Germany

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

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1 The agreement between the political parties forming the federal government

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 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[2].

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[3]. BnetzA is expected to decide on disputes over refusals for applications for coordination of civil works on a case-by-case basis.
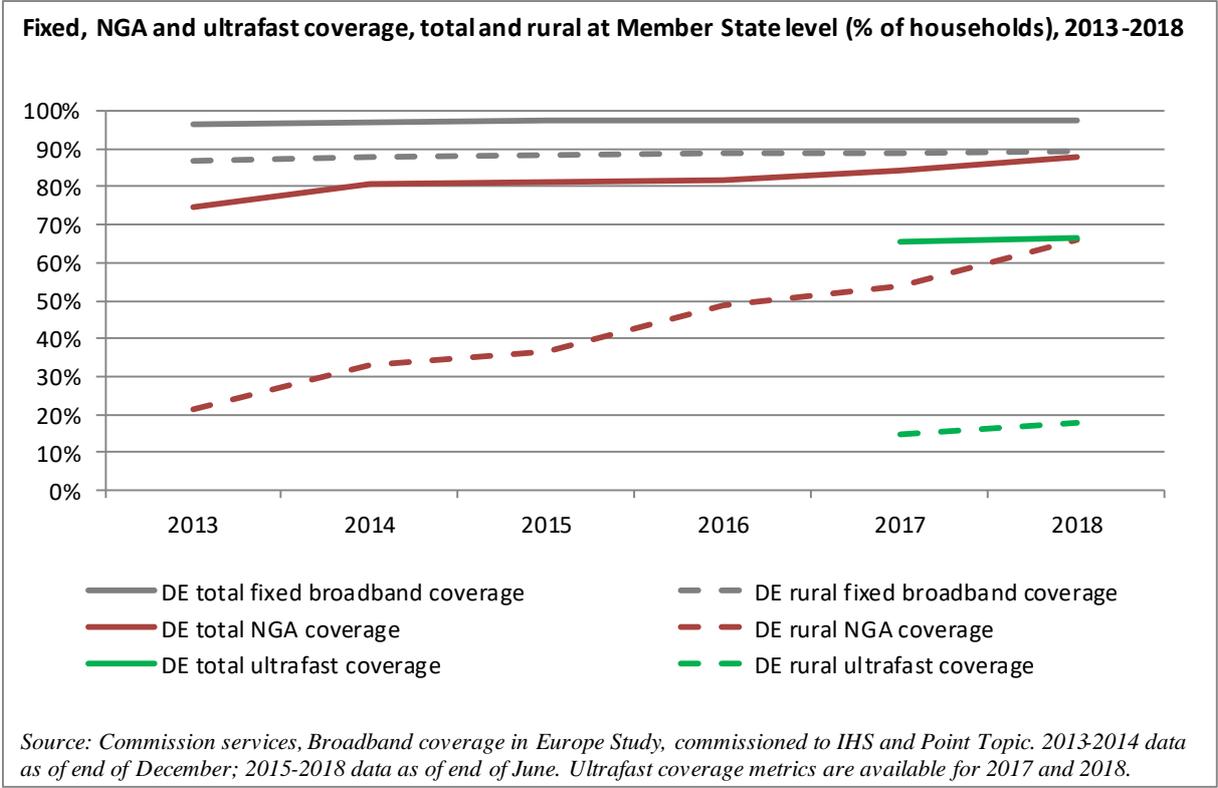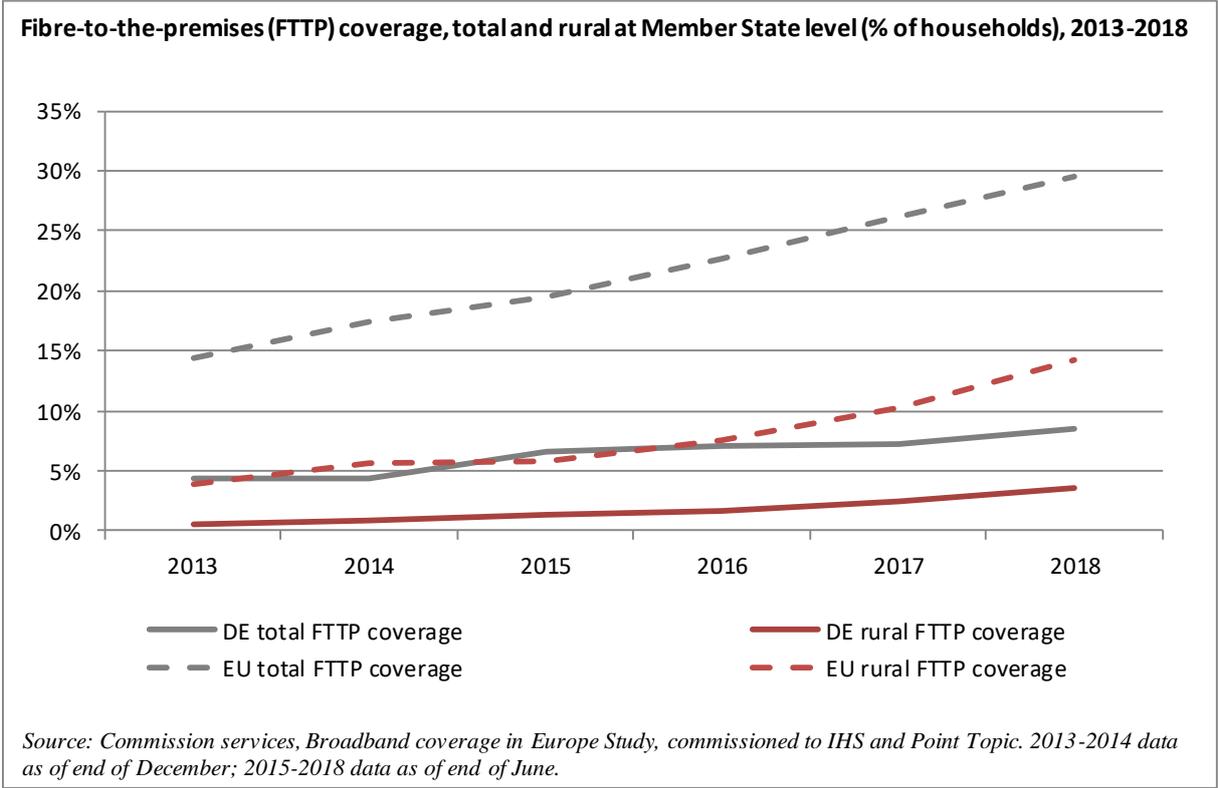
The European Commission has approved under EU State aid rules public support for the construction of physical infrastructure required to deploy state-of-the-art mobile networks based, at the very least, on long-term evolution (LTE) technology in areas of Bavaria where no mobile services are currently 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[4]. 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

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[2] In the context of the transposition of the EECC, see at the end of this section and the paper referenced in the footnote.
[3] 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 […]"
[4] http://europa.eu/rapid/press-release_MEX-18-6466_en.htm?locale=en

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[5].

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

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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[6]. 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[7].

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[8]. 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

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[6] https://www.bfw-bw.de/wp-content/uploads/sites/4/2019/03/190228_Eckpunkte_TKG_Novelle-1.pdf
[7]   See   https://www.bmwi.de/Redaktion/DE/Downloads/P-R/sechstes-gesetz-zur-aenderung-des-telekommunikationsgesetzes.pdf?__blob=publicationFile&v=6
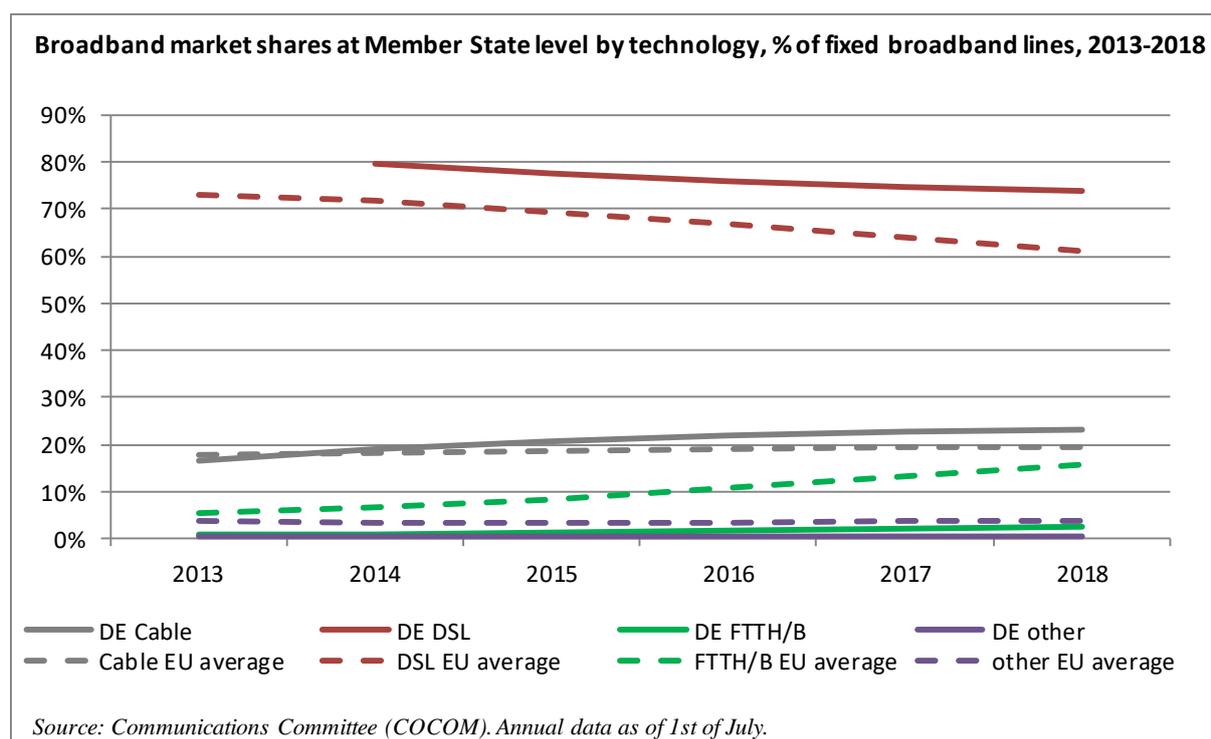[8] http://europa.eu/rapid/press-release_IP-18-6772_en.htm

upgrade of cable TV networks to Docsis 3.1[9] 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.

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

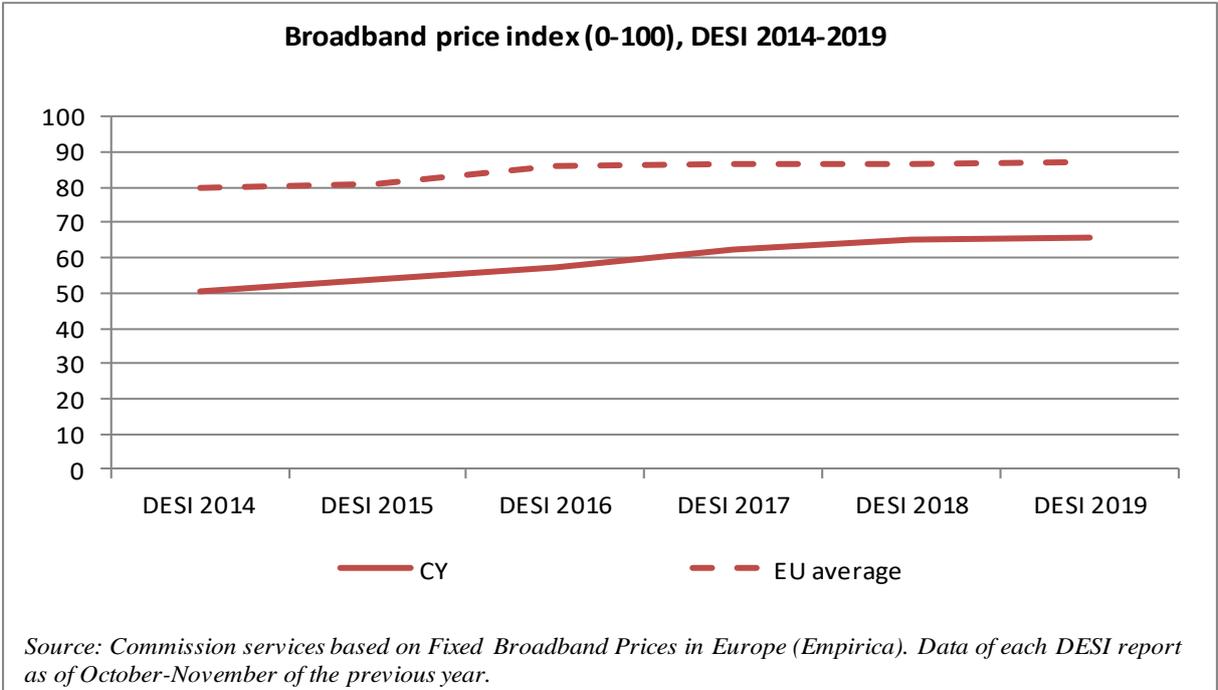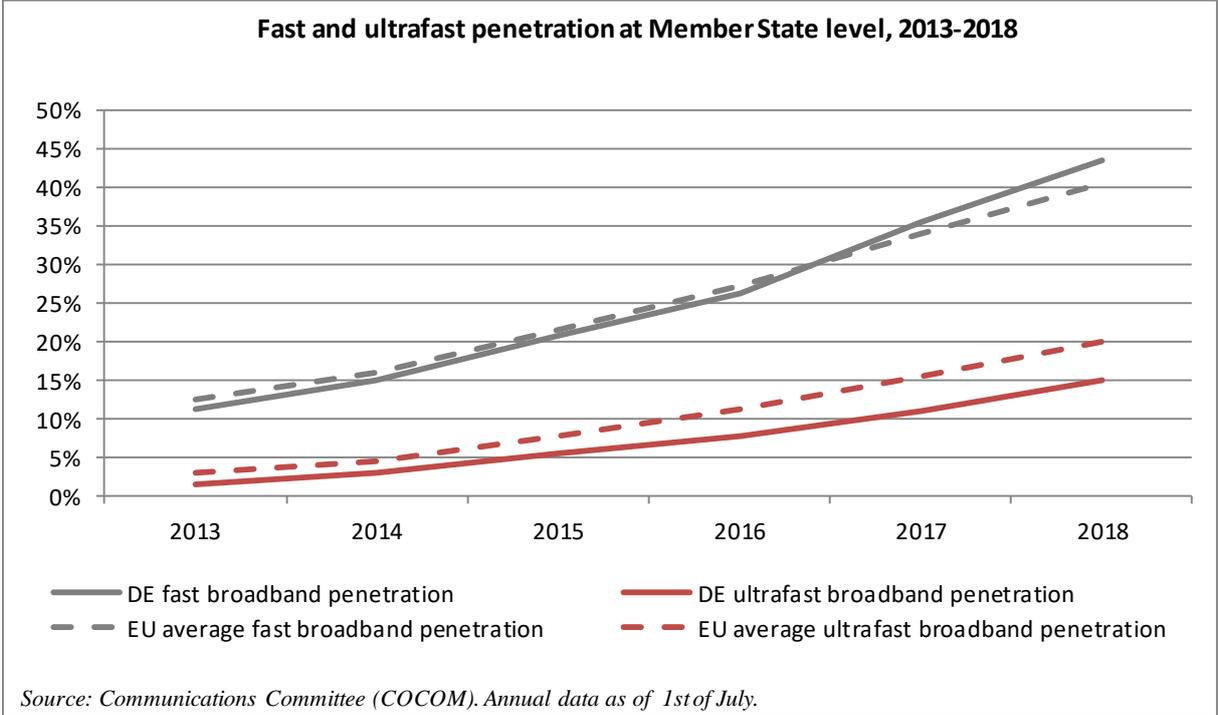*Source: Communications Committee (COCOM). Annual data as of 1st of July.*

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.

[9] 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).

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.

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

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

Broadband price index (0-100), DESI 2014-2019

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).
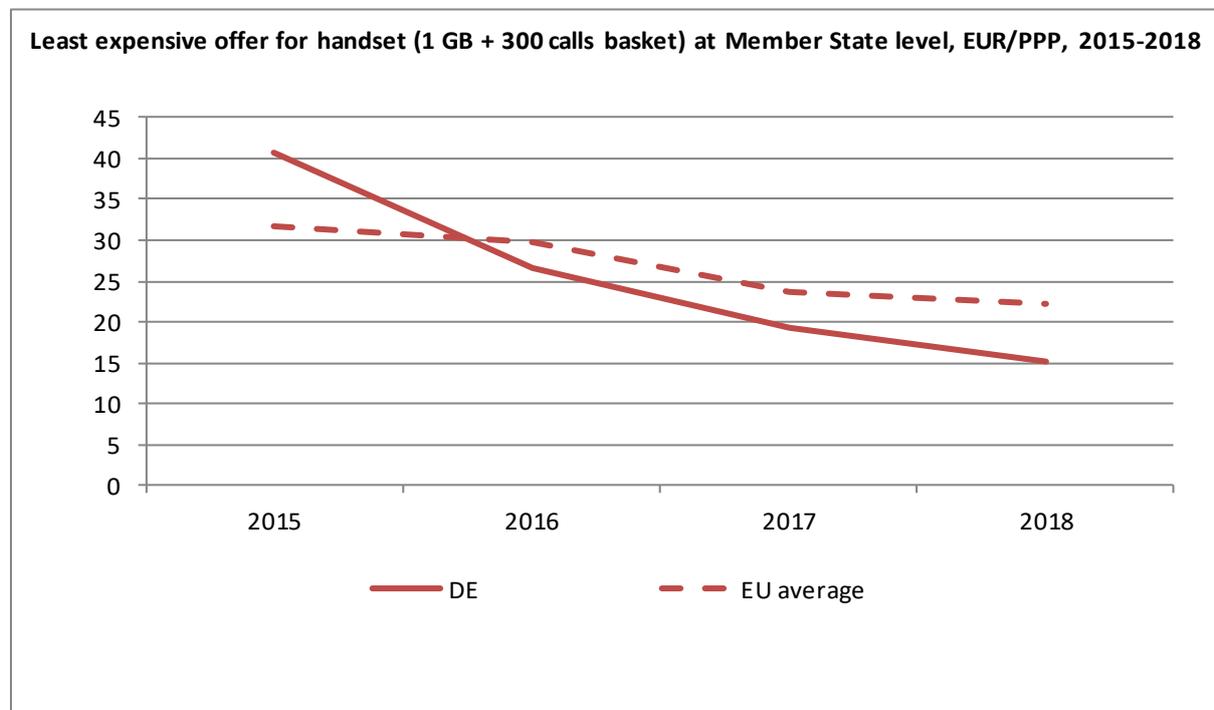
Germany scores well on the broadband price index[10], its prices per purchasing power parity (PPP) being lower than the EU average.

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[11].

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.

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

The mobile market shares calculated based on the number of mobile subscriber's active SIM cards are available from BNetzA's website[12]. 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.

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[10] 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.

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

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

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[13]. Only the 26 GHz band remains unassigned.

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.
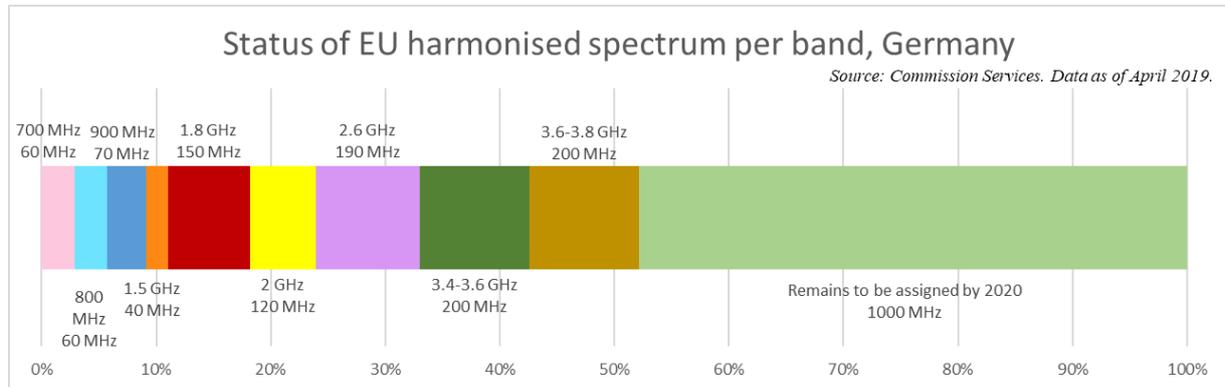
The spectrum award of the 2 GHz and the 3.6 GHz bands, originally scheduled for 2018 and which started on 19 March 2019, was of utmost interest to consumer associations, MNOs, resellers[14], the BMVI, the federal economic affairs ministry (BMWi) and BNetzA. Main issues under debate concerned coverage 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.

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[13] 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.

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

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.

- 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:

- agreements 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;

- agreements 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)[15] 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

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[15] BNetzA's decision to assign 100 MHz for licenses on a local basis has been welcomed by industry at large and criticized by MNOs.

services[16]. 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 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[17]). 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[18]. 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[19]). It proposed to provide a full set of remedies[20] on both the market segment for

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[16] 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.

[17] 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.

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

[19] 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.

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.

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[21]. 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[22], 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

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[20] 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.

[21] 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

[22] problems people encountered moving house or area

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 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.[23]

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[24]. BNetzA executed its decision and imposed €200,000 in fines on DTAG[25]. These fines are not yet applicable[26] 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 perspective, 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[27].

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

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

[24] 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.

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

[26] 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.

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

roaming data and 10 % more call minutes (under RLAH rules) than in Q1 2017 (before the introduction of RLAH).[28]

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[29]. The Commission is currently 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[30]. 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[31]. 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

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[28] 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
[29] 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
[30] http://ec.europa.eu/growth/tools-databases/tris/en/index.cfm/search/?trisaction=search.detail&year=2018&num=195&dLang=EN
[31] https://www.tess-relay-dienste.de

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.

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.