absorbing the 2013-2020 cohesion funds and in implementing the projects. There have been some projects phasing out (Rural Broadband), some projects abandoned, and some projects resubmitted (SYZEFXIS II).

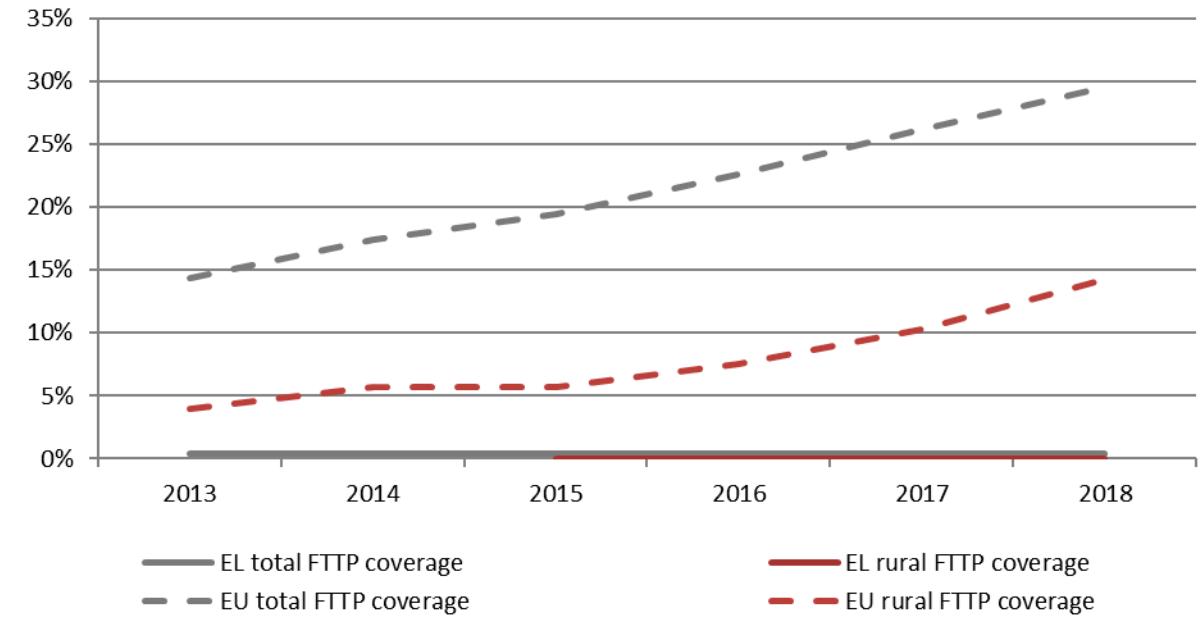
Besides the Rural Broadband project, which was the 2017 broadband award winner[142], the National Broadband Plan includes two major broadband projects: Superfast Broadband and Ultra-fast Broadband. The former focuses on densely populated urban areas, aiming to provide FTTB/FTTH access and to improve broadband penetration, whereas the latter supports the deployment of broadband infrastructures all over the country, in NGA-white areas.

[141] www.nga.gov.gr .
[142] The European Broadband Awards is an annual event where the European Commission recognises outstanding broadband deployment projects in Europe.

**Fixed, NGA and ultrafast coverage, total and rural at Member State level (% of households), 2013-2018**




**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.*

In December 2018, the European Commission approved the Superfast Broadband project, a demand stimulation vouchers scheme aiming to support Greece's take-up of broadband services with download speeds of at least 100 Mbps[143]. The project's maximum overall budget is estimated at €50 m per year

[143] Decision C (2018) 8363 final, Brussels, 7.1.2019, State Aid SA. 49935 (2018/N) – Greece Superfast Broadband (SFBB) Project. Cf. www.sfbb.gr

and is totally funded from national resources, under the state's general budget. The vouchers will support increased take-up by covering part of the set-up costs and part of the monthly fee for a maximum of 24 months. Users will be able to activate the vouchers until 31 March 2020.

Moreover, the Ministry has resubmitted the SYZEFXIS II major project (at a cost approximately €621 m) which aims to connect all of the country's public administrations into one network. This project needs to be implemented as soon as the official agreement is given so it can fully utilise the allocated funds.

The Greek General Secretariat of Telecommunications and Post's (GGTT's) large-scale broadband project Ultra-Fast Broadband[144] (UFBB) was approved by the Inter-Ministerial Committee for Public-Private Partnerships (SDIT) and the initiation of the tender procedure is planned in the second quarter 2019. The project's total budget is €700 m, of which €300 m is a public contribution, and the remaining €400 m is private.

he design and implementation of the project is carried out by the General Secretariat of Telecommunications and Posts (GGTT). Of the €300 m public participation for the ESPA 2014-2020 programme, €265 m comes from the "Competitiveness, Entrepreneurship and Innovation" 2014-2020 operational programme (EPAnEK) and € 35 m. from the 'Rural Development Programme'.

The UFBB project aims to cover all the country's areas that will remain NGA-white and is designed to complement the corresponding infrastructure developed by private telecommunications providers. The project's infrastructure is estimated to cover approximately 2.5 million citizens (about 18 % of the active lines) at national level.

The project's duration is estimated at 20 years. After the end of the concession period, all of the project's infrastructure will be fully owned by the Greek government. The project is part of the country's National Broadband Plan.

By 2023, 71 % of the population will have access to a 1 Gbps speed network (covered either by networks to be developed by telecom operators or by the UFBB network) and 29 % will have access to networks that have speeds of 30-100 Mbps (including the areas covered by Rural Broadband).

Greece is one of the successful Member States in the WiFi4EU first call as it won 117 vouchers coming to around 40 % of those applied, 268 in total. There are 326 eligible entities in Greece but there are 339 municipalities registered in the database, which indicates that some municipalities created multiple registrations.

The General Secretariat of Telecommunications and Post has signed Memoranda of Understanding (MoUs) with 3 cities, namely Trikala, Kalamata and Zografou, for the deployment of pilot 5G networks. Furthermore, an agreement was signed with Bulgaria and Serbia to implement a 5G pilot cross-border corridor. In addition, the General Secretariat of Telecommunications and Post has established a special task force that will coordinate all issues regarding 5G development in Greece, including the plan to achieve the Gigabit Society targets for 5G. To this end, the Ministry amended National Frequency Allocation Table (NFAT) for the release of 700 MHz band.

The initial private plans announced by the operators for NGA deployment were mainly based on copper technologies (VDSL vectoring). At this point of time, there is an interest in upgrading the planned VDSL (vectoring) plans with fibre technologies (FTTB/FTTH). According to information from the national regulatory authority (EETT), Vodafone has rolled out FTTH connecting households with approximately 26 % of the total number of Vodafone's allocated cabinets and WIND has also deployed FTTH connecting households with approximately 8 % percent of the total number of Wind's

[144] http://www.nga.gov.gr/index.php/ultrafast-broadband .

allocated cabinets. OTE has no FTTH deployment under its vectoring plan. However, OTE has announced FTTH rollout under different schemes outside the vectoring allocation procedure. OTE has approximately 73 % of the total number of the allocated cabinets from the three operators under the vectoring plan, while Vodafone has approximately 13 % and Wind approximately 14 %. The numbers indicate that the FTTH roll out in Greece is progressing very slowly and the total number of FTTH allocated cabinets is still very small.

During the NGA deployment, there were requests from the operators for the modification of the originally approved deployment time plan. The main reasons for these modifications were the significant delays in the power supply procedure by DEDDHE (HEDNO S.A., the Hellenic Electricity Distribution Network Operator S.A.) and the delays in the procedure for permit granting. EETT issued 18 different decisions between January and October 2018, which modify the originally approved deployment plan.

The General Secretary of Telecommunications and Post has decided to set up a team composed by Ministry and EETT's experts, to work together on the implementation of the Directive 2018/1972/EE, the European Electronic Communications Code (EECC). The Working Group[145] has been established and has already started to elaborate on the transposition of the EECC into the national legislation. The work of the transposition is expected to be accomplished by Q1 2020.

## 2. Market developments

### Competitive environment

In terms of competitive dynamics, the Greek telecoms market, specifically the mobile market underwent a market consolidation phase in 2018.

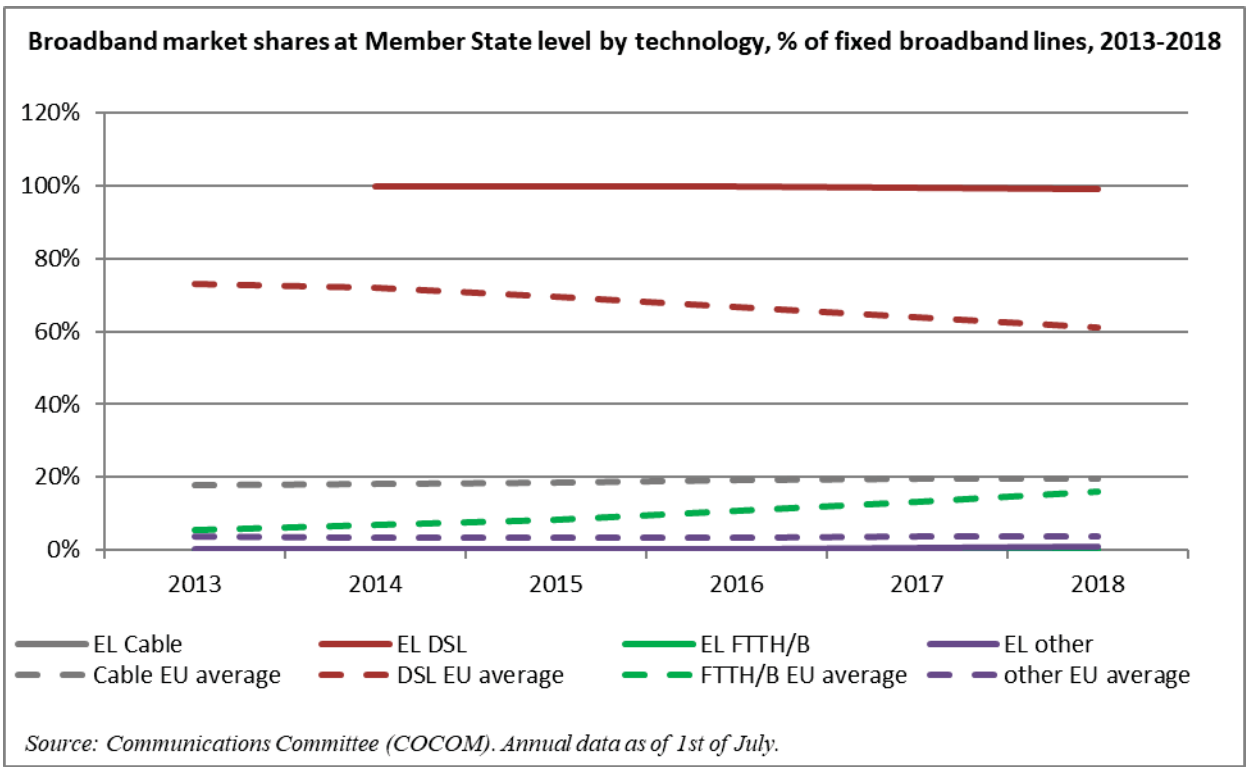
EETT approved in June 2018[146] the acquisition of CYTA Hellas by the Vodafone Group for a total enterprise value of €118 m. CYTA Hellas was a provider of fixed and mobile telecommunication services. It owned a fibre optic Next Generation Network and offered mobile services through a Mobile Virtual Network Operator with Vodafone Greece[147]. CYTA Hellas had around 300,000 fixed broadband customers (approximately 8 % market share) and around 40,000 mobile customers. Through this acquisition, Vodafone Greece will expand its fixed network and increase its customer base.

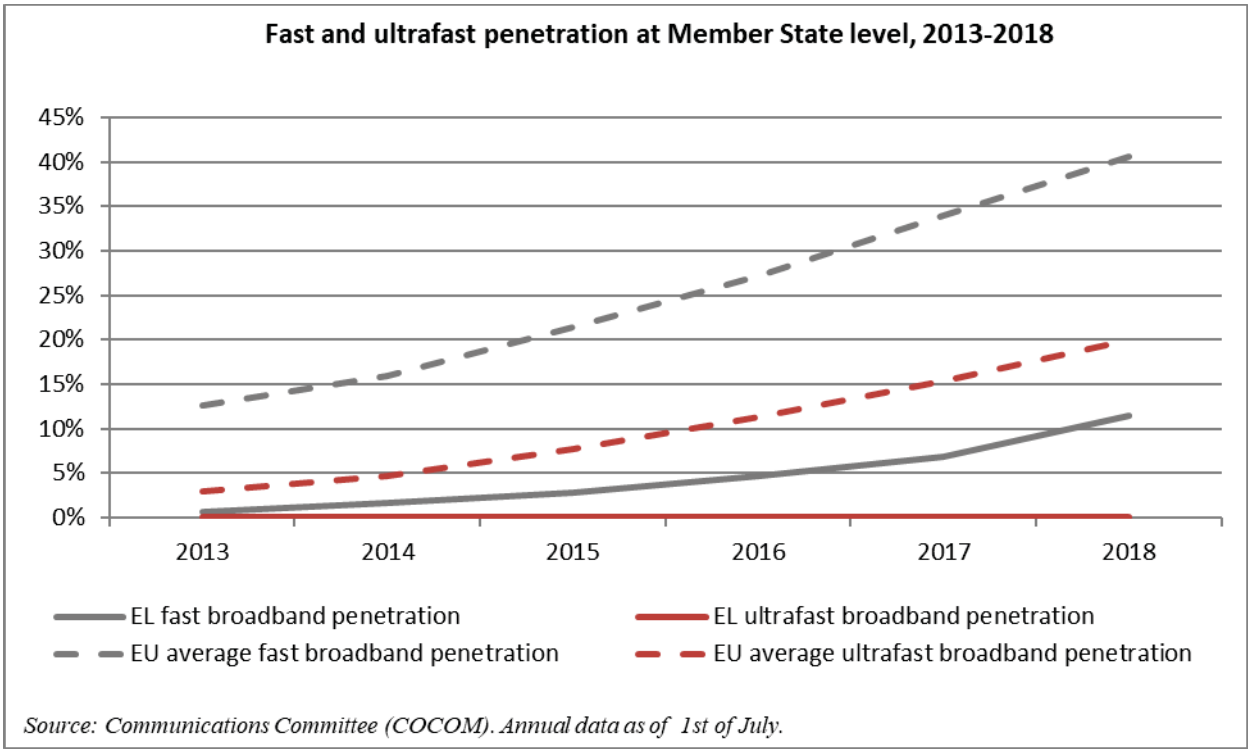
In 2016, Forthnet requested the three MNOs be granted access to operate as an MVNO but did not finalise an agreement with any of the MNOs. It filed a request for dispute resolution with EETT, which was resolved at the end of 2018 by a decision notified to the Commission in the context of the Article 7/7a procedure. Through the decision, imposed by EETT on the MNOs, they had to offer access to Forthnet and set relevant access conditions including prices. This resulted in the MVNO market in Greece being opened up to other interested players.

Banks are continuing to negotiate for Forthnet's takeover. The "coalition" of Vodafone Greece and Wind Hellas, which for the time being takes the lead and is in exclusive negotiations with the creditor banks, is expecting developments, while Forthnet seeks to attract a strategic investor to submit its own bidding proposal.

## 2.1. Fixed Markets

[145] https://diavgeia.gov.gr/decision/view/64Ξ0465XΘ0-ΞΟΕ .
[146] EETT's decision : Protocol Number 857/7- 28-6-2018
[147] Cyta was the only MVNO currently active in the Greek market and operated in the local market with less than 1 % market share.

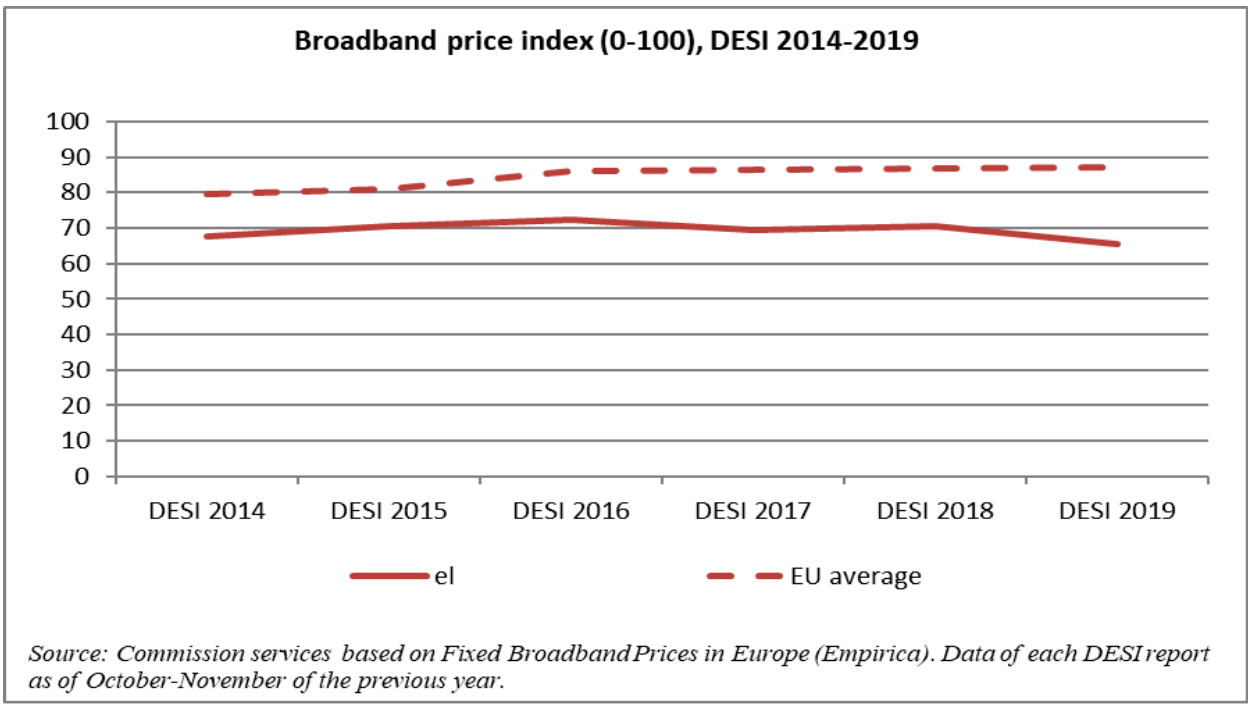



DSL remains the only technology available for delivering broadband access services in Greece, remaining practically stable at 100 % over the past 5 years. In Greece, there are neither cable networks nor competition from FTTH/B technology. Competition is almost entirely based on regulated access to the incumbent's, OTE's, access network.

Take-up of fixed broadband is still progressing slowly, reaching 74 %, below the EU average of 77 %. This could be linked to prices, which remain relatively high compared to the EU average, as Greece now ranks last among the EU Member States also on the broadband price index[148].

The transition to fast broadband connections is slower than in other EU Member States and Greece ranked last in 2018.This slow transition could be linked to the fact that Greece has very few ultrafast broadband networks. Specifically, the fast broadband penetration has increased from 6.8 % in 2017 to 11.4 % in 2018, which is almost four times lower than the EU average (40.6 %). The ultrafast broadband penetration increased from zero to 0.1 %, remaining far below the EU average (19.9 %). While subscriptions to fast broadband have increased by 4 percentage points to 11 %, they remain well below the EU average of 41 %.

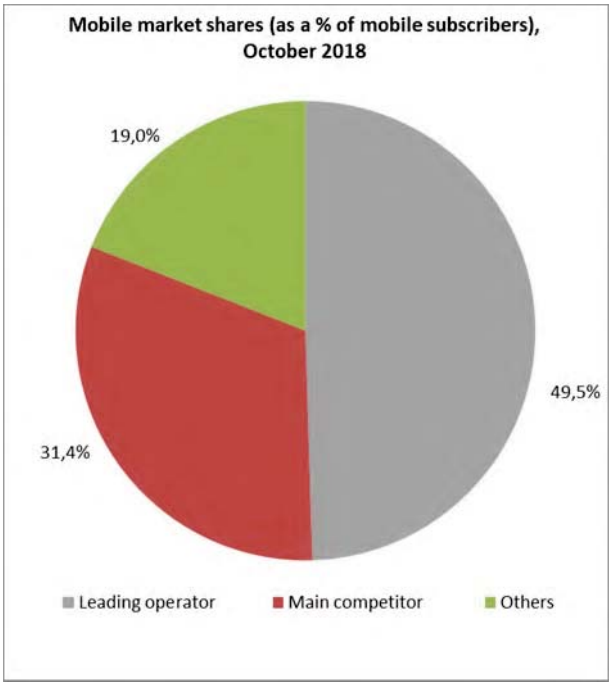



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets

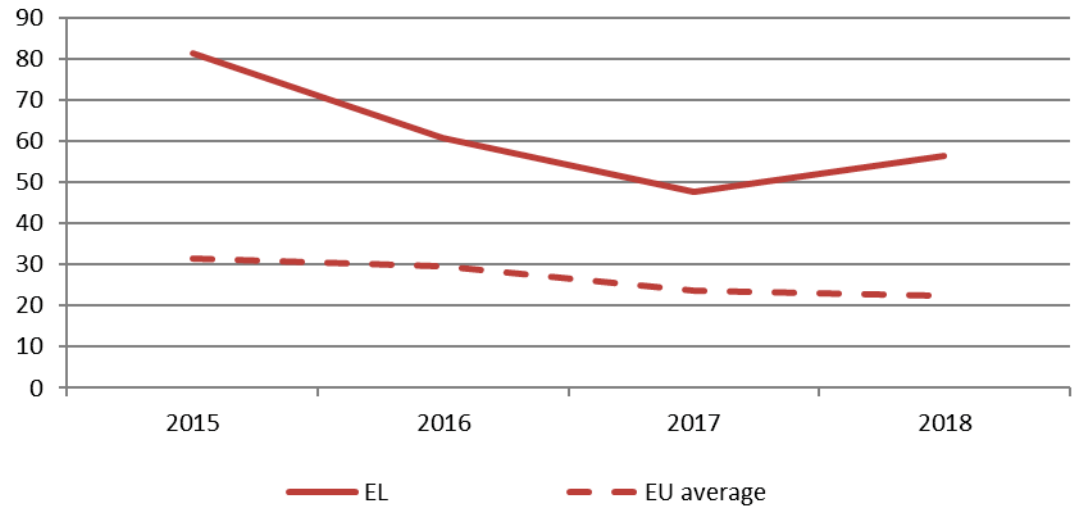
The incumbent, OTE, continues to have the largest market share (49.5 %). Its main competitor and second largest operator, Vodafone follows with a market share of 31.4 %. Greece shows a better performance in terms of 4G. 4G coverage reaches 92 %, close to the EU average of 94 %. In terms of mobile broadband take-up, despite an 8 percentage point increase, it lies at 74 subscriptions per 100 people, well below the EU average of 96 subscriptions per 100 people. This could be due to mobile broadband prices being significantly higher than the EU average. Based on the Mobile Broadband Price Study's, baskets for voice and data bundles, for the 100-MB-and-30-calls basket, prices in Greece are 7 % cheaper than the EU average, while for the 500-Mb-and-100-calls basket the prices are 13 % higher than the EU average. However, prices in Greece for higher-consumption baskets are extremely more expensive than the EU average, and especially for the 1GB and 300 calls and 2GB and 900 calls baskets in handset. As far as the laptop baskets are concerned, the study has revealed that prices in Greece for the 500MB and 2GB laptop usage are slightly higher than the EU average. In higher-volume baskets (1, 5, 10 and 20 GB) the prices in Greece are significantly more expensive than the EU average.

[148] 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..




EETT has received in 2018 from Vodafone and Wind a request for the approval of the expansion of their existing network sharing agreement to include 4G technology. The application is currently under consideration by EETT's competent departments. According to data available from EETT (as of the end of 2017), the mobile SMS market size has exhibited a significant annual decrease of 20 % on volumes. Additionally, although the outgoing mobile traffic to international destinations in 2017 has increased compared to last year (about 7 %), it has experienced a total loss of over 30 % compared to 2014. Similarly, the incoming mobile traffic from international destinations increased by 1.5 % compared to 2016 after years of losses. Moreover, the evolution of outgoing fixed traffic (minutes of calls) to international networks shows an enhanced decrease of about 20 % from year to year. Data services via mobile telephony networks, increased by 108 % in 2017, reaching 98 billion MB. The above-mentioned phenomena could be partially interpreted as a result of the OTT penetration and the economic crisis.

**Least expensive offer for handset (1 GB + 300 calls basket) at Member State level, EUR/PPP, 2015-2018**



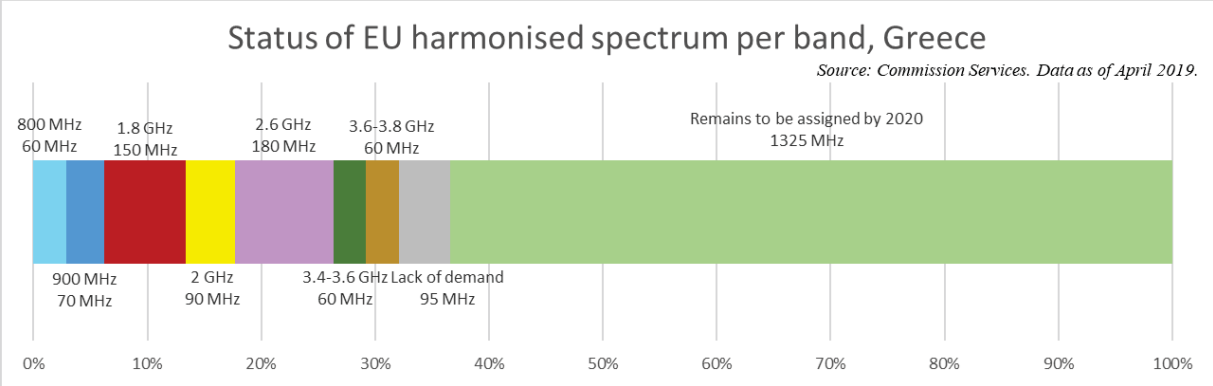

*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

## 3. Regulatory developments

### 3.1. Spectrum

In Greece 32 % of the spectrum harmonised at EU level for wireless broadband has been assigned[149]. The spectrum that remains to be assigned is mainly in the 700 MHz, 1.5 GHz, 3.4-3.8 GHz and 26 GHz bands.

In general, the Ministry of Digital Policy, Telecommunications and Media which is the competent authority for the harmonisation of the Greek legislation with the Commission implementing decisions has incorporated most of them. However, the Decision (EU) 2017/1483 (Short Range Devices - SRD)[150] has not been incorporated yet and was in an ongoing process for its implementation during 2018.




Under Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the EU, the Ministry of Digital Policy, Telecommunications and Media published the national roadmap for the release of 700 MHz[151]. According to the roadmap, the final date for use of the 700 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services is 15 December 2020. In the framework of SEDDIF (South European Digital Dividend Implementation Forum) and Adriatic and Ionian Initiative, Greece has signed all cross-border frequency-coordination agreements.Among the challenges that Greece faces in releasing the 700 MHz band are the divergent digital dividend availability dates in neighbouring countries such as Italy and Turkey and the migration of DTT below 694 MHz, with the lowest possible impact to the public.

In Greece there are currently two digital terrestrial television (DTT) networks, one public (ERT) and one private (DIGEA). The migration to new frequencies and to new technology (DVB-T2) will need to be coordinated under the same time frame for ERT and DIGEA due to technical and economic reasons. The Ministry expressed concerns that legal issues regarding the amendment of their licenses may delay the migration.

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[149] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU) 2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

[150] Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC (notified under document C(2017) 5464). The Ministry in cooperation with EETT prepared an amendment of the National Frequency Band Allocation Regulation (ΕΚΚΖΣ), taking into account the Decision (EU) 2017/1483 (SRD) (Official Gazette Issue 751/B/5-3-2019).

[151] http://mindigital.gr/index.php/26-g-g-t-t/ανακοινωσεισ/2574-700-hz

During 2017, EETT launched a public consultation to assess the demand for rights to use radio frequencies in the 3.4-3.8 GHz band, taking into account existing limitations concerning the number of available rights in the band. The results of this public consultation indicated, inter alia, that the preferable date, for granting rights to use 5G networks in this band is the end of 2019. In 2018, in its technical report on 5G bands, EETT identified as key frequency bands for the deployment of 5G networks the 700 MHz, 1500 MHz, 2100 MHz, 2300 MHz, 3600 MHz, and the 26 GHz bands. In its ongoing 5G strategy, EETT plans to further investigate with all stakeholders the main challenges (e.g. refarming, network synchronisation, protection of incumbent services).

In Greece, there are two existing licenses of 2 x 30 MHz paired spectrum : the first one assigned to OTE, within the 3.4-3.6 MHz sub-band and the second one within the 3.6-3.8 MHz sub-band assigned to a public private partnership (PPP) venture for the deployment of broadband networks covering underserved areas (par. 18, art. 21 of Law 4070/2012). The status of the 3.4-3.8 GHz band in Greece would not allow the use of sufficiently large blocks (80-100 MHz) of contiguous spectrum for a sufficient number of operators. As a result, the refarming and reorganization of the band would be necessary. EETT is working towards this goal in close cooperation with all the involved parties.

### 3.2. **Regulated access**

The third round of market analyses of the markets for leased lines and trunk segments of leased lines (i.e. the market for wholesale high-quality access provided at a fixed location (market 4 of the 2014 Recommendation on relevant markets), the market for retail leased lines (market 7 of the 2003 Recommendation on the relevant markets) and the market for wholesale trunk segments of leased lines (market 14 of the 2003 Recommendation on the relevant markets) was initially scheduled for Q1 2019. Those market analyses have not been completed yet and have been delayed several times. At the beginning, EETT encountered difficulties in gathering consistent and timely data from market players. The public consultation was completed in September 2018 and the feedback in the comments revealed very significant issues, which led EETT to request additional information from the providers and schedule meetings with them for further analysis of the consultation comments. -EETT decided to carry out a second public consultation and expects to notify the related markets to the European Commission in the second quarter of 2019.

In 2016, EETT notified to the Commission the fourth round of market reviews of the market for wholesale local access provided at a fixed location (market 3a of the 2014 Recommendation on relevant markets) 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). Currently there is only one major access network in Greece, namely the incumbent’s (OTE's) copper network. However, since 2017, Vodafone and WIND have been deploying NGA networks capable of offering ultrafast broadband services. The deployment of fibre is very limited while there is no cable TV network.

The implementation of the 2016 vectoring decision is ongoing and a significant number of local exchange areas for the exclusive deployment of vectoring are assigned. Alternative operators had little success in getting areas assigned: the incumbent got 773 local exchanges while Vodafone and Wind together only 65. EETT plans to start its new review of markets 3a and 3b in 2019 and to conclude it as soon as possible.

The final measure of the (Virtual Local Unbundling) VLU regulation was under public consultation until the end of February 2018 and EETT issued its final decision in July 2018[152]. EETT approved the specifications and technical characteristics of the VULA type wholesale product (VLU) that every

[152] Decision 859/006/16-07-2018 Definition of the technical specifications and the minimum characteristics of the Virtual Local Unbundling – VLU product.

operator is obliged to offer, in the context of the procedure for introducing vectoring technology into the access network, in all outdoor cabinet areas that have been allocated to them.

In case EL/2016/1936, the Commission already commented that EETT should notify both the technical specifications and the prices for the Virtual Unbundled Local Access (VULA) products without undue delay. Regarding prices of VULA services, EETT decided in the last market review that, as soon as a newly developed Bottom-up Long Run Incremental Cost plus (BULRIC+) model was ready, the prices would be calculated on that basis. Until then, an intermediate pricing regime would be in place. However, the Commission notes that these intermediate prices have not been notified, nor formally communicated to the Commission under Article 7 of Framework Directive. EETT committed to notify the model as soon as possible.

In September 2018, EETT ran a public consultation[153] for the flagship products concerning the examination of the fixed and mobile bundled offers in order to reduce administrative costs. With this consultation, EETT apparently sought to reduce a large number of OTE's retail products that should be subject to a margin squeeze test. The draft measure was initially expected to be notified to the Commission as an intermediate measure before the notification of analyses of markets 3a and 3b. Regarding the interconnection markets (market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1 of the 2014 Recommendation on the relevant markets) and the market for call origination on the public telephone network provided at fixed location (market 2 of the 2007 Recommendation on relevant markets) are concerned, EETT is preparing the draft measure and is planning to conduct the public consultation in the second semester of 2019.

On 17 November 2018, the Commission registered a notification from the EETT concerning the settlement of two disputes between Forthnet, a mobile virtual network operator (MVNO), and two mobile network operators (MNOs) Vodafone and Cosmote. The disputes concerned the terms and conditions for Forthnet's access to the MNOs networks.

The MNOs have an obligation to offer access at reasonable conditions according to preceding decisions on the conditions for spectrum allocation[154]. EETT assessed the appropriateness of the terms and conditions offered by the MNOs. EETT used international roaming costs and caps as benchmarks as these are likely to be conservative estimates of the underlying costs for providing national wholesale mobile access in Greece. Given the specific national circumstances, the Commission did not object to the price benchmarks put forward by EETT. The Commission issued a letter inviting EETT to further clarify its approach in the final measure and, in particular, to clarify that it allows for commercially agreed wholesale prices as long as they are below the set price caps.

In 2018, EETT adopted a new "Co-location and facility sharing" Regulation, taking into account the new national law transposing Directive (EU) 2014/61 (Cost Reduction Directive), aiming at facilitating the development of NGA networks by reducing the cost of civil engineering. The geographic scope of the symmetric measures is national and they are limited to passive infrastructure, which also includes the sharing of wiring inside buildings. However, this Regulation does not specify the location of the first distribution or concentration point when this is located outside the building.

As far as the Single Information Point (SIP) is concerned, the Ministry announced that an electronic system that will handle all issues concerning granting of permits is being prepared and the tender had been planned to take place in 2018. All SIP functions will be performed by this new system as well.

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[153] Conduct of a national public consultation, in accordance with article 17 of L. 4070/2012, amending annex I to the decision of EETT ΑΠ 595/013/10.3.2011 (ΦΕΚ 533/6.4.2011).

[154] The draft decision has been based on art. 41 to 54 of Law 4070/2012, EETT decision 732/4/11.09.2014 on the terms and conditions of access and interconnection, and the provisions of the EETT decision on the rights for frequency use of the MNO.

## 4. End-user matters

According to the 2018 consumer markets scoreboard[155], from a consumer perspective, the performance of the mobile telephone services in Greece has recorded a slight improvement by 2.9 points at the market performance index (MPI)[156], between 2015-2017, but still scores 1.2 percentage points below the market's EU average score. Internet provision showed a decline by 2.1 points at the market performance index in the period 2015-2017 and its MPI score is 1.6 points below the market's EU average. Fixed telephone services recorded a decline by 3.9 points in the period 2015-2017 and they have an MPI, which is 0.6 points below the market's EU average score.

Based on data from the Greek Consumer Ombudsman, there was an increase of 17 % in the number of complaints concerning the electronic communications market. The complaints concerning the electronic communication market accounted for 40.3 % of the total number of complaints received in 2018. 47.7 % of these concerned fixed telephony services, 39.9 % concerns mobile telephony services, 6.5 % internet services and 3.4 % television services. According to the data from the Greek Consumer Ombudsman, the main sources of complaints are disputes on price/tariff (40.2 %), invoicing / billing and debt collection (26.2 %) and contracts and sales (20.9 %). An increase of about 11 % in consumer complaints in general has also been observed by EETT in 2018.

By the end of 2018, all the provisions of the new General Authorisation Regulation[157] came into force. The new Regulation emphasizes on the protection of the consumers rights and aims at giving them tools to control their telephony and Internet charges efficiently.

### a. Net neutrality

EETT issued a binding regulatory decision on net neutrality (EETT decision 876/7B/17-12-2018) in the area of Articles 4(3) and 5(1) of the Regulation and the BEREC Guidelines. The decision was published in the Government Gazette[158] and entered into force on 05 February 2019. This decision sets out additional transparency requirements for Internet Service Providers (ISPs) and provides clarifications for the application of traffic management and commercial practices. It also entails a methodological framework for estimating speeds as well as the conditions under which subscribers can claim compensation in the case of discrepancies between the actual performance of the Internet Access Services (IAS) and the performance indicated in the contract.

From 1 May 2017 to 30 April 2018, EETT had received a total number of 186 end-user complaints, most of which concerned the general quality of service (QoS) (usually low speeds compared to the speeds advertised in the contract). Comparing this number with the number of complaints from 1 May 2016 to 30 April 2017, which was 106, there was a significant increase.

In November 2018, EETT initiated procedures against mobile Internet Service Providers in Greece for breaches of Art. 3(3) of Regulation (EU) 2015/2120[159]. Specifically, the cases concern throttling of video streaming in zero-rated offers and discriminatory treatment of applications after the user exceeds the data cap. EETT sent to the ISPs involved a notice of violation and in parallel requested their compliance. Subsequently, EETT engaged in communications with the ISPs for clarifying the detailed operation of the zero-rated offers. The ISPs involved have been expected to comply with the EETT directions within the first trimester of 2019.

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[155] Consumer Markets Scoreboard, 2018 Edition, Justice and Consumers, European Commission.
[156] The MPI is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers.
[157] Decision no 834/2/9-11-2017 "Regulation on General Authorizations" (ΦΕΚ Β' 4262/ 6-12-2017).
[158] ΦΕΚ 242/Β/5-2-2019.
[159] 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 amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

### b. Roaming

EETT has not identified any case of confirmed or potential non-compliance with the RLAH rules, which have been applicable since June 2017.

According to the study "International Roaming BEREC Benchmark Data Report October 2017 - March 2018, BoR"[160], there is a definite upward trend for consumption of roaming services in Greece. However, BEREC data show clear evidence of seasonal movements and in Greece especially there is an increase for consumption of roaming services during the touristic season in the summer. The reported data indicate that traffic for calls made grew by 2.6 % in Q1 2018, compared with Q1 2017[161] Data traffic increased by 5.7 % in Q1 2018 compared with Q1 2017[162].

As far as prices are concerned, the average wholesale price per minute for roaming voice calls in Greece decreased from 2.57 euro cent in Q4 2017 to 2.29 euro cent in Q1 2018, while the EU average price for Q1 2018 is 2.06 euro cent[163]. The average wholesale data price per MB has been also decreased from 0.45 euro cent in Q4 2017 to 0.30 euro cent in Q1 2018, while the EU average price for Q1 2018 is € 0.27 euro cent[164].

### c. Emergency communications - 112

On the basis of the information available in the 2018 Report on the implementation of the European emergency number 112[165], there are no measures in place to ensure that Article 26 (4) of the EU Universal Service is applied and as a result no means of access to "112" for disabled users are currently available in Greece.

In their most recent answer received to the Commission, the Greek authorities confirmed that caller location information is not provided for every emergency call. In addition, it is stated that all end-users of all MNO's or MVNOs, are not located instantly. In the same answer Greece reported that it takes on average 261, 6 s from the moment the call is answered by the PSAP operator for receiving the caller location information by the operator. Hence, despite the transposition of relevant EU rules, the Greek authorities seem currently unable to ensure that caller location information is made available to the authority handling emergency calls "as soon as the call reaches that authority"[166].

For these reasons, the Commission services are currently looking into the functioning of emergency communications and the 112 number in Greece, with particular regard to caller location and to equivalent access for disabled end-users, namely Article 26 para. 3, 4 and 5 of the Universal Service Directive[167].

### d. Universal service

EETT, after having received incumbent's claims for unfair burden, published at the end of 2017 a decision with the results of the audit 2010 & 2011, which led to the acceptance that the net cost

[160] International Roaming BEREC Benchmark Data Report October 2017 - March 2018, BoR (18) 160, Date of registration: 10.10.2018, https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8251-international-roaming-berec-benchmark-data-report-october-2017-march-2018

[161] Figure 31 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[162] Figure 72 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[163] Figure 18 and 19 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[164] Figures 59 and 60 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[165] Document COCOM Nº 19-04: https://ec.europa.eu/digital-single-market/en/news/2018-report-implementation-european-emergency-number-112

[166] The 2017 COCOM questionnaire was launched on 30 June 2017 setting a deadline to respond on 6 November 2017. The 2018 COCOM questionnaire was launched on 3 October 2018, setting a deadline to respond on 19 November 2018.

[167] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (OJ L 108, 24.4.2002, p. 51).

calculations constitute an unfair burden. As a result, in March 2018 EETT published a decision[168] activating the financing mechanism.

## 5. Institutional issues

In 2018 ‘’Forthnet S.A’’ appealed against EETTs’ Decision on the second phase of the first allocation procedure for areas/LEXs concerning NGA deployment because EETT rejected Forthnet’s “bid” for participating in vectoring project. According to the procedure, as approved by European Commission on the framework of Market for wholesale local access provided at a fixed location (market 3a of the 2014 Recommendation on relevant markets) analysis, areas are allocated initially to OTE and then to “bidding” OLOs mainly based on NGA rollout parameters. The first allocation procedure aimed at lifting the asymmetry in the access network, while the annual procedure is fully symmetrical.

As far as the administrative charges under Art.12 of the Authorisation Directive are concerned, EETT according to Art.74 (para.4) of the Law 4070/2012 publishes at the end of every calendar year, in a national newspaper and in the internet, a review of the collected fees as well as the total amount collected by the authority. For 2017, the overall amount of administrative charges was €11.715,99 m and the administrative charges review was published in the ‘’Newspaper of the Editors ’’. Since the administrative charges review is published at the end of the year, EETT has not published it for 2018 yet. Every year EETT applies according to Greek law an adjustment mechanism in order to avoid inconveniences or huge differentiations on the amount of administrative charges for the operators and to secure the correct and harmonised operation of the market.

EETT published the amending Decision Number 845/01/26-3-2018[169], which regulates the allocation of M2M numbers and the transition from 3-digit to 4-digit number portability codes. The new numbering range has been introduced by means of the amendment to the ministerial decision on the National Numbering Plan (Ministerial Decision no 85541/1300/27-11-2017). The numbering range available for these services is 40-42 (10digit numbers). Furthermore, according to Law 4487/2017, no identification procedures are required in the case of M2M SIM cards. In Greece there is no decision that allows for the extraterritorial use of numbers. Numbers allocated in other countries by national authorities cannot be used permanently in Greece.

A major problem for which all mobile operators complain about is the large delays on obtaining an antenna permit. Despite the efforts that have been undertaken over many years, there are many urban planning authorities that are not linked with the SILIA, the one-stop-shop for antennae licencing. EETT has still some backlog of permit applications for existing antennas to address. In order to address the problem mentioned above, in October 2018 the Ministry of Digital Policy launched a public consultation[170] in order to prepare a new legislative framework for the licensing of antenna structures. The aim of this new legislation is to facilitate the whole process through the electronic submission of all required applications in SILIA and the electronic issuing of all approvals from the competent authorities via the e-system within 3 months. Then, EETT will follow up and will be responsible for issuing the “Antenna Structure License”. In addition, there will also be an automatic issuing of the building permit through this e-licenses platform after the submission of all the required applications and studies by a delegated independent engineer to the e-platform.

[168] See EETT's Decision N. 844/05/12-3-2018 for sharing the net cost of universal service for year 2011.
See EETT's Decision N. 844/04/12-3-2018 for sharing the net cost of universal service for year 2010.
[169] “Amendment and codification of the Regulation for the Management and Allocation of Numbering Resources of the National Numbering Plan” (845/01/26-3-2018, Official Gazette 1411/B/25-4-2018).
[170] See the public consultation text: http://www.opengov.gr/digitalandbrief/?p=1007

## 6. Conclusion

Despite the update of the national broadband plan, the still existing considerable delays in the implementation of the projects and the absorption of allocated funds did not allow Greece to improve its connectivity score ranking last among the EU Member States in 2018. Greece could benefit from addressing these delays and from creating the right conditions for private investment in order to improve its digital competitiveness. Addressing the significant delays in antenna permit granting proceedings and promoting the 5G development will improve the digital status of the country. In addition to this, the Regulator could secure the timely and correct implementation of regulatory decisions. Finally, Greece should take appropriate measures and address the issues concerning the implementation of the European emergency number 112 without further delay.

# France

| | France | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **>99.5%**<br>2016 | **>99.5%**<br>2017 | **>99.5%**<br>2018 | ***6*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **72%**<br>2016 | **71%**<br>2017 | **73%**<br>2018 | ***18*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **78%**<br>2016 | **89%**<br>2017 | **95%**<br>2018 | ***18*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **81**<br>2016 | **86**<br>2017 | **91**<br>2018 | ***15*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **33%**<br>2018 | ***3*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **47%**<br>2016 | **52%**<br>2017 | **58%**<br>2018 | ***28*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **13%**<br>2016 | **16%**<br>2017 | **20%**<br>2018 | ***25*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **42%**<br>2017 | **49%**<br>2018 | ***25*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **8%**<br>2016 | **10%**<br>2017 | **14%**<br>2018 | ***20*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **94**<br>2016 | **95**<br>2017 | **94**<br>2018 | ***2*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

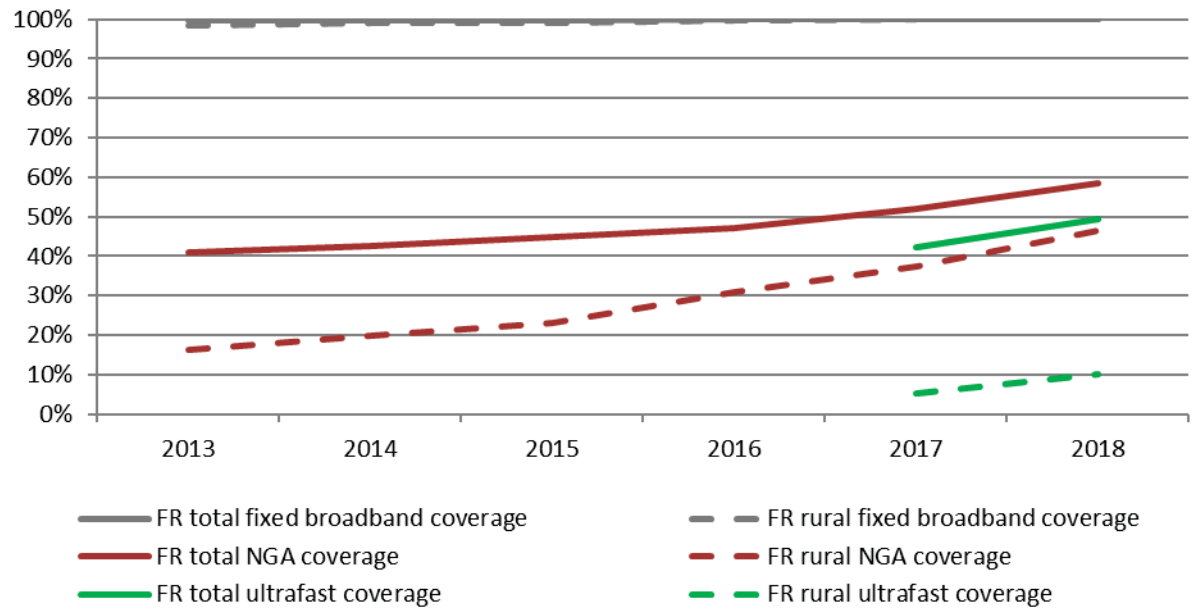
Fixed broadband coverage is ubiquitous in France including in rural areas. Nevertheless, the rate of fixed Next Generation Access (NGA) coverage, including in rural areas, is below the EU average. This is the result of low coverage by cable networks and the relatively high average length of the copper network sub-local loop compared to other European countries. is The low rate of fixed NGA coverage is why France has engaged in nationwide FTTH network rollout plans. 58.5 % of French households enjoy NGA coverage including 46.5 % of households in rural areas. 49.3 % of French households enjoy ultrafast coverage including 10.2 % of households in rural areas.

According to the 2013 French national broadband plan, “Plan France Très Haut Débit”(France’s Plan for Ultra-Fast Broadband), all French households and businesses should be covered by broadband speeds of 30 Mbps and above by 2022. The plan supports the rollout of different technologies, with a large share of Fibre to the home (FTTH). Besides, the national broadband plan must also meet a specific connectivity target set by President Macron in 2017[171].

The plan provides for € 20 bn. of investment over a ten-year period. Overall, the investment costs will be split between the State, territorial collectivities and operators. It is estimated that up to € 14 bn. of investment should be generated by the revenues recouped from the public networks that will be rolled-out by the relevant public entities. The other part of the investment (about € 6,5 bn.) will be financed by public subsidies including State subsidies worth € 3.3 bn. As of July 2018, € 3.1 bn. had been allocated by the Government to support the National broadband plan.

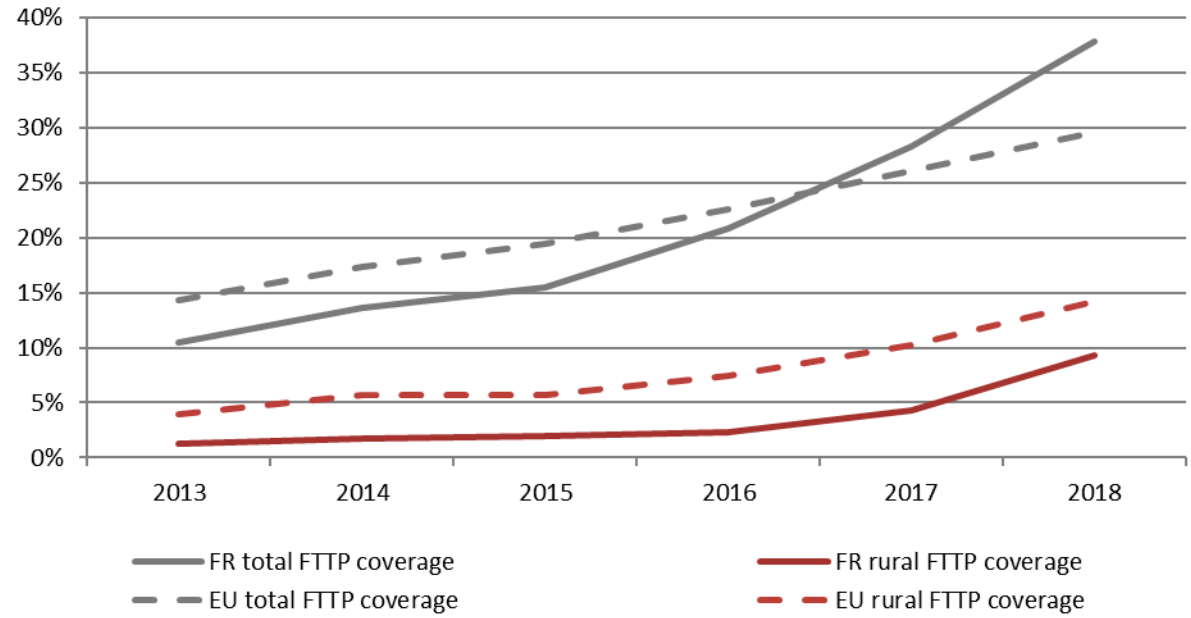
[171] In July 2017, President Macron declared that he wished to offer "good high speed" Internet (at or above 8 Mbit/s download) to all by 2020 and confirmed the goal previously set of very high speed Internet to all by 2022. In order to achieve this goal, France aims to speed up the rollout of fibre network and has considered alternative means to fibre in remote areas, e.g. fixed 4G or satellite solutions. Nevertheless, the national broadband plan does not expressly provide for an obligation to offer an Internet broadband connection of 1 Gigabit/s.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

**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 of 30 September 2018, 12.5 million dwellings were eligible for FTTH offers (an increase of +31 % compared to the previous year). At the end of Q3 2018, 19.6 million dwellings were eligible for very high speed services (regardless of technology type). Out of those 19.6 million, 13.5 million were

situated outside very densely populated areas[172].

France has total FTTP coverage of 37.8 % (against an EU average of 29,6 %). However, France's rural FTTP coverage is 9.3 %, lower than the EU's average rural FTTP coverage of 14.2 %. In April 2018, two operators –Orange and SFR- offered to make legally binding commitments to rollout of FTTH without subsidies in different cities in France. The operators Orange and SFR are now committed as follows: Orange committed to cover 2,978 municipalities totalling around 11.10 million premises by the end of 2020 (around 30 % of the population, 7 % of the country's surface area and 30 % of all premises in France). SFR committed to cover 641 municipalities by the end of 2020, totalling around 2.55 million premises this proposal would reach around 8 % of the population, 1.5 % of the country's surface area and 7 % of all premises in France). On 26 July 2018, the French government accepted both of these offers subject to a favourable opinion from Arcep. Arcep will be monitoring the operators' compliance with their commitments[173].

Finally, the government aims to bring connectivity to about 6 % of households that would otherwise not benefit from good high-speed broadband by 2020. To do this, the government will be offering financial support to the relevant private individuals to have equipment installed (for instance to receive internet by satellite or Hertzian terrestrial network) ("THD" radio or fixed 4G). To that end, the government will make € 100 million available starting in 2019.

France scores third in the 5G readiness indicator. This is because by the end of 2018 they had assigned spectrum in the 700 MHz band according to Commission Decision (EU) 2019/235. The spectrum should be available for 5G use by 2019.

5G rollout is being prepared by the government and the National Regulatory Authority Arcep, which have adopted a roadmap for 5G and a "battle plan" for 5G respectively[174]. The following timeframes and objectives have been identified in the roadmap: while some 5G testing was already carried out in different cities in 2018, the frequency bands needed for 5G use should be freed and in 2019 and the first 5G compatible terminals should be also be commercialised in 2019. In 2020, the relevant frequency bands should be assigned and 5G should be commercially available in at least one major city. Finally, by 2025, the main routes should be covered by 5G.

A public consultation aimed at identifying operators' spectrum needs for 5G was held from mid-October to mid-December 2018.

According to Arcep's "battle plan" for 5G, a large part of the 3.4 - 3.8 GHz band and at least 1 GHz of the 26 GHz band should be allocated through an attribution procedure expected to be held in the second half of 2019.

## 2. Market developments

### Competitive environment

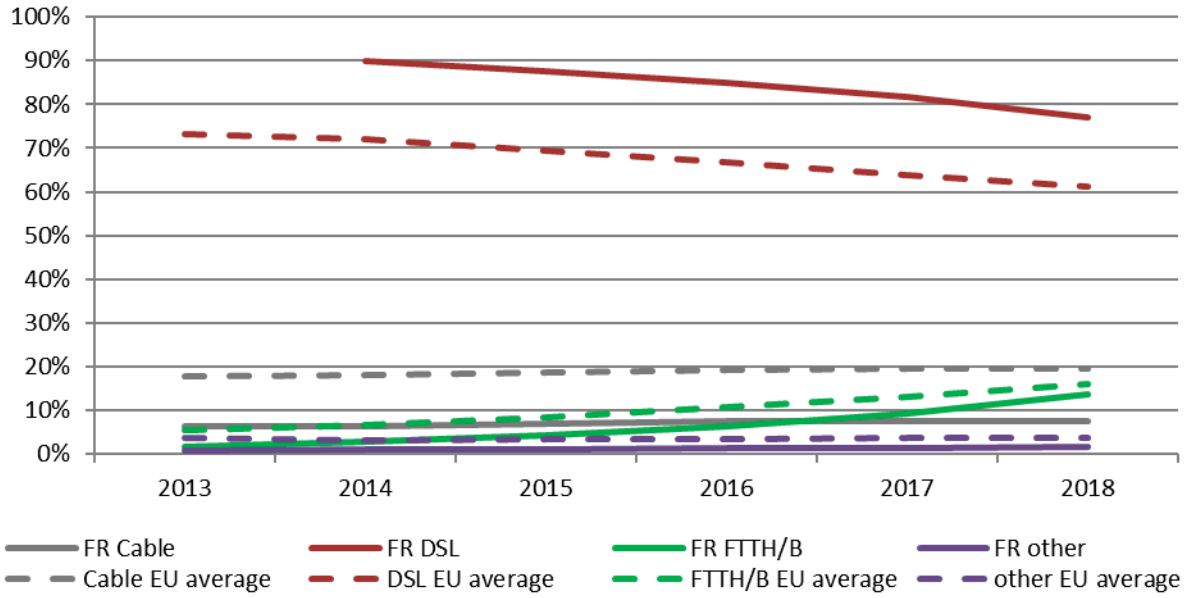
The French telecommunications market has four main operators: Orange, SFR, Bouygues and Free. aThere is fierce competition in the mobile market. In Q3 2018, after a first semester of stability, operators experienced a loss of revenues on the global market (-1.3 % compared to the previous year) as they earnt less from fixed services[175]. In Q3 2018, the only segment where revenue grew was mobile services (+1.1 % revenue growth within a year.)

[172] Source: Arcep, «services fixes haut et très haut débit : abonnements et déploiements, 3ème trimestre 2018, résultats provisoires»
[173] On the basis of Art.L33-13 of the "Code des postes et communications électroniques", Arcep may monitor compliance with those commitments under the conditions provided under the article L. 36-11 of the same Code, which provides that Arcep may impose fines on operators that would turn out to be non-compliant with the obligations they undertook.
[174] Documents published on 16 July 2018.
[175] Source : Arcep, Observatoire des marchés des communications électroniques en France, T3 2018.

## 2.1. Fixed Markets

According to Arcep[176], the number of subscriptions to high-speed internet (20.6 million in the third quarter of 2018), consisting mainly of DSL subscriptions, has been declining for more than 3 years. This decline in subscriptions has accelerated (-1.2 million in one year). Those subscriptions are gradually being replaced by subscriptions to very high speed broadband (there were 8.4 million in Q3 2018, an increase of 1.9 million subscriptions compared to the same period a year earlier), and in particular by subscriptions to end to end optical fibre (4.3 million., namely an increase of 1.4 million in one year). End-to-end optical fibre now accounts for 15 % of internet access subscriptions. To a lesser extent, subscriptions to services of between 30 and 100 Mb/ps (via VDSL2, coaxial cable, 4G or THD radio also contribute to growth in internet access with an increase of 475,000 subscriptions in one year to 2.7 million subscriptions in Q3 2018. The number of very high speed broadband subscriptions represents almost one out of three internet subscriptions out of a total of 28.9 million subscriptions.

**Broadband market shares at Member State level by technology, % of fixed broadband lines, 2013-2018**

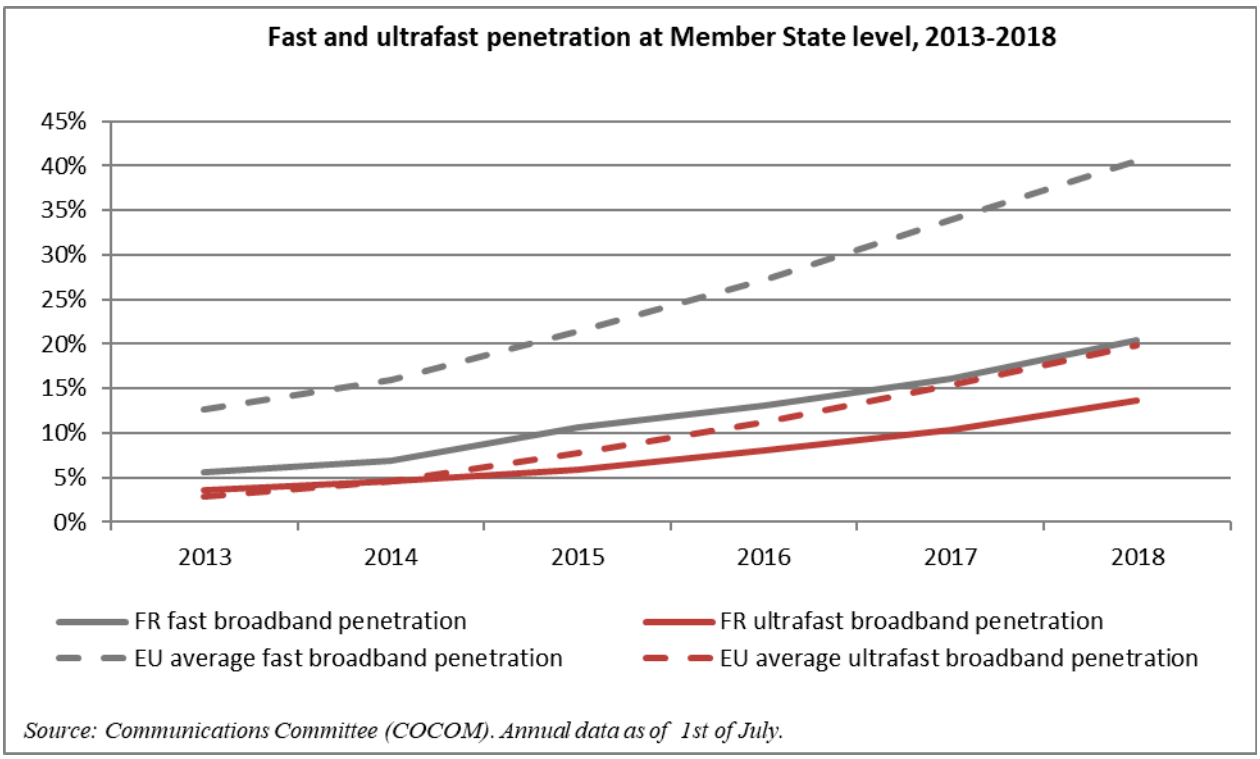



*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

The French broadband market has seen a decrease in broadband provided by DSL lines and an increase in broadband provided by Fibre to the Home over the past year. Indeed, the share of DSL provided broadband decreased from 81.7 % in 2017 to 77 % in 2018 (against 63.9 % and 61.1 % for the EU in 2017 and 2018 respectively). Conversely, FTTH shares increased from 9.4 % in 2017 to 13.7 % in 2018 (against 13.1 % and 15.9 % for the EU in 2017 and 2018 respectively).

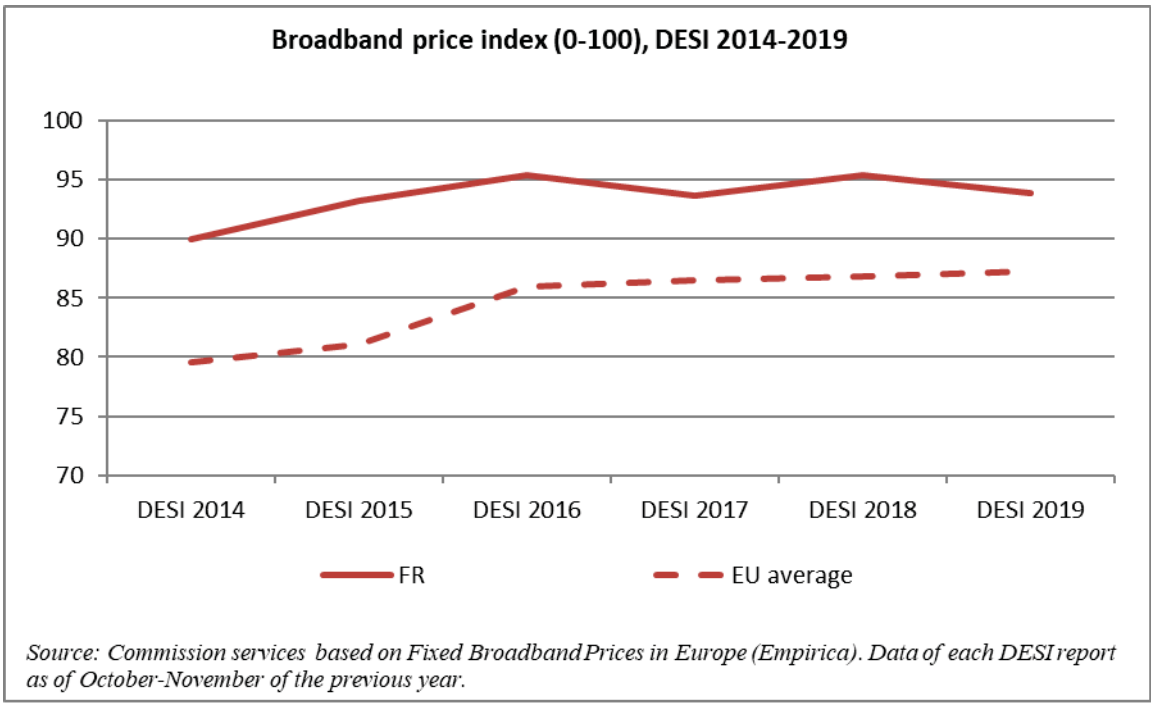
Penetration of fast broadband in France is significantly below the EU average (20.5 % against 40.6 % for the EU). The penetration of ultrafast broadband the country is also below the EU average (13.7 % against 19.9 % for the EU).

[176] Source: Arcep, Observatoire des marchés des communications électroniques en France, T3 2018.




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

Significant developments should furthermore be noted concerning the corporate market in 2018: For instance, Linkt, which is a subsidiary of Altitude, started to offer telecommunication services to private companies and public entities; the new operator Kosc Telecom entered the wholesale market of activated offers for companies; and Bouygues Telecom, already present on the (retail) B2B market, reinforced itself by acquiring specialised operators and entered the wholesale market.

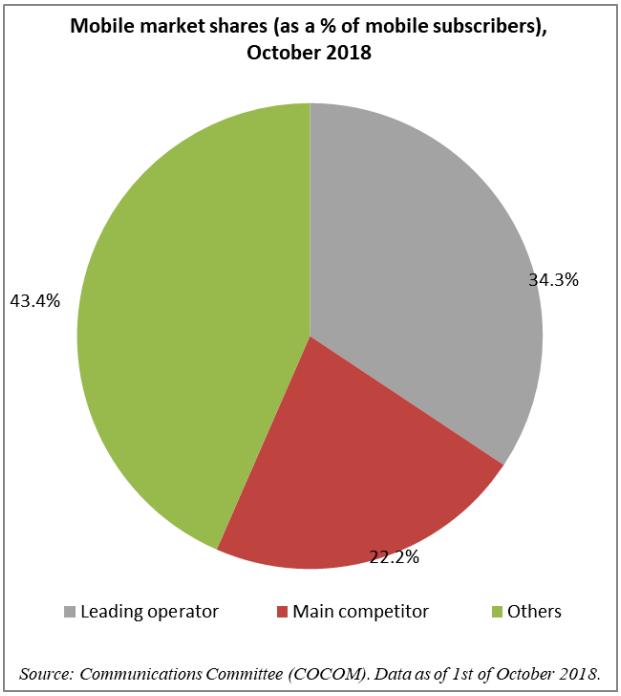



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

Fixed broadband prices in France are slightly under the EU average (93.9 against 87.2 for the EU respectively in terms of price index)[177].

[177] 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

## 2.2. Mobile markets



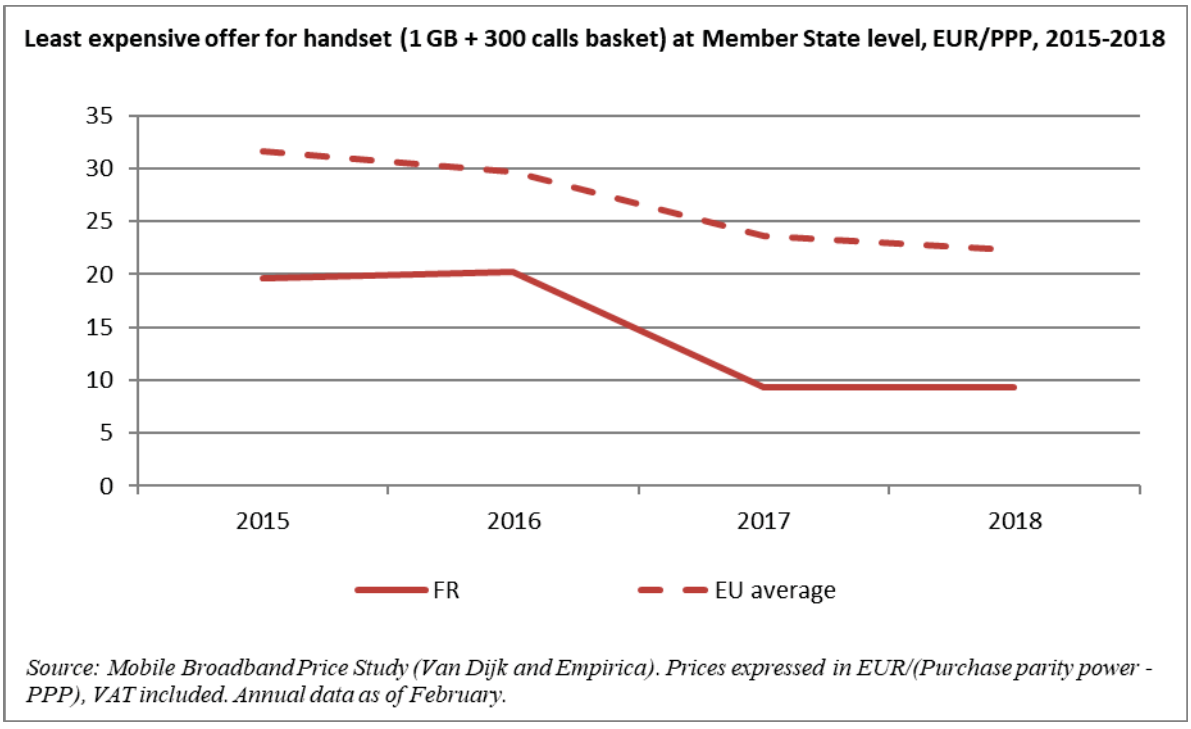

*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

Orange is the leading operator with 34.3 % of market shares. Its main competitor SFR has 22.2 % of market shares. The two other MNOs follow closely.

The French mobile market is characterised by low prices and strong fixed to mobile substitution. Besides, mobile offers are often included as part of quadruple play offers.

There was a slight increase in mobile market revenues over the reporting period (+1,1 % between Q3 – 2017 and Q3 2018, leading to 3,3 billion euros in Q3 2018)[178].

The MVNO market has been stagnating. Since 2016, MVNOs' market shares went up to around 11 %[179].




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

France's least expensive offer for handsets is significantly lower than the EU average at 9.4 EUR/PPP against an EU average of 22.30 EUR/PPP.

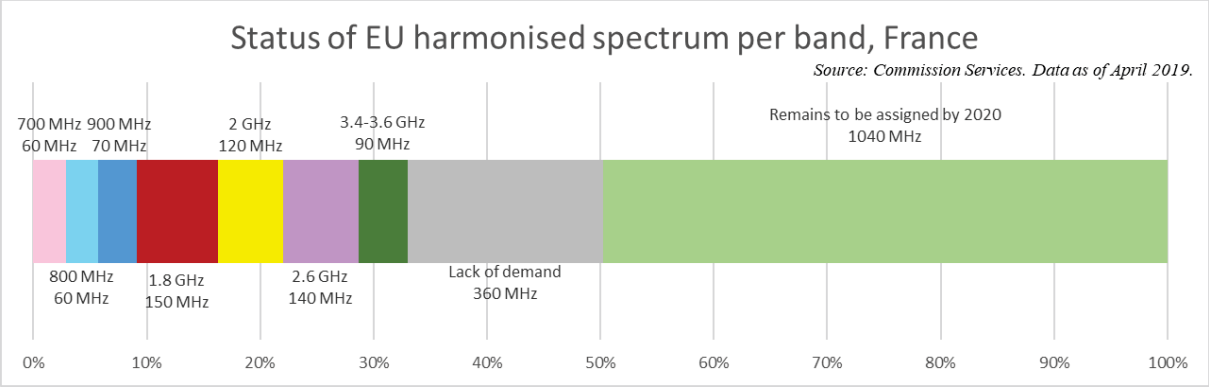
## 3. Regulatory developments

### 3.1. Spectrum

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.

[178] Source: Observatoire des marchés des communications électroniques en France, T3 2018

[179] Source: Observatoire des marchés des communications électroniques en France (services mobiles), T3 2018




In France, 33 % of the spectrum harmonised at EU level for wireless broadband has been assigned[180]. The spectrum that remains to be assigned is mainly in the 1.5 GHz, 3.6-3.8 GHz and 26 GHz bands.

In 2018, a procedure for the allocation of the 900 MHz, 1800 MHz and 2.1 GHz band frequencies whose existing licences where expiring between 2021 and 2024 was launched by the Ministerial Order of 2 August 2018, acting on a proposal from Arcep. On 15 November 2018, Arcep adopted a decision on the results of the assignment procedure for the 900 MHz band spectrum, along with four decisions for the 900 MHz, 1800 MHz, and 2.1 GHz frequency bands that were assigned to winning candidates on 23 October 2018.

All four mobile network operators (Bouygues Telecom, Free Mobile, Orange and SFR) acquired rights of use for radio-spectrum in the 900 MHz and 2.1 GHz bands. However, only three acquired new rights of use in the 1800 MHz band. Free Mobile did not apply for the 1800 MHz band but it already has a licence for a 15 MHz duplex in the band up to 2031.

The frequency licences shall enter into force at the expiry of existing licences (between 2021 and 2024) and enshrine a number of new obligations on the winning applicants. as follows:

1) Operators must improve reception quality nationwide, and particularly in rural areas, by applying a new baseline standard to operators' obligations (that of "good coverage", corresponding to an indoor situation);

2) Operators must be faster at achieving the goals set by targeted programs for improving coverage. There is a “targeted coverage program” according to which each operator must deploy at least 5 000 new cell sites across the country, some of which will be shared. These new cell sites must extend beyond the scheme for covering “white spot areas”, for which operators will now be entirely responsible;

3) Operators must achieve ubiquitous 4G coverage, which will mean providing 4G to over a million more people in France, across10.000 municipalities, by upgrading all cell sites to 4G;

4) Operators must accelerate the pace of transport corridor coverage, so that all main roads and railway lines have 4G coverage (this obligation applies only to operators that were allocated the 1800 MHz band spectrum) ;

5) Operators must achieve ubiquitous indoor coverage, notably by offering Voice over Wi-Fi solutions for customers with compatible devices.

[180] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

Furthermore, the licences provide for a RAN sharing obligation in areas of the "targeted coverage program" where none of the four operators already offers satisfactory coverage for voice and SMS services. In other instances, there is a passive infrastructure-sharing obligation with operators who have been asked to rollout in given areas.

These obligations were already incorporated in mid-2018 into the existing licences that the mobile operators are currently holding.

As for the 700 MHz band, it was allocated in metropolitan France in 2015, ahead of the European timetable. There is no current plan to allocate the sub 700 MHz band, which is currently used by TV broadcasters.

### 3.2. Regulated access

On 9 May 2018, the Commission registered a notification from the French national regulatory authority, Arcep. The notification concerned changes in the technical details of the cost accounting obligation imposed in the market for wholesale voice call termination on individual mobile networks in France (market 2 of the 2014 Recommendation on relevant markets[181]). The Commission did not have any comments about the notified measure[182].

On 20 June 2018, Arcep launched a public consultation called "Bilan et perspectives" which proposed to deregulate the market for broadcasting transmission services. This would make it possible to deliver broadcast content to end users through electronic communication networks (market 18 of the 2003 Recommendation on relevant markets[183]). However, in the light of the replies received and the upcoming review of the audio-visual regulatory framework in 2019, Arcep proposed to extend for another two-year period the regulatory regime provided for in its Decision 2015-1583[184]. On 15 November 2018, Arcep notified this intention to the Commission pursuant to Article 16(6) of the Framework Directive. The Commission did not object to the notified measure pursuant to Article 16(6) of the Framework Directive. As a consequence, Arcep launched a new public consultation on 27 November 2018 about its plan to extend its Decision 2015-1583 by two years namely until the end of 2020. This public consultation ended in December 2018 and Arcep is now analysing its results.

At the end of 2017, Arcep renewed its decisions for the market for wholesale call termination on individual public telephone networks provided at a fixed location (market 1 of the 2014 Recommendation on relevant markets), the market for wholesale voice call termination on individual mobile networks (market 2 of the 2014 Recommendation on relevant markets), the market for wholesale local access provided at a fixed location (market 3a of the 2014 Recommendation on relevant markets), the market for wholesale central access provided at a fixed location for mass-market products (market 3b of the 2014 Recommendation on relevant markets), and the market for wholesale high-quality access provided at a fixed location (market 4 of the 2014 Recommendation on relevant markets).

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[181] Commission Recommendation 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.

[182] Decision of 8 June 2018, C(2018) 3813 final.

[183] Commission Recommendation of 11 February 2003 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 communication networks and services (Text with EEA relevance) (notified under document number C(2003) 497), OJ L 114, 8.5.2003, p. 45–49.

[184] Décision n°2015-1583 de l'Autorité de régulation des communications électroniques et des postes en date du 15 décembre 2015 portant sur la définition du marché pertinent de gros des services de diffusion hertzienne terrestre de programmes télévisuels en mode numérique, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur sur ce marché. A public consultation is also running from 25 February 2019 till 25 March 2019 in order to gather views on those elements that Arcep is proposing to use to calculate the price of regulated terrestrial broadcasting services on sites that have been deemed non-replicable, in 2019 and 2020.

On dispute settlement, Arcep adopted a decision in May 2018 about access conditions to shared optical FTTH networks outside of very dense areas (Décision n° 2018-0569-RDPI). The operator "Free", which had been involved for a number of years in co-financing the FTTH network rollout by Orange, had requested Arcep to settle a dispute it had become involved in. The dispute concerned the duration of access rights to the co-financed network. Arcep held that the access rights initially planned for a duration of 20 years (and more decisively the renewal conditions) did not offer enough predictability and transparency for "Free". Consequently, Arcep ordered Orange to grant access rights to "Free" for a definite period of time lasting at least 40 years, under both transparent and predictable conditions.

## 4. End-user matters

According to the 2018 consumer markets scoreboard[185], from a consumer perspective, the market performance indicator (MPI) of all electronic communications markets outperformed the EU 28 average. The internet provision service market and the mobile telephone services have both MPIs 7.1 points higher than the EU average, the MPI of TV-subscriptions is 7.3 points higher than the EU-28 average, while that of the fixed telephone services 5.9 points higher. Only TV-subscriptions depict a statistically significant variation of MPI between years 2015 and 2017 (+1.7), the other being relatively stable.

In terms of overall consumer satisfaction with the French telecommunications market, some brief observations can be made: Between October 2017 and October 2018, Arcep received 34 000 reports via its dedicated platform called "J'alerte l'Arcep". Most of those related to quality of service and expectations for the rollout of very-high-speed internet networks. Other noticeable reports pertained to billing, portability or access to fibre networks[186].

In 2018, the mediator for electronic communications received 11.481 mediation requests compared to 13.030 in 2017 namely a decrease of 12 %. The main complaint topics were the following: mobile telephony (51.91 % of complaints), Internet and bundled offers (35.19 % of complaints), fibre (11.07 % of complaints)[187]. More specifically, the following complaint types were received: contract related (26.79 % of complaints), billing (20.30 % of complaints) and technical issues (25.02 % of coomplaints).

### a. Net neutrality

On 15 February 2018, Arcep published a report entitled "Smartphones, tablets, voice assistants - Devices: weak link in achieving open internet access" which analyses Net Neutrality from the perspective of different Internet enabled devices and contains a series of proposals for guaranteeing an open internet . In particular, it recommends that the open internet be promoted by guaranteeing users' freedom to choose their content and applications regardless of the device they are using. The report also recommends lifting certain restrictions imposed by key market players by, for example, allowing users to delete pre-installed applications. The report is part of Arcep's overall work on net neutrality and was adopted after different workshops were organised in 2017.

In 2018, Arcep launched an application called "Wehe" to detectthe use of internet traffic management tools. The relevant application was developped in cooperation with the Northeastern University. Through this application, end-users can find out whether their internet access is potentially subject to management practices which might be blocking or slowing down theirinternet traffic. In addition,

[185] Consumer markets scoreboard, 2018 edition. The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers See Eurobarometer Consumer Markets Scoreboard 2018, p 12 and p 100, available at https://ec.europa.eu/info/files/consumer-markets-scoreboard-making-markets-work-consumers_en

[186] Source:Arcep

[187] Source: Les chiffres clés de la mediation en 2018, la médiation des communications electroniques.

Arcep worked with stakeholders involved in ecosystem measurement (measurement tool developers, consumer associations) with the view to producing a Code of conduct for the purposes of making the results obtained by measurement tools on the market more transparent and reliable. The first version of the Code of Conduct was published in December 2018[188].

ccording to Arcep[189], between October 2017 and April 2018, the section dedicated to Net Neutrality from the tool called "J'alerte l'Arcep" received 367 reports. Nevertheless, it turned out that most of those report did not pertain to Net Neutrality related infringements as such but rather to quality of service. In particular, Arcep opened an investigation into the quality of service of some online content offered through the internet by one market player. After the investigation was opened, the relevant market player amended its interconnection practices, which helped improve the situation as evidenced by measurements and a lack of further complaints.

**b. Roaming**

According to Arcep, since the entry into force of roam like at home rules (RLAH) in June 2017, operators have been mostly compliant with their obligations. This was evidenced by the relatively low level of complaints related to EU roaming which Arcep received via its dedicated platform for complaints. Indeed, between June 2017 and June 2018, only 0,2 % of the complaints received via that tool pertained to EU roaming[190].

Consumption patterns have also changed since the entry into force of RLAH rules. For example, French end-users have consumed 1.8 times more roaming minutes (calls made) in Q4(2017) than in Q4 (2016) and 4.4 times more roaming data in Q4(2017) than in Q4(2016)[191].

In Q1 2018, subscribers to French mobile network operators consumed an average of19.58 minutes a month of roaming calls made. Over the same period, subscribers to French mobile network operators consumed an average of 464.20 MB a month of data roaming services[192].

**c. Emergency communications - 112**

Although the European emergency number 112 is in service in France, the Commission services are monitoring whether the obligation on caller location laid down by Article 26(5) of the Universal Service Directive 2002/22/EC is properly implemented in practice. It has in particular been brought to the attention of the Commission services that not all relevant public entities would be properly connected to the PFLAU ("plateforme de localisation des appels d'urgence", a technical platform dedicated to establishing caller location) This could generate delays in readily establishing the 112 mobile caller location. The Commission services are currently looking into the functioning of emergency communication and the 112 number in France, with a particular focus on caller location information.

[188] https://www.arcep.fr/uploads/tx_gspublication/code-of-conduct-internet-qs-2018_EN.pdf
[189] The state of the Internet in France, 2018 edition.
[190] Source: Arcep
[191] Source: Berec benchmark report.
[192] International Roaming BEREC benchmark data report October 2017 – March 2018.

### d. Universal service

In June 2018, the Arcep body responsible for settling disputes, legal proceedings and investigations into possible failures to meet obligations ("règlement des différents, poursuites et instructions", "RDPI" body), launched an investigation into a possible failure by Orange to meet its universal service quality of service obligations for fixed telephony[193]. According to Arcep, the investigation made it possible to confirm a gradual deterioration in the quality of the relevant universal service. As a result, on 23 October 2018, Arcep's RDPI bodydecided to serve on Orange a letter of formal notice imposing the obligation to achieve, in 2019 and 2020, all of the annual values that were established when it was designated as the operator in charge of providing the universal service. In addition, with the view to remedying the situation smoothly, Arcep's RDPI body has also set values for all of the most critical indicators, which Orange had to achieve by 31 December 2018 and will have to achieve on a quarterly basis in 2019.

## 5. Institutional issues

The «Loi n° 2018-607 du 13 juillet 2018 relative à la programmation militaire pour les années 2019 à 2025 et portant diverses dispositions intéressant la défense»[194], gives certain powers to the National Agency in charge of the security of information systems (Agence nationale de sécurité des systèmes d'information, or«ANSSI»). The Law states that in some instances, ANSSI may [195]require operators to use on their networks devices for detecting events that are likely to affect the security of certain information systems. The Law also gives Arcep new powers to monitor ANSSI's compliance with the conditions of application of the Law.

## 6. Conclusion

In order to foster connectivity across the country, France has adopted a dual approach: On the one hand, the *New Deal for Mobile* was implemented in 2018, aiming at offering nationwide 4G coverage. On the basis of legally binding obligations included in their current licences and in those that will be valid from 2021, the stakeholders concerned will have to take action with the view to providing ubiquitous 4G coverage throughout the country. The relevant 4G coverage objectives appear to be high and will require substantial investments on the part of the operators concerned who will have to build a considerable number of dedicated sites. In parallel, the execution of the French National Broadband plan (plan France Très Haut Débit) is ongoing with the aim to have all French households and businesses covered by broadband speeds of 30 Mb/ps and above by the end of 2022. As to 5G, its rollout is being jointly assessed by the government and the national regulatory authority, Arcep. According to the government's 5G roadmap, at least one major city should be covered by 5G by 2020. In the meantime, and as a first step, 5G testing is already ongoing at different locations across the country.

[193] On 27 November 2017, Orange was designated as the operator in charge of providing the plug-in and telephony related part of the Universal Service as provided for in Art.L35-1 of the *"Code des postes et communications électroniques"*.
[194] JORF n°0161 of 14 July 2018.
[195] Whenever the Authority is aware of a threat that is likely to affect the security of the information systems of public Authorities, of operators of vital importance or of operators of essential services.

# Spain

| | Spain | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage** % households | 95% 2016 | 96% 2017 | 96% 2018 | *18* | 97% 2018 |
| **1a2 Fixed broadband take-up** % households | 71% 2016 | 73% 2017 | 77% 2018 | *10* | 77% 2018 |
| **1b1 4G coverage** % households (average of operators) | 86% 2016 | 92% 2017 | 94% 2018 | *21* | 94% 2018 |
| **1b2 Mobile broadband take-up** Subscriptions per 100 people | 86 2016 | 92 2017 | 97 2018 | *13* | 96 2018 |
| **1b3 5G readiness** Assigned spectrum as a % of total harmonised 5G spectrum | NA | NA | 30% 2018 | *8* | 14% 2018 |
| **1c1 Fast broadband (NGA) coverage** % households | 81% 2016 | 85% 2017 | 88% 2018 | *13* | 83% 2018 |
| **1c2 Fast broadband take-up** % households | 35% 2016 | 43% 2017 | 54% 2018 | *11* | 41% 2018 |
| **1d1 Ultrafast broadband coverage** % households | NA | 84% 2017 | 87% 2018 | *7* | 60% 2018 |
| **1d2 Ultrafast broadband take-up** % households | 15% 2016 | 18% 2017 | 30% 2018 | *9* | 20% 2017 |
| **1e1 Broadband price index** Score (0 to 100) | 70 2016 | 75 2017 | 76 2018 | *22* | 87 2017 |

## 1. Progress towards a gigabit society

Spain has further improved its overall connectivity ranking in DESI, moving up to ninth place in the EU. Spain performs particularly well when it comes to fast and ultrafast coverage. Currently 87 % of households have access to ultrafast broadband networks capable of providing at least 100 Mbps, although there are significant differences between urban and rural areas. The deployment of fibre networks (FTTP) continues to be a significant feature of the Spanish digital domain, covering 77.4 % of households. Rural FTTP coverage in Spain reaches, nonetheless, 32.6 % of the households, which lies significantly above both the EU rural and total FTTP coverages (14.1 % and 29.6 %, respectively).

In Spain, the national 'Programme for the extension of next-generation broadband networks' (*Programa de Extensión de la Banda Ancha de Nueva Generación* PEBA-NGA), continues to provide financial support for the rollout of broadband networks in underserved areas. Since 2013, this programme has provided high-speed connectivity to 2.8 million households. In 2018, Spain announced an ambitious plan reinforcing the budget of PEBA-NGA in order to bring 300 Mbps connectivity to all population centres (95 % of the total population) in the 2018-2021. In addition, in March 2018, the government approved a budget of € 150 million for the programme in 2018[196]. As reported by Secretaría de Estado para el Avance Digital (SEAD), of the four largest operators only two (Telefónica and Grupo Másmóvil-from now on MásMovil-) seem to be interested in participating in the new plan.

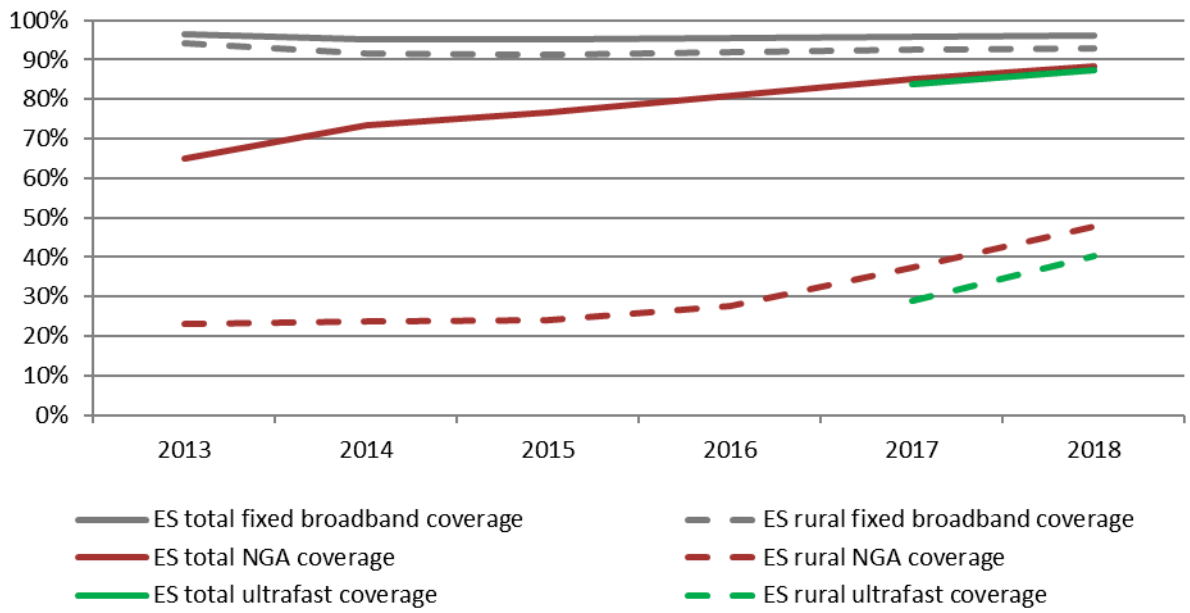
By means of Ministerial Order ECE/1166/2018, of 29 October, Spain approved the Plan to provide coverage at a speed of at least 30 Mbps to at least 90 % of people in settlement of less than 5,000 inhabitants. This plan should be implemented by 1 January 2020. The holders of public concessions in the 800 MHz band[197] (Telefónica, Orange and Vodafone) should carry out this obligation to provide

[196] http://www.minetad.gob.es/esES/GabinetePrensa/NotasPrensa/2018/Paginas/ElGobiernoautorizalaconvocatoriade150M€delPlan300x100parae xtenderlabandaanchaen2018.aspx

[197] Royal Decree 458/2011, 1 April and Order ITC/1074/2011, 28 April.

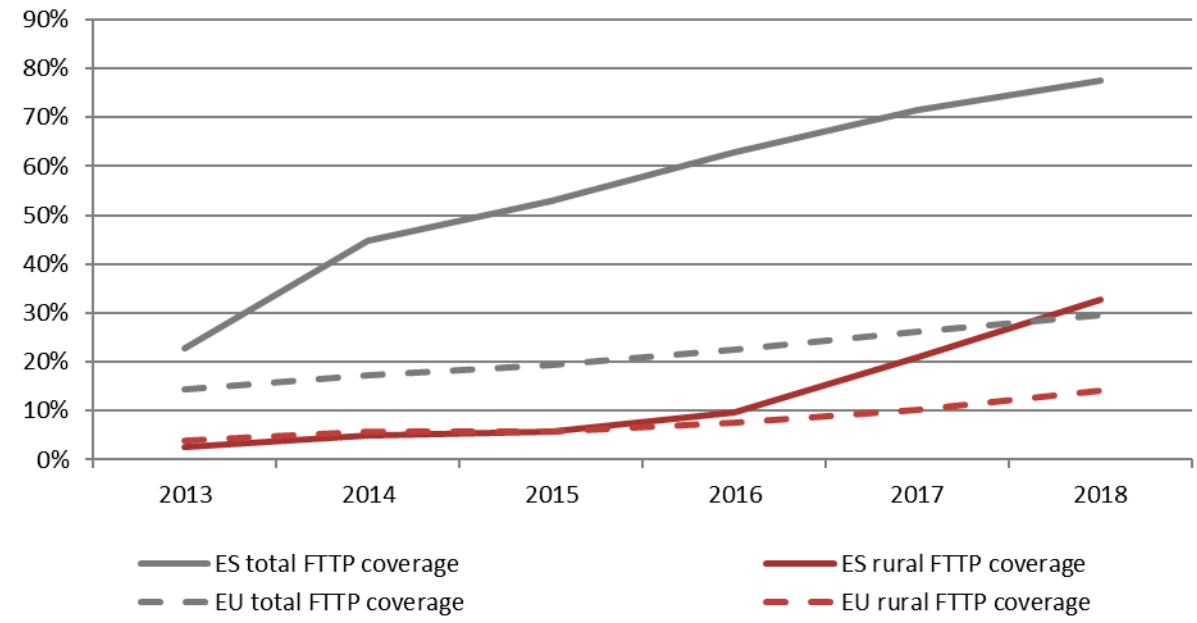
this coverage. Following the technological neutrality principle, operators may comply with this obligation using any technological solution or combination of technological solutions of their choice.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

**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 in previous years, and as reported by the NRA ( *Comisión Nacional de los Mercados y la Competencia* or CNMC), FTTH has been the focus of operators' investment efforts in 2018. Telefónica continues to operate the largest network, with morethan 22.0 million building units (Q4

2018), followed by Orange with 13.8 million building units within its network. Both Telefónica and Orange added approximately 2 million new building units between Q4 2017 and Q4 2018. These figures show a slight reduction in the deployment speed compared to the previous year when they had added around 2.2 million new building units. Másmóvil leads the ranking on investment on fibre between Q4 2017 and Q42018 by adding almost 3.8 million new building units to its FTTH network, i.e. a very substantial increase with respect to the previous year when it did not reach 1.2 million . By contrast, Vodafone did not further expand the footprint of its FTTH network within this period[198]. The number of new building units between Q4 2017 and Q4 2018 amounted to only 3.000 while in the previous year it reached 135,000 carried out. As to Euskaltel, the expansion of its HFC network mainly reflects the acquisition of Telecable; its growth was not "organic".

The coverage of HFC networks is characterised by its stability and has accounted for more than 10 million accesses since the end of 2014. As for operators' FTTN/VDSL network, no major change has been observed either: its coverage is still very low and has reduced since December 2016 so there is no prospect for further expansion of such access technology as the operators are deploying FTTH networks. As reported by the CNMC, in the first quarter of 2018, the network only covered 709,000 building units.

The total number of NGA building units' passed (FTTH, HFC and FTTN) grew by 8 million, from 47.9 million in Q4 2017 to 55.9 million in Q4 2018. Almost all this growth is attributable to FTTH deployment. These figures show an increase in the growth rate with respect to the previous year, when the total number of new NGA building units was 5.9 million.

Following the publication of the 5G national plan for 2018-2020 in December 2017, a Resolution of the former Secretary of State for the Information Society and Digital Agenda (today known as SEAD) on 14 February 2018[199] guaranteed the use of certain frequency bands for 5G pilots (26 GHz band up to 1 GHz per pilot project, and 3.6-3.8 GHz band up to100 MHz per pilot project). By means of Ministerial Order ECE/1016/2018, of 28 September[200], Spain established the regulatory basis for granting subsidies to 5G technology pilot projects (maximum duration of 30 months). On that legal basis, in October 2018, the Public Entity *Red.es* issued an invitation to tender for granting subsidies for two 5G pilots. As provided for in the invitation, subsidies cannot exceed 25 % of the total eligible costs, unless certain requirements are fulfilled, in which case they can go up to 40 % of the total eligible costs. The maximum available budget is €20 million[201].

In June 2018, the Ministry of Economy and Business published the 'Roadmap for the process to authorise the use of the 700 MHz frequency band for wireless broadband electronic communications services'[202], which will involve the migration of digital terrestrial television (DTT) services between January 2019 and March 2020[203]. According to the roadmap, the process to release the 700 MHz frequency band should be be completed by 30 June 2020, but no specific date is provided for the auction process. Among other things, a new national technical plan for DTT will be approved, under which the current service capacity will be maintained. Similarly, the availability of the 470-694 MHz frequency band to provide such services will be ensured at least until 2030. Moreover, under the roadmap, a goal has been set to approve, before 2018, a compensation scheme to adapt the reception facilities in buildings to the new frequencies and to compensate for the changes required to the

[198] The downturn in Vodafone roll-out trend would result from the commercial agreement that Vodafone and Telefónica signed in March 2017 by means of which Telefónica provides Vodafone with wholesale access to its FTTH network.
[199] https://avancedigital.gob.es/5G/Documents/resolucion-SE-frecuencias-pilotos5G.pdf
[200] https://www.boe.es/buscar/doc.php?id=BOE-A-2018-13440
[201] https://sede.red.gob.es/procedimientos/c00718-sp
[202] http://www.mineco.gob.es/stfls/mineco/comun/pdf/Hoja_de_Ruta_Segundo_Dividendo_Digital.pdf
https://avancedigital.gob.es/5G/Documents/Spanish_Roadmap_700MHz_band.pdf
[203] June 2020 according to the proposed new DTT Technical plan.

broadcasters' transmission equipment. As SEAD informed, Spain notified to the Commission this compensation scheme under the state aid rules and clearance has just been approved in April 2019. The telecommunication sector fears that Spanish general elections, which took place April 2019, will have slown down the process of migration of DTT service and, consequently, may put at risk the timely completion of the 700 MHz auction[204].

The modification of the Spanish National Frequency Allocation Table[205] designated 3.6 GHz and the 26 GHz bands as bands for 5G uses. The 3600-3800 MHz band was auctioned in July 2018 and was granted to three mobile operators (Vodafone 90 MHz, Orange 60 MHz and Telefónica 50 MHz)[206]. This is reflected in the 5G indicator, which shows that Spain ranks in eightposition with 30 %, well above the EU average of 14 %. The assignment process has enabled the acquisition of spectrum at reasonable prices (0.05 euro cent/pop/MHz) in view of the forthcoming investment challenge. The 3400-3600 MHz band has 2 x 20 MHz for radiolocation uses. In summer 2018, Másmóvil purchased 40 MHz in the secondary market reaching in total 80 MHz. The administration is working to make available that portion of spectrum assigned to radiolocation systems in order to reorganise the band for operators so they can have a larger contiguous amount of spectrum in the whole band.

In January 2018, Telefónica presented the 5G Technological Cities project, with the initial deployment of 5G capabilities in the cities of Segovia and Talavera de la Reina, in partnership with Nokia and Ericsson. Telefónica intends to convert the two cities into 5G laboratories over 3 years (2018-2020), with pioneering capabilities including the initial 5G capacity, the deployment of the new 5G network and the development of use cases. Orange[207] and Vodafone[208] also announced several projects.

Preliminary works for the elaboration of a new General Telecommunications Law transposing the European Electronic Communications Code[209] (EECC) has started. A preliminary draft was expected to be finished in the second quarter of 2019, it then has to be submitted to and approved by the Council of Ministers later on, after the corresponding consultation procedures. The approved draft bill is expected to be sent to the *Cortes Generales* in the last quarter of 2019. Many of the principles that inspire the new provisions for market regulation have already been implemented in Spanish regulation of broadband markets, i.e. remedies on access to physical infrastructure, access to vertical segments, differentiation of remedies depending on competition conditions in regions, and migration from legacy infrastructure, among other things.

## 2. Market developments

The three big national convergent players (i.e. Telefónica, Orange and Vodafone) account for 88.6 % of lines in the fixed broadband market. However, their joint share has been reduced by 2.9 pps over the last year, mainly to the benefit of Másmóvil, which entered the market as a new convergent operator at the end of 2016 and is active under various brand names (such as Yoigo, Pepemobile and Másmóvil). Telefónica's (the SMP operator) market share is steadily decreasing. From March 2017 to March 2018, Telefónica's market share has decreased by 1.4 pp. Indeed in Q1/2018, Másmóvil

[204] http://www.expansion.com/empresas/tecnologia/2019/02/20/5c6d5c0be2704e60548b45c2.html. On 8 March 2019 the Council of Ministers announced the drafting of an urgent Royal Decree including the National Plan for the DTT. http://www.lamoncloa.gob.es/consejodeministros/referencias/Paginas/2019/refc20190308.aspx#DIGITAL. Approval is still pending.
[205] Approved in April 2018 by Ministerial Order ETU/416/2018 of 20 April.
[206] The rights of use were granted by means of Order ECE/1161/2018, of 29 October http://normativa.infocentre.es/sites/normativa.infocentre.es/files/noticies/20256406e.pdf
207 https://www.europapress.es/economia/noticia-orange-lanzara-2019-programa-pilotos-5g-siete-ciudades-espanolas-20181025132438.html
208 https://www.businessinsider.es/vodafone-inicia-despliegue-piloto-su-red-5g-seis-ciudades-espanolas-282713
[209] *OJ L 321, 17.12.2018, p. 36–214*

became the fourth largest operator (in terms of broadband lines) after it surpassed Euskaltel, which ranked at that position despite its limited geographical footprint (only Northern regions of Spain). The entry and consolidation of Másmóvil as a key market player therefore constitutes the most remarkable change in Spain's market structure between 2017 and 2018. In November 2018, Másmóvil made public its acquisition of Lebara, a MVNO that owns more than 400,000 customers (i.e. a market share below 1 % of the mobile market). Moreover, Másmóvil's strategy based on value for money products, non-inclusion of pay TV, simplicity and on-line marketing channels has further shaped the competitive trends. Incumbent operators such as Telefónica and Vodafone have reacted by recently launching new second brands (O2 and Vodafone Bit in June and November 2018, respectively), in addition to their existing ones (Tuenti and Lowi, respectively), with the aim of addressing this market segment while retaining their own primary brand for high-end users. Orange was the first operator to follow this multibrand strategy in Spain by means of brands such as Amena, SIMYO, Jazztel and its own brand.

Telefónica's market share in the fixed business services remained very high (60 %) and quite stable. In this segment, operators specialised in high-end business products are proportionally less successful than those targeting residential users. The CNMC is planning to update the analysis of competition in the business segment that was performed in the context of the latest review of wholesale markets for broadband access[210].

In Spain, co-investment has taken the form of commercial wholesale agreements that usually consist of two parties voluntarily agreeing to give each other partial or full access to their NGA networks using bitstream or VULA type services. The economic conditions of these agreements sometimes include volume discounts, minimum purchasing requirements or reduced prices (relative to regulated wholesale offerings), while the technical conditions usually allow the participating parties to replicate each other's offers. With regard to possible deployment obligations, the agreements specify in some cases that each operator will increase its coverage by a given number of housing units and later provide access, on the agreed terms, to these building units.

Three were three commercial wholesale access agreements signed in 2018. In February 2018, Telefónica and Orange reached an agreement on commercial wholesale access by which Telefónica would provide Orange with both regional bitstream and VULA access to its FTTH network. In March 2018, Telefónica and DIGI Mobil signed an agreement by which Telefónica would provide DIGI, an MVNO, with commercial wholesale access to its FTTH network (regional bitstream, *NEBA fibra*) as well as commercial national bitstream access to its copper network ('ADSL-IP COMERCIAL'). In September 2018, Vodafone and Másmóvil reached a commercial wholesale agreement to share access to 1.9 million housing units that will be implemented over the next 4 years.

Bundles remain the most representative way for operators to commercialise electronic communications services in Spain. 'Four Play' (fixed and mobile telephony and broadband) and "Five Play" ('Four Play' with pay TV) bundles have cemented their place in the Spanish broadband and mobile markets and currently account for more than 80 % of the 14.48 million active bundles in Spain.

In this context, content (in particular premium content) has become a key component to compete in the Spanish electronic communications markets. The main driver of demand for audio-visual content is football. In June 2018, Telefónica acquired the main blocks of audio-visual rights for Spanish National Football League matches for the next three seasons starting in 2019, taking a competitive advantage over Vodafone and Orange in its negotiations to acquire the rights to broadcast the Champions League (in the hands of MediaPro). Only Telefónica and Orange offer full football content the 2018-2019

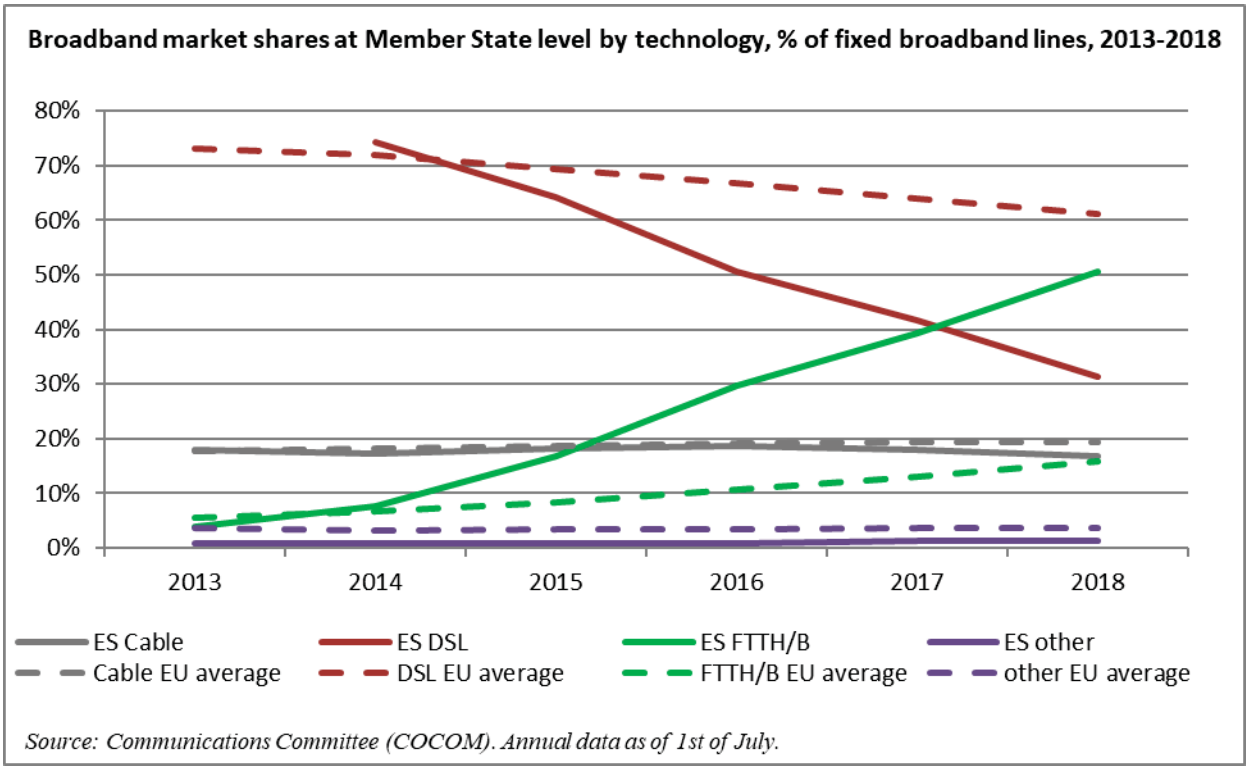
[210] The final decision was adopted by the CNMC on 24 February 2016.

season[211]. During the summer of 2018, Telefónica launched a promotion targeting new clients migrating from operators that do not offer football (all operators except Orange) in order to acquire high value customers. As a result, as reported by CNMC, portability reached record figures in September 2018[212].

Other important drivers of demand for audio-visual content are premium series and films. These have led several operators (Vodafone, Orange and, recently, Telefónica), to negotiate agreements with OTT content platforms (Netflix, Amazon Prime or HBO) that give consumers access to their content libraries at discounted prices.

### 2.1. Fixed Markets

There is a downward trend in the share of Cable (from 18 % to 16.8 %) and DSL (from 41.6 % to 31.2 %) in broadband access, and conversely a strong upward trend for FTTH/B (from 39.2 % to 50.7 %) which attests of the migration of customers to the new technology.

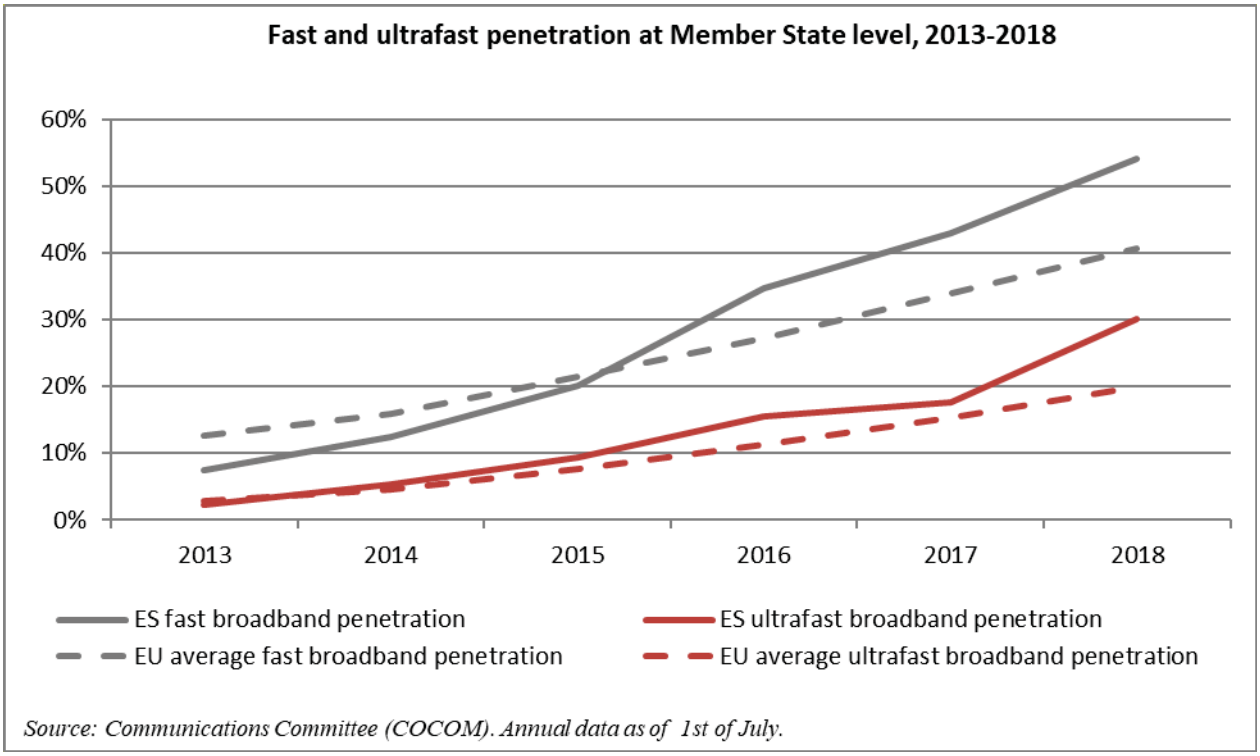



Fast and ultrafast broadband take-up are two of the main drivers of improvement in the connectivity section of DESI in 2018. While fast broadband take-up has increased by 11 p.p. (from 43 % to 54 %), well above EU average (41 %), ultrafast broadband take-up has increased by 12 p.p. (from 18 % to 30 %), also well above EU average (20 %).

As reported by the CNMC, duct access is being actively used by alternative operators to deploy their own FTTH access networks, with 26,500 km of shared ducts. Local loop unbundling (LLU) lost 900,000 active lines between March 2018 and March 2019 as a consequence of the migration of LLU-based broadband customers to alternative operators' newly deployed NGA networks. This has lead to an increase in the take-up of fibre-based wholesale access products such as unbundled virtual access to the fibre-optic loop (NEBA local in Spanish) and the new broadband ethernet service (FTTH NEBA in

[211] Vodafone decided not acquiring rights for showing of Champions league and UEFA Europa League marches as well as "El Partidazo" (the best match of the week) of the Spanish National Football Leagues for the season 2018-2019. Vodafone only offers a reduced service with eight Spanish first division, all the second division and la Copa del Rey matches.
[212] 700 707 mobile numbers changed operator, which is 17.4 % more than the volume recorded in the same month of 2017.

Spanish)[213].




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

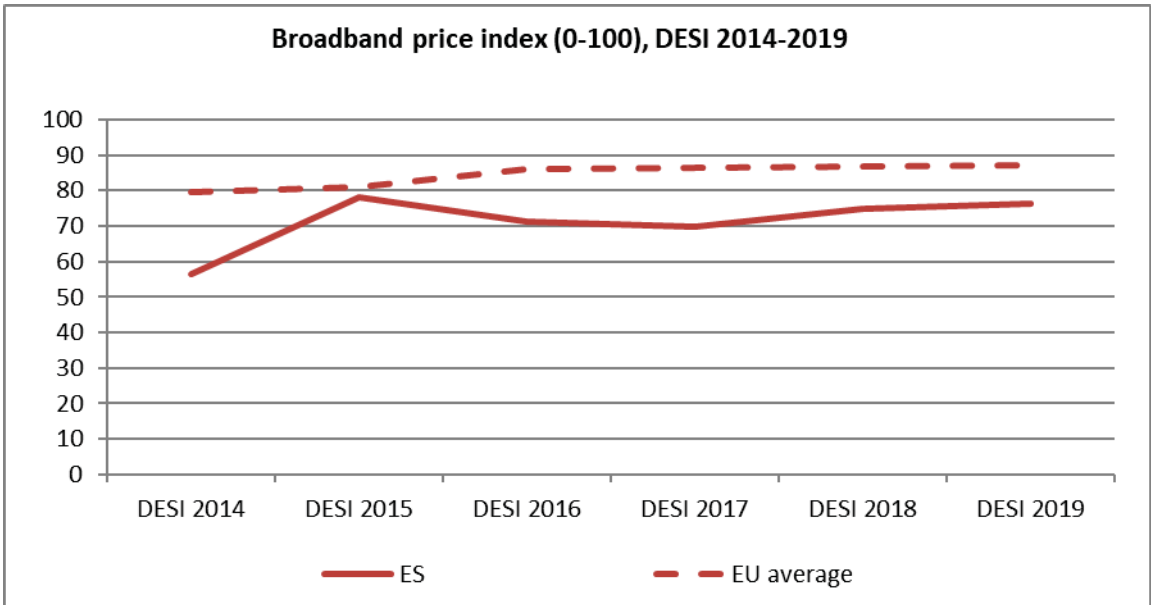
In March 2019, NEBA local has gained more than 900,000 lines, since January 2018, when this product was made effectively available. FTTH NEBA lost 200,000 lines in 1 year because operators are migrating their bitstream NEBA FTTH connections to the VULA type NEBA local. The demand for other copper-based bitstream services has significantly reduced; in fact, in March 2019, the total number of copper wholesale connections (1.75 million) amount to practically the same number of lines as the new NEBA local plus NEBA FTTH.

The fixed broadband price index[214] for Spain shows a slight improvement, but the country still ranks 22 out of 28 as in 2017... As explained above, the context is a market dominated by convergent bundles, including mobile services as well as pay TV services, and characterized by higher speed for accessing the internet (supported by a very substantial investment in the deployment of FTTH/B networks) where price increases in the flagship-bundled products of the main operators are generally linked to different improvements (inclusion of more bandwidth, higher allowances for data and voice traffic, additional mobile lines or of premium TV content)[215].

[213] Please see Section 3.2 bellow.

[214] 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.

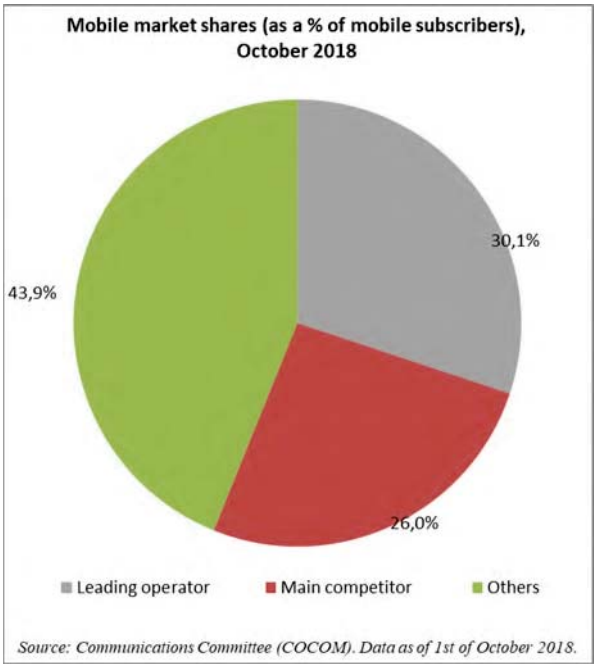
[215] However, fixed broadband services are usually sold jointly with mobile services in Spain and, therefore, the value of this indicator for this Member State does not include 83 % of the bundles sold in the country (CNMC data http://data.cnmc.es/datagraph/jsp/inf_trim.jsp).




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets

4G coverage and mobile broadband take-up ratios also improved in DESI in 2018. While 4G coverage has advanced by 2 p.ps. (from 92 % in 2017 to 94 % in 2018), reaching the same level as the EU average (94 %), mobile broadband take-up increases 5 p.p. (from 92 % to 97 %), 1 p.p. above the EU average. In order to provide 4G coverage, MNOs have reached network sharing agreements, in a similar way to those previously reached for 3G-2G networks. The operators are increasingly using fibre backhaul in order to boost the capacity of their networks. Over recent years, the operators have been deploying fibre to the base transceiver station, mainly in the urbans areas. This trend is expected to continue in the coming years. For this purpose, the operators use their own fibre deployment, dark fibre leased by third parties and the wholesale fibre services offered by third party operators, including Telefónica's regulated ducts access.




*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

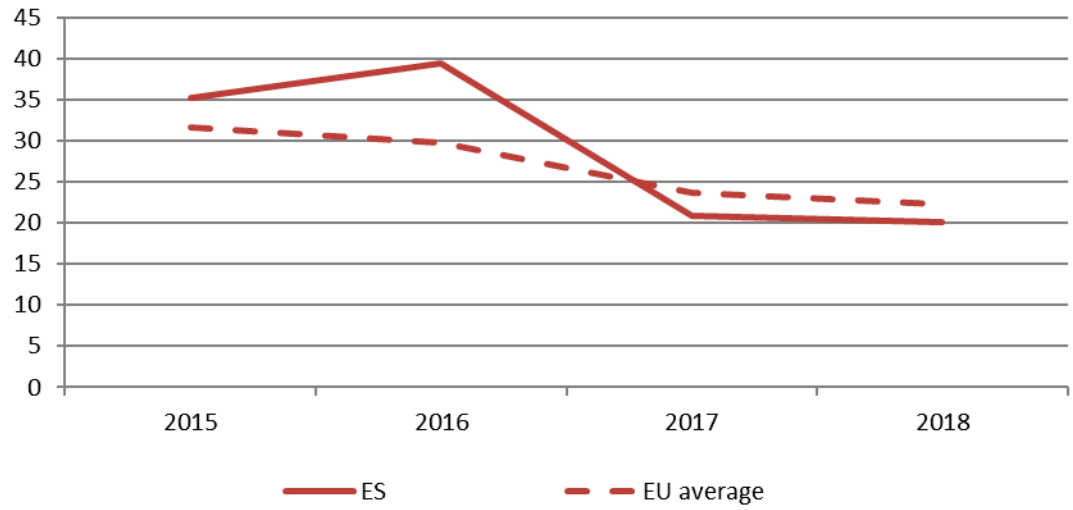
Focusing specifically on mobile electronic communication services, the CNMC does not expect any significant change in current usage trends. Mobile voice (both mobile-to-mobile and mobile-to fixed) will continue to show slow, but sustained, growth over the medium term as tariffs including unlimited calls or large allowances continue to replace pay-per-use plans. Similarly, SMS and MMS traffic between end users (P2P) is expected to continue decreasing. However, data obtained by the CNMC during a recent procedure showed increased activity in the application-to-person (A2P) SMS segment. Nevertheless, the traffic generated by A2P SMS has not reversed the losses from previous quarters. The use of mobile broadband has grown notably since 2015, both in terms of the total volume of data consumed by users and average use by line. In

2018, mobile broadband use has increased 27 %, moving from 2.3 in the last quarter of 2017 to 2.9 GB/line in the last quarter of 2018.

The impact of OTTs on the services provided by mobile network operators (MNOs) has been concentrated on short and multimedia messaging (SMS and MMS), where instant messaging services such as WhatsApp or Telegram have practically replaced the traditional services. Regarding voice, OTTs have had very little effect on MNO's services, mainly because of the widespread practice of retailing unlimited call tariffs.

In Spain the mobile market shares of the leading operator are equal to 43.9 % while mobile market shares of the main competitor are 30.1 %.

**Least expensive offer for handset (1 GB + 300 calls basket) at Member State level, EUR/PPP, 2015-2018**




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

Stand-alone mobile broadband prices, for handset offers[216] have decreased in the past year (from €20.8/PPP to €20/purchasing power parity, PPP), and are even below the EU average (€22.3/PPP).

## 3. Regulatory developments

### 3.1. Spectrum

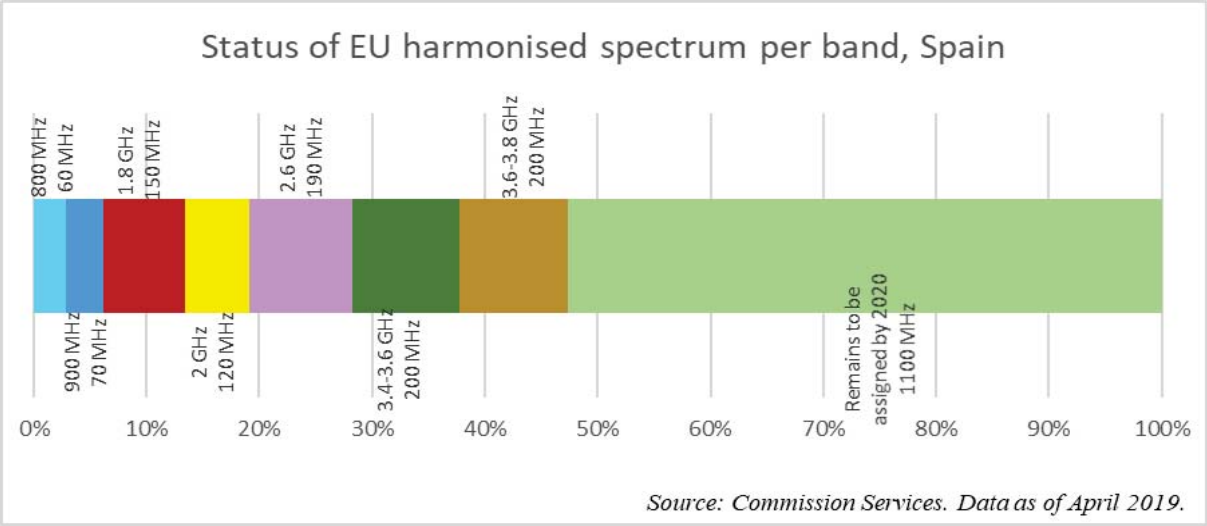
In Spain, 47 % of the spectrum harmonised at EU level for wireless broadband has been assigned[217]. The spectrum that has yet to be assigned is mainly in the 700 MHz, the 1.5 GHz and the 26 GHz bands; this last band is nevertheless available for 5G pilots.. As indicated in Section 1 above, according to the 700 MHz roadmap (approved in June 2018), the process to release the band should be completed by 30 June 2020, but no specific date is provided for the auction process. The Commission is looking into this matter.

As mentioned in section 1 above, the 3600-3800 MHz band was auctioned in July 2018 and granted to three of the four largest mobile operators (Vodafone 90 MHz, Orange 60 MHz and Telefónica 50

[216] 1 GB + 300 calls basket.

[217] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

MHz). A total of 200 MHz was available, in blocks of 5MHz, for state geographic coverage. A maximum cap of 120 MHz per operator was applied for the 3400-3800 MHz band. All concessions will be valid for 20 years, and the licence fees will be spread over the course of this period.




In June and July 2018, Másmovil purchased 40 MHz of rights of use of spectrum from the satellite company Eurona and the group already has 40 MHz being the holder a B2B service provider Neutra Network. Másmovil thus holds rights of use for a total of 80 MHz in the 3.5 GHz band. Másmovil also competed in the 3600-3800 MHz band auction but did not win additional spectrum.

In April 2018[218], and following the guidelines established in the national plan for 5G (2018-2020)[219], the National Frequency Allocation Table was updated introducing the provisions needed to have the relevant bands, including the 26 GHz band, available for the provision of 5G services. In particular, the new Frequency Allocation Table modified the National Use Notes ('*Notas de utilización nacional*') for the following bands: 1500 MHz band, 3.4-3.8 GHz band, 26 GHz band, 42 GHz band and included a new Use Note for the 66-71 GHz band.

As reported by SEAD, a new update of the National Frequency Allocation Table is planned for the third quarter of 2019 in order to implement several technical harmonisation Decisions and, in particular, the Commission's Decision on the 3400-3800 MHz band.

The Regulation for use of Spectrum, adopted in February 2017[220], reduced the requirements and simplified the procedures for deploying low power stations, to facilitate the deployment of small cells. Moreover, new mechanisms for sharing spectrum within the secondary market were provided. This could enable an operator with no spectrum licence to be part of an agreement for the mutualisation of rights of use. The Regulation also laid down that the management of the frequencies that are subject to mutualisation could be entrusted to a third party. These new mechanisms are additional to others already established like transfer and leasing.

There is a common trend consisting of migrating spectrum from old technologies (2G and 3G) to the newer one (LTE), in order to increase the broadband internet access speed. It is expected that in the short term the volume of frequencies used for 2G and 3G will be reduced and concentrated in the 900 MHz band; the 1800 MHz as well as the 2100 MHz band will be used fully for LTE . However, the CNMC is not aware of plans to completely phase-out the old technologies (2G and 3G) in the short term.

[218] See footnote number 10.
[219] https://avancedigital.gob.es/5G/Documents/plan_nacional_5G_en.pdf
[220] https://www.boe.es/boe/dias/2017/03/08/pdfs/BOE-A-2017-2460.pdf

The coordination process with EU neighbouring countries concerning the 700 MHz band has already been concluded, with the exception of Morocco and Algeria, for which, as the Ministry reported, negotiations are in their final stages.

### 3.2. Regulated access

On 18 January 2018, the CNMC adopted the final measures concerning the fourth review of the wholesale markets for (i) voice call termination on individual mobile networks (market 2/2014 of the 2014 Recommendation on Relevant Markets[221]) and (ii) trunk segments of leased lines (market 14/2003 of the 2003 Recommendation on Relevant Markets[222]).

As to market 2/2014, 4 MNOs and 7 full mobile virtual network operators (MVNOs) were designated as SMP operators for calls terminating on their respective mobile networks and were obliged to comply with the following ex-ante regulatory obligations: (i) access, (ii) non-discrimination, (ii) price control; symmetric cost oriented mobile termination rates (MTRs) based on the pure BU-LRIC model and (iv) transparency. Moreover, Telefónica, Vodafone and Orange are subject to the obligation of cost accounting and accounting separation. The following MTRs were established: from 1 February2018 to 31 December 2018, 0.70 euro cent per min; from 1 January2019 to 31 December 2019, 0.67 euro cent per min and from 1 January 2020, 0.64 euro cent per min (EU weighted average € 0.85 cents per min)[223].

The measure also imposed reciprocal rates for non-EEA originated traffic on the SMP operators.

As to market 14/2003, Telefónica was designated as SMP operator and was obliged to provide third parties with trunk segments of leased lines under cost oriented prices for nine undersea routes connecting the peninsula with Ceuta and Melilla, and the Balearic and Canary islands among them respectively. The regulation in place for the undersea route connecting the peninsula with the Canary Islands (which included, among other things, the obligation of setting reasonable prices) was withdrawn in light of the level of competition that this route had achieved.

On 6 March 2018, the CNMC adopted the final measure setting the details of the methodology for the Economic Replicability Test (ERT) for the broadband products that Telefónica offers to the residential market. This measure implements the price control obligation that the CNMC imposed on Telefónica for providing the new fibre wholesale access services, namely, NEBA local (VULA) and FTTH NEBA *Residencial* with no bandwidth limitation (fibre bitstream) in the context of the third review of the wholesale broadband markets[224].

On 26 July 2018, the CNMC adopted the final measure setting the details of the methodology for the ERT for the broadband products that Telefónica offers to the business market. This measure implements the price control obligation that CNMC imposed on Telefónica for providing NEBA Empresarial over fibre, the high-quality bitstream service, in the context of the third review of the wholesale broadband markets[225].

In May 2019, the CNMC notified the draft measures regarding the market for broadcast transmission

[221] Commission Recommendation 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 (OJ L 295, 11.10.2014, p. 79–84).

[222] Commission Recommendation of 11 February 2003 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 communication networks and services (*OJ L 114, 8.5.2003, p. 45–49*).

[223] BoR (18) 218, Berec report on Termination rates at European level, July 2018.

[224] Decision adopted by CNMC on 24 February 2016 concerning the review of the wholesale broadband markets (market 3a, 3b and 4).

[225] NEBA Empresarial over copper is subject to a cost orientation obligation.

services (market 18 of the 2003 Recommendation on relevant markets) after a national public consultation conducted in October 2018[226]. Final measures are planning to be adopted also in 2019.

In November 2018, a public consultation concerning the review of the fixed termination markets was launched. As in the case for MTRs, the following new (lower) fixed termination rates (FTRs) for the next regulatory period and reciprocal rates for non-EEA originated traffic are proposed (current rate, since October 2014, 0.0817 euro cent per min): from final decision to 31 December 2019, 0.0640 euro cent per min; from 1 January 2020 to 31 December 2020, 0.0591 euro cent per min and from1 January 2021, 0.0543 euro cent per min.

The CNMC adopted some other technical measures: (i) Decision on phasing-out ATM-based ADSL bitstream service (closed down in March 2019); (ii) Decision on three-month trial of the multicast functionality for VULA service (NEBA local); (iii) Regulation of 10 Gbps backhaul service in the Reference Unbundling Offer; (iv) Decision regarding the origination services to be included in IP-based Reference Interconnection Offer (RIO) and review of the current access prices to call origination and (v) Notification regarding the review of capacity charge in NEBA bitstream service.

It is also worth mentioning that the CNMC established clear rules for the decommissioning of main distribution frames (MDF), whereby Telefónica is allowed to discontinue wholesale and retail services based on the copper network in locations where fibre can be used instead. By March 2019, more than 1,000 sites are in some stage of the process and more than 190 non-LLU sites have already been decommissioned after a minimum one-year transitional period. More than 400 LLU sites are already scheduled for decommissioning after a 5-year period. Partial-site decommissioning is analysed case by case by the CNMC; there were three such decisions in 2018.

In 2019 the CNMC plans to notify the Commission and adopt the final measures concerning the market for wholesale call termination on individual public telephone networks provided at a fixed location[227] (market 1 of the 2014 Recommendation on relevant markets). Moreover, the CNMC plans to start working in 2019 on markets 4/2014 and 3/2014 (3a and 3b) of the 2014 Recommendation on Relevant Markets (wholesale local access provided at a fixed location and the wholesale broadband access markets) (probably in 2 different cases, one for market 3 and other for market 4).

In 2018, the CNMC solved around 25 disputes between undertakings. Most of them pertained to access and contractual relationships between operators (in particular, termination of access agreements in instances of non-payment or breach of the essential terms of the agreement by one of the parties) and problems over the use of certain numbering resources (including retention of payments in cases where it was deemed that fraud-related activities where taking place, and disputes relating to access by providers of directory enquiry services to the network of the main telecommunications services providers in Spain).

Since 2008, Telefónica has been obligated to grant access to its physical infrastructure on the basis of the ex ante (asymmetric) regulation that is applicable at wholesale level to broadband markets in Spain (current market 3a of the Commission Recommendation). In addition, both the Spanish Telecoms Act as well as Royal Decree 330/2016 (which transposes Directive (EU) 2014/61[228], Broadband Cost Reduction Directive or BBCRD) mandate access on a symmetric basis to the physical infrastructure of telecommunications operators in general, as well as to the physical infrastructure of utilities (gas, electricity, water companies), transport companies and public administrations, for the deployment of high-speed electronic communications networks.

[226] The one-month public consultation on market 18/2003 finished on 6 November 2018.
[227] The public consultation was launched on 16 November 2018.
[228] Directive 2014/61/EU, of the European Parliament of the Council of 15 May 2014, on measures to reduce the cost of deploying high-speed electronic communications networks (*OJ L 155, 23.5.2014, p. 1–14*).

There are some provisions of the BBCRD that have yet to be implemented such as the Single Information Point (SIP). Initially the SIP regulation was scheduled to be approved by the end of 2018. However, the approval and publication of the regulation is still pending. SEAD confirmed that the application by which users can get access to the SIP has already been developed and is awaiting the final approval of the regulation to be put into operation. Moreover, the regulation on the installation of the final sections of the high-speed electronic communications fixed network (partially transposing Articles 2 and 9 of the BBCRD) is also still pending so it can include some amendments suggested by *Consejo de Estado*.

Dispute settlement under Directive (EU) 2014/61 is becoming a prominent function within the CNMC. Since the entry into force of Royal Decree 330/2016, several dispute settlement procedures have been initiated. Cases generally focus on the provision of access to physical infrastructure and to information. In 2018, the CNMC settled five such cases (other final decisions are still pending). As reported by the CNMC, the main challenges raised in the context of the dispute settlement are: (i) the network operators (and in particular public administrations) lack of awareness of the access and transparency obligations they must comply with; (ii) the challenges inherent to calculating the wholesale price of access to the physical infrastructure; (iii) determining whether some telecommunications providers (in particular those making use of wireless access networks) are entitled to access under Royal Decree 330/2016, taking into account that in some cases the maximum theoretical download speed may not be the real download speed in instances of shared use; and (iv) ensuring compliance with the non-discrimination principle.

## 4. End-user matters

According to the 2018 consumer markets scoreboard[229], despite the little increase in their Market Performance Indicator (MPI)[230] score in the period 2015 - 2017[231], the markets for 'Internet provision services', 'Fixed telephone services' and 'Mobile telephone services' scored significantly below the EU average in terms of MPI score (10.9 p.ps, 12.1 p.ps and 14.4 p.ps respectively bellow the EU average). In fact, 'Mobile telephone services' are within the three lowest-scoring services markets among the 25 markets surveyed, while 'Internet provision services' and 'Fixed telephone services' are in the seventh and fifth position from last respectively. '.

EAD reported that 12,510 consumer complaints were received during the first half of 2018, with 69.5 % of those being resolved in favour of the end-user.

### a. Net neutrality

Consumers can address their complaints to the Telecommunication Users Office (under the auspices of the Ministry of Economy and Business) which is empowered to resolve disputes regarding electronic communication services between end-users and internet services providers or ISPs (this is not limited to net neutrality issues)[232]. However, until now no remedies have been imposed by the Telecommunication Users Office. So far, the Ministry (SEAD) chose non-coercive measures to achieve conformity with the obligations as laid down in Article 4 of the Regulation (EU) 2015/2120[233]. The Ministry has not found any violations in relation to Article 3 of the Regulation (EU) 2015/2120.

[229] Consumer Markets Scoreboard, 2018 Edition, Justice and Consumers, European Commission.
[230] The MPI is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers.
[231] +0.3 'Internet provision', +0.5 'Fixed telephone services' and +1.4 'Mobile telephone services'.
[232] Bird & Bird & Ecorys Net Neutrality Study. Final Report - Part II – Country Chapters
[233] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (OJ L 310, 26.11.2015, p. 1).

evertheless, SEAD analysed two types of zero-rating practices to determine whether: (i) some offers are correctly applied while roaming and (ii) some offers are too restrictive. According to the SEAD, non –coercive measures have proved to be efficient, as operators modified some content of their contracts which could breach Regulation (EU) 2015/2120.

### b. Roaming

Spanish end-users have consumed 5.3 times more roaming minutes (calls made) and 17 times more roaming data in Q1 2018 than in Q1 2017.[234].

Moreover, according to the study "Mobile Broadband Prices in Europe 2018[235]", Spain is showing that prices for voice and data packages are falling.

SEAD reported that some offers from Vodafone ('Vodafone Pass') have been analysed after being informally consulted by the operator itself. The Secretary of State concluded that there was no violation of the Rome Like at Home (RLAH) regulation[236] due to the wide variety of applications included in the offer. As reported by SEAD, several operators' offers have been analysed concluding that, subject to some amendments, contracts can be considered in compliance with RLAH regulation.

While in 2017 one MVNO was authorised to apply a surcharge, in 2018 CNMC has not received any new application, which means that the operator benefiting from the authorised surcharge did not renew its request. There have been other offers reported informally to CNMC, but it no cases of incompliance with the roaming regulation have been found and no procedures opened.

Wholesale prices are decreasing significantly below the regulated caps. This trend makes it possible to infer that there is competition at the wholesale level. The introduction of RLAH seems to have led to a significant increase of roaming traffic and wholesale operators are competing for it. For the time being, no complaints or significant issues have been reported by any operator on the functioning of RLAH at the wholesale level. Finally, 48 % of operators include non-EEA countries in their RLAH tariffs (more than 30 non-EEA countries have been reported, but most non-EEA countries included in RLAH tariffs are Switzerland, Monaco and USA).

### c. Emergency communications – 112

In Spain, the autonomous communities are in charge of managing calls to the emergency number 112. There are nineteen 112 Public Safety Answering Points (PSAPs) that depend on regional governments which manage 112 emergency communications, access to emergency service for disabled end-users and e-calls among other things.

According to the 2018 Communications Committee (COCOM) 112 Questionnaire, calls to 112 are answered within 5 seconds and end-users with disabilities can use SMS, assisted calls (chat), apps and fax. Concerning equivalent access to emergency services for disabled users, as reported in the Questionnaire, there is no accessibility solution available throughout the whole of Spain and a significant number of autonomous regions, particularly those that implemented SMS as an alternative means of access for disabled end-users, do not ensure that user location information is provided. The European Commission is currently looking into the functioning of emergency communications and the 112 number in Spain, particularly focusing on caller location and equivalent access for end-users with disabilities.

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[234] Data from the International Roaming BEREC Benchmark Data Report October 2017- March 2018, published on 4 October 2018.

[235] Mobile Broadband Prices in Europe in 2018, a study conducted for the European Commission by Empirica

[236] 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 amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.

### d. Universal service

By means of Royal Decree 1517/2018, of 28 December, the Ministry of Economy and Business amended Royal Decree 424/2005, to reduce the scope of universal service provisions. In particular, the Ministry eliminated the following components from the scope of the universal service: (i) directory guides and (ii) enquiry services. In relation to the directory enquiry services, the regulation includes a provision that obligates the designated operator to provide the universal service to grant a monthly exemption of 10 free calls to end users (or members of their family) with some type of visual disability.

However, the obligation to provide for public pay telephones is still within the scope of the universal service obligation, as the Ministry opted to extend it during 2019. This decision is consistent with *Consejo de Estado*'s opinion, which understood that even when the need covered by public pay telephones was largely replaced by other solutions, the obligation should be eliminated by means of a law instead of a regulation (Royal Decree).

In 2018, the CNMC calculated the cost of providing the universal service in 2016. The total cost amounted to €16.8 million, € 400,000 less than the previous year. Telefónica is the current provider of the universal service in Spain. According to the 2014 Telecoms Law, this cost will be borne, in proportion to their revenues, by all operators with annual turn-over above €100 million.

## 5. Institutional issues

The CNMC is still exercising some of the functions that in 2014 the General Telecommunications Law transferred to the Ministry of Economy and Business (management of the Registry of the Telecommunications Providers, assignment of numbering resources, management of the end-user database and all penalisation and control functions regarding these functions and public resources, and taxes settlement procedures). The recently enacted Royal Decree 1046/2018, of 24 August 2018, on the structure of the Ministry of Economy and Business, confirmed the transferral of these functions to the Ministry. The Decree also provided for a transfer of the staff that carry out these functions from the CNMC to the Ministry. This was carried out on the same terms as those provided in the repeal of Royal Decree 903/2017, of 13 October 2017, on the structure of the former Ministry of Energy, Tourism and the Digital Agenda. Thus, this situation seems to be maintained over time.

The Ministry kept its powers to monitor net neutrality (except for dispute resolution) and to impose of technical symmetrical obligations in buildings. Regarding roaming the functions are distributed between the CNMC and the Ministry. Moreover, the Spectrum Regulation[237] only assigns a very limited role to the CNMC. More specifically, it removed the CNMC´s previous mandatory advisory role in spectrum granting processes, for issues not affecting competition.

Concerning numbering, in 2018, the Government approved some user protection measures proposed by the CNMC regarding calls to directory services (118 numbers).[238] Moreover, the CNMC fined several network operators who misused numbers in the non-premium special tariff number range (NXY=902) as no payments related to the calls received are allowed within this range.

As reported by the CNMC, no notification from a Spanish operator has been received for an extra-territorial use of M2M numbers with the country code 34 within the EU. In this context, the CNMC neither keeps a dedicated register nor has introduced a standard form for those operators that want to provide M2M services in the EU with Spanish resources. No specific obligations apply in these cases. On the other hand, the extra-territorial use of foreign numbers for M2M communications in Spain is in

[237] Royal Decree 123/2017, of 24 February, on spectrum regulation
[238] Order ETU/114/2018, 8 February.

general permitted[239], provided that the assignee notifies the CNMC of this in advance. This is to allow the CNMC to decide whether the assignee is providing an electronic communications service in the territory.

## 6. Conclusion

Spain is one of the top performers in the rollout of ultrafast broadband as well as the take-up of ultrafast broadband connections. Deployment is driven by commercial investment made up by several telecom operators, a regulatory framework focused on supporting deployments through effective regulated duct-access and supported by an ambitious national strategy that involves providing subsidies in sparsely populated and rural areas. The ground for 5G deployment is being prepared with several pilot projects underway. The assignment of pioneer spectrum is well under way and the 700 MHz auction is expected in early 2020. Concerning equivalent access to emergency services for disabled end-users, Spain should take action on deploying an accessibility solution available throughout the whole country.

[239] Specific consultation answered by CNMC, 28 September 2018.

# Croatia

| | Croatia | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **97%**<br>2016 | **99%**<br>2017 | **>99.5%**<br>2018 | ***8*** | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **70%**<br>2016 | **70%**<br>2017 | **72%**<br>2018 | ***19*** | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **67%**<br>2016 | **73%**<br>2017 | **94%**<br>2018 | ***19*** | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **78**<br>2016 | **82**<br>2017 | **84**<br>2018 | ***21*** | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA** | **NA** | **0%**<br>2018 | ***13*** | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **60%**<br>2016 | **68%**<br>2017 | **83%**<br>2018 | ***20*** | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **7%**<br>2016 | **14%**<br>2017 | **19%**<br>2018 | ***26*** | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA** | **35%**<br>2017 | **39%**<br>2018 | ***26*** | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **0%**<br>2016 | **1%**<br>2017 | **5%**<br>2018 | ***26*** | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **56**<br>2016 | **63**<br>2017 | **72**<br>2018 | ***26*** | **87**<br>2017 |

## 1. Progress towards a gigabit society

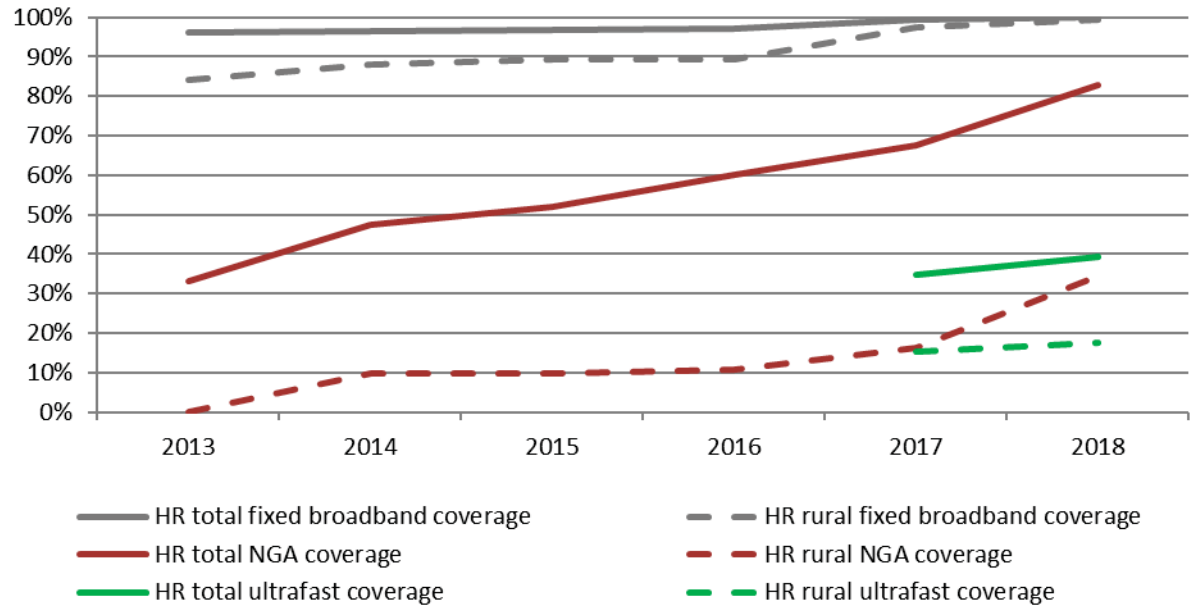
Croatia reached 100 % fixed broadband coverage for all households (both total and rural) in 2019. On next generation access (NGA) coverage, Croatia improved by 15 p.p. compared to 2018, reaching the EU average of 83 %. However, significant regional differences in NGA coverage persist. Croatia modestly improved its ultrafast broadband coverage, but remains significantly behind the EU average. On total ultrafast coverage, Croatia is 20.5 p.p. below the EU average, while ultrafast coverage in rural areas reached 17.4 %, still below the EU average of 29.2 %.

On fibre to the premises (FTTP), Croatia continued to increase coverage, but coverage remains below the EU average. More than half of Croatia's ultra-fast broadband lines are FTTP. On rural coverage, Croatia reached 3.7 % % in comparison to marginal coverage of 0.2 % that it had in 2017, closing still significantly below the EU average (14.1 %).

Currently, there are no investments in ultra-fast networks in areas of no commercial interest. According to the Croatian authorities, the reasons for that are low demand mostly caused by unfavourable demographic situation and low economic activity in general in these areas. However, in some urban areas, there is parallel NGA infrastructure, and there are signs that infrastructure-based competition is starting to develop.

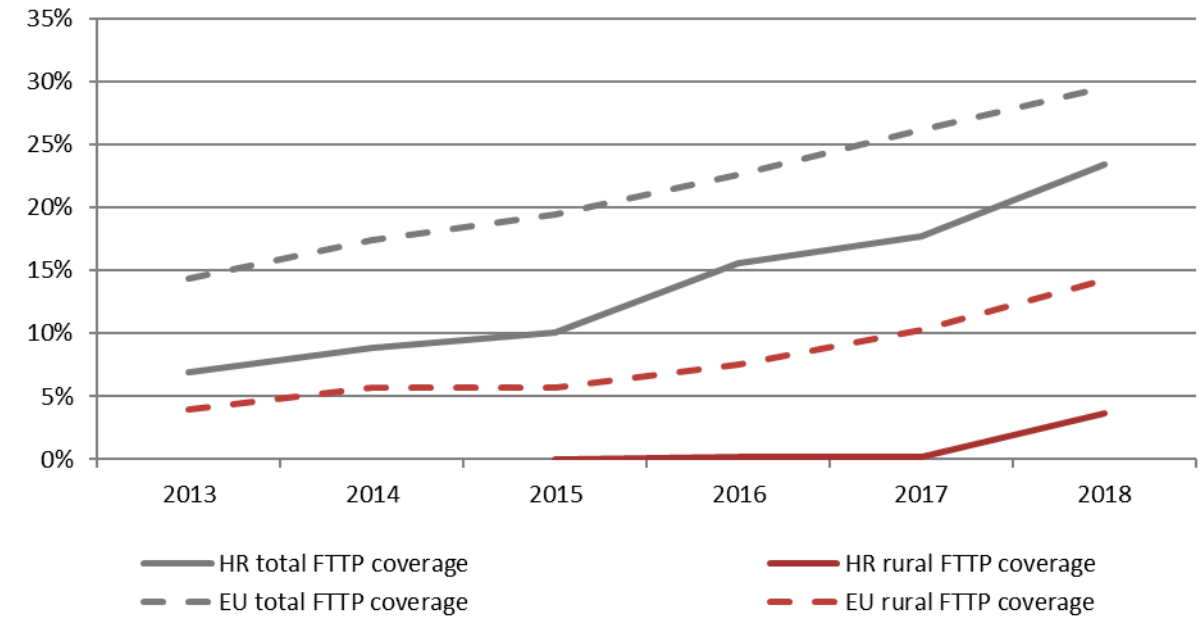
There are two national, EU-co-financed NGN schemes in Croatia: the Framework national programme for the development of broadband access infrastructure (ONP) and the National programme for backhaul broadband infrastructure development (NP-BBI). For the implementation of ONP, there is €123 million available from the European Regional Development Fund (ERDF), and for the implementation of NP-BBI there is €101.4 million available, of which €86.2 million is being provided by the ERDF. Both programmes focus on areas where high-speed connectivity is neither available nor planned due to a lack of commercial interest.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

**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.*

The Ministry of Regional Development and EU funds is responsible for the ONP as intermediary body 1240 and HAKOM is responsible as a competent authority for ONP at national level. The public call

[240] According to Article 123 of Regulation EU 1303/2013, a Member State may designate one or more intermediate bodies to carry out certain tasks of the managing or the certifying authority under the responsibility of that authority. In particular, managing authority of the Operational Programme Competiveness and Cohesion has designated different bodies as

for state aid within the ONP was expected by the end of 2018 but it was published on 19 March 2019.241 By the end of Q3 of 2018, there were 68 new projects covering white areas in 448 municipalities expected to apply on the public call in 2019[242].

In April 2018, the Croatian government finally adopted the NP-BBI programme, which was already approved under the EU state-aid rules in June 2017. According to a government decision, company OiV is responsible for technical implementation of the programme, and the Directorate-General for Strategic Planning and EU funds of the Ministry of the Sea, Transport and Infrastructure (hereinafter: the MSTI) is designated as CAB.

Although all funding was made available, no significant implementing measures were undertaken in 2018. Therefore, the implementation of both programmes is seriously delayed and the milestones are being postponed, putting at risk the absorption of available funds. Apart from the ONP, there are no other specific programmes in place that target rural and underdeveloped areas. It appears that the government is relying solely on the ONP to bridge the digital gap between urban and rural areas. It follows that the goals set for 2020 for NGA coverage will be hard to achieve.

The current national development strategy for broadband access is not aligned with the objectives of the gigabit society. However, preparatory work to achieve this alignment has already started. Work has also begun on the development of the draft national development strategy for 2030. An independent evaluation of the implementation of the strategy (hereinafter: 'the Study') was conducted in 2017 and 2018[243]. The results of the Study led the MSTI to decide to revise the strategy primarily to align it with the targets in the gigabit society. Some of the proposed actions have already been implemented.

In the WiFi4EU first call, 224 eligible entities from Croatia each won vouchers for €15,000.

In 2018, Croatia introduced additional measures to make it more attractive for operators to invest in the deployment of 5G networks and services[244]. In June 2018, Croatia abolished the one-off fees for the use of radio spectrum for public mobile networks amounting to HRK 150 m. per mobile network operator, for each new frequency band. In November 2018, the amount of the annual fee for the use of the radio frequency spectrum was further reduced for all three operators by 50 %, reducing the amount to the levels that have been used in 2014. A 5G working group was also set up that consisted so far of Croatian national regulator (HAKOM) and operators. The aim of the 5G group is to identify possible challenges and barriers to 5G deployment. Other institutions and industry bodies are also starting to get more involved in the working group. However, a deployment roadmap or strategy for 5G has not yet been adopted. An action plan for the deployment of 5G will be a part of the revised national broadband strategy that is planned for Q4 2019.

Limited 5G trials that began in 2017 continued in 2018. In summer 2018, HT and A1 reported tests of 5G. In June 2018, HT's first test-network operating in the 3.5 GHz spectrum band was implemented with the pre-installed 5G system. HT expects the first 5G commercial networks to be operational in 2020. In July 2018, in its presentation of 5G technology, A1 demonstrated for the first time its fully functional 5G equipment with a data transfer rate of over 20 Gbps.

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intermediate bodies to perform certain tasks for the managing authority. In this particular case there are two levels of IBs, the first layer is mostly in charge of preparation, launching the calls for proposals and selecting projects whereas the second layer is comprised of institutions, mainly agencies, working directly with the beneficiaries in grant contract implementation.

[241] Available at: https://strukturnifondovi.hr/natjecaji/javni-poziv-za-iskaz-interesa-za-sudjelovanje-u-postupku-pred-odabira-na-temelju-odobrenih-planova-razvoja-sirokopojasne-infrastrukture-a-vezano-za-odabir-prihvatljivih-prijavitelja-te-ispunjavanje-k/.

[242] The prior technical evaluation of the projects was carried out by HAKOM, therefore the number is known.

[243] Study is available at: http://www.mppi.hr/default.aspx?id=3625.

[244] In December 2017, Croatia reduced the amount of the annual fee for the use of the radio frequency spectrum for all three operators by one third.

A1's project 'Croatian multi-gigabit islands – the examples of Rab & Cres' was a finalist in the European Broadband Awards 2018 in the 'territorial cohesion in rural and remote areas' category. The project's goal was primarily to provide multi-gigabit connectivity from the mainland to the remote island areas of Rab and Cres through a hybrid solution that used optical links and microwave radio links[245].

Commercial fiber to the home (FTTH) deployment continued in 2018, and 67 new rollouts of optical fibre distribution networks covering 49,725 households (and other potential users) were announced; rollout is planned to start in 2018. A1 continued its FTTH roll out in 2018 (41,220 covered users in 2018 compared to 38,293 in 2017). The incumbent slowed down its rollout significantly with seven new optical fibre distribution networks covering only 8,505 users in 2018 compared to 26,114 in 2017. However, HT continued the reconstruction of its copper network by building street cabinets and new nodes. Since the beginning of 2018, HT has built 44 new cabinets and nodes (combined), and it has implemented — or is planning to implement — vectoring on all of these. HT started to test G.fast technology on fibre to the business (FTTB) networks, and expects commercial deployment to start in 2019.

## 2. Market developments

Due to the consolidation[246][247] in the market in recent several years, the Croatian telecommunications market is now strongly consolidated. The incumbent HT and A1 (the second largest operator) dominate the fixed market. Overall, there were no major changes of market share in the past year. The entry of a strong new operator could increase competition, bringing benefits such as greater choice for users, price declines, and improvements in quality, just as the entry of TELE2 Croatia to the mobile market did.

There are two wholesale-only broadband network operators in the market. Digital City is present only in the city of Zagreb, and Infrastruktura is active in few smaller cities. Having limited coverage, both wholesale-only operators cannot significantly affect the market.

Although mobile telephony penetration is almost 102.3 % in Croatia, 78 % of households continue to have a fixed-telephone-network subscription. It therefore appears that Croatian end-users are not substituting their fixed line with a mobile subscription.

The number of users of bundled services continued to grow. Apart from '2-play' (internet and mobile) and '3-play' (internet, mobile and TV) bundles, there are also offers for '4-play' bundles of services (including fixed telephone network, internet, TV and mobile). More than half of all bundle subscriptions in Croatia include TV/content services. It appears that the TV/content services are one of the main drivers for subscribing to a bundle, due to the savings that end-users can benefit from. It is expected that this TV/content market segment will continue to grow. The pay-TV market in Croatia[248] continues to grow in 2018: its customer base increased by 4 % compared to 2017. Around 28 % of pay-TV subscribers have an IPTV subscription. The HT group has a 55 % share of the pay-TV market.

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[245] https://ec.europa.eu/digital-single-market/en/content/croatian-multi-gigabit-islands-examples-rab-cres-croatia.

[246] In 2006, HT acquired Iskon Internet. In June 2014, HT took over management of Optima Telekom. In October 2015 A1 (under former name of VIPnet) merged with Amis Telekom. In 2017, Optima Telekom merged with H1 Telekom, and A1 (under former name of VIPnet) acquired local alternative telecommunications operator Metronet Telekomunikacije.

[247] In June 2014, Croatian incumbent HT took over management of alternative fixed network operator Optima Telekom following the completion of the pre-bankruptcy settlement procedure and the adoption and registration of the decisions by the General Assembly of Optima Telekom. The Croatian Competition Agency (AZTN) ruled that the duration of the concentration of HT and Optima Telekom shall be limited to a period of four years, starting from HT's acquisition of control. On 9 June 2017, AZTN approved a prolongation of the HT's management rights over Optima Telekom until 10 July 2021. The incumbent must commence with the transparent, objective and non-discriminatory sale procedure of its shares held in Optima in January 2020 via a competitive international call for tender. The sales procedure should be prepared by 1 July 2019 and preference will be given to a potential buyer that is not yet present in the Croatian market.

[248] IPTV, SATTV, cable reception, digital terrestrial reception.

In July 2017, Slovenia Broadband announced that it planned to acquire Nova TV in Croatia. On 26 March 2018, the Croatian Competition Agency cleared the merger between Slovenia Broadband and Nova TV after the Electronic Media Agency assessed the merger as 'admissible' under the special provisions of the Electronic Media Act. The acquisition of Nova TV was completed in July 2018 for €86.4 million.

In November 2018, HT announced the acquisition of 100 % of HP Produkcija, the owner and operator of Evotv, which had a 6 % share of the pay-TV market in Croatia. Evotv has been in operation since 2012, and has been gaining market share since its entry to the market, becoming the third-largest pay-TV operator due to its wide availability. Evotv is widely available because it does not use traditional infrastructure. Instead, it uses digital terrestrial reception via free-to-air technology, allowing it to easily reach rural areas and islands. This means that it can already reach 94 % of households. HT uses the IPTV and SATTV technologies to broadcast its pay-TV services. In January 2019, HAKOM decided to launch an in-depth investigation into HT's acquisition of Evotv, as its preliminarily assessment showed that the acquisition could have a significant effect on the pay-TV market. HAKOM also considered whether the negative effects that could follow approval of the acquisition could override the possible positive effects and thereby significantly distort competition. However, on 27 February 2019 HAKOM approved[249] the acquisition provided certain conditions were met to eliminate any potential negative effects that the acquisition might have on competition[250].

### 2.1. Fixed Markets

There was no new consolidation in 2018 in the fixed market. Seven new operators submitted prior notification for provision of electronic telecommunication services on the fixed telephony market.

In the fixed market, HT (the incumbent and a part of the Deutsche Telekom Group), its affiliated company Iskon (100 % owned), and Optima Telekom (HT has control over Optima Telekom), continue to have a stable and high market share. These three companies account for 76 % of the fixed voice market, 69 % of the fixed broadband market, and 55 % of the pay-TV market. With the recently approved acquisition of Evotv, HT further increased its market share in the pay-TV market. HT also dominates the business market, with a 67 % share of the market for business users in fixed telephony services and a 70 % share of the market for business users in fixed broadband.

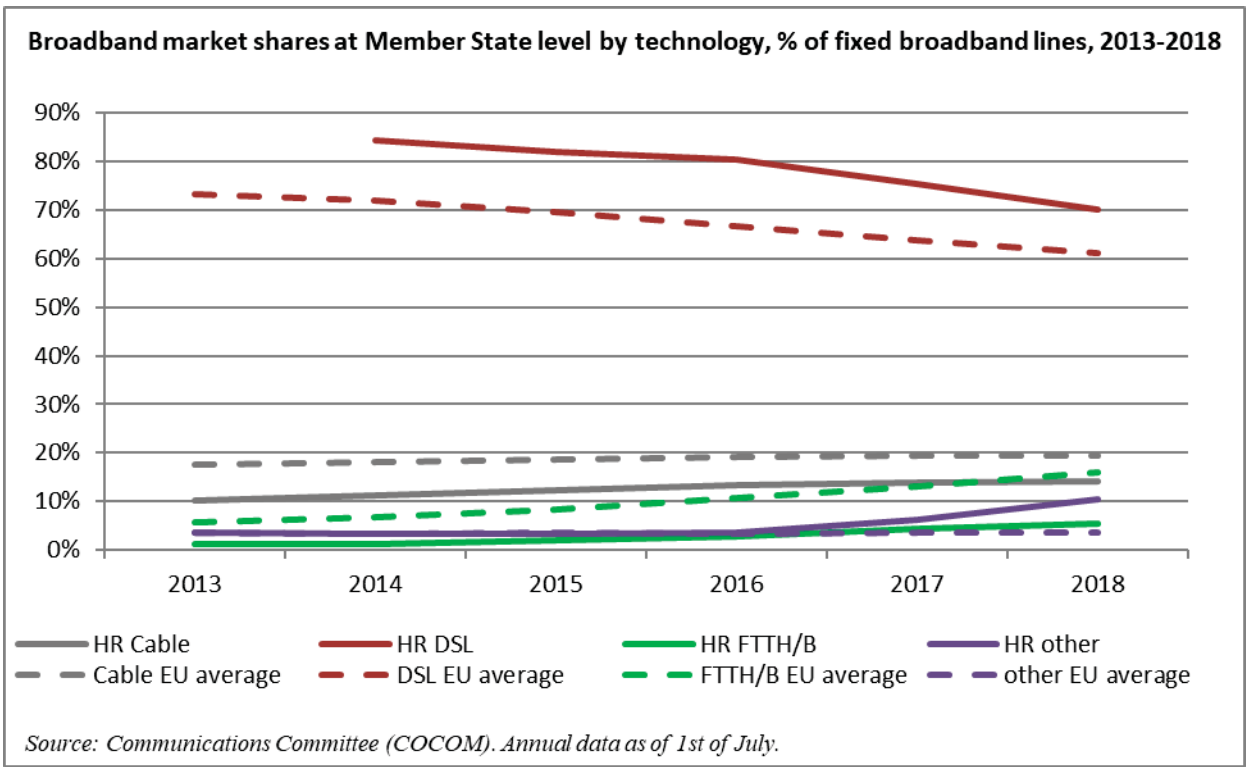
The Croatian fixed broadband market continued to grow at an annual rate of 3 % in 2018, reaching 1.11 million fixed broadband connections at the end of July 2018.

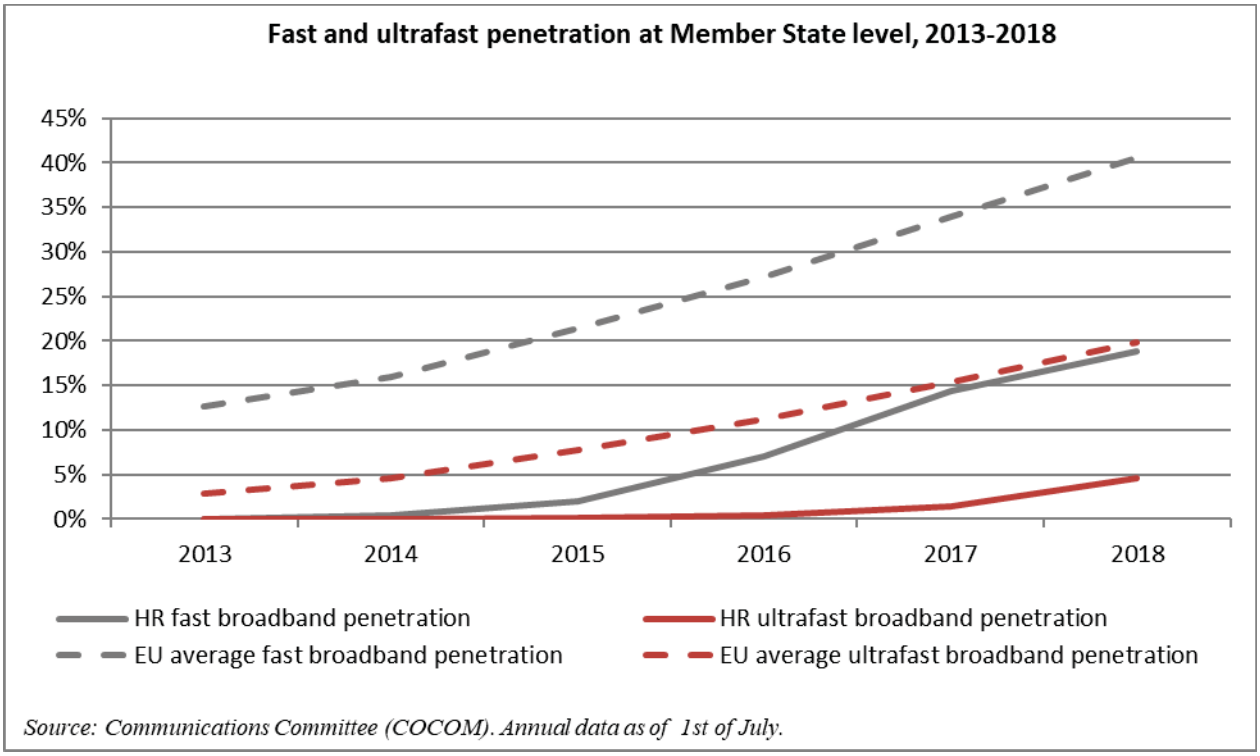
DSL remains the dominant technology for the delivery of broadband access services in Croatia, but its decline continued at a similar pace as the EU average. In Croatia, there is modest competition from cable networks and FTTH/B technology.

Consequently, FTTH take-up increased from a marginal level in 2017 to 5.3 % coverage in 2018.

The transition to fast broadband connections is slower than in other EU Member States, with Croatia ranking 26th out of 28 for fast broadband take-up in 2018. Fast broadband penetration increased from 14.4 % in 2017 to 18.8 % in 2018, a level that is still less than half the EU average of 40.6 %. The penetration of ultrafast broadband increased from 1.4 % to 4.6 %, remaining significantly below the EU average of 19.9 %.

[249] Thresholds set in the Croatian Competition Act (Article 17) were not cumulatively met. Therefore, according to the Croatian Act on Electronic Communications (Article 68), HAKOM was competent to assess the notification.
[250] Decision available here: https://www.hakom.hr/UserDocsImages/2019/odluke_rjesenja_presude/Odluka-Kona %C4 %8Dno %20rje %C5 %A1enje %20mjere %20-EVO %20TV-20190227 %20v %201.0..pdf.

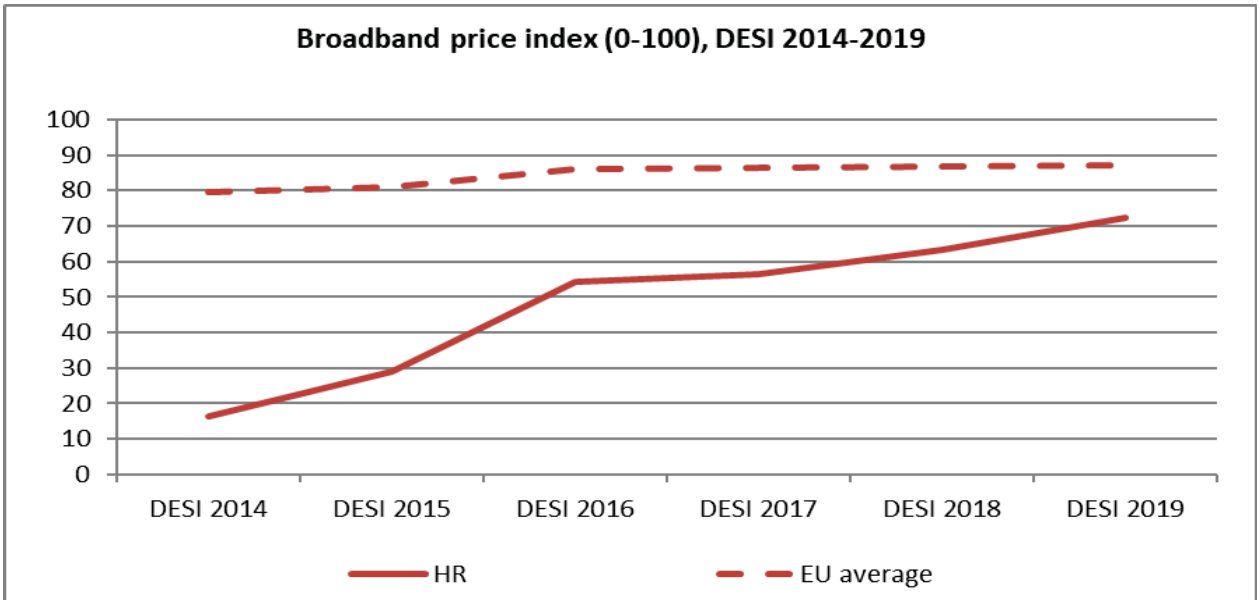



Despite HAKOM's 2017 analysis that concluded that there were no legal or regulatory obstacles to co-investment, there were no co-investment agreements for the rollout of fixed broadband lines or any co-investment initiatives in 2018. Additional incentives could be explored.

Fixed broadband prices in Croatia are in general higher than the EU average, but they continued to decline in 2018[251].

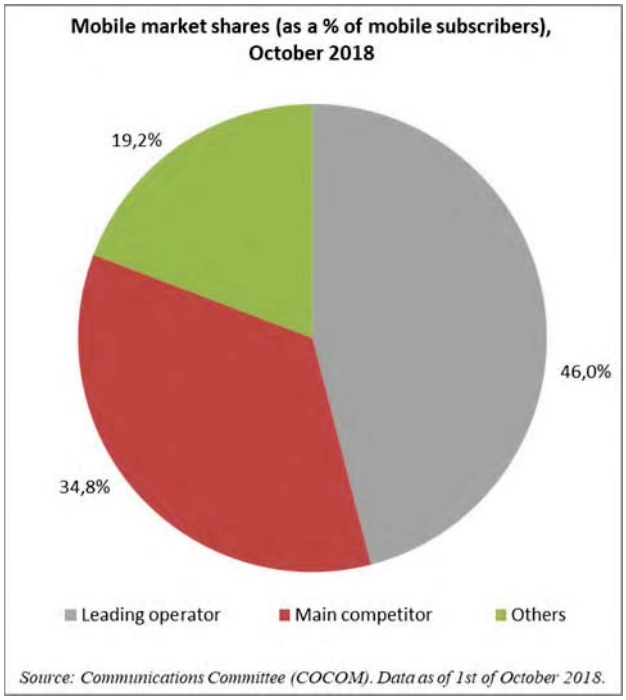
[251] The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets

There are three mobile network operators (MNOs) that compete in the Croatian mobile market, and this is reflected in the increasing affordability of handset offers.




*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

As of October 2018, the leading mobile operator in Croatia had a 46.0 % share of the market for mobile subscribers. With 34.8 %, its main competitor followed, while the remaining operator served 19.2 % of the subscribers.

The number of mobile subscribers increased 1 % year-on-year. There was a decline in the prepaid market, while the post-paid subscriber base continued to grow, continuing the general shift in the market from prepaid to post-paid.

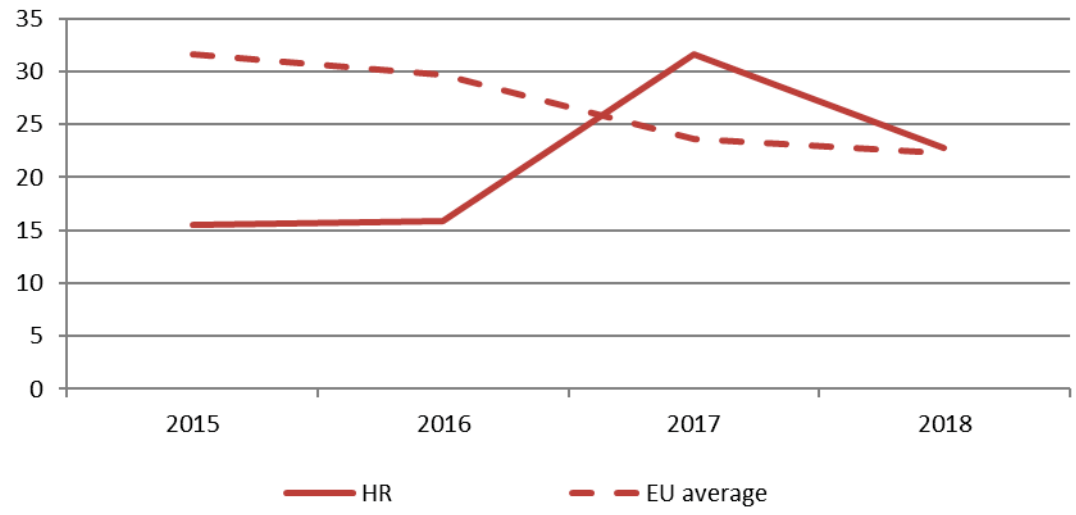
Several MVNOs are registered, but according to HAKOM none of them are actually providing services. Over-the-top (OTT) players (such as Skype, WhatsApp, Viber, etc.) have a significant influence on the mobile market. In the first six months of 2018, SMS traffic volume declined by 13 % in comparison to the same period in 2017. However, mobile voice services are not declining. On the contrary, use of mobile voice services increased by 3.01 % in the same period. By the end of June 2018, mobile users in Croatia had already consumed 75 % of the total mobile data traffic they consumed in 2017.

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.

Croatia significantly improved its performance in terms of 4G coverage reaching the EU average of 94 % in 2018. All three mobile operators offer 4G services with competitive packages. For mobile broadband, in 2018, there were 84 subscriptions per 100 people252, a figure that is still below the EU average of 96 subscriptions per 100 people. The reason for this might be that Croatian users are still not substituting mobile subscriptions for their fixed line (78 % of all households have a subscription to the fixed telephone network). Currently there are no plans to phase-out 2G or 3G.

Prices for mobile broadband continued to fall in 2018, and are now at the same level as the EU-28 average.

**Least expensive offer for handset (1 GB + 300 calls basket) at Member State level, EUR/PPP, 2015-2018**




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

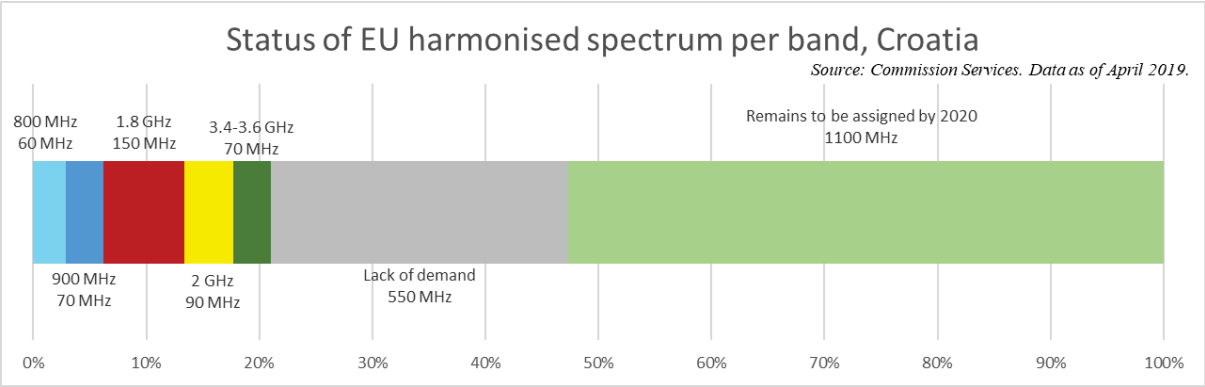
## 3. Regulatory developments

### 3.1. Spectrum

Croatia has assigned 440 MHz (which is 21.1 % of the spectrum harmonised at EU level) for wireless broadband[253]. This is below the EU average of 39 %. No auctions of spectrum took place in 2018. In the 3,400-3,594 MHz band, 124 MHz is available but not used. After 4 November 2023, the whole band will be available countrywide. The 3.594-3.8 GHz band will be available countrywide after 31 December 2020 (122 MHz is already available). Available spectrum in both bands is not in a contiguous block.

The spectrum that remains to be assigned is in the 700 MHz, 2.6 GHz, 3.6-3.8 GHz, and 26 GHz bands. A review of spectrum assignment in pioneer bands is in the internal reflection phase[254]. The timely assignment of the pioneer bands could improve prospects for wireless connectivity.

[252] All active users in July 2018.
[253] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.
[254] 5G Observatory Report 2 (up to December 2018), European 5G Observatory, prepared by IDATE. Available here: http://5gobservatory.eu/wp-content/uploads/2019/01/80082-5G-Observatory-Quarterly-report-2-V2.pdf.




In November 2018, the Commission sent a letter of formal notice to Croatia because it did not adopt a national plan — and did not decide any specific date — for the start and completion of the assignment process of the 700 MHz band for wireless broadband electronic communications services in compliance with the deadline set by Decision 2017/899[255].

At the end of 2017, coordination agreements with neighbouring countries had been signed, but local television plans and the transition period were still to be negotiated. Croatian authorities report that, from experience, the timing of transition in the neighbouring non-EU countries (Serbia, Bosnia and Herzegovina, and Montenegro) would largely determine whether it would be possible to use the 700 MHz band spectrum for mobile services in Croatia. In addition, there is still unresolved interference from Italian TV stations with coordinated Croatian channels, which will influence the availability of the sub-700 MHz band for Croatian TV stations.

In June 2018, Croatia abolished the one-off fees for the use of radio spectrum for public mobile networks amounting to € 2m. per mobile network operator, for each new frequency band. In November 2018, the annual fee for the use of the radio frequency spectrum was further reduced for all three operators by 50 %, reducing the amount to the levels that have been used in 2014.

In February 2019, Croatia notified that it had fully implemented Decision (EU) 2017/1483 (Short Range Devices - SRD)[256].

### 3.2. Regulated access

In February 2018, HAKOM issued conditions for IP interconnection. They contained technical details on IP interconnection with mobile networks in the market for wholesale voice-call termination on individual mobile networks (market 2 of the 2014 Commission Recommendation on relevant markets[257]). Croatia's draft decision on IP interconnection had previously been notified to the Commission and the Commission did not comment.

In February 2018, HAKOM also issued the Decision amending the reference offer for the wholesale central access market (market 3b of the 2014 Commission Recommendation on relevant markets[258]). In the Decision, HAKOM set: (i) the monthly fee for wholesale broadband access (WBA) based on

[255] Decision (EU) 2017/899 of the European Parliament and of the Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union, *OJ L 138, p. 131.*
[256] Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC, OJ L 214, 18.8.2017, p. 3–27.
[257] Commission Recommendation 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, pp. 79-84.
[258] *Ibid.*

fibre to the distribution point (FTTDP)[259]; and (ii) detailed arrangements (obtaining customer agreements, discounts) in cases where HT's active equipment is powered by means of return power supply. The draft decision was previously notified to the Commission and it did not comment.

Additionally, in February 2018, the Commission registered a notification from HAKOM on amendments to the symmetrical regulation on access to fibre distribution networks (market for wholesale local access at a fixed location, market 3a of the 2014 Commission Recommendation on relevant markets). HAKOM proposed to repeal the Ordinance on optical fibre distribution networks imposing obligations on all operators in Croatia who deploy optical fibre distribution networks (terminating segment of FTTH access network). In response to this notification, the Commission issued a comment on the need to ensure effective access to the fibre terminating segment in Croatia. In particular, the Commission invited HAKOM to reconsider its plans to repeal the Ordinance, and said that Croatia should keep the objectives that were set in 2014 to ensure effective access to the fibre terminating segment. Finally, HAKOM did not repeal the Ordinance in question.

In May 2018, HAKOM issued a Decision on three criteria for testing and analysing the market for access to the public telephone network at a fixed location (market 1 of the 2007 Commission Recommendation on relevant markets[260]). Market review was previously notified to the Commission. The Commission issued a comment on the commercially negotiated prices for wholesale line rental bundled with other wholesale access services. In this comment, the Commission asked HAKOM to monitor whether access seekers, in particular those who are independent from HT, could acquire wholesale line rental bundled with other wholesale services, if they so demand, on fair and reasonable terms. The Commission asked HAKOM to ensure that there was no margin squeeze between HT's (and its affiliated companies) wholesale and retail offers.

In October 2018, HAKOM issued a provisional measure on the margin squeeze test. The measure was applicable only for the prolongation of the deadline for the notification to HAKOM of retail prices on markets 3a and M3b (from 8 to 20 days prior to the application). This provisional measure was not notifiable under Article 7 of the Framework Directive[261].

In November 2018, the Commission registered a notification from HAKOM, concerning call origination on the public telephone network provided at a fixed location (market 2 of the 2007 Commission Recommendation on relevant markets). Since the market for fixed call origination is no longer listed in the 2014 Recommendation on relevant markets, HAKOM conducted the three-criteria test[262]. HAKOM found that the criteria were cumulatively met, and therefore concluded that the market was still susceptible to ex ante regulation. In response, the Commission commented on the need to: (i) further substantiate the SMP finding in the final measure; and (ii) closely monitor developments in the market for wholesale fixed call origination.

On 15 January 2019, the Commission registered a notification from HAKOM concerning the markets for wholesale call termination on individual public telephone networks provided at a fixed location

[259] The fibre is extended to the last distribution point, usually located approximately 300 m from the relevant building. The remaining part of the network consists of copper elements.

[260] Commission Recommendation 2007/879/EC of 17 December 2007 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 (2007 Recommendation on Relevant Markets), OJ L 344, 28.12.2007, p. 65.

[261] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), OJ L 108, 24.4.2002, p. 33, as amended by Directive 2009/140/EC, OJ L 337, 18.12.2009, p. 37, and Regulation (EC) No 544/2009, OJ L 167, 29.6.2009, p. 12.

[262] According to the 2014 Recommendation on Relevant Markets, the three-criteria test is carried out to determine whether: (i) the markets defined are characterised by high non-transitory barriers to entry, (ii) the markets defined lack a tendency to effective competition, and (iii) competition law is insufficient to address identified market failures.

and wholesale voice call termination on individual mobile networks (markets 1 and 2 of the 2014 Commission Recommendation on relevant markets). In response, the Commission issued a comment on the efficient level of termination rates, asking HAKOM to: (i) consider updating the current model with readily available and more up-to-date input data (i.e. traffic volumes); and (ii) assess the pertinence of the outcomes to the transition to the Eurorate, which must take into account the weighted average of efficient costs in the EU.

HAKOM resolved four regulatory disputes.

Most of the provisions of Directive 2014/61/EU[263] (the Broadband Cost Reduction Directive – BBCRD) have been transposed in Croatia through amendments to the Electronic Communications Act and the Act on Measures to Reduce the Cost of Deploying High-Speed Electronic Communications Networks.

The main competent authority for the implementation of this Directive is the Croatian national regulatory agency HAKOM, which ensures compliance with many requirements under this Directive, such as the national dispute settlement.

However, the central state administration body for construction and spatial planning, the State Geodetic Administration[264] (SGA), is the competent body for the creation and operation of a centralised Single Information Point (SIP). Contractors are obliged to announce planned and ongoing civil works on the website of the State Geodetic Administration. SGA set up a portal[265] for the purpose of SIP, but it is not yet fully functional.

Some examples of joint usage of infrastructure across sectors was reported, such as the use of physical infrastructure (poles) of the electrical distribution networks by telecom operators for deployment of high-speed networks.

The study on the implementation results of the strategy concluded that the implementation is divided between several public bodies[266], but that none of these bodies is competent to holistically monitor the implementation of the BBCRD. Another issue that was discovered is that nobody has been appointed to inform the stakeholders, such as network providers and building co-owners and their representatives.

**4. End-user matters**

HAKOM received 1,556 complaints and 1497 complaints have been resolved as disputes between end-users and their operators[267]. The main source of consumer complaints were terms of contracts, followed by disputes over bills, quality of service, and special tariff services.

Legal obligations on the summary of essential contract information did not change. However, a working group for amendments was set up. This working group covers new obligations for operators on contract transparency.

According to the 2018 Consumer Markets Scoreboard, Croatia is assessed poorly by consumers for its fixed telephone services (ranking 20th out of 25 services assessed in Croatia), with as many as 9.5 percentage points below the market's EU average score[268]. Equally, the markets for mobile telephone services and internet provision did not show an improvement in their market performance indicator

[263] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks, Text with EEA relevance, OJ L 155, 23.5.2014, pp. 1-14.
[264] Državna geodetska uprava.
[265] https://e-obavijesti.dgu.hr/.
[266] Ministry of f the Sea, Transport and Infrastructure, HAKOM, Ministry of Construction and Spatial Planning and State Geodetic Administration.
[267] Data until 1 November 2018.
[268] Consumer Markets Scoreboard 2018 Edition, p. 126.

score between 2015 and 2017 and stand 8.4 and 6.1 percentage points below the markets' respective EU average scores.

### a. Net neutrality

There were two cases in 2018. HAKOM carried out one formal assessment of a possible violation of Article 3(3) of Regulation 2015/2120/EU, concerning technical discrimination of traffic as part of the tariff option 'StreamOn' put on the market by the incumbent. The 'StreamOn' offer also involves traffic management measures, as bandwidth for video streams was throttled to a maximum of 2 Mbps (480p). This constituted unequal treatment of data traffic, and was therefore assessed under Article 3(3) of the Regulation. Upon HAKOM's intervention HT voluntarily aligned its offer with the Regulation, so no formal decision was taken. HAKOM also assessed the tariff option 'GO Video streaming' from the A1 operator, another zero-rating offer. The 'GO Video streaming' offer also involved traffic management measures, as bandwidth for video streams was throttled to a maximum of 0.9 Mbps (480p). This constituted unequal treatment of data traffic, and was therefore assessed under Article 3(3) of Regulation. A1 undertook to change the terms of service until the end of March 2019 to comply with the Regulation.

### b. Roaming

HAKOM has not identified any case of confirmed or potential non-compliance with the RLAH rules, which have been in force since June 2017.

In Croatia, demand for roaming services continues to grow[269]. BEREC data also show clear evidence of seasonal tourist movements in Croatia. The reported data indicate that traffic for calls made grew by 4.8 % in Q1 2018, compared with Q1 2017[270]. Croatian end-users consumed 18.2 times more roaming data in in Q1 2018 than in Q1 2017[271].

### c. Emergency communications - 112

According to the 2018 Communications Committee (COCOM) 112 Implementation Report, calls to the emergency number 112 are answered within 5.2 seconds and 92 % of all calls are answered within 10 seconds[272]. The Commission is currently looking into the functioning of emergency communications and the 112 number in Croatia, focusing particularly on instant provision of caller location and equivalent access to emergency services.

## 5. Institutional issues

In 2018, HAKOM cooperated with AZTN in the supervision of HT's managing rights over Optima Telekom[273].

On 11 July 2018, the High Administrative Court rejected a complaint submitted by A1 (formerly known as VIPnet)[274]. The Court sided with HAKOM's argument that an operator may ask for changes in regulatory obligations, including prices, set out in its final decision only if it provides prima facie evidence that circumstances have significantly changed. Otherwise, the operator may not ask for a change of the final decision issued in proceedings where public consultations had been held and where the operator in question had had an opportunity to provide comments.

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[269] International Roaming BEREC Benchmark Data Report October 2017 - March 2018, BoR (18) 160, Date of registration: 10.10.2018, https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8251-international-roaming-berec-benchmark-data-report-october-2017-march-2018

[270] Figure 31 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[271] Figure 72 of the International Roaming BEREC Benchmark Data Report October 2017 - March 2018.

[272] Implementation report is available here: https://ec.europa.eu/digital-single-market/en/news/2018-report-implementation-european-emergency-number-112.

[273] On 9 June 2017, the incumbent HT's management rights over Optima Telekom were prolonged until 10 July 2021.

[274] Case UsII-24/17-6.

In DESI 2018, it was reported that many operators complained about the excessive right-of-way fee charged by local municipalities. The calculation and the amount of the fees are set in HAKOM's Ordinance on confirmation and compensation for the right of way[275], which sets the fee. In the meantime, HAKOM initiated discussions with relevant stakeholders on possible future regulation of the right-of-way fees. HAKOM has also opened a public consultation on the Ordinance[276]. Operators have welcomed this initiative, but remain cautiously optimistic.

## 6. Conclusion

In 2018, some slow progress was achieved. However, it has not been sufficient to increase Croatia's DESI ranking for connectivity Croatia could speed up the rollout of the approved EU-funded access and backhaul networks to avoid the risk of losing EU funds. While the reduction of fees for the use of radio-spectrum is a positive development, Croatia still lacks a dedicated comprehensive strategy for 5G deployment and a roadmap for the timely assignment of the pioneer bands, both of which could improve its prospects for improving its wireless connectivity.

[275] Ordinance on confirmation and compensation for the right of way, Croatian Official Journal 152/2011, 151/2014, 95/2017.
[276] Public consultation was closed on 6 December 2018.

# Italy

| | Italy | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage** | **99%** | **99%** | **>99.5%** | ***9*** | **97%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1a2 Fixed broadband take-up** | **55%** | **57%** | **60%** | ***24*** | **77%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1b1 4G coverage** | **86%** | **91%** | **97%** | ***13*** | **94%** |
| % households (average of operators) | 2016 | 2017 | 2018 | | 2018 |
| **1b2 Mobile broadband take-up** | **85** | **86** | **89** | ***17*** | **96** |
| Subscriptions per 100 people | 2016 | 2017 | 2018 | | 2018 |
| **1b3 5G readiness** | **NA** | **NA** | **60%** | ***2*** | **14%** |
| Assigned spectrum as a % of total harmonised 5G spectrum | | | 2018 | | 2018 |
| **1c1 Fast broadband (NGA) coverage** | **72%** | **87%** | **90%** | ***10*** | **83%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1c2 Fast broadband take-up** | **7%** | **12%** | **24%** | ***23*** | **41%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1d1 Ultrafast broadband coverage** | **NA** | **22%** | **24%** | ***27*** | **60%** |
| % households | | 2017 | 2018 | | 2018 |
| **1d2 Ultrafast broadband take-up** | **1%** | **5%** | **9%** | ***24*** | **20%** |
| % households | 2016 | 2017 | 2018 | | 2017 |
| **1e1 Broadband price index** | **90** | **88** | **91** | ***6*** | **87** |
| Score (0 to 100) | 2016 | 2017 | 2018 | | 2017 |

## 1. Progress towards a gigabit society

The national ultra-broadband (UBB) plan originally published in March 2015 has been periodically updated: in particular, following reviews of the investment plans of private operators resulting from public consultations, the public intervention areas were re-modulated accordingly.

On 19 December 2018, Open Fiber was officially awarded the third public tender (value: €103 million) launched by Infratel to roll out high-speed broadband in white areas (clusters C&D of the ultra broadband plan) in Calabria, Puglia and Sardinia. Open Fiber will be required to install services providing download speeds of 100 Mbps and upload speeds of 50 Mbps to 296 000 premises and 378 000 people in the selected localities.

In the context of the first two tenders, Open Fiber opened around 950 worksites; in 40 works have been finalised. Nevertheless, trials to provide active and passive services have been launched in only four municipalities with a view to commercialising the network on a large scale in the future[277].

In April 2019, Open Fiber launched a call for interest for the wholesale services provided by the company in 141 Municipalities covered by the publicly funded network (the consultation will finish at the end of May).[278]

With regard to investigation launched in 2017 by the Italian Competition Authority (AGCM) against Telecom Italia (TIM) for abuse of dominant position *inter alia* for conducts adopted in the context of the implementation of the Italian Ultra broadband (UBB) strategy, in July 2018 TIM presented some commitments aimed at eliminating the risk of anti-competitive behaviour at stake, and in October 2018 AGCM decided to postpone the closure of the proceeding to 31 May 2019.

[277] https://openfiber.it/it/fibra-ottica/comunicati/open-fiber-collegati-primi-clienti-della-rete-interamente-fibra-ottica-nelle-aree-dei-bandi-infratel

[278] https://openfiber.it/it/fibra-ottica/area-infratel/aggiornamenti-e-news/consultazione-nodi-apr-19

In April 2018, the new 'Investment Plan in grey areas' has been published and submitted to public consultation; the consultation ended in May 2018 and the Italian authorities are currently assessing and choosing the necessary intervention model to be notified to the European Commission.

Regarding profitable areas (clusters A&B of the UBB plan), by September 2018 3.3 million households. were passed by Open Fiber. Open Fiber's goal is to provide coverage to 271 cities (9.5 million households) by 2023[279].

In April 2018, Open Fiber adopted its industrial plan for 2018-2027 that includes investments for more than €6.5 bn and aims to bring fibre to the home (FTTH) to some 19 million homes and businesses.

In August 2018, Open Fiber obtained a €3.5 bn finance package, with support from banks (led by UniCredit, Societe Generale, and BNP Paribas), Deposits and Loans Fund (*Cassa Depositi e Prestiti*) and the European Investment Bank, to roll out ultrafast broadband[280].

Open Fiber started offering VULA and passive access services (ULL fibre on the GPON[281] network) at the beginning of 2017 and Bitstream FTTH services at the beginning of 2018.

Flash Fiber, the joint venture between TIM and Fastweb launched in July 2016, is currently deploying a FTTH network in 29 main cities. The availability of Flash Fiber's services can be monitored on the relevant website[282].

In the context of the investigation proceeding on Flash Fiber launched by AGCM at the beginning of 2017 and aimed at verifying possible competition restrictions connected with the co-investment agreement between the parties, TIM and Fastweb presented a commitments proposal, articulated in six remedies. AGCM accepted with some modifications the commitment proposal in March 2018, thus closing the investigation.

Some of these commitments (commitments 2 and 3) are supposed to have a significant impact on the rollout of fixed broadband lines as they will lead to an increase in the offers of wholesale access services available to all market operators[283].

As to the wifi technologies, in October 2018, a decision of the CIPE ('*Comitato Interministeriale per la Programmazione Economica*') allocated around €100 m for the development of wifi and new technologies (artificial intelligence, Internet of things, and Blockchain). Out of this amount, €5 m is earmarked for the second phase of the wifi.italia.it project[284], which involves extending the footprint of the wifi network with priority given to the areas hit by a violent earthquake in 2016 as well as to further developing of the wifi.italia.it app.

Following the launch of the first WiFi4EU call for proposals, on 7-9 November 2018, 224 Italian municipalities were awarded a WiFi4EU voucher of €15 000 to set up wifi hotspots in public spaces.

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[279] Progress in the deployment of the Open Fiber Network can be monitored on the relevant website: https://openfiber.it/it

[280] The financing deal will be repayable over 7 years. The new funding is made up of €350 million from the EIB and €950 million from Open Fiber's shareholders.

[281] Gigabit Passive Optical Network

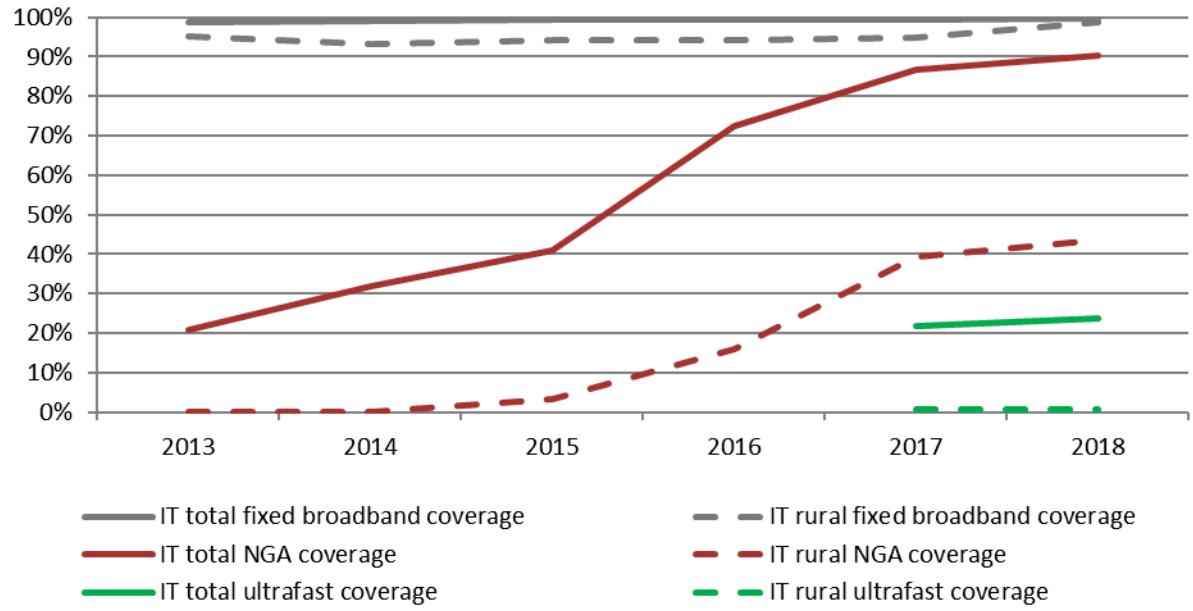
[282] https://www.flashfiber.it/copertura/

[283] Those commitments entail the: a) removal of the pre-emption right in favour of TIM and Fastweb on the Flash Fiber network; b) availability of a guaranteed number of optical fibres for each optical distributor for third party subjects; c) obligation to conclude agreements for the access to the vertical segments with third party subjects. Moreover, commitment no.3 establishes: a) the launch in the wholesale market of independent offers (VULA and NGA bitstream services) from TIM and Fastweb with non-discriminatory conditions; b) the access to infrastructure through agreements entailing the exchange of the available rights on respective infrastructures or concession agreements of the individual rights of use (IRU) under transparent, fair, reasonable and non-discriminatory, conditions. Therefore, Flash Fiber operates exclusively in the wholesale market by selling passive access services (ducts, dark fibre) both to subscribers of the co-investment agreement (TIM and Fastweb) and to third parties, at regulated technical and economic conditions, as Flash Fiber is subject to TIM's direction and coordination, currently notified as SMP operator in market 3a and 3b. See http://en.agcm.it/en/media/detail?id=36440180-135e-44f3-88f0-d7f221b88aae

[284] See http://wifi.italia.it/it/al-via-la-fase-2-wifi-italia-it/

In the context of the public call for 5G projects launched by the Ministry of Economic Development (MISE) in 2017[285], the Ministry selected three projects proposed by Vodafone; Wind Tre and Open Fiber; Telecom Italia, Fastweb and Huawei. The ongoing 5G trials started at the end of 2017 and will run until June 2020[286]. A number of 5G use cases are being tested such as virtual reality, smart environment, public safety, Health 5.0, Industry 4.0, smart mobility, etc. Moreover, based on voluntary agreements between operators and municipalities, other 5G trials are also ongoing in Rome, Turin and Naples (mainly by Telecom Italia). Fastweb is also carrying out trials in Genoa and in Rome in partnership with the two municipalities (use cases include harbour 4.0, traffic mobility, tourism). The 5G trials can leverage on 100 MHz of contiguous spectrum in the 3.7-3.8 GHz frequency band. In particular MISE set the following main requirements for the 5G trials: (i) efficient use of the 3.7-3.8 GHz band; (ii) adoption of technical solutions of the 5G family for both radio access network and system aspects (including network slicing); and (iii) analysis of at least one of the use cases defined by ITU (i.e. enhanced mobile broadband, massive machine type communications, ultra reliable low latency communications).

**Fixed, NGA and ultrafast coverage, total and rural at Member State level (% of households), 2013-2018**



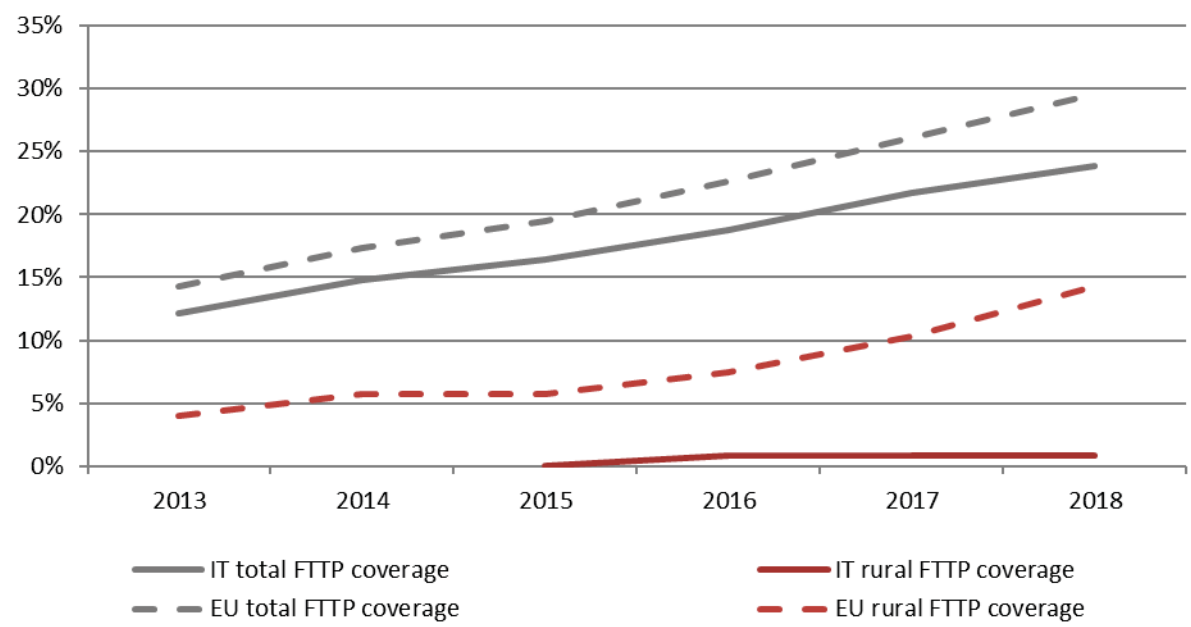

*Source: Commission services, Broadband coverage in Europe Study, commissioned to IHS and Point Topic. 2013-2014 data as of end of December; 2015-2018 data as of end of June. Ultrafast coverage metrics are available for 2017 and 2018.*

The Italian NRA (AGCOM) provides on a dedicated website the broadband map[287], including information on status of the deployment classified by network and technology. The graph above shows clearly the constantly improving performance of Italy in terms of total NGA coverage, which in 2018 reached the 90.2 % of the households, outperforming the EU average (83.1 % of the households). In rural areas the NGA coverage is still quite low (43.4 % of the households), also against the EU average (52.8 % of the households). With regard to total and rural fixed broadband coverage, Italy performs above the EU average. On the contrary, on total and rural ultrafast coverage Italy lags

[285] In 2017 the Ministry of Economic Development (MISE) launched a public call for projects aimed at running pre-commercial 5G trials in five Italian cities, clustered in three geographical areas: Milan metropolitan area (Area 1); the cities of Prato & L'Aquila (Area 2); the cities of Bari & Matera (Area 3). The 5G trials can leverage on 100 MHz of contiguous spectrum in the 3.7-3.8 GHz frequency range, which is one of the pioneer bands for the 5G development in Europe.
[286] The term was originally December 2021 but it has been shortened by the Italian government in consideration of the 5G auction.
[287] See https://maps.agcom.it/

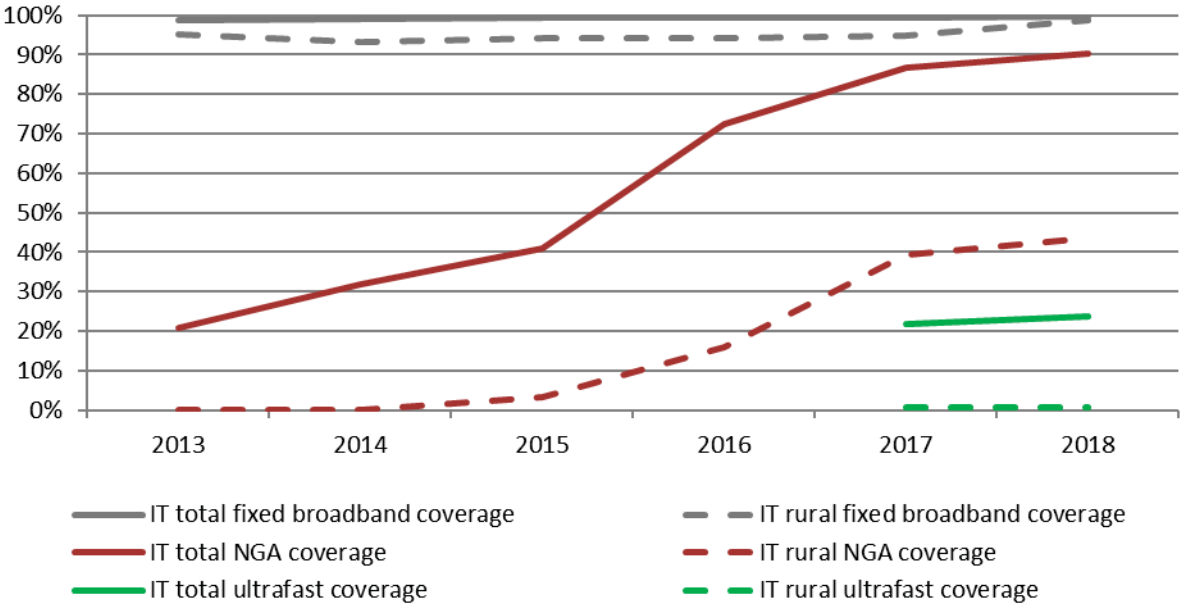
significantly behind (total ultrafast coverage in Italy 23.9 % against an EU average of 59.7 %).

**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.*

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

The total FTTP coverage has been increasing in Italy, reaching 23.9 % in 2018, but it is still below the EU average (29.6 %). In terms of rural FTTP coverage, Italy still lags behind with 0.8 % in 2018 (against an EU average of 14.2 %).

Regarding fast and ultrafast penetration the graph above shows that the take up of high (>30 Mbps) and very high (>100 Mbps) bandwidths in the fixed line segment has increased over recent years but in both cases Italy lags well behind the EU average (fast broadband penetration reached 23.6 % in 2018 against an EU average of 40.6 % and ultra-fast broadband penetration reached 8.9 % in 2018 against an EU average of 19.9 %.

## 2. Market developments

### Competitive environment

The increasing infrastructure competition trend observed already last year can be confirmed for 2018.

From a competitive point of view, TIM, the incumbent operator, saw its market share in the retail broadband market decrease in 2018.

Open Fiber's entry in the market had a significant impact on the overall competition trends in the country. Since 2016, when Open Fiber started to implement its investment plan at national level, TIM has been increasing the NGA coverage speed based on a FTTC solution, reaching around 80 % of households in 2018, compared to about 42.0 % of households covered in 2015[288]. Moreover, as a result of the availability of Open Fiber's offers in the wholesale market (since the beginning of 2017) all operators have started to sell services on the FTTH network (1Gbps) in the corresponding retail markets, at the same price as offers based on standard VDSL. At the end of 2018, Open Fiber declared to have reached more than 4 million homes passed, with some 480,000 FTTH lines supplied to operators.

During 2018, services offered using the FTTC technology increased by 56.9 %, reaching 6.38 million lines and a similar trend was observed also for services offered via FTTH technology (+53.5 % to 850,000 lines), driven by the growth of services offered by Open Fiber.

From September 2017 to September 2018, services offered using the FTTC technology increased by 70.7 %, and a similar trend was also observed for services offered via FTTH technology (+48 %), driven by the growth of services offered by Open Fiber.

Overall, DSL lines decreased on an annual base by 21 % to 8.57 million (-2.27 m. year-on-year), while FWA lines have increased by 17.0 %, reaching an amount of 1.23 m. units.[289]

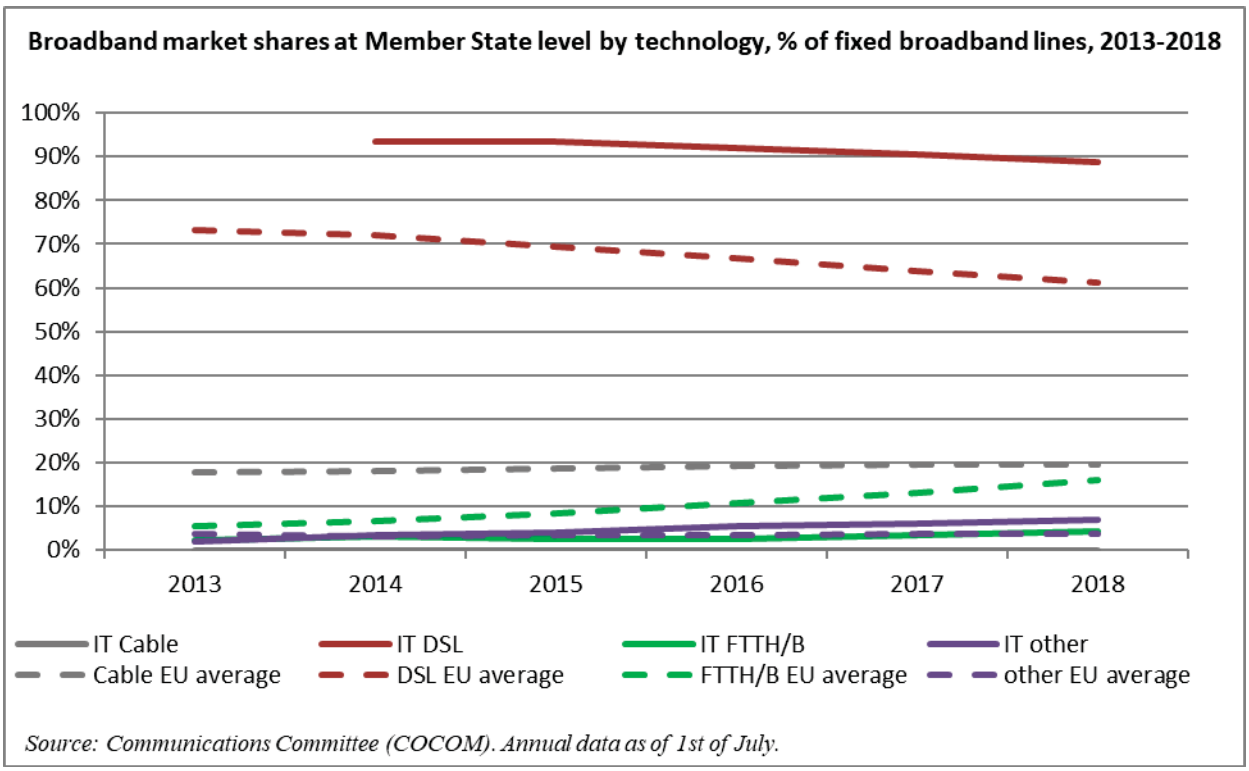
In March 2018, Sky and Open Fiber signed a commercial agreement to provide Sky's Pay TV (IPTV) over FTTH. These services should be available by the summer of 2019. In September 2018, Open Fiber also signed an agreement with Inwit to use its towers to deploy FWA in white areas.

The consolidation trend was confirmed in 2018 as well. This trend included Enter and CloudItalia, two alternative operators specifically active in supplying broadband and ultra-broadband services to business and residential consumers, being aggregated in a new company called Irideos that also includes Infracom, BIG Tlc, KPNQwest Italia, Mclink[290].

### 2.1. Fixed Markets

The graph above shows the broadband market shares at Member State level by technology between 2013 and 2018. The share of DSL in 2018 (88.8 %) is well above the EU average (61.1 %). The share of FTTH is still below the EU average (4.1 % versus 15.9 %).

[288] https://www.telecomitalia.com/tit/it/about-us/business/rete-strategia.html
[289] Source: AGCOM quarterly report n. 1/2019 available at the following link https://www.agcom.it/osservatorio-sulle-comunicazioni.
[290] See http://www.f2isgr.it/f2isgr/investimenti/portafoglio/irideos.html




As to the market shares of the main fixed operators (20.21 m. total fixed lines at year's end), compared with December 2017, TIM's market share dropped to 50.2 % at the end of December 2018 (-3.5 pp); Vodafone's market share reached 14.0 % with a growth of 1.5 percentage points; Wind Tre's market share remains substantially stable around 13.2 %, and Fastwebfollows (13 %) with a growth of 0.8 percentage points. Other operators have, as a whole, increased their market share by 0.8 percentage points year-on-year; the increase has been more evident for FWA operators.[291]

In December 2018, the total number of broadband lines reached 17 million, out of which 45.1 % (30.3 % in December 2017) were capable of 30 Mbps speeds. The market share of TIM decreased to 43.9 % (-1.6 percentage points), that of Vodafone reached 15.8 % (+1.3 percentage points), followed by Fastweb (14.9 %) and Wind Tre (14.4 %).[292]

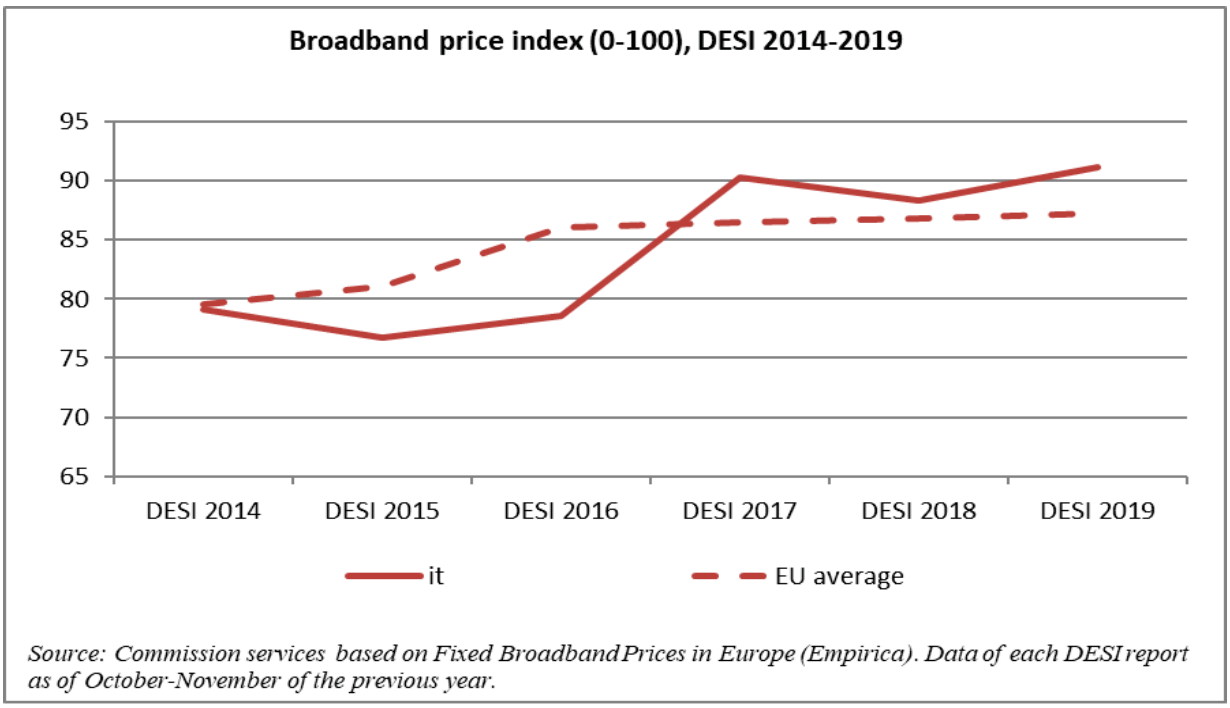
In March 2018, TIM notified to AGCOM the project to separate its network, as further explained in paragraph 3.2 below.

In December 2018, the Italian Parliament approved an amendment to the existing legislation on functional and voluntary separation (respectively Article 50 *bis* and *ter* of the Italian Communication Code) allegedly aimed at paving the way for the creation of a single broadband infrastructure company by combining the existing networks.

AGCOM recently analysed fixed-to-mobile substitution with regard to voice services in the context of the review of the market for wholesale voice call termination on individual mobile networks. AGCOM found no evidence of such substitution in Italy, although voice traffic is mostly concentrated on mobile networks; fixed voice volumes are decreasing while mobile volumes are increasing. However, traffic volumes are essentially polarised in fixed-to-fixed and mobile-to-mobile.

The graph above shows that fixed broadband prices are below the EU average[293].

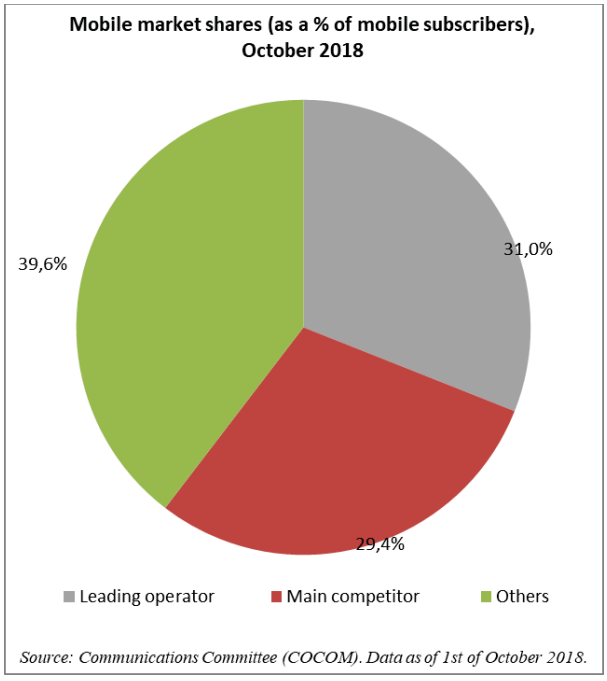
[291] See footnote 12
[292] See footnote 12
[293] The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

## 2.2. Mobile markets

In May 2018, a fourth mobile operator, Iliad, officially entered the mobile market and launched its offers. Iliad registered 2.84 m clients by the end of December 2018.



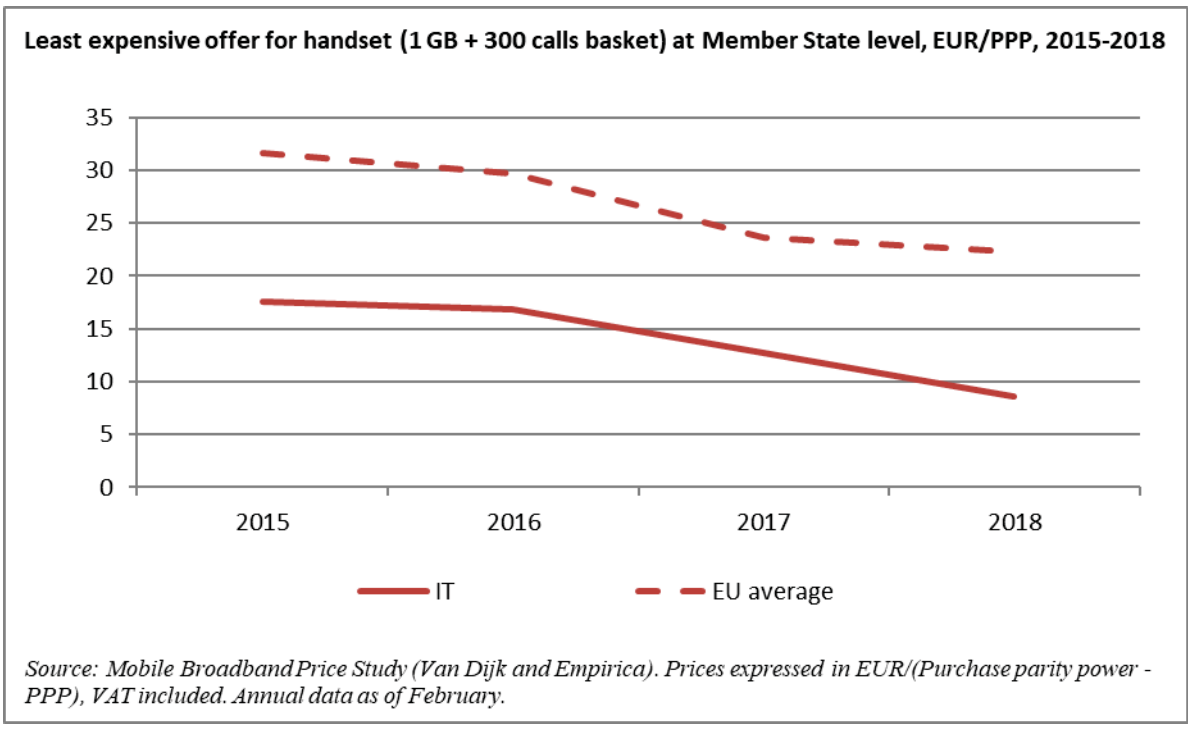

*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

The entry of Iliad significantly affected the market. In response, some of the main mobile operators (TIM and Vodafone) launched via their 'no-frills' brands (respectively, Kena mobile and ho.mobile) competitive offers on the market.

In Italy the mobile market shares of the leading operator are equal to 39,6 % while mobile market shares of the main competitor are 31 %.

In Italy, mobile broadband prices are lower than the EU average (with a price of €8.60 for a 1 GB + 300 minutes calls basket versus the EU average of €22.30), which is reflected in the Mobile Broadband Price Study, where Italy is considered among the more 'inexpensive countries'.

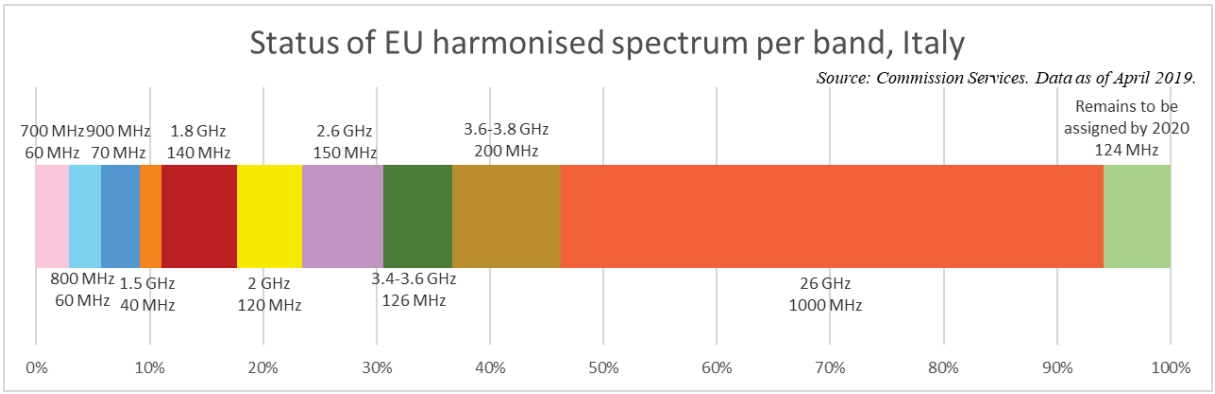
Mbps. This indicator presents values from 0 to 100 (which should not be read as prices) and the higher the values, the better the country performs in terms of affordability of prices relative to purchasing power.




*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

## 3. Regulatory developments

### 3.1. Spectrum




In Italy 94 % of the 2090 MHz spectrum harmonised at EU level for wireless broadband is assigned[294]. In 2018 the assignments of the different bands of the radio spectrum and the relevant planning was the subject to an overall reorganization, set by Law No. 205 of 2017 (the 'Budget Law 2018') [295], which provided for a complex timetable for 2018-2022, particularly to make the 700 MHz band (currently used for broadcasting) available for mobile broadband wireless communication systems. The Budget Law 2018 provided for the adoption by AGCOM of a new broadcasting frequency plan (PNAF 2018). AGCOM approved this plan on 27 June 2018 with Decision no. 290/18/CONS. Eventually, following significant amendments introduced by Budget Law 2019, AGCOM's Decision was updated and a new national broadcasting frequency plan was adopted with AGCOM's Decision no. 39/19/CONS of February 2019.

[294] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

[295] Text available in Italian: Legge 27 dicembre 2017, n. 205, recante "Bilancio di previsione dello Stato per l'anno finanziario 2018 e bilancio pluriennale per il triennio 2018-2020"

The Italian auction of the three '5G pioneer bands' ended on 2 October 2018, after 14 days and 171 rounds. The objectives and planning of the competitive assignment procedure were set by the '2018 Budget Law' mentioned above, which included measures aimed at promoting the development of 5G wireless and mobile systems in line with the EU's 5G action plan.MISE launched the procedure on 11 July 2018[296], based on the rules[297] established by AGCOM, following a public consultation launched on 5 March 2018[298]. Five companies took part in the procedure: Iliad Italia, Fastweb, Wind Tre, Vodafone and TIM.

Each of the bidders won one lot of 200 MHz in the 26 GHz band. The 700 MHz band was assigned to Iliad, Vodafone and TIM (for a total of 2x10 MHz each each). In the 3.6 GHz band, Vodafone and TIM acquired 80 MHz each, while the 20 MHz lots went to Wind Tre and Iliad. Rights of use for the 3.6 GHz and the 26 GHz band will have a duration of 19 years (starting on 1 January 2019) and those for the 700 MHz band will last 15.5 years (starting on 1 July 2022)[299].

The 3.6 GHz spectrum, in which 5G services are first expected to be deployed, was assigned at high prices relative to the investment needs, i.e. at an average price of € 36 cents / pop / MHz, which is the highest price arising from spectrum assignments to date in Europe. The total amount of offers reached over €6.5 million, exceeding by far both the Italian government's previously stated expectations and the stakeholders' calculations.

In July 2018, Fastweb acquired Tiscali's 40 MHz in the lower part of the 3.6 GHz band for approximately €150 million.

At the beginning of 2019, Vodafone and TIM entered into a Memorandum of Understanding whereby the two operators declared their intention to enter into an active network sharing partnership for 5G[300]. Negotiations are currently ongoing.

Cross-border negotiations with countries outside the EU in order to avoid harmful interferences are ongoing with assistance from the Radio Spectrum Policy Group (RSPG); there has not been significant progress made with Albania, Libya, Algeria and Tunisia. To address unresolved spectrum coordination issues with non-EU countries, Italy requested the assistance of the European Commission

Upon the request of some FWA/LTE operators that have rights to use spectrum in the 3.4-3.6 GHz band the Ministry, with a favourable AGCOM opinion, decided to grant the extension of these rights (for about 6.5 years - from May 2023 until December 2029) in order for these operators to plan new investments linked to 5G developments. AGCOM has accepted the FWA operators' requests to extend their rights of use until 31 December 2029, in view of their investments in 4.5 and 5G technologies and in light of the recent extension (until the same date) of mobile operators' rights of use in the 900 MHz and 1800 MHz bands.

### 3.2. Regulated access

On 27 March 2018, TIM formally notified to the national regulator of its voluntary separation project. Following this notification, AGCOM started, in accordance with Article 13b of the Access Directive, the coordinated analysis to assess the regulatory impact of TIM's voluntary separation on relevant

[296] Date of publication on the Official Journal: http://www.gazzettaufficiale.it/eli/id/2018/07/11/TU18BFC14184/s5
[297] https://www.agcom.it/visualizza-documento/ce5f9340-2b1f-49ba-9cd0-8984d9c56d85
[298] Information on the public consultation can be found here.
[299] All rights can be renewed in compliance with national law and cannot be transferred to third parties without MISE's prior agreement. They cannot be transferred earlier than 24 months after their assignment (48 months for the assignee of the reserved blocks) and in any case they can only be transferred after fulfilling the relevant coverage obligations. Similar coverage obligations are included in the rules on the auction and include coverage obligations related to percentage of population, territories and main national roads as well as rail transport routes.
[300] See https://www.telecomitalia.com/tit/en/archivio/media/comunicati-stampa/telecom-italia/corporate/istituzionale/2019/TIM-Vodafone-21022019.html

markets for access services. The coordinated analysis was carried out as part of the review of the market for wholesale local access provided at a fixed location concerning wholesale central access provided at a fixed location for mass-market products and for wholesale high-quality access provided at a fixed location. The outcome of the coordinated analysis was published for public consultation[301]. Under the current regulatory framework designed by AGCOM, the main access remedies applicable to the NGA networks of SMP operators are access to civil infrastructures, dark fibre, fibre unbundling, access to the terminating segment of fibre and VULA. In 2018, several decisions were taken on the implementation of regulatory obligations imposed on the SMP operator (TIM) regarding specifically the approval of reference offers and the enforcement of non-discrimination obligations. AGCOM is also reviewing the guidelines regarding the economic replicability tests applicable to the offers of the incumbent operators.

In 2018, the analysis of the market for wholesale voice call termination on individual mobile networks was finalised updating the cost model and setting the new mobile termination rates until 2021. AGCOM confirmed that the calls which originated outside the EEA are not subject to price control obligation.

Regarding the symmetric access obligation imposed on all the operators to in-building wiring infrastructure, the relevant decision, adopted by AGCOM under Art. 12 of the Framework Directive, in 2013 is still in place.

AGCOM, with the relevant support of the supervisory board of TIM, is currently monitoring the implementation of TIM's new model of equivalence. With Decision 395/18/CONS, AGCOM launched an overall review of the key performance indicator for the non-discrimination system[302].

Directive (EU) 2014/61 (the 'Broadband Cost Reduction Directive')[303] was fully transposed in Italy through the Legislative Decree no. 33/2016 of 15 February 2016. AGCOM, designated as the dispute settlement body for the disputes between network operators and undertakings providing electronic communications networks access to its physical infrastructure, has so far settled three disputes and launched one dispute resolution proceeding between electronic communication operators and undertakings that provide a physical infrastructure.

The SINFI, (National Registry of infrastructures), selected as Single Information Point in the above-mentioned transposition measures was launched in 2018. It is still in the process of being completed. According to information available, many municipalities and many operators (among them some of the principal utilities) have failed to provide the relevant data so far. In October 2018, a specific committee was created by the Government in order to rectify the delays in collecting the data and in putting the SINFI fully into operation[304].

The ongoing issues related to the delays in granting permits/local authorisation, already reported in the DESI Telecom Chapter 2018 have not been efficiently resolved so far but new specific provisions

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301 See https://www.agcom.it/documentazione/documento?p_p_auth=fLw7zRht&p_p_id=101_INSTANCE_ls3TZlzsK0hm&p_p_lifecycle=0&p_p_col_id=column-1&p_p_col_count=1&_101_INSTANCE_ls3TZlzsK0hm_struts_action= %2Fasset_publisher%2Fview_content&_101_INSTANCE_ls3TZlzsK0hm_assetEntryId=13616286&_101_INSTANCE_ls3TZlzsK0hm_type=document

302 https://www.agcom.it/documentazione/documento?p_p_auth=fLw7zRht&p_p_id=101_INSTANCE_ls3TZlzsK0hm&p_p_lifecycle=0&p_p_col_id=column-1&p_p_col_count=1&_101_INSTANCE_ls3TZlzsK0hm_struts_action= %2Fasset_publisher%2Fview_content&_101_INSTANCE_ls3TZlzsK0hm_assetEntryId=11916384&_101_INSTANCE_ls3TZlzsK0hm_type=document

303 Directive (EU) 2014/61 of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks, OJ L 155, 23.5.2014, p. 1–14.

304 https://www.sviluppoeconomico.gov.it/index.php/it/per-i-media/notizie/2038725-insediato-il-comitato-del-catasto-delle-infrastrutture-sinfi-nella-sua-nuova-composizione

included in the "Simplification Decree" reportedly aim to tackle the problem.

On a positive note, there has been significant re-use of existing physical infrastructure, made possible by the Broadband Cost Reduction Directive's provisions, in the context of the UBB plan.

## 4. End-user matters

According to the 2018 Consumer Markets Scoreboard, of the 25 services markets assessed by consumers in Italy 'internet provision', 'mobile telephone services' and 'fixed telephone services' rank quite poorly (20th, 21st and 22nd respectively), recording a decrease in the markets' MPI[305] score of 4.2, 5.5 and 3.5 points respectively between 2015-2017. These markets equally score much lower compared to the average EU score for each of the three markets (-7.9, -8.3 and -9.2 points respectively)[306].

period for the invoicing of the electronic communication services, which operators had brought to 28 days and to apply sanctions to these operators. The Court of first instance has upheld the decision adopted by AGCOM in this regard and the Court of Appeal is expected to issue its ruling by May 2019.

In July 2018, a new platform, called 'ConciliaWeb' was launched to resolve disputes online between users and operators. The platform relies on a single web-based access portal managed by AGCOM, that sorts and forwards individual disputes to the regional committees. Also, the mediation hearing takes place online via a videoconferencing system accessible from the platform. Should the mediation fail, users can request, via the platform, a formal decision on the dispute. In these cases, the competence is shared between AGCOM and the regional committee.

Nine months after its launch, around 53 % of the 102,868 complaints lodged have been settled.

OOverall, in 2018, 42 % of complaints referred to pricing and billing, 11 % to availability and quality of service, 15 % to terms of contracts and 6 % to roaming. Enforcement actions undertaken during the year led to the imposition of financial sanctions for more than 7 million euros.

In November 2018, AGCOM approved the Guidelines on termination and switching, which aim to define principles of methodology for calculating the costs consumers have to incur upon termination of the contract or a change of operator[307].

### a. Net neutrality

In 2018, AGCOM continued monitoring and enforcement actions and held formal meetings with vendors and ISPs with the aim to provide a clear and useful set of information to stakeholders about the content of Regulation (EU) 2015/2120 and stimulate an effective compliance.

AGCOM launched two public consultations on 30 January 2018, resulting in two decisions[308].

The first consultation related to physical infrastructure used for electronic communications services, the purpose of which was to improve transparency in retail offerings for broadband and ultra-

[305] The market performance index (MPI) is a composite indicator ranging from 0 to 100. It takes into account how easy/difficult it is perceived to compare offers; if consumers trust that retailers/suppliers comply with consumer laws; if they encountered problems and harm (including but not limited to financial loss); if services live up to their expectations and if they are satisfied with the number of providers in the market.
[306] See https://ec.europa.eu/info/sites/info/files/consumer-markets-scoreboard-2018_en.pdf
[307] Available on AGCOM's website: https://www.agcom.it/documents/10179/12323606/Delibera+487-18-CONS/b7571ebb-8bdd-44b3-ab73-736acbe27f68?version=1.0
[308] More information available in the "Study on the implementation of the net neutrality provisions of the Telecoms Single Market Regulation" (SMART 2017/0011).

broadband.[309] Following the consultation, AGCOM published a binding decision imposing certain transparency obligations in advertising and in contracts for (ultra)broadband internet access service (IAS) on 19 July 2018.[310] The decision requires ISPs, among other things, to inform end-users of the type of architecture through which the IAS is offered (e.g. copper, fibre or a mix of both). This decision clarified some of the transparency requirements of Articles 4(1)(b) and (d) of Regulation (EU) 2015/2120[311] and AGCOM considers this decision to be an additional requirement under Article 5(1).

The second consultation concerned the right of end-users to use the terminal equipment of their choice and the prohibition of ISPs from entering into agreements with end-users or from adopting commercial practices that restrict end-users rights in using terminal equipment of their choice.[312] On 2 August 2018, AGCOM published a decision stating that end-users have the right to freely choose their broadband router.[313] According to AGCOM, ISPs cannot require end-users to rely exclusively on the router supplied by the ISP itself. This decision was appealed and the appeal proceeding is pending.

Furthermore, AGCOM issued an order to end restrictions in the use of mobile terminals. As to the relevant 2018 enforcement cases, AGCOM initiated enforcement actions against an offer by Vodafone which involved users being obliged to pay an extra daily internet connection fee (€6 per day) for tethering. This additional payment was charged on top of regular payments for a data bundle, as well as if end-users only consumed data (in tethering mode) included in their subscription. Vodafone users that subscribed to the 'Vodafone Exclusive' option (at an extra cost of €1.90 per month), could tether without additional costs. AGCOM assessed Vodafone's plan and concluded that it infringed Articles 3(1) and 3(2) of Regulation (EU) 2015/2120. Therefore, AGCOM ordered Vodafone to cease this activity. Vodafone did not appeal this decision.

### b. Roaming

Italian end-users have consumed 2.1 times more roaming minutes (calls made) in Q1 2018 than in Q1 2017.

Between 2017 and 2018, four sustainability derogations were granted to Fastweb, PosteMobile, Tiscali and Digi Italy on the basis of Article 6c of Regulation (EU) 2015/2120. [314].

Between 2017 and 2018, there were 2 cases of non-compliance with the Roaming like at Home rules by the operators Lycamobile and CoopVoce (Decisions no. 419/17/CONS and no. 420/17/CONS) and a procedure was initiated to apply sanctions on Lycamobile (Decisions no. 372/18/CONS).

In the Lycamobile case, the company did not apply the same pricing mechanism used at national level to its roaming customers. It emerged that customers with pay-per-unit tariffs were subject to roaming services with charges different to those for national services, and which varied according to the country called. Moreover, customers with bundled offers (valid for 30 days from activation), had to top up their SIM with additional credit (‘pay as you go’) to take advantage of roaming services.

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[309] AGCOM (2018), Decision n. 33/18/CONS *Public consultation on the definition of technical characteristics and the corresponding denominations of the different types of physical infrastructure used for the delivery of telephone services, television networks and electronic communications* of 30 January 2018.
[310] AGCOM Decision n. 292/18/CONS.
[311] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users’ rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (Text with EEA relevance), OJ L 310, 26.11.2015, p. 1–18.
[312] AGCOM (2018), Decision n. 35/18/CONS *Public consultation on possible measures for the free choice of terminal equipment by consumers and end-users of connection services to a public communications network or Internet access services* of 30 January 2018.
[313] AGCOM Resolution n. 348/18/CONS.
[314] See https://www.agcom.it/roaming-internazionale

In the CoopVoce case, the prices of voice and SMS varied according to the party that was called[315]. Moreover, different out-of-bundle charging mechanisms were applied for 3G and 4G.

### c. Emergency communications - 112

According to the 2018 Communications Committee (COCOM) 112 Questionnaire, calls to the emergency number 112 are answered within 9.1 seconds and the calls answered within 10 seconds are the 77.3 %.

In Italy, caller location information is provided for every emergency call with a rate of 6 % of calls where network based location information is not available.

The Commission services are currently looking into the functioning of emergency communications and the 112 number in Italy, with particular regard to equivalent access for disabled end-users.

### d. Universal service

In June 2018, AGCOM published a decision extending its system of social tariffs up to a potential number of 2.6 million low-income households. The scheme consists of a discount on fixed-line tariffs and access to the scheme is based exclusively on income criteria (no other requirements – like unemployment or disability – are needed). Specifically, AGCOM required the USO provider Telecom Italia to grant a 50 % discount on the monthly fixed line rental fee for households with an ISEE indicator below €8,112.23 per year (the ISEE indicator reflects household income, which is weighed by the number of household members); and a free 30 minute calls package for calls to national fixed and/or mobile lines.

In order to achieve the objective of social inclusion, recognising the relevance of broadband access services, AGCOM invited telecom operators to include within their portfolio of offers at least one standalone broadband access offer.

## 5. Institutional issues

In September 2018 the Court of Justice of the European Union issued its ruling in cases C-54/17 and C-55/17 on the interpretation of Directive 2005/29/EC[316] and the *lex specialis* principle (i.e. law governing a specific subject matter), laid down in Recital 10 and Article 3(4) of the Directive mentioned, regulating the relation between the sector-specific legislation and the general consumer protection law.

In particular, the Court stated that conduct that involves a telecommunications operator selling SIM cards on which services such as internet browsing and voicemail are pre-loaded and pre-activated, without first properly informing the consumer about these services, nor their cost, can in some cases fall under the concept of 'inertia selling' within the meaning of Annex I, point 29 of Directive 2005/29/EC.

As a consequence, the competence at national level for cases similar to the one at stake in the proceedings mentioned above (identified as *inertia selling* by the CJEU) has to be attributed to the authority in charge of enforcing general consumer protection law, which in Italy is the AGCM.

On the basis of the 2017 Competition Law[317], undertakings that indirectly use national numbering

[315] In case of voice calls and SMS directed to Italy, the national plan was applied; in case of voice calls and SMS directed to a different EU country, customer paid 6.1 cents/min for voice and 2.44 cents for SMS.
[316] Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive') in *OJ L 149, 11.6.2005, p. 22–39*.
[317] Law 4 August 2017 n. 124. Annual Competition Law.

resources (WhatsApp, Viber, Facebook/Messenger) are required to enrol in the Registry of Communication Operators ('ROC').

The criteria for registering undertakings in the ROC were laid down by the Decree of 5 March 2018[318]. Additionally, in compliance with the provisions of this ministerial decree, AGCOM adopted Decision no. 402/18/CONS, ('Regulations on the Registry of Communication Operators'), which obligates operators that indirectly use a national numbering resource to register in the ROC, as of 1 November 2018.

## 6. Conclusion

The increasing trend in infrastructure-based competition already registered in 2017 can be confirmed for 2018. This resulted in the rollout of a constantly improving level of fibre-based NGA) In addition, in 2018, Italy significantly improved its ranking, from 26 to 19, in the DESI Connectivity indicator.

In 2018, the national UBB plan entered in the operative phase and the last (third) tender was assigned. On the implementation of the Broadband Cost Reduction Directive, as mentioned above, although Italy was the first Member State to fully transpose the legislation, the single information point (SINFI) is not fully operational yet. In the context of the UBB strategy, the winner of the three tenders made significant use of existing infrastructure mainly thanks to the provisions of the Cost Reduction Directive as transposed at national level. However, the complexity and the fragmentation of the procedure for local authorisation/granting permits could have had a negative impact on the initial phase of the UBB strategy. Improving the effectiveness of initiatives from the Italian authorities in this respect could result in better outcomes for the national broadband strategy.

[318] The Decree establishes, *inter alia*, that in case of indirect use of national numbering resources, the use of national numbering resources, assigned to a mobile network operator, is considered as a mere identifier of the user of the mobile and personal communications service. Pursuant to the decree, any undertaking that indirectly uses a national numbering resource has the obligation to register in the appropriate section of the ROC, even though they do not need to notify under the general authorisation regime. The decree is available here: http://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2018-04-28&atto.codiceRedazionale=18A02942&elenco30giorni=true

# Cyprus

| | Cyprus | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage**<br>% households | **>99.5%**<br>2016 | **>99.5%**<br>2017 | **100%**<br>2018 | ***1***<br> | **97%**<br>2018 |
| **1a2 Fixed broadband take-up**<br>% households | **72%**<br>2016 | **76%**<br>2017 | **85%**<br>2018 | ***6***<br> | **77%**<br>2018 |
| **1b1 4G coverage**<br>% households (average of operators) | **64%**<br>2016 | **77%**<br>2017 | **94%**<br>2018 | ***20***<br> | **94%**<br>2018 |
| **1b2 Mobile broadband take-up**<br>Subscriptions per 100 people | **89**<br>2016 | **100**<br>2017 | **112**<br>2018 | ***8***<br> | **96**<br>2018 |
| **1b3 5G readiness**<br>Assigned spectrum as a % of total harmonised 5G spectrum | **NA**<br> | **NA**<br> | **0%**<br>2018 | ***13***<br> | **14%**<br>2018 |
| **1c1 Fast broadband (NGA) coverage**<br>% households | **88%**<br>2016 | **88%**<br>2017 | **90%**<br>2018 | ***11***<br> | **83%**<br>2018 |
| **1c2 Fast broadband take-up**<br>% households | **3%**<br>2016 | **9%**<br>2017 | **15%**<br>2018 | ***27***<br> | **41%**<br>2018 |
| **1d1 Ultrafast broadband coverage**<br>% households | **NA**<br> | **45%**<br>2017 | **53%**<br>2018 | ***23***<br> | **60%**<br>2018 |
| **1d2 Ultrafast broadband take-up**<br>% households | **0.1%**<br>2016 | **0.2%**<br>2017 | **2%**<br>2018 | ***27***<br> | **20%**<br>2017 |
| **1e1 Broadband price index**<br>Score (0 to 100) | **62**<br>2016 | **65**<br>2017 | **66**<br>2018 | ***27***<br> | **87**<br>2017 |

## 1. Progress towards a gigabit society

All major operators actively invest in ultra-high speed networks. In 2018, the Cypriot telecoms group CYTA started to deploy a G-PON fiber-to-the-home (FTTH) network as part of a ten-year €100 million investment plan, meant to cover mainly urban areas. In total 180,000 households will be connected to this network, of which 100,000 will be connected in the first 4 years. In rural areas, high-speed internet access will be supported through the use of vectoring and bonding techniques. Cablenet, another Cypriot telecoms group, already passes 53 % of the premises in Cyprus with a DOCSIS 3.0 network. Cablenet currently deploys an FTTH access network in a rural area near Nicosia (targeting 5,000 premises) and plans to deploy FTTH access networks in Paphos (2020) and Paralimni (2021). Two other telecoms groups, MTN and Primetel, have also announced they will start to deploy fibre infrastructure in 2019.

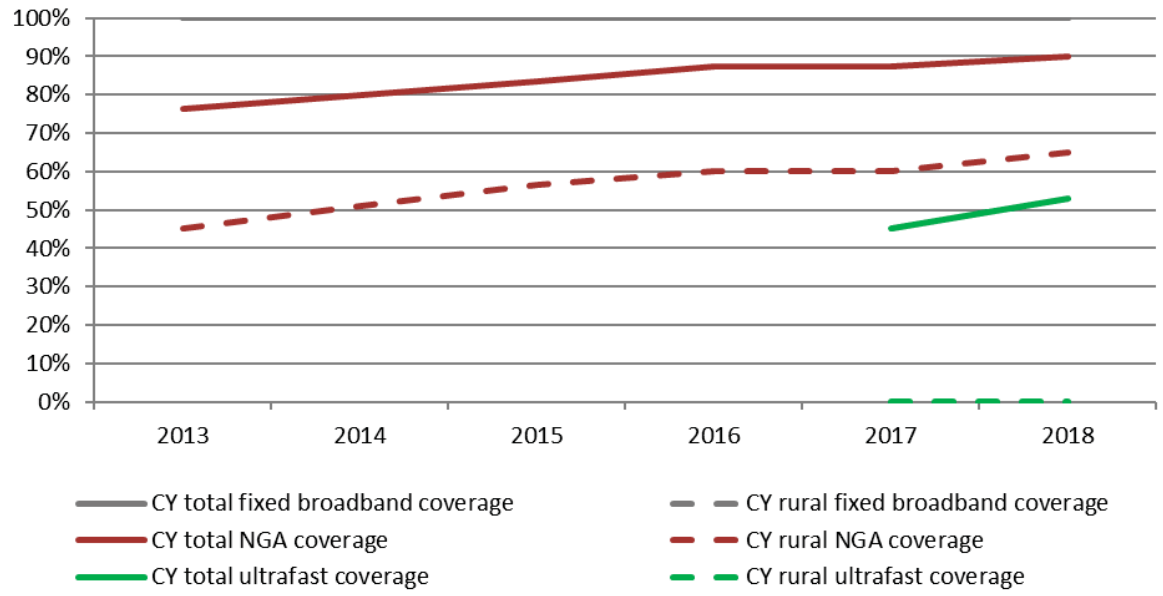
Given these plans, national authorities are optimistic that Cyprus can meet the 2020 target for ubiquitous 30 Mbps coverage. The main difficulty in achieving this target is the deployment of fast and ultra-fast broadband networks (fixed and mobile) in remote villages and rural areas. In these areas, low population density hampers viability and makes the rollout of commercial networks a business risk.

The take-up of high-speed broadband services is still poor, which causes continuous concerns for market participants. The reasons for low take-up include pricing, lack of compelling content and low digital literacy.

To address these issues, the national broadband plan (NBP) contains demand-side measures, aiming to increase digital awareness and encourage broadband take-up. These measures include awareness campaigns, training programmes, the digitalisation of the government, and the provision of (limited) free wifi access in public buildings and remote villages. However, the implementation of several of these measures continues to lag behind schedule, mainly due to court actions, which are customary in most public procurement procedures.

To address pricing issues, Cyprus announced in January 2019 a pilot voucher scheme, which will subsidize new subscriptions (or upgrades) for speeds of 100 Mbps and above for a duration of 12 months. The intension is to cover approximately 1/3 of the annual costs, which amounts to a subsidy of €360 the maximum per subscription per year. The total budget is estimated to approximately €800,000, coming entirely from national funds.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

Cyprus has recently updated its NBP, to align it with the targets of the European gigabit society[319] and the 5G action plan[320]. It also intends to draft a new broadband plan by end 2020. This new broadband plan will include detailed actions in accordance with the guidelines of the Commission. One of the actions of the new NBP will be the deployment of very-high-speed infrastructure in areas where this is not viable with private investment alone. The target is to reach 100 % coverage with 100 Mbps.

Cyprus intends to include 5G in the new NBP. There is growing market interest in 5G, and all three mobile operators have asked for pilot rights to use the 3.5 GHz band. These rights have been granted, and will last until the launch of the auction for 5G spectrum, currently anticipated to take place in Q3 2019.

Cyprus also intends to auction 5G spectrum in the second half of 2019. The auction will include the 3.5 GHz band, the 26 GHz band and, if all relevant issues are resolved and the migration process is complete, the 700 MHz band. The authorities do not anticipate any problems for the licensing of the 3.5 and 26 GHz bands, as there are no pending rights of use. They have consulted with the market on the 1.5 GHz band but there was no interest at all, mainly because this is a download-only band.

Preparations for the transposition of the European Electronic Communications Code (EECC) into Cypriot law are under way. The Office fo the Commissioner of Electronic Communications and Postal Regulation (OCECPR) requires an internal study of the Code's provisions to be completed by March

[319] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Connectivity for a Competitive Digital Single Market — Towards a European Gigabit Society (COM (2016) 587 final)
[320] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — 5G for Europe: An action plan (COM (2016) 588 final)

2019, followed by consultations with stakeholders until May 2019. The government's current intention is to draft a new law, which will transpose the EECC into national legislation and will replace the Electronic Communications Law 112(I)/2004[321]. The final draft of the new law is planned for February 2020, with a view to have it ratified by Parliament by October 2020. The Department of Electronic Communications is also preparing a new Law, concerning radio frequency management issues, which will transpose parts of the EECC into national legislation and will replace the Radiocommunications Law of 2002 -2016. The law is scheduled to be ratified by Parliament by October 2020.

## 2. Market developments

This has been a year of structural change in the Cypriot market. The incumbent operator CYTA sold its subsidiary in Greece (CYTA Hellas) to Vodafone, thus restricting its business activities in Cyprus. At the same time, Monaco Telecoms acquired MTN, the second biggest mobile operator in Cyprus.

All players focus on bundling to foster competitive advantage. They seek to offer converged services that include fixed telephony, mobile communications, internet and pay TV. They place particular emphasis on integrating a pay TV offering that includes prime content, especially football. However, the costs of football content rights cannot always be recovered by the corresponding revenues. The Commission for the Protection of Competition (CPC) recently decided that cross subsidising the cost of football content rights is a prima facie infringement of competition law and of Article 102 of the TFEU. Recently, some market players have sought to explore the advantages of content sharing.

All market players are eager to deploy their own infrastructure, and are either already doing so or are in the process of making the necessary plans. However, they do not pursue co-investment strategies, apart from occasional joint projects (e.g. CYTA and Cablenet co-investing to install a network connecting Limassol and Paphos).

CYTA dominates both the fixed and mobile market but faces increasing competition that leads to continuously eroding market shares. In September 2018, it launched a retail high-speed broadband service up to 100 Mbps, based on copper (using vectoring and bonding) and up to 1 Gbps on the FttH network it deploys.

Under new ownership, MTN, the second-largest mobile operator, has refocused its strategy. It is putting more emphasis on the fixed market and seeking to invest in ultra-high speed broadband infrastructure.

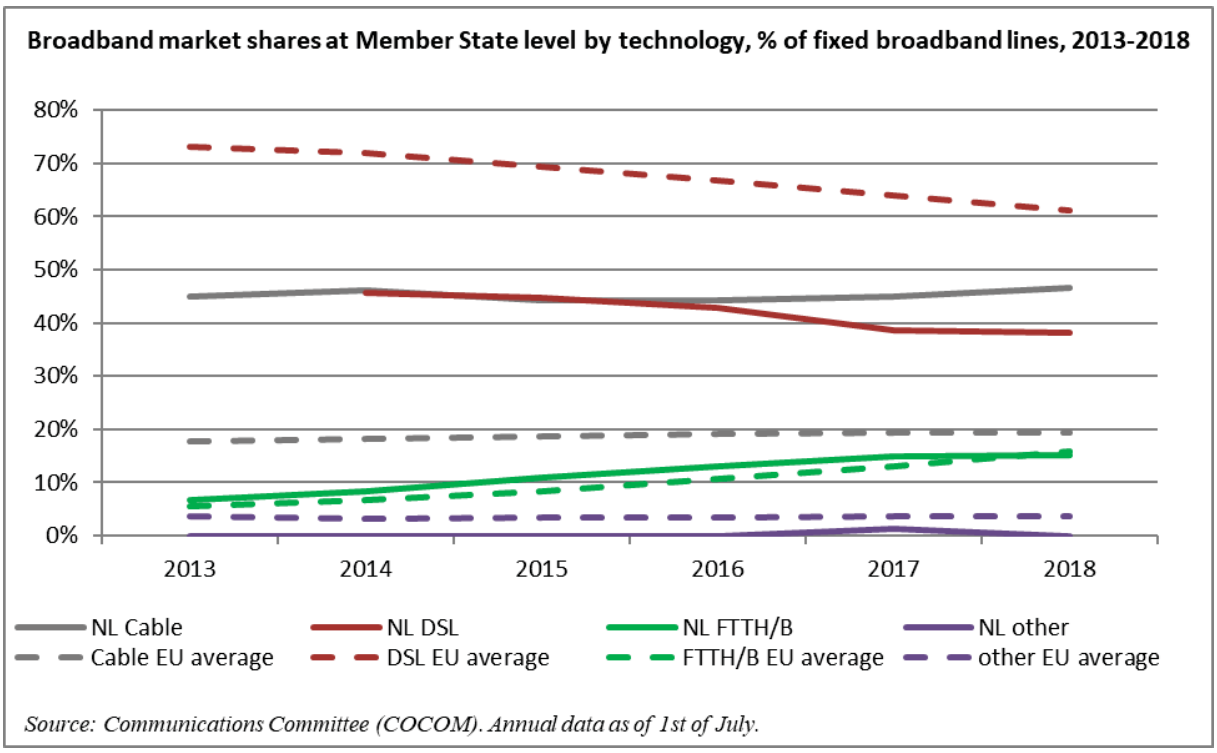
Cablenet covers most major cities (Nicosia, Limasol, Larnaca) with its own network (DOCSIS 3.0), and currently serves other cities by using CYTA's wholesale products. It complements its fixed offering with mobile services, based on an MVNO agreement with CYTA. However, its share of the mobile market remains marginal.

In the mobile market, Primetel has been gaining market share and exerting competitive pressure, resulting in reduced retail prices.

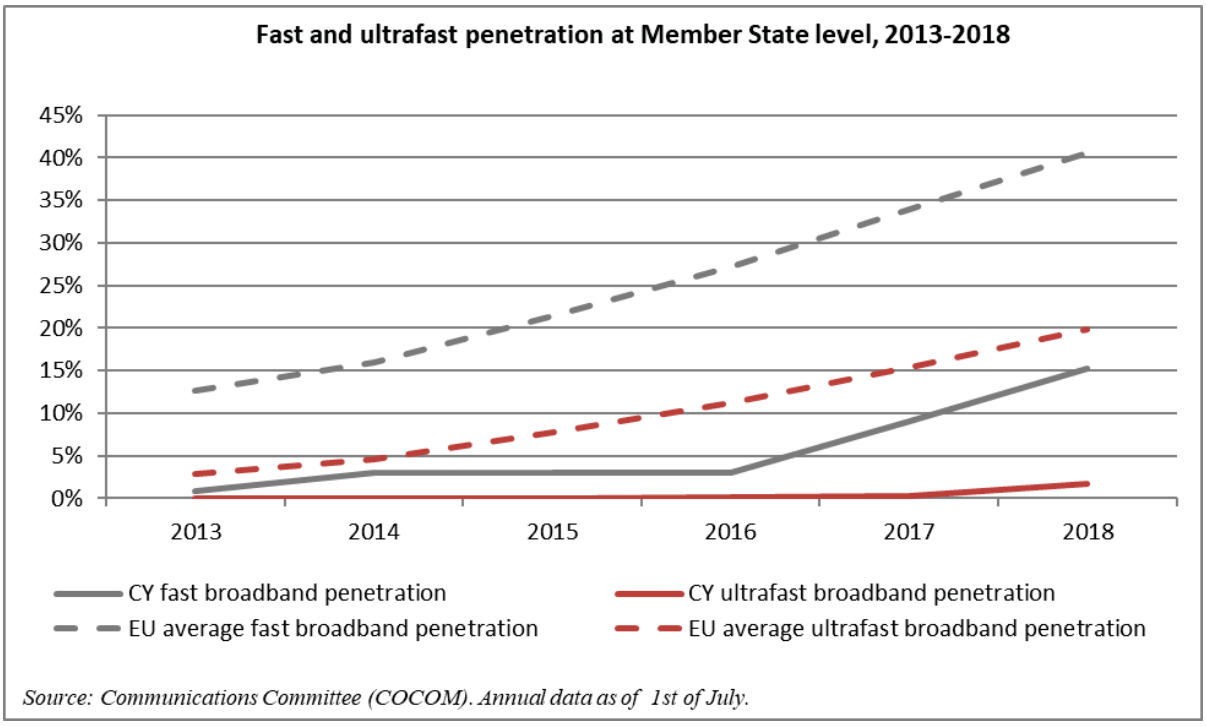
### 2.1. Fixed markets

DSL remains the predominant technology for the delivery of broadband access services. It accounts for around 80 % of broadband provision, a figure that has remained stable over the past 3 years. The main competition for DSL comes from cable, which accounts for almost all of the remaining 20 % of broadband provision. This percentage share of cable has also remained stable over the past 3 years. FTTH/B accounts for a very small number of broadband connections.

[321] Ο περί ρυθμίσεως Ηλεκτρονικών Επικοινωνιών και Ταχυδρομικών Υπηρεσιών Νόμος του 2004 112(I)/2004 of 30/4/2004.



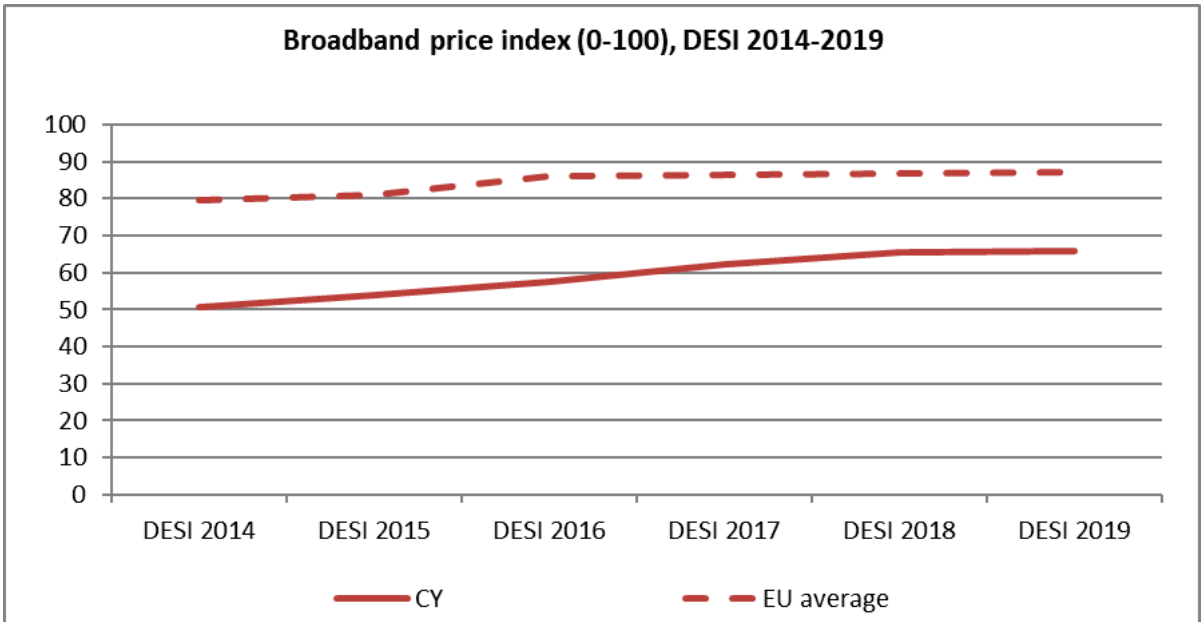

The penetration of fast broadband has gradually increased in the past 2 years, rising from 3 % in July 2016 to 15 % in July 2018. However take-up of fast broadband not only lags behind the EU average but this lag is slowly increasing. Penetration of ultrafast broadband is just starting to grow, and in 2018 it surpassed 1 % for the first time (2 % in mid 2018). The gap between ultrafast broadband penetration in Cyprus and the EU average for ultrafast broadband penetration is increasing rapidly.




In 2018, there was a noticeable shift of subscribers away from packages of <10Mbps (from 58 % of broadband subscriptions in July 2017 to 28 % in July 2018) and towards packages of 10-30 Mbps (from 30 % to 54 % respectively).

Still, Cyprus remains second to last in the percentage of subscriptions to high-speed baskets (30 Mbps

and above) and to ultra-high speed baskets (100Mbps and above).

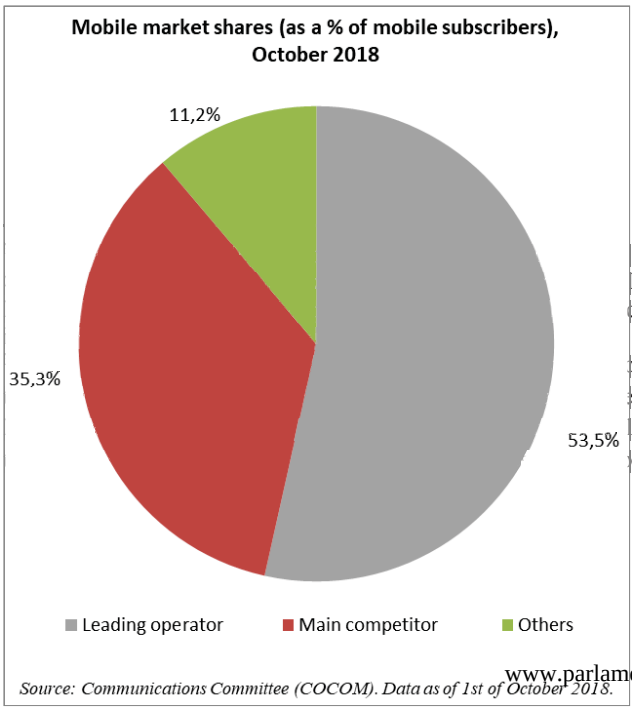



*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

Fixed broadband prices[322] in Cyprus are in general higher than the EU average. At the ultra-high-speed end (above 100 Mbps), prices in Cyprus are between 2 and 3.5 times higher than the EU average. This partly explains the very low uptake of ultra-high-speed services. On the other hand, the comparison with the EU average is more favourable for offers that include a TV component. In fact, prices for '3-play' bundled subscriptions (comprising TV, internet and telephony) are slightly lower than the EU average for both the 12-30 and 30-100 Mbps baskets (1 % and 4 % respectively). This is also reflected in the broadband price index[323].

## 2.2. Mobile markets

Competition in the mobile market remains intense. During the last year, the mobile market share of the incumbent CYTA eroded by 1.65 %, a share that was mainly gained by Primetel. Operators continue to invest in network coverage to strengthen their competitive position. MTN and CYTA already publicise their 4.5G coverage in all major urban centres. They also use bundling to make their offers more attractive.




*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

Around 20 % of telecom bundles contain mobile telephony, a percentage that has doubled in the past 3 years, though this represents barely 3 % of the total mobile subscriptions. Moreover, around 45 % of all

(Empirica, project SMART 2016/0044), to be published. Each basket is defined based on the speed bracket (up to 10 ce components (internet, '2-play' with internet+telephone or

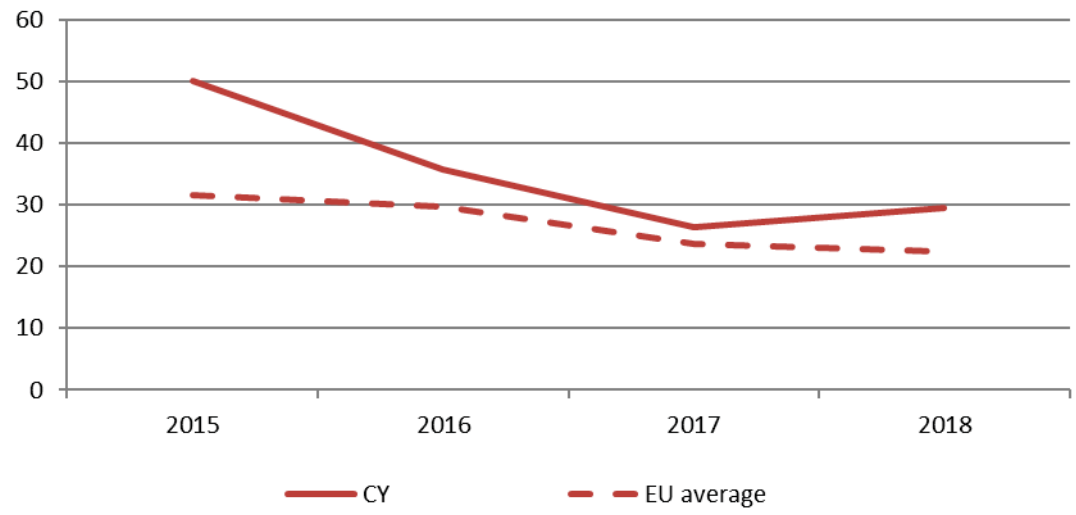
offers from: standalone, double play (BB + TV, BB + fixed speeds categories - 12-30 Mbps, 30-100 Mbps and +100 d not be read as prices) and the higher the values, the better purchasing power.

mobile subscriptions, which is 75 % of all the post-paid subscriptions, have a contract that contains mobile broadband data.

Prices for mobile-broadband-only services are substantially higher in Cyprus than in the rest of the EU, with the exception of low-volume baskets (256 MB and 512 MB), where prices are very close to the EU average. In higher-volume baskets (1, 2, 5 and 10 GB) Cyprus is the most expensive of the EU Member States. For the 5 and 10 GB baskets, prices in Cyprus are more than 50 % higher than in the second-most expensive EU country.

The picture is better - but the trend is similar - for voice and data bundles. For the 100-MB-and-30-calls basket, prices in Cyprus are 35 % cheaper than the EU average, while for the 500-Mb-and-100-calls basket they are practically identical. However, prices in Cyprus for higher-consumption baskets are substantially more expensive than the EU average, and are almost twice as high for the 5-GB-and-100-calls basket.

**Least expensive offer for handset (1 GB + 300 calls basket) at Member State level, EUR/PPP, 2015-2018**

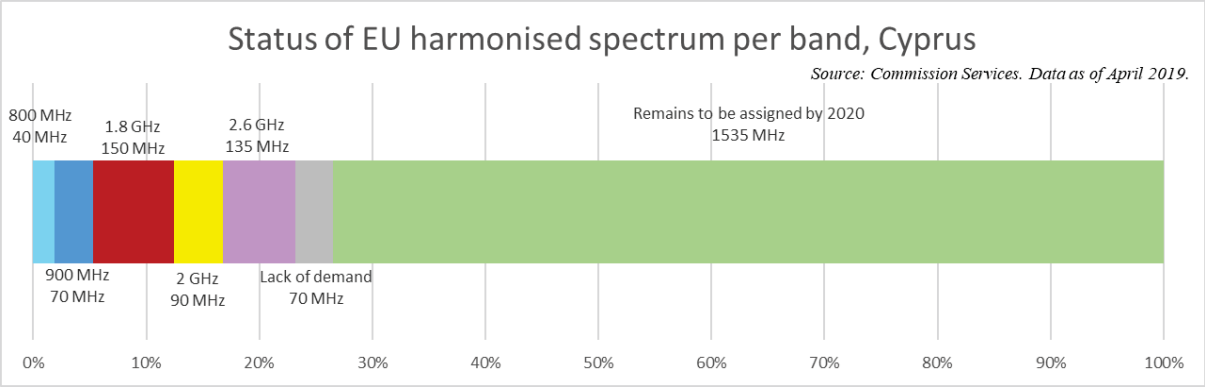



*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

## 3. Regulatory developments

### 3.1. Spectrum

Cyprus has assigned 23 % of the 2090 MHz overall harmonised spectrum for broadband[324]. The spectrum that remains to be assigned is mainly in the 700 MHz and the 2.6, 3.4-3.8 and 26 GHz bands[325].




During 2018, Cyprus has initiated an auction for a third lot in the 800 MHz and 2.6 GHz bands (total spectrum of 75 MHz). Cyprus had auctioned the entire spectrum in 2016 but the third lot was not authorised due to lack of demand. Submission of applications was concluded in December 2018. Cyprus expects to complete the assignment of this package by June 2019[326].

The Cypriot authorities are currently seeking to secure frequencies in the 600 MHz band, in order to migrate Velister (the private, national DTV operator), which transmits exclusively within the 700 MHz band. For this purpose, Cyprus processed new assignments to ITU in recent years through the procedures described in the GE06 plan. Cyprus has now concluded the coordination procedure with all neighbouring states[327] except Turkey, which refuses to enter into any coordination discussion. Despite this setback, Cyprus intends to move forward with its plans to secure frequencies in the 600 MHz band, making use of the non-interference provision. This provision effectively allows transmission, even without completing the coordination procedure. The current intention is to start parallel transmission in March 2019 and end it in July 2019. However, the main issue with this plan is the potential interference from TV broadcasts in the 700 MHz band, coming from the occupied territories. This effectively prevents the auctioning of the 700 MHz band freed up by the migration of Velister. Cyprus expects that once such broadcasts stop, there will be interest from the market. As it has been already mentioned Cyprus further intends to auction the entire 3.4-3.8 GHz band and the 26 GHz band and, if all relevant issues are resolved and the migration process is complete, the 700 MHz band.

### 3.2. Regulated access

In May 2018, CYTA published a reference offer and prices for a VULA (virtual unbundled local access) wholesale product. CYTA's publication was aimed at launching a retail high-speed broadband

[324] The 5G spectrum-readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 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 communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.
[325] The Ministry has consulted with the market on the 1.5 GHz band but there was no interest at all, mainly because this is a download-only band.
[326] On 20 May 2019, the Department of Electronic Communications announced the temporary highest bidder, Cablenet, who will be awarded the rights of use for this spectrum within 30 days, subject to fulfilling the requirements of the tender.
[327] Greece, Israel, Palestine, Lebanon, Syria and Egypt.

service and followed the OCECPR Market Analysis Decision[328] on the market for wholesale local access provided at a fixed location (market 3a of the 2014 Recommendation on relevant markets)[329]. Although market players see the introduction of VULA as a positive development, there is concern about the complexity and the high level of wholesale prices.

All seven markets that are still subject to the SMP Regulation in Cyprus[330] have been analysed within the last 3 years. OCECPR intends to notify companies operating in markets 1 and 2 in the second half of 2019 as well as Markets 18 and 15 of the 2003 Recommendation in the first half of 2019.

All seven markets that are still subject to the SMP Regulation in Cyprus[331] have been analysed within the last 3 years. OCECPR intends to notify markets 1 and 2 in the second half of 2019 as well as Markets 18 and 15 of the 2003 Recommendation in the first half of 2019.

In 2018, the NRA concluded analyses of two markets. Its conclusions are outlined in the two bullet points below.

- The NRA decided that the market for wholesale trunk segments of leased lines (Market 14 of the 2003 Recommendation on relevant markets) is no longer susceptible to ex-ante regulation, and withdrew the previously imposed regulatory obligations[332].
- The NRA adopted a decision[333], which designates the incumbent (CYTA) as having SMP in the market for wholesale high-quality access provided at a fixed location (Market 4 of the 2014 Recommendation on relevant markets). This decision imposed the remedies of: transparency; non-discrimination; accounting separation; access to and use of specific network facilities; price control and cost accounting; and collocation. In response to this notified draft measures, the Commission issued comments urging the NRA to consider imposing a lighter set of remedies in the more competitive areas and/or bandwidth segments, where appropriate.

According to the decision regulating the market for wholesale local access provided at a fixed location, the VULA obligation is imposed on the high-speed network of the SMP operator. The decision also imposes to the SMP operator obligations for: (i) cost orientation; (ii) economic and technical replicability; and (iii) equivalence of inputs. Obligations such as ‘duct access’ and ‘backhaul’ services are also a prerequisite for the deployment of alternative infrastructures, especially given the

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328 "Η περί των αποτελεσμάτων Εξέτασης Αγοράς και της Επιβολής Ρυθμιστικών Μέτρων στον Οργανισμό με Σημαντική Ισχύ στη σχετική Αγορά χονδρικής παροχής τοπικής πρόσβασης σε σταθερή θέση (Αγορά 3α), Απόφαση του 2017" 91/2017.

329 Commission Recommendation 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 (OJ L 295, 11.10.2014, pp. 79-84).

330 They include all markets identified in the Commission Recommendation on relevant markets of 2014, i.e. Market 1 (Wholesale call termination on individual public telephone networks provided at a fixed location), Market 2 (Wholesale voice call termination on individual mobile networks) Market 3a (Wholesale local access provided at a fixed location), Market 3b (Wholesale central access provided at a fixed location for mass-market products), and Market 4 (Wholesale high-quality access provided at a fixed location) as well as two markets of the 2003 Recommendation, i.e. Market 15 (Access and call origination on public mobile telephone networks) and Market 18 (Broadcasting transmission services, to deliver broadcast content to end users).

331 They include all markets identified in the Commission Recommendation on relevant markets of 2014, i.e. Market 1 (Wholesale call termination on individual public telephone networks provided at a fixed location), Market 2 (Wholesale voice call termination on individual mobile networks) Market 3a (Wholesale local access provided at a fixed location), Market 3b (Wholesale central access provided at a fixed location for mass-market products), and Market 4 (Wholesale high-quality access provided at a fixed location) as well as two markets of the 2003 Recommendation, i.e. Market 15 (Access and call origination on public mobile telephone networks) and Market 18 (Broadcasting transmission services, to deliver broadcast content to end users).

332 “Η περί της Άρσης των υφιστάμενων ρυθμιστικών υποχρεώσεων της ΑΤΗΚ στην Αγορά Ζευκτικών Τμημάτων Χονδρικών Μισθωμένων Γραμμών, Απόφαση του 2018” 622/2018.

333 “Η περί των αποτελεσμάτων Εξέτασης Αγοράς και της Επιβολής Ρυθμιστικών Μέτρων στον Οργανισμό με Σημαντική ισχύ στην Χονδρική Αγορά Τερματικών Τμημάτων Μισθωμένων Γραμμών (Αγορά 4 της Σύστασης 2014/710/ΕΕ της Ευρωπαϊκής Επιτροπής: Χονδρική παροχή πρόσβασης υψηλής ποιότητας σε σταθερή θέση), Απόφαση του 2018” 621/2018.

anticipated replacement of the copper access network, where an optical-fibre-access network is deployed.

The OCECPR imposes fixed and mobile termination rates on the basis of a bottom-up, long-run incremental cost (BULRIC) model. The regulated fixed termination rates (FTR) cap for 2018 has been set at 7 euro cent/minute for local termination, and applies to all operators. The regulated mobile termination rates (MTR) cap for 2018 has been set at 69 euro cent/minute[334] (compared to 85 euro cent/minute for the weighted EU average) for all MNOs/ MVNOs (including Primetel, for which a glidepath was imposed previously, allowing MTR a higher-than-the-regulated cap until 2018). The above rates apply only for EEA originated traffic.

On the Broadband Cost Reduction Directive[335] (already transposed in 2016[336]) OCECPR reports that any practical examples of cross-sector network deployment (notably the use of the Electricity Authority's poles by electronic communication operators based on commercial terms), were in place prior to the transposition of the Directive.

OCECPR continues working to promote transparency of physical infrastructure. The geographic information system (GIS) portal is now interoperable, with a fully automated, electronic permit-granting procedure system. The system is available for use by electronic communications network operators, and will gradually replace the current use of written forms.

However, companies operating in the market have expressed concerns about the procedures and delays for granting permits for antenna masts. While the relevant law sets strict deadlines, getting a permit can take more than a year. In some cases, local authorities have announced that they will not accept any more requests for antenna permits. This could deter the effective deployment of 5G networks. The competent ministry acknowledges this problem and is seeking measures to alleviate it. A process on the modernization policy framework on the installation of antenna masts has been recently initiated, involving all relevant stakeholders.

## 4. End-user matters

According to the 2018 Consumer Markets Scoreboard, of the 25 services markets assessed by consumers in Cyprus 'mobile telephone services', 'fixed telephone services' and 'internet provision', rank quite high (4th, 7th and 12th respectively) and above the "services" average". They also outperform the respective EU averages (by 5.6, 4.6 and 2.4 points respectively).[337].

In 2018 (until November) the Commissioner received 420 complaints (compared to 174 in 2017), most of which were resolved through mediation. The majority concerned subscription to multimedia services (383) and charges following contract termination (24). According to a consumer association, the complaints that they receive most frequently from consumers concern the cost of switching, multimedia services, delays in establishing new connections, quality of service, and internet speed.

### a. Net neutrality

In 2018, OCECPR's found that some ISPs were limiting the access rate of heavy users based on their traffic volume to prevent network congestion. OCECPR informed the ISPs concerned that their practices may have constituted an infringement of, and requested further action to ensure compliance

[334] The relevant decision was issued in November 2018 and applies with retroactive effect from 1 January 2018.
[335] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).
[336] "Ο περί Ρυθμίσεως Ηλεκτρονικών Επικοινωνιών και Ταχυδρομικών Υπηρεσιών (Τροποποιητικός) Νόμος του 2016", 104(I)/2016 (14/10/2016).
[337] The market performance index (MPI) is a composite indicator ranging from 0 to 100 which measures how well a given market performs according to consumers. See Eurobarometer Consumer Markets Scoreboard 2018, p 12 and p 100, available at https://ec.europa.eu/info/sites/info/files/consumer-markets-scoreboard-2018_en.pdf.

with the provisions of Regulation (EU) 2015/2120[338] and Decree 72/2017[339]. However, OCECPR did not impose any penalties on the ISPs.

In addition, OCECPR identified two zero-rating products, offered by a single provider (the products were for music and social media applications). OCECPR carried out a formal assessment of these services and concluded that since only a limited number of subscribers used the zero-rated applications (0.01 % of the providers' subscribers used the music application and 0.1 % used the social media application), there was no immediate impact on end-users' rights. For this reason OCECPR did not take any action against the provider.

**b. Roaming**

There has been a sharp increase in the use of roaming services for voice calls by Cypriot subscribers, following the introduction of RLAH[340]. Specifically, in Q4 2017 there was 2.5 times more voice roaming than in Q4 2016, while in Q1 2018 where was 2.7 times more voice roaming than in Q1 2017[341].

OCECPR has not identified any cases of confirmed or potential non-compliance with the RLAH rules, which are set out in Regulation (EU) 2015/2120 and have been in force since June 2017. It has not observed any increases in domestic mobile prices. Also, it has not received any complaints about the quality of services (in particular the data speed and connectivity) either from Cypriot consumers travelling within the EU or from foreign subscribers roaming in Cyprus. There have been only seven complaints about high charges for tourists unintentionally using services from mobile operators active in the area of Cyprus which is out of the control of the Republic of Cyprus.

**c. Emergency communications - 112**

Emergency communications for people with special needs are currently ensured through fax (to a long number) or SMS. The service allows people with special needs to send a (written) message to the universal service provider (CYTA), which is then relayed to the 112 centre. The 112 centre handles it as usual. The use of this service is free for all. In cases where a fax is used, the police department can obtain caller location information (CLI) from the universal service provider. When an SMS is used, there is no possibility to obtain CLI, unless it is included in the message. There are no statistics on the current system.

A new system to support emergency communications is currently in place as part of the framework of the eCall system. In the new system, CLI for 112 calls is based on operator data. The police department system links to the system of the MNOs and gets the information directly. However, it seems that such information is currently limited to cell level.

Currently there are six call centres serving 112 calls, one in each prefecture. With the new system, there will be a single call centre in the premises of the police department. There will be a second call centre in Paphos for redundancy purposes.

For end-users with disabilities, an application for smart phones (both Android and IOS) is under development. It will require registration when downloading the application, so the person calling will

[338] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union (Text with EEA relevance), OJ L 310, 26.11.2015, p. 1.
[339] "Το Περί της Πρόσβασης στο Ανοικτό Διαδίκτυο Διάταγμα του 2017" 72/2017 (3/3/2017).
[340] 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 amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920.
[341] Figures compare Q4/2017 and Q1/2018 with Q4/2016 and Q1/2017 retail roaming volumes according to the BEREC International Roaming Benchmark Report, October 2017-March 2018, of 4 October 2018.

be identified. For CLI, the application will use mobile data, wifi and GPS data. The new system and smart phone application are in a testing phase, and are expected to become operational within the first half of 2019.

The Commission is currently looking into the functioning of emergency communications and the 112 number in Cyprus, with particular focus on CLI.

#### d. Universal service

There were no new developments or changes to report on the scope of the universal service (which includes: access to fixed telephony; special retail packages to end-users with disabilities and/ or on low income; electronic directory services; and free access to the emergency number) or the designation process. Broadband is not included in the scope of the universal service, and its possible inclusion within the scope of universal service is currently not under consideration. Social tariffs include 50 % discounts for low-income households and free-of-charge services for end-users with disabilities. In 2018, no claims were received for compensation and therefore the financing mechanism was not activated.

## 5. Institutional issues

The NRA, OCECPR, has sole competence for the tasks listed in Article 5 of the EECC, with two exceptions. The first exception is ensuring consumer protection and end-user rights in the electronic communications sector, which is a responsibility that OCECPR shares with the Ministry of Commerce (Department of Consumer Protection). The second exception is spectrum-related tasks, which are under the sole competence of the Ministry of Communications and Works (Department of Electronic Communications). The legislator will also need to appoint the competent authority for the geographic surveys of networks.

Currently there are two authorities competent to address consumer issues. The first authority is the Commissioner (NRA), which approaches such issues on the basis of sector-specific consumer-protection regulation, i.e. within the context of promoting competition and innovation in the electronic communications market. The second authority is the Department for the Protection of Consumers (Ministry of Commerce), which approaches consumer complaints on the basis of consumer protection regulation, i.e. as with any other sector.

Undertakings providing or intending to provide electronic communications networks and services are subject to the general authorisation regime set out in the Electronic Communications Law 112(I)/2004[342]. The OCECPR levies annual administrative charges on all registered providers of electronic communication services (under general authorisation). Administrative charges for 2018 amounted to €2,472,910.

In 2018, the OCECPR passed new secondary legislation on numbering resources[343] (Decree 63/2018), which came into force in March 2018. The changes introduced in the secondary legislation were based on the results of the annual study on the efficiency of the Cyprus numbering plan. The main changes are listed in the bullet points below.

- Withdrawal of the capability of providers to reserve numbering resources for future use. OCECPR now assigns numbering resources based on justified (regarding the need) applications.
- Withdrawal of the assignment fee for numbering resources, while maintaining an annual usage fee which applies from the day of assignment.

[342] Ο περί ρυθμίσεως Ηλεκτρονικών Επικοινωνιών και Ταχυδρομικών Υπηρεσιών Νόμος του 2004 112(I)/2004 of 30/4/2004.
[343] "Το περί Αριθμοδότησης (Ηλεκτρονικών Επικοινωνιών) Διάταγμα του 2018" 63/2018 (2/3/2018).

- Reduction of numbering fees per category.

## 6. Conclusion

Fixed network coverage is one of the factors helping Cyprus to benefit from the digital economy. The main challenge faced by the country is to encourage take-up of high-speed broadband. Low take-up is influenced by factors such as pricing, a lack of compelling content and low digital literacy. Market players seem keen to invest in new networks and launch 5G services. A new broadband strategy and plan, setting concrete targets and actions in line with the European gigabit society and the 5G action plan can promote this investment. Another important enabler of investment in new networks and 5G services is the timely award of spectrum. The unwillingness of local authorities to grant permits for antenna masts and delays in the relevant procedures could deter the effective deployment of such networks.

# Latvia

| | Latvia | | | | EU |
|---|---|---|---|---|---|
| | DESI 2017 | DESI 2018 | DESI 2019 | | DESI 2019 |
| | value | value | value | rank | value |
| **1a1 Fixed broadband coverage** | **93%** | **93%** | **94%** | ***22*** | **97%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1a2 Fixed broadband take-up** | **61%** | **64%** | **60%** | ***25*** | **77%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1b1 4G coverage** | **91%** | **98%** | **98%** | ***9*** | **94%** |
| % households (average of operators) | 2016 | 2017 | 2018 | | 2018 |
| **1b2 Mobile broadband take-up** | **78** | **92** | **123** | ***6*** | **96** |
| Subscriptions per 100 people | 2016 | 2017 | 2018 | | 2018 |
| **1b3 5G readiness** | **NA** | **NA** | **33%** | ***3*** | **14%** |
| Assigned spectrum as a % of total harmonised 5G spectrum | | | 2018 | | 2018 |
| **1c1 Fast broadband (NGA) coverage** | **91%** | **92%** | **93%** | ***8*** | **83%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1c2 Fast broadband take-up** | **38%** | **42%** | **40%** | ***16*** | **41%** |
| % households | 2016 | 2017 | 2018 | | 2018 |
| **1d1 Ultrafast broadband coverage** | **NA** | **88%** | **90%** | ***6*** | **60%** |
| % households | | 2017 | 2018 | | 2018 |
| **1d2 Ultrafast broadband take-up** | **29%** | **35%** | **32%** | ***8*** | **20%** |
| % households | 2016 | 2017 | 2018 | | 2017 |
| **1e1 Broadband price index** | **86** | **87** | **87** | ***10*** | **87** |
| Score (0 to 100) | 2016 | 2017 | 2018 | | 2017 |

## 1. Progress towards a gigabit society

Latvia's national broadband plan for 2013-2020 includes the same broadband targets as the EU. The gigabit society objectives are included in Latvia's 2018-2020 national policy plan for the electronic communications sector and will be included in its next broadband policy document covering the post-2020 period.

Latvia is among the EU's front runners as regards the deployment of very high speed infrastructure. Total fibre to the premises (FTTP) coverage amounted to 88 % of households in 2018 in the country, compared to 30 % for the EU (see figure above). As a result, ultrafast broadband coverage in Latvia reaches 90 % of households compared to 60 % in the EU (see DESI connectivity indicators in the table above). The take-up of such connections in Latvia is also high (32 % of households versus 20 % in the EU).

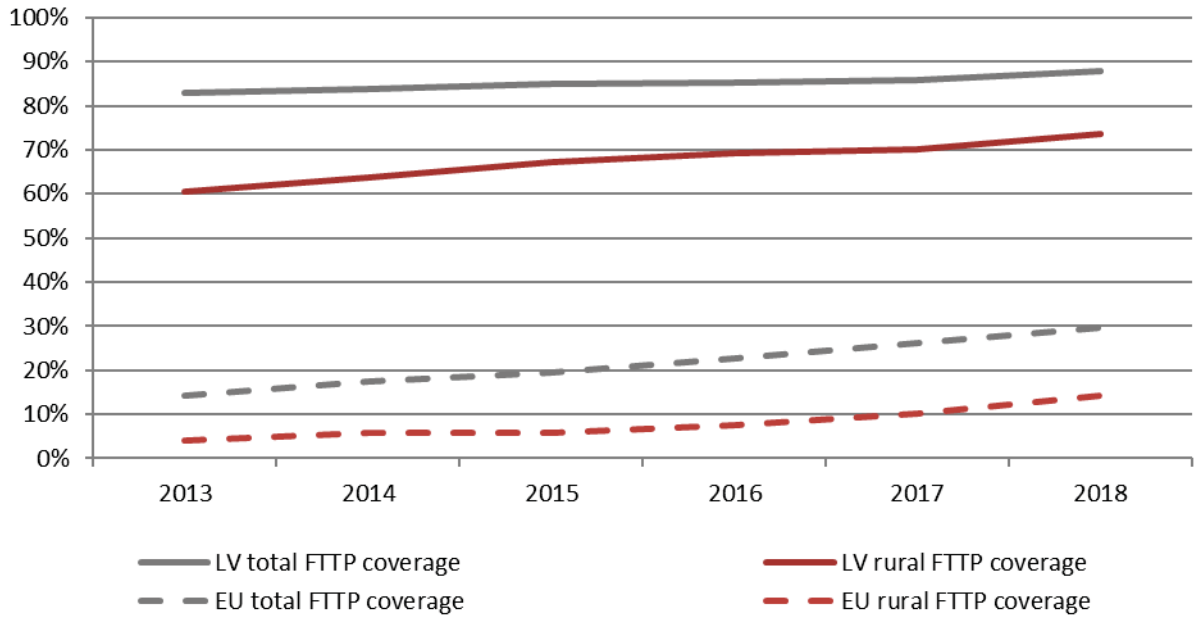
Latvia's rural areas had among the highest FTTP coverage in the EU in 2018 (73.6 %, compared to 14.1 % for the EU, see figure above). However, in 2018, 18 % of rural households lacked fixed broadband infrastructure, which places Latvia at the bottom in terms of overall fixed broadband coverage and take up in the EU (see DESI connectivity indicators in the table above). This also means that the rural areas that are covered by fixed broadband infrastructure are to a large extent FTTP.

Bridging the digital divide between urban and rural areas has been the objective of the 'middle mile' project, which deploys fibre (in particular backhaul infrastructure) up to the last mile in "white areas"[344]. In the last year, the project has resulted in better planning and anticipation of specific needs at the local level. Private operators are more involved in decisions made locally under the project,

[344] State aid programme Nr.SA.33324 'Next generation network in rural areas'

which makes it possible for them to take over the local loop/last mile[345]. The infrastructure is owned by the 100 % state-owned company LVRTC, a wholesale-only broadband network operator, and they have adapted access pricing. Aside from the fixed incumbent, mobile operators are also clearly important market players for deploying wirelessly the last mile and home connections over 4G technology. Reflections on how to deploy the last mile in a number of remaining white areas and increase the use of infrastructure deployed under the project are still ongoing, including on possibilities of extending state aid schemes.

**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.*

The figure below shows that ultrafast broadband coverage has almost reached the level of fixed broadband coverage in Latvia, including in rural areas.

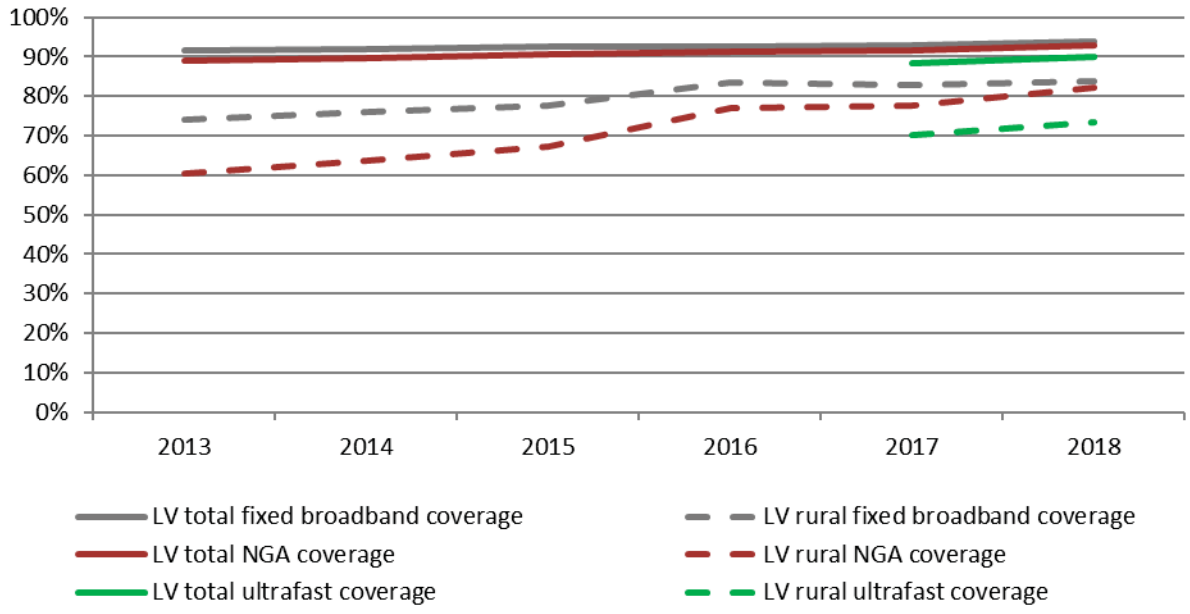
4G deployment continued to progress rapidly in 2018. 4G coverage in Latvia is now available in close to 100 % of Latvian households and mobile broadband take-up is substantially higher than the EU average (see DESI cConnectivity indicators in the table above).

The Latvian authorities are working on a national 5G rRoadmap. The results of the Ffirst 5G trials in the 26 GHz band were presented at the 5G regional conference ("5G Techritory") that was hosted held in Riga in September 2018. This conference is meant planned to be organised annually. Mobile operators will start deploying 5G in 2019 in the 3.4-3.8 GHz band which is now fully assigned on to technical conditions suitable for 5G. This brought Latvia to the podium top with as regards to the 5G readiness indicator (with 33 % of the 5G spectrum assigned, against an EU average of 11 %). However, the concrete specific new- use cases and services to be provided via 5G are still unclear to the industry. The first use of 5G in 2019 is likely to be home or office wireless internet. In September 2018, all Baltic states signed a memorandum of understanding where they agree to seek for gradual deployment of the 4G+, 4G ++ and finally 5G network along the section of Via Baltica (E67) Tallinn (EE) – Riga (LV) – Kaunas (LT) – Lithuanian/Polish border. In the medium- to long term, access to

[345] The optical network and access points created make it possible for at least five electronic communications companies to build the last mile connections to internet access services on equal terms and under non-discriminatory conditions.

and rental of property needed in order to install the many base stations required for 5G might become a bottleneck to 5G deployment. At this stage, operators do not plan to switch off 2G and or 3G in the foreseeable future.

**Fixed, NGA and ultrafast 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. Ultrafast coverage metrics are available for 2017 and 2018.*

## 2. Market developments

### Competitive environment

There are relatively frequent market entries and exits in the fixed market by very small operators. The option of a merger between the fixed incumbent (Lattelecom) and the mobile incumbent (LMT) was rejected by the government in 2017. However, changes in the governance structure of both companies are being considered.

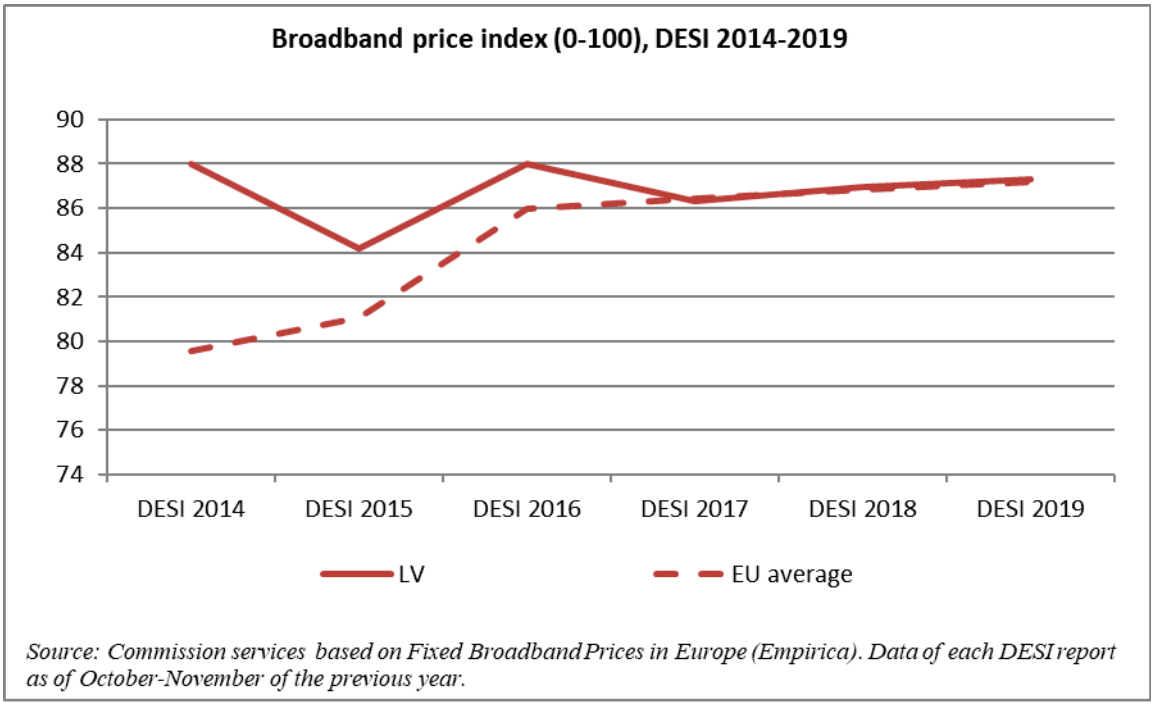
The three mobile operators compete with the fixed incumbent on the fixed residential broadband market by offering TV and internet connection using dedicated 4G routers at home. However, following a fixed-mobile substitutability analysis at retail level, the national regulator (SPRK) does not yet consider mobile broadband as a full substitute to fixed broadband. SPRK has determined that 30 % to 50 % of all bundled telecommunications services in use have TV included as a part of the bundle. Therefore, SPRK considers TV services to be important to the end-users of telecommunications services.

There is no national co-investment strategy. Operators, including Lattelecom, have not implemented any co-investment agreements. Aside from LVRTC (see section 1), there are four other wholesale-only operators in Latvia. They offer national and international gateway services to other companies in the market.

### 2.1. Fixed markets

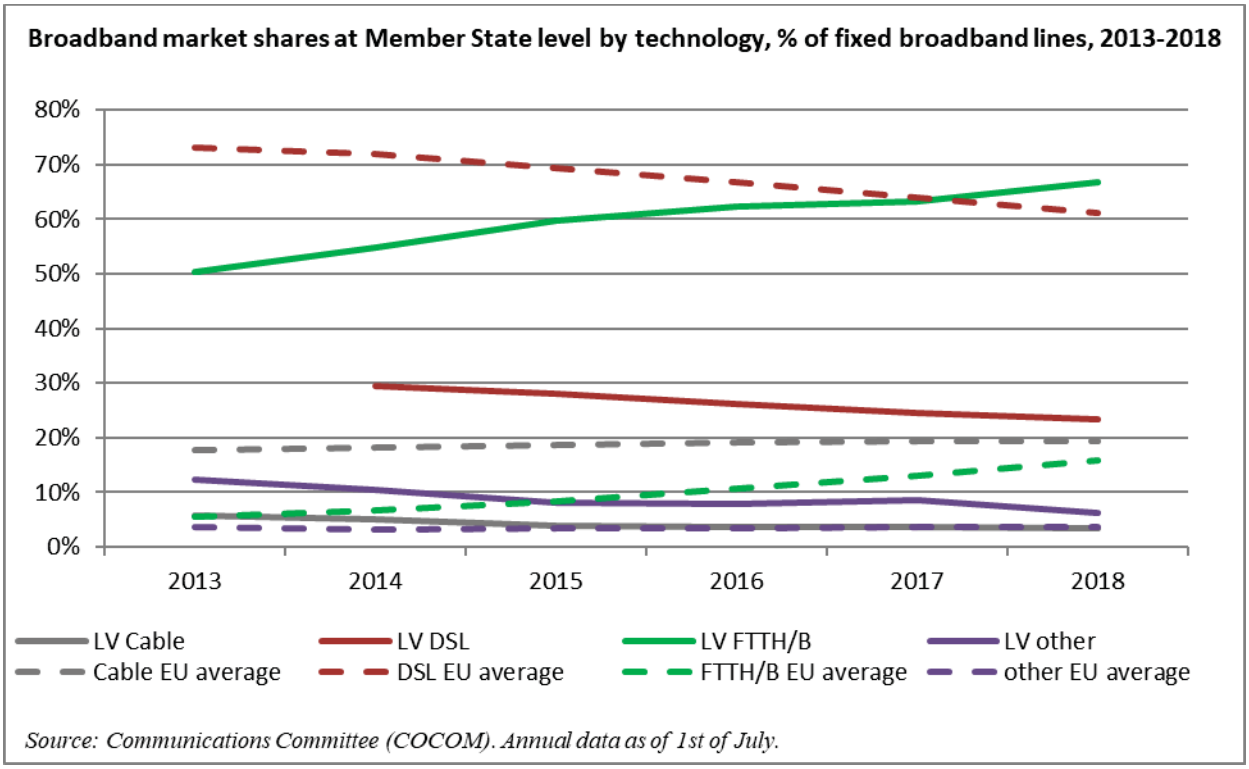
After several years at a higher level, Latvia's fixed broadband prices have converged towards the EU average, showing that fixed broadband has become more affordable in Latvia relative to the cost of

living[346].




*Source: Commission services based on Fixed Broadband Prices in Europe (Empirica). Data of each DESI report as of October-November of the previous year.*

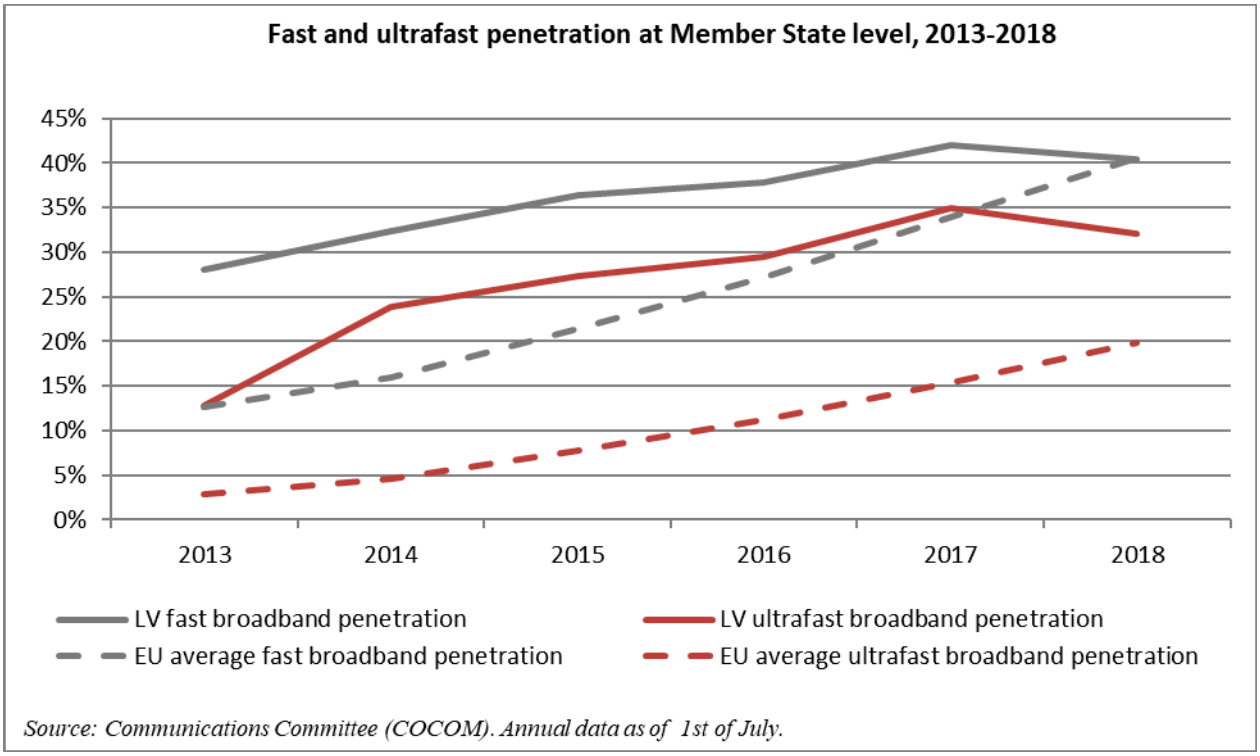
Overall, fixed broadband take-up is slowly rising in Latvia. The market share of the fixed incumbent (Lattelecom) has fallen slightly but is still above 50 %. In 2014, Lattelecom started to deploy VDSL2 vectoring. The fastest developments concern FTTH/B, whose share has been markedly increasing since 2013 (figure below).




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

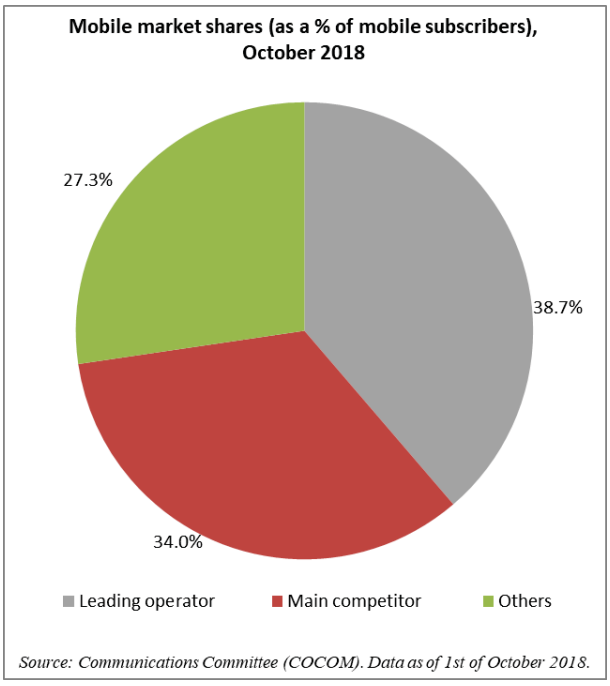
[346] The fixed broadband price index weighs the cheapest retail offers from: standalone, double play (BB + TV, BB + fixed telephony) and triple play (BB+TV+fixed telephony) and three speeds categories - 12-30 Mbps, 30-100 Mbps and +100 Mbps. This indicator presents values from 0 to 100 (which should 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.

As shown in the connectivity indicators table above and in the figure below, Latvia is among the EU's leaders as regards ultrafast broadband take up (32 % in Latvia versus 20 % in the EU) and at about the EU average as regards fast broadband take up (40.5 %).




*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

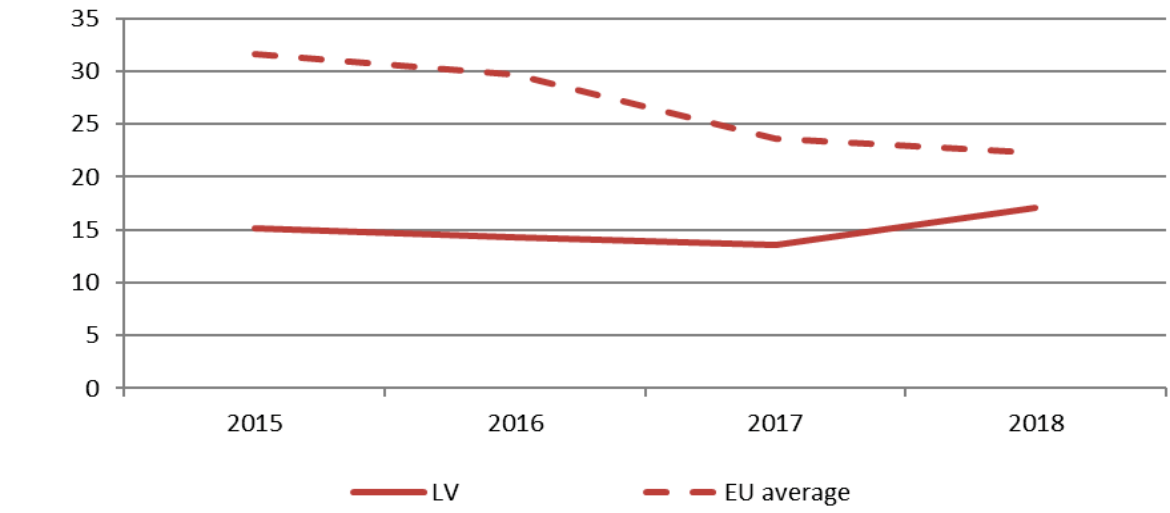
## 2.2. Mobile markets




*Source: Communications Committee (COCOM). Data as of 1st of October 2018.*

Market shares are stable in the Latvian mobile market.

Latvia's mobile prices are among the lowest in the EU, in particular for large data bundles. The figure below shows that, for the low- to middle-range baskets, there has been some convergence with the EU average price level in EUR/ppp.

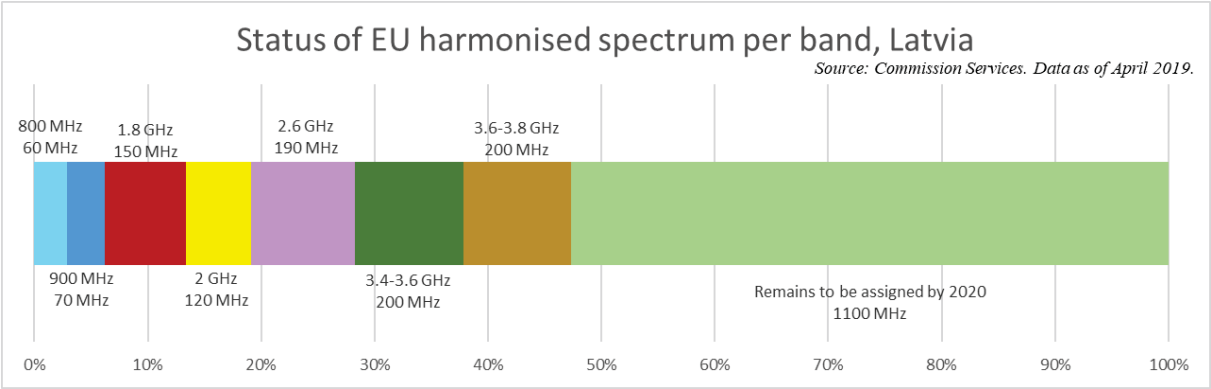



*Source: Mobile Broadband Price Study (Van Dijk and Empirica). Prices expressed in EUR/(Purchase parity power - PPP), VAT included. Annual data as of February.*

## 3. Regulatory developments

### 3.1. Spectrum

In Latvia, 47 % of the spectrum harmonised at EU level for wireless broadband has been assigned[347]. The spectrum that remains to be assigned is mainly in the 700 MHz, the 1.5 GHz and the 26 GHz bands.




The 3.4-3.8 GHz frequency band has been rearranged into 8 x 50 MHz Time Division Duplex (TDD) continuous spectrum blocks for implementation of mobile/fixed communication networks. The auction of the last 100 MHz took place in 2018. Tele2 acquired the right for the 100 MHz for €6.5 million. The assignment process has enabled operators to acquire large blocks of spectrum facilitating the provision of gigabit 5G services, at reasonable prices (6.5 euro cents/MHz/pop.). All operators now own the necessary rights to use spectrum in that band to deploy 5G from January 2019.

[347] The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for use for 5G by 2020 within the so-called 5G pioneer bands in each EU Member State. For the 3.4-3.8 band this means that only licences aligned with the technical conditions annexed to Commission Decision (EU)2019/235, are considered 5G-ready. On the contrary, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

Currently all available Ultra High Frequency (UHF) 470-790 MHz band is used for Digital Terrestrial Television (DTT). The broadcasting licenses and corresponding permits for transmitters are in force until 31 December 2021. The DVB-T transmission system and MPEG-4 signal compression are used. The 694-790 MHz band (700 MHz band) provides for a substantial part of the UHF spectrum for transmission of TV content. Auctions of the 700 MHz band are expected to take place in 2020 or in the first semester of 2021. The 700 MHz band will be available for 5G from 1 January 2022. The 2-year delay is due to the current use of that band for TV broadcasting and to frequency coordination being under discussion with Russia. It is planned that the sub-700 MHz band will be kept for DTT operations.

Additional frequency resources for early 5G trials can be already assigned in some parts of the spectrum above 24 GHz. Allocating a full 1 GHz to 5G in the 24.25-27.5 GHz band will require coordination and negotiations with the military. However no particular difficulty is expected.

Implementation of Decision (EU) 2018/661[348] has reached its final stage. Following amendments to the Latvian national radio frequency plan made by the Cabinet of Ministers, the 1.5 GHz band (1427-1518 MHz) has been available for electronic communications networks since January 2019. Auctions are planned to take place in 2019.

### 3.2. Regulated access

Only the markets identified in the 2014 Recommendation on Relevant Markets[349] are regulated in Latvia.

Because small operators frequently enter and exit the market, SPRK frequently reviews the market for wholesale call termination on individual public telephone networks provided at a fixed location (Market 1 of the 2014 Recommendation on relevant markets) in order to update the list of operators with Significant Market Power (SMP). SPRK adopted its latest decision on this in November 2018. Frequent updates of SMP operators in Market 1 make it possible to quickly regulate new entrants and avoid situations in which they charge high Fixed Termination Rates (FTRs), even though they are not regulated as much as they had been in the past. This has proven to be effective in combatting abusive FTRs, which were still highly problematic only a few years ago. Since 1 January 2018, the maximum FTR has been set at 0.0701 euro cent per minute (decrease of 7.7 %, below the EU weighted average of 0.21 euro cent per minute) with a call set-up of maximum 0.0766 euro cent, and the maximum MTR has been set at 0.8868 euro cent per minute (decrease by 15.5 %, slightly above the EU weighted average of 0.85 euro cent per minute).

A new decision on the market for wholesale local access provided at a fixed location and on the market for wholesale central access provided at a fixed location for mass-market products (Markets 3a & 3b of the 2014 Recommendation on relevant markets) was adopted in October 2018. SPRK concluded that there was fixed to mobile substitution for voice, but not for broadband. Lattelecom was found to have SMP on both markets. Although, there is limited take-up of regulated access products, SPRK confirmed the same regulatory approach. As Lattelekom started modernising its network and implementing VDSL2 vectoring, SPRK extended the obligation to provide virtual unbundled access (VULA). However, the most significant change in regulatory obligations concerns the conditions for access to Lattelekom's civil infrastructure, which were set by strengthening the non-discrimination

[348] Commission Implementing Decision (EU) 2018/661 of 26 April 2018 amending Implementing Decision (EU) 2015/750 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union as regards its extension in the harmonised 1427-1452 MHz and 1492-1517 MHz frequency bands (notified under document C(2018) 2286), OJ L 110, 30.4.2018, p. 127–133.

[349] 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, OJ L 295, 11.10.2014, p. 79–84.

obligations and for which there is significant and increasing demand. Competition is almost exclusively infrastructure-based through cheap rollout of cables on roofs in Riga.

The market for wholesale high-quality access provided at a fixed location (Market 4 of the 2014 Recommendation on relevant markets) is planned to be reviewed in 2019. Currently Lattelecom has been designated as having SMP on this market and is subject to obligations of access, non-discrimination, transparency (Reference Offer), price control, cost accounting, and accounting separation for the provision of terminating segments of leased lines to competitors in order to provide leased lines to end-users.

Article 12 of the Framework Directive does not impose any infrastructure sharing. Under the Latvian Electronic Communications Law, however, the sharing of underground cable ducts and manholes has been mandated on a symmetric basis since 1 April 2014. These symmetrical remedies do not include access to cables. There is no measure adopted on the basis of Article 12(3) on the sharing of wiring inside buildings or up to the first concentration or distribution point.

The Broadband Cost Reduction Directive has only recently been fully transposed and there is no evidence of a tangible impact of the new measures. National regulator SPRK is the Dispute Settlement Body (DSB) designated by the Directive. So far, there have been no disputes in relation to the rules provided for in the Directive.

## 4. End-user matters

There has been no outstanding consumer issue in 2018. In 2018[350], SPRK received and replied to 45 consumer complaints. The Consumer Rights Protection Centre (PTAC) received 93 individual complaints regarding electronic communications providers. All acceptable complaints were answered or solved. The key issues were related to terms of contracts, bills, tariffs, quality of service, termination of contracts[351]. An independent tariff comparison tool has been available online for several years[352].

According to the 2018 Consumer Markets Scoreboard, in Latvia the Market Performance Indicator (MPI)[353] for Internet provision services ranks in the middle of all 25 services assessed by consumers (despite a decrease by 2.3 percentage points between 2015-2017, the market stands 2.7 points above the market's EU average score). Moreover, because of some very large decreases in consumers' assessments between 2015-2017, fixed and mobile telephone services rank further below (19th and 16th respectively), having recording a decrease in their MPI scores of 2.4 and 8.2 percentage points respectively.

### a. Net neutrality

There has been no particular issue as regards net neutrality. The SPRK has not detected any breach of EU regulation.

The main areas of SPRK focus as regards net neutrality are: transparency (contract information), internet speeds, monitoring mechanisms (to test non-conformity of performance), traffic management (including port-blocking). SPRK has set out the minimum guaranteed upload and download speeds in fixed networks (not less than 20 % of the network speed in the contract) and the minimum guaranteed speed for mobile networks (not lower than 256 Kbit/s), and it obliges internet service providers to include maximum speeds in its contracts. In 2018, SPRK reported that 19 % of all ISPs use some form

[350] Until 1 November 2018.
[351] SPRK deals with complaints regarding quality of services while PTAC deals with complaints arising from the application of contracts' rules.
[352] https://www.gudriem.lv
[353] The five components of the Market Performance Indicator are 'comparability', 'trust', 'choice', 'expectations' and 'problems and detriments'.

of traffic management. The primary traffic management measure is port-blocking to prevent malware, malicious applications and spam from being transmitted and/or installed.

No specific end user satisfaction survey has been conducted regarding quality of service. However, the low number of end user complaints regarding quality of service can be considered as an indicator of overall end user satisfaction in this area.

### b. Roaming

There have been no particular issues with implementing Roam-Like-At-Home (RLAH) in Latvia. Mobile operators have managed the impact of the new roaming rules well. The rules are now well assimilated by the market and understood by end users. Latvian travellers now use approximately nine times more data while roaming than they did before RLAH, and they call two to three times more[354]. SPRK still needs to assess the zero-rated offers on the Latvian market in accordance with RLAH rules.

Triggered by a simultaneous similar price increase carried out by two operators in June 2017, the Competition Council (CC) conducted an investigation and in September 2018 concluded that there is no evidence of collusion. As a direct effect of this investigation, the CC requested operators to better inform their customers about the existence of cheap domestic-only tariff plans. SPRK assessed the price difference between these tariff plans and roaming-enabled tariff plans as justified by the difference in domestic conditions of the plans.

### c. Emergency communications - 112

All location data, derived from both the network and the handset, is collected in one database and can be accessed by all services involved in emergency communication. However, an amendment of national law is necessary to allow for handset-based caller locations to be communicated to the relevant rescue services. This amendment is ready and should be on the Parliament's agenda in 2019. Only network location can be used until the amendment is adopted.

There was no new measure adopted in 2018 to ensure equivalent access to emergency services for end users with disabilities.

The Commission is currently looking into the functioning of emergency communications and the 112 number in Latvia, with particular focus on user location.

### d. Universal service

There has been no change in 2018 concerning Universal service in electronic communications in Latvia.

## 5. Institutional issues

SPRK consults the Competition Council on market analyses decisions. All draft decisions are sent to the Competition Council for comments prior to adoption. None of SPRK's decisions were appealed in 2018.

Numbering fraud has substantially decreased due to SPRK action in this area over the last few years (i.e. only giving mobile numbers to companies having spectrum or MVNO agreements and quickly regulating new market entrants). SPRK would like to introduce numbering fees to promote a more efficient use of numbers and introduce an M2M-specific numbering range to avoid a shortage of mobile numbers in a few years. This is still under discussion with the authority in charge of the national numbering plan (VARAM). The Ministry of Transport is preparing a new information report with the up-to-date opinions and information from stakeholders on this question. A new regulation

[354] International Roaming BEREC Benchmark Data Report, October 2017-March 2018, BoR(18)160

regarding the right of use of numbers, which defines rules for a more effective usage of numbering resources, came into force on 1st of January 2019.

## 6. Conclusion

Lavia is already well advanced in the deployment of very high speed fixed network infrastructure. As regards mobile networks, Latvia has a near to complete 4G coverage of households, and is prepared for early 5G deployment in the 3.4-3.8 GHz band. However, deploying the last mile in a number of remaining white areas remains a challenge. In the medium to long term, access to and rental of property needed in order to install the many base stations required for 5G might become a bottleneck to 5G deployment. The national numbering plan may need to be adapted to allow for the expected development of M2M/IoT services.